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# GUIDELINES ON INTEGRATING HEALTH AND GENDER INTO ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS IN SUB-SAHARAN AFRICA

August 2017



AFRICAN DEVELOPMENT BANK GROUP  
GROUPE DE LA BANQUE AFRICAINE  
DE DEVELOPPEMENT

**Issued by:**

UNDP Regional Center for Africa  
DRC Street, Olympia Round About  
Box 60130  
Addis Ababa  
Ethiopia

**Citation**

UNDP (2017). Guidelines on Integrating Health and Gender into Environmental and Social Impact Assessments in Sub-Saharan Africa. Prepared for UNDP Regional Centre for Eastern and Southern Africa by the Southern African Institute for Environmental Assessment.

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**Waiver**

Please note that this document is a guideline and serves as a reference and supportive text relating to the integration of health and gender into the Environmental and Social Impact Assessment process. It does not seek to be a definitive guideline on any of the Environmental Assessment tools such as Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), Social Impact Assessment or Health Impact Assessment, as these are covered in many other publications, which are listed in Appendix 2 of this document. Furthermore, the recommendations made in the guidelines should not take the place of any specific legal requirements of any country; rather, these guidelines should be used as ideas and options to improve best practice within the context of each country's legal and administrative frameworks.

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# PREFACE

In 2013, the United Nations Development Program (UNDP) published guidelines on how to integrate HIV and gender-related issues into the environmental assessment process in eastern and southern Africa, in association with the African Development Bank (AfDB). In rolling out those guidelines in 14 countries of the sub-Saharan Africa (SSA) over the past four years, it became evident that health issues associated with large capital projects are extremely complex, with a high degree of co-morbidity between diseases, as well as the intricacy of linkages between the social determinants of health, environmental conditions and health outcomes.

In response to a request from the target countries, the 2013 guidelines have been completely revised to reflect the range of communicable and non-communicable diseases that may be caused by large capital projects, ways such projects can affect the health of men and women differently, and the increasingly important effects of climate change on disease epidemiology. Most crucially, these new Guidelines provide guidance to environmental assessment practitioners and other stakeholders on how to strengthen the integration of health into environmental and social impact assessments (ESIAs) so that, meaningful cost-effective management and mitigation plans can be developed. It is increasingly being acknowledged that the ESIA process has an extremely important role to play in preventing or significantly reducing disease and other health disorders, as well as providing an entry point to improve domestic financing for health. Africa AIDS Watch (AWA), in their 2015 report to the African Union which was subsequently endorsed by the AU, urged Member States to *“improve the integrity of HIV/AIDS, TB, malaria and gender equality responses in the execution of large capital projects to leverage public and private sector partnerships to increase domestic financing as part of innovative approaches for sustainable financing for health.”*

There is a plethora of guidelines on health impact assessment, social impact assessment and ESIA processes, so what differentiates these guidelines from the others?

- They specifically focus on the diseases, legal and policy systems and environmental conditions prevalent in sub-Saharan African countries;
- They are a result of a demand-driven process;
- They are based on a considerable volume of evidence collected during the 5-year long UNDP/AfDB programme, with inputs from the Southern African Development Community (SADC), East African Community (EAC) and the African Union Commission (AUC);
- They provide a lay-person's guide to health issues typically encountered on and around the development and operation of large capital projects in SSA i.e. written for ESIA practitioners and non-medical stakeholders;
- For each health condition described, the guidelines provide a brief overview of the disease itself, together with an analysis of who is at risk, the development triggers, together with suggested mitigation measures to try and meet the specified international health targets;
- They provide guidance on how to integrate physical, biological, social and health issues into the various steps of the ESIA process.

# ACKNOWLEDGEMENTS

This publication is an accumulation of many people's wisdom from a wide array of institutions in different nations. It is a key output from the UNDP Regional Service Centre for Africa's initiative on integrating health and gender into the environmental assessments for large capital projects, in collaboration with the AfDB.

We would specifically like to thank UNDP HIV, Health and Development Practice Leader, Tilly Sellers for her leadership and continuing support for this work. Benjamin Ofosu-Koranteng, Senior Policy Advisor: HIV, Health and Development, was the enthusiastic driving force behind this initiative and played an enormous role in obtaining buy in from so many countries in sub-Saharan Africa. He critically reviewed several drafts of this document and provided constructive comments. The team of consultants supporting this six-year long initiative are also thanked: Bryony Walmsley who drafted these guidelines and facilitated many of the country workshops; Betty Hailu, Evelyn Gyampo, Lakew Berhanu and Dieudonne Bitondo for assisting with the organization and facilitation of country workshops, training sessions and meetings; and Marzia Calvi for assisting with research and support in the UNDP Regional Service Centre for Africa in Addis Ababa.

Special appreciation goes to the Social Affairs Department of the African Union Commission especially Dr Marie Goretti and Sabalo Mbokazi for the partnership created through the AIDS Watch Africa (AWA) platform for this work as well as the strategic collaboration with UNDP leading to the buy in of the project through AUC's AWA decisions of 2015 and 2016.

Special thanks go to Natalia Linou, Douglas Webb and Dudley Tarlton at the UNDP Head Office in New York, and Vitalis Chipfakacha (SADC), Belynda Amankwa, Frederick Muyano and Dieudonne Bitondo for their constructive comments on various drafts of these Guidelines.

We would like to acknowledge the inputs received from our country office HIV Programme Managers: Dr. Nelly Mwaka (South Africa), Belynda Amankwa (Ghana), Narcisse Chimi (Cameroon), Amelina Sifnaiou (Lesotho), Salmina Marta Merique (Mozambique), Sarah Mwilima (Namibia), Preethi Sushil Nair (Seychelles), Senelisiwe Ntshangase (Swaziland), Dr. Bwijo Bwijo (Tanzania), Ian Milimo (Zambia), Felix José (Angola), Sarah Musungwa (Zimbabwe) and Mavis Bengtsson (Botswana). This was complemented by inputs from regional organization representatives such as Dr. Vitalis Chipfakacha (SADC), Dr. Michael Katende (EAC) and Dr. Janet Byaruhanga (AUC). The following partner organizations are also thanked, particularly Anthony Nyong and Annah Rutebuka (AfDB), Reiko Matsuyama (IOM), Franklin Mchuri (ILO) and Dr Peter Tarr (SAIEA).

The participants at the country workshops in Botswana, Cameroon, Ghana, Lesotho, Malawi, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Uganda, and Zambia are too many to list here, but thanks to all those who attended these workshops from government ministries, departments and agencies, NGOs, private sector businesses and consultants, and academics; your useful inputs, comments and discussions have all informed this document.



# ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AfDB	African Development Bank
AI	Avian influenza
AIDS	Acquired Immune -Deficiency Syndrome
ART	Anti-retroviral therapy or treatment
ARV	Anti-retroviral
As	Arsenic
AU	African Union
AUC	African Union Commission
AWA	AIDS Watch Africa
BCC	Behavioral change communications
CBD	Convention on Biological Diversity
CBO	Community-based organization
CD	Communicable disease
Cd	Cadmium
CEDAW	Convention on the Elimination of all forms of Discrimination against Women
CN	Cyanide
CO	Carbon monoxide
Co	Cobalt
CO <sup>2</sup>	Carbon dioxide
COMESA	Common Market for Eastern and Southern Africa
COPD	Chronic obstructive pulmonary disorder
Cr	Chromium
CSO	Civil society organization
Cu	Copper
DDT	Dichloro-diphenyl-trichloroethane
DEAT	Department of Environmental Affairs and Tourism (South Africa)
DFI	Development finance institution
DRC	Democratic Republic of Congo
EAC	East African Community
E&S	Environmental and social
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EID	Emerging infectious disease
ESF	Environmental and Social Framework
ESIA	Environmental and social impact assessment
ESMP	Environmental and social management plan
FCTC	Framework Convention on Tobacco Control
GDP	Gross Domestic Product
GIA	Gender impact assessment
H <sub>2</sub> S	Hydrogen sulphide
Hg	Mercury
HIA	Health impact assessment
HIV	Human Immune -deficiency Virus
HR	Human rights
HRIA	Human rights impact assessment
ICMM	International Council on Mining and Metals
IEM	Integrated environmental management

IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IHD	Ischemic Heart Disease
ILO	International Labor Organization
IPIECA	International Petroleum Industry Environmental Conservation Association
JICA	Japanese International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
LGBTI	Lesbian, gay, bisexual, trans-gender and intersex
MDA	Ministry, department or agency
MDG	Millennium Development Goal
MoH	Ministry of health (generic term)
MSD	Musculo-skeletal disorder
MSF	Médecins sans Frontières
MSM	Men who have sex with men
NAC	National AIDS council (generic term)
NCD	Non-communicable disease
NEPA	National Environmental Protection Act (US)
NGO	Non-governmental organization
NOx	Nitrous oxide
OAU	Organization for African Unity (prior to AUC)
OECD	Organization for Economic Cooperation and Development
OHS	Occupational health and safety
OP	Operational Policy (WB)
OS	Operational Safeguard (AfDB)
PAH	Poly-aromatic hydrocarbon
Pb	Lead
PCB	Poly-chlorinated biphenyl
PLHIV	People living with HIV
PM10	Particulate matter (with a diameter of less than 10 micrometers)
POP	Persistent organic pollutant
PPE	Personal protective equipment
PS	Performance Standard
PWID	People who inject drugs
Ra	Radium
RBM	Roll Back Malaria
RE	Resident Engineer
Rn	Radon
SADC	Southern African Development Community
SDG	Sustainable Development Goal
Se	Selenium
SIA	Social impact assessment
SO <sub>2</sub>	Sulphur dioxide
STI	Sexually transmitted infection
SSA	Sub-Saharan Africa
TB	Tuberculosis
Th	Thoron
TICAD	Tokyo International Conference on African Development
ToR	Terms of reference
U	Uranium
UNDP	United Nations Development Program
UNGASS	UN General Assembly Special Session
US	United States

UNAIDS	Joint United Nations Program on HIV/AIDS
UNICEF	United Nations International Children's Fund
V	Vanadium
VCT	Voluntary counseling and testing
WB	World Bank
WHO	World Health Organization
Zn	Zinc

# AND DEFINITIONS

**Acquired immunodeficiency syndrome (AIDS):** is an epidemiological definition based on clinical signs and symptoms. AIDS is caused by HIV, the human immunodeficiency virus. HIV destroys the body's ability to fight off infection and disease, which can ultimately lead to death. Antiretroviral therapy (ART) slows down replication of the virus and can greatly enhance quality of life but does not eliminate HIV infection (UNAIDS, 2011).

**Acute health effects:** are those that are likely to be immediately obvious to the individual and where it is possible to attribute cause and effect. Acute health effects usually appear within hours of exposure e.g. contact with an irritant vapor may lead to watering eyes, sneezing, coughing etc., which usually subside on removal of the irritant.<sup>1</sup>

**Alternatives assessment:** The consideration of potential alternatives in an ESIA is one of the most critical elements when determining the scope of the ESIA. Consideration of alternatives provides an opportunity for an objective, scientific evaluation of all the environmental, social, technical and economic consequences of different project options (Department of Environmental Affairs and Tourism (DEAT), 2004a).

**Baseline data:** is the data that describe issues and conditions at the inception of the ESIA. Serves as the starting point for measuring impacts, performance, etc., and is an important reference for evaluation (Organization for Economic Cooperation and Development (OECD), 2006).

**Behavior change communication (BCC):** promotes tailored messages, personal risk assessment, greater dialogue and an increased sense of ownership. BCC is developed through an interactive process, with its messages and approaches using a mix of communication channels to encourage and sustain positive, healthy Behaviors (UNAIDS, 2011).

**Biodiversity:** is the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity (CBD), 1992).

**Chronic health effects:** are ones that can develop over a longer period of exposure. On occasion, these will be conditions where the severity of the symptoms or disease or the risk of harm is related to the accumulative exposure to the hazard over a period of months or years. Chronic health effects usually occur after repeated exposure over days, weeks and months, and examples of such conditions include noise-induced hearing loss and hand arm vibration syndrome.<sup>2</sup>

**Cumulative effects/impacts:** Incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions. Cumulative impact can result from individually minor but collectively significant actions taking place over a period of time (OECD, 2006).

**Economic Displacement:** is loss of land, assets, access to assets, income sources, or means of livelihoods (Asian Development Bank (ADB), 2009).

**Environment:** The physical, biological, archaeological, aesthetic, cultural, economic, institutional, human health and social aspects of the surroundings of a person.

**Direct impact:** The effect of an activity or situation giving direct cause to one or more components of the receiving environment.

<sup>1</sup>[www.icmm.com/en-gb/health-and-safety/health/occupational/](http://www.icmm.com/en-gb/health-and-safety/health/occupational/)

<sup>2</sup>Ibid.

**Environmental and social risk:** A combination of probability of occurrence of a hazard scenario (e.g. unprotected sex) and the severity of the consequences resulting from the scenario (e.g. transmission of HIV).

**Environmental impacts:** are any changes, potential or actual, to the physical, natural, social, cultural and economic environment resulting from the business activity or proposal.

Environmental and Social Impact Assessment (ESIA): a process, applied mainly at project level, to improve decision making and to ensure that development options under consideration are environmentally and socially sound and sustainable. ESIA identifies, predicts and evaluates foreseeable impacts, both beneficial and adverse, of public and private development activities, alternatives and mitigating measures, and aims to eliminate or minimize negative impacts and optimize positive impacts (OECD, 2006).

**Environmental and Social Management Plan (ESMP):** The ESMP is a detailed action plan to implement the mitigation measures identified in the ESIA. For each impact identified it should specify: the mitigation measure required to avoid, reduce, minimize or control an impact; the goals/targets or objectives to be met; the key performance indicators; the person or institution responsible for implementing the mitigation measure; the time-frame – i.e. over what period must the mitigation measure be applied; and the budget.

**Gender:** Refers to socially constructed roles, responsibilities and opportunities associated with men and women as well as the power structures that govern the relationships between them (www.undp.org).

**Gender equality:** This refers to the equal rights, responsibilities and opportunities of women and men and girls and boys. Equality does not mean that women and men will become the same but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men. Gender equality is not a women's issue but should concern and fully engage men as well as women. Equality between women and men is seen both as a human rights issue and as a precondition for, and indicator of, sustainable people-centered development . (<http://www.un.org/womenwatch/osagi/conceptsanddefinitions.htm>).

**Gender impact assessment** is the estimation of the different effects (positive, negative or neutral) of any policy or activity implemented to specific items in terms of gender equality (European Commission, 2009).

**Gender-sensitive:** Gender-sensitive policies, programs or training modules recognize that both women and men are actors within a society, that they are constrained in different and often unequal ways and that consequently they may have differing and sometimes conflicting perceptions, needs, interests and priorities (UNAIDS, 2011).

**Health:** Health is a multi-dimensional concept which encompasses a complete state of physical, mental and social wellbeing and not merely the absence of disease or infirmity (World Health Organization (WHO), 1946). In the context of large capital projects, health issues can be categorized according to the cause or driver:

- Communicable diseases such as HIV/AIDS, TB, Hepatitis, etc.;
- Non-communicable diseases caused by lifestyle risk factors such as cardiovascular diseases;
- Pollution-induced diseases including air and water-borne pollution;
- Vector-borne diseases such as Malaria, Schistosomiasis;
- Nutritional disorders such as malnutrition, wasting and obesity;
- Mental health associated with involuntary resettlement and change;
- Occupational diseases, disorders and injuries.

**Health impact:** A health impact resulting from a project, plan or program is a measurable change on the health status of an individual, group or population which may be attributable to the direct or indirect effects

of a development. They may be intended or unintended and may not become apparent for many years after prolonged exposure or due to long-term latency in the human body.

**Health Impact Assessment (HIA):** A combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects (WHO, Gothenburg Consensus Paper, 1999 amended 2006).

**Health equity:** Health equity, or health inequalities, refers to the avoidable health differences between different groups within a given population. A focus on health equity highlights how differences in income, education, status, housing, culture, gender, age and ethnicity affect the levels of health enjoyed by different individuals and groups. Individuals and groups that are seen to suffer from health inequity are often described as vulnerable or sensitive groups e.g. older people, children and young people, women, people with disabilities, people on low incomes or unemployed, people from minority ethnic backgrounds, those with a different sexual orientation or social excluded groups (ICMM, 2010).

**Health hazards:** Health hazards are substances, agents, processes, activities or situations with the potential to adversely affect the health of an individual or group. Health hazards, such as release of a dangerous chemical, are an important subset of the full range of determinants of health. Hence, all health hazards are health determinants, but not all determinants are health hazards. For example, we do not normally refer to changes in the price of market foods or poverty as a health hazard, but they are both important determinants of health (ICMM, 2010).

**Health risk:** A health risk is the likelihood, or probability, that a particular set of health determinants will cause harm to an individual when they are exposed to that hazard for a given period of time. Therefore, the health risk posed by a severe hazard for a short duration could be equal to the health risk posed by a mild hazard over a long period of time, depending on the substance of exposure (ICMM, 2010).

**Human immunodeficiency virus (HIV):** HIV is the virus that weakens the immune system, ultimately leading to AIDS (UNAIDS, 2011).

**Indirect impact:** The knock-on effect of a direct impact onto another component of the receiving environment. It is also known as a secondary or tertiary effect.

**Integrated Environmental Management (IEM):** Provides an holistic framework that can be embraced by all sectors of society for the assessment and management of environmental impacts and aspects associated with an activity for each stage of the project life cycle, taking into consideration a broad definition of environment and with the overall aim of promoting sustainable development. IEM includes,

- Consideration of environmental issues at every stage of the project life cycle from pre-feasibility through construction, implementation and closure through an integrated approach to project planning, design and development;
- Integration of knowledge across specialist disciplines e.g. tracing and analyzing the links between air pollution, health and economic costs;
- Integration of stakeholders i.e. providing effective and constructive interaction between authorities, business and labor, civil society and the proponent
- Integration of appropriate tools into the decision-making process e.g. integrating health risk assessment in air quality dispersion modeling (DEAT, 2004b).

**Integration:** means that the various dimensions of sustainable development should be addressed in impact assessment in a way that acknowledges the linkages and inter-relationships between them. This is best achieved through an inter-disciplinary approach in which the specialists work closely together, informing each other's work

and developing a holistic, collective understanding of the potential impacts of the proposal with regard to the Sustainable Development Goals (Morrison-Saunders, Pope, et al., 2014).

**Involuntary Resettlement:** Refers to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets) that leads to loss of income sources or other means of livelihood as a result of project-related land acquisition and/or restrictions on land use (IFC, 2012a).

**Large capital project:** Comprises a multi-million dollar project relating to infrastructure development (e.g. roads, bridges, pipelines, dams, airports, harbors and ports), mines, power generation or large-scale commercial agricultural schemes, which is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. These projects may affect an area broader than the sites or facilities subject to physical works. A full ESIA is required including an ESMP to address the management of impacts. These types of projects are classified as Category A projects by most leading multi-lateral banks such as World Bank, International Finance Corporation, African Development Bank, etc.

**Latency:** is a feature of many occupationally acquired diseases where the development of the signs and symptoms of the condition occur many years after the exposure is implicated as the cause. Examples include the development of mesothelioma decades after initial asbestos exposure, and other lung cancers and pneumoconiosis such as silicosis, coal worker's pneumoconiosis, asbestosis, etc., which can occur decades after exposure has ceased (ICMM, 2010).

**Limits of acceptable change:** The upper and lower thresholds within which those systems would be resilient to disturbance or change, and beyond which impacts could be irreversible or lead to irreplaceable loss of natural or social capital.

**Migrant worker:** A person, who is to be engaged, is engaged or has been engaged in a remunerated activity in a State of which he or she is not a national. (Art. 2(1), International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families, 1990).

**Mobile worker:** The term 'mobile worker' refers to a large category of persons who may cross borders or move within their own country on a usually frequent and short-term basis for a variety of work-related reasons, without changing place of habitual primary residence or home base. Mobile work involves a range of employment or work situations that require workers to travel in the course of their work. Mobile workers are usually in regular or constant transit, sometimes in (regular) circulatory patterns and often spanning two or more countries, away from their habitual or established place of residence for varying periods of time (UNAIDS, 2011).

**Resilience:** Amount of change a system can undergo without changing state (International Panel for Climate Change, 2001). It can apply to both natural and social systems.

**Risk:** The combination of the probability of an event occurring and the severity of its consequences, or expected losses.

**Scoping:** The process of determining the spatial and temporal boundaries, project alternatives and key issues to be addressed in the ESIA (DEAT, 2004c). The key issues are identified through public consultation and stakeholder engagement, desktop studies and field visits.

**Screening:** A process to determine whether or not a development proposal requires an ESIA and if so, what type and level of assessment.

**Sensitivity:** The degree to which a system is vulnerable to change, either adversely or beneficially, as a result of the impacts of the project or from climate related stimuli.

**Social:** Encompasses the following: demographic structure (age, gender, population growth), settlement and migration patterns, education and skills, local economy, employment (formal and informal sectors), livelihoods and livelihood options, use of ecosystem services, land use and land tenure (property rights), community health and wellbeing (including health status and drivers of disease), gender roles and equality, culture (shared beliefs, customs, values, language and religion), cultural heritage (physical and spiritual), local governance structures and decision-making, community services (schools, tertiary institutions, health care, water and sanitation, power supply, communications), indigenous knowledge (adopted from Vanclay, 2003).

**Social impact assessment (SIA):** Includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, plans, program and projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment (Van clay, et al., 2015).

**Stakeholders:** Those who may be interested in, potentially affected by, or influence the implementation of a policy, plan, program or project, typically include: (i) national environmental management authorities, (ii) other relevant government ministries, departments and agencies such as those dealing with health, gender, labor and social welfare, as well as the line ministries (water, energy, mining, transport, etc.), (iii) development finance institutions (where applicable) (DFIs), (iv) NGOs, and (v) civil society (interested and affected parties).

**Vulnerable groups:** the disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status.... as well as factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources (IFC, 2012b).

**Vulnerability:** Refers to those within a project's area of influence who are particularly marginalized or disadvantaged and who might thus be more likely than others to experience adverse impacts from a project. Vulnerability can be determined by identifying the likelihood that an individual or a group faces harder conditions as the result of the implementation of a project (AfDB, 2015 Guidance Note 2.2).

**Wellbeing:** wellbeing is generally seen as a positive physical, social, mental and emotional state where an individual or community's basic needs are met and individuals and communities are able to achieve personal fulfillment and be an active and respected part of a society (ICMM, 2010).

**"Each disease interacts with every other disease and we are all interdependent".**

The late Mark Wainberg, President of the International AIDS Society, 1998-2000 and highly esteemed AIDS researcher.

# 1 INTRODUCTION TO THE GUIDELINES

An estimated 12.6 million people died as a result of living or working in an unhealthy environment in 2012 – nearly 1 in 4 of total global deaths, according to the latest estimates from the World Health Organization (WHO). Environmental risk factors, such as air, water and soil pollution, chemical exposures, climate change, and ultraviolet radiation, contribute to more than 100 diseases and injuries.<sup>3</sup>

By focusing on reducing environmental and social risk factors, nearly a quarter of the global burden of disease can be prevented. Examples include promoting safe drinking water, better hygiene measures, safer management of toxic substances and health promotion in the workplace. Actions by sectors such as energy, transport, mining and agriculture are urgently required, in cooperation with the health sector, to address root environmental and social causes of ill-health that lie beyond the direct control of the health sector – in other words, addressing the social and economic determinants of health is critical.<sup>4</sup>

In 2010, the United Nations Development Program (UNDP), in collaboration with EAC and SADC Secretariats, launched an initiative to strengthen the inclusion of HIV and gender-related issues into environmental assessments, prompted by the UNAIDS statement in 2010: *“Mainstreaming HIV and AIDS into the environmental assessment process means that the impacts of a policy, plan, Program or project on the status of HIV in the receiving communities are systematically evaluated from initial scoping through the detailed environmental assessment. It also means that the mitigation plan and detailed environmental management plan incorporate measures to avoid, reduce, minimize or control the transmission of HIV. Health monitoring on and off the project site will include HIV indicators.”*<sup>5</sup>

Since then, the UNDP initiative, with subsequent support from the African Development Bank (AfDB), and assistance from the Southern African Development Community (SADC), has been rolled out to 14 countries in sub-Saharan Africa (SSA) and Indian Ocean Islands, through a series of advocacy workshops, legal, policy and institutional assessments and training of trainer’s Program. In 2013, Guidelines on the *Integration of HIV and Gender-related Issues into Environmental Assessments in Eastern and Southern Africa* were produced to assist all stakeholders in the environmental assessment process – government authorities, consultants, developers and civil society, to better integrate HIV into environmental and social impact assessments (ESIA). As a result of the UNDP/AfDB initiative, many countries have revised their environmental laws to be more inclusive of health and gender, and have customized the Guidelines.

In response to the recommendations<sup>6</sup> made at the Second UNDP/AfDB Regional Technical Meeting on Health, Gender Equality and Capital Projects held in Pretoria in 2015 attended by 18 countries in SSA, it was decided to revise the 2013 Guidelines, to address health issues more broadly and to promote the integration of health, gender and social issues in ESIA.<sup>7</sup>

Furthermore, there is a growing move to improve domestic financing for health, with one of the key entry points being through the implementation of well-designed and costed environmental and social management plans. This approach was recommended by Africa AIDS Watch (AWA) in their 2015 report to the African Union and subsequently endorsed by the AU, which urged Member States to *“improve the integrity of HIV/AIDS, TB, malaria and gender equality responses in the execution of large capital projects to leverage public and private sector partnerships to increase domestic financing as part of innovative approaches for sustainable financing for health.”*<sup>8</sup>

<sup>3</sup>[www.who.int/topics/environmental\\_health/en/](http://www.who.int/topics/environmental_health/en/)

<sup>4</sup>[www.who.int/topics/environmental\\_health/en/](http://www.who.int/topics/environmental_health/en/)

<sup>5</sup>UNAIDS, 2010.

<sup>6</sup>See Appendix 1 for a full list of the recommendations from this meeting

<sup>7</sup>Second Regional Technical Meeting on Health, Gender Equality and Capital Projects in Africa. UNDP/AfDB, Pretoria, South Africa, 8-10 June 2015.



With these mandates, UNDP has extended the scope of the new Guidelines to cover health more broadly and has expanded the geographic scope to include sub-Saharan Africa (SSA). There are numerous guidelines available on ESIA, SIA and HIA (see Appendix 2) and so what does this Guideline offer that is new? It covers the wide range of health issues that can affect communities and workers on and around project sites, not just communicable diseases. It links development activities to the direct and indirect impacts on health and gender, so that environmental assessment practitioners can obtain a better understanding of the unintended consequences of project development on health. Most of the main donor banks require impacts to be disaggregated on the basis of sex and age (or other social differentiators) but how does one do this? For each health issue, the Guideline identifies which demographic group is most affected. It provides a menu of mitigation options to prevent or minimize health impacts and suggests innovative ways for developers to deliver health benefits. In short, the aim of the Guideline is to guide ESIA practitioners, developers and government authorities on how to better integrate broader health issues into an ESIA from a non-health professional's point of view. .

This Guideline is produced for the following target audience involved in the ESIA process:

- Environmental authorities;
- Other relevant government authorities (health, gender, labour, social, and line ministries);
- ESIA consultants (including social, health and gender specialists);
- Civil society (interested and affected parties);
- Development Finance Institutions;
- Contractors, sub-contractors and supervising consultants.

The national and international legal and policy basis for health-inclusive ESIAs is presented in Chapter 2, while the roles and responsibilities of the main ESIA stakeholders in ensuring that health issues are properly integrated into ESIAs are described in Chapter 3. A lay-person's guide (for the non-health professional) to some of the key health issues associated with project construction and operation is provided in Chapter 4. Chapter 5 sets out the ways in which health issues can be better integrated into each stage of the ESIA process in order to achieve better health outcomes.

## 1.1 Background and evolution of the guidelines

The concept of health in ESIA is not new. If we look at the origins of ESIA, it was triggered by several events that had a major impact on human health, such as the 1952 'killer fog' in London that killed 4,000 people, the 1966 smog that affected visibility and health in New York and the three times that the Cuyahoga River caught fire in Cleveland Ohio due to hydrocarbon pollution. In 1963, Rachel Carson wrote the seminal work 'Silent Spring' which documented the negative effects of the widely used pesticide Dichloro-Diphenyl-Trichloroethane (DDT) on human health. The growing awareness of the negative health consequences of uncontrolled development culminated in the promulgation of the National Environmental Protection Act (NEPA) in America in 1970. The concept of health as part of the broader environment, was enshrined in the introduction to the Act which created the environmental impact assessment process to *"to encourage productive and enjoyable harmony between man and his environment; to promote efforts, which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man..."*.<sup>9</sup>



*Industrial air and water pollution*

<sup>9</sup>Assembly/AU/Dec.571 (XXV)  
<sup>9</sup>US NEPA, 1969

However, over time, health and social issues became more and more marginalized in ESIA's due to an increasing focus on the biophysical environment at the expense of socio-economic considerations. This shift manifested itself in the definitions of the term 'environment' which remain in many legal instruments today, where the environment is defined as being merely the air, earth, water and wildlife surrounding human beings. As a result environmental impact assessments (EIAs) (as they were known) focused on the biophysical environment to the detriment of the socio-economic conditions and impacts, and generally ignored the direct and indirect effects of project activities on health. Even when social impact assessments were carried out, they seldom focused on all the health impacts that may arise from the project.

Although the right to health was identified as a fundamental human right in both the Universal Declaration of Human Rights in 1948 and again in the International Convention on Economic, Social and Cultural Rights in 1966, it was not until 1986 that the Ottawa Charter for Health Promotion recognized that the promotion of health could not be ensured by the health sector alone, and that it would require the coordinated action by all concerned: national and local government as well as social and economic sectors such as industry, mining and the media. The Charter states that *"the inextricable links between people and their environment constitute the basis for a socio-ecological approach to health"* and that *"systematic assessment of the health impact in a rapidly changing environment ... is essential and must be followed by actions to ensure positive benefits for the public."* This was a clear call to assimilate health issues into ESIA's, but it was another 12 years before the World Bank published the Pollution Prevention and Abatement Handbook in 1998, where the direct links between pollution for a variety of industrial processes and health were described (but other dimensions of health associated with development e.g. communicable diseases, were omitted).

At around the same time, the concept of health impact assessment (HIA) was formalized in the Gothenburg Consensus on HIA as *"A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects."*<sup>10</sup>

In spite of a plethora of Agreements, Strategy Papers and Declarations on health through the first part of this century, it was not until the Libreville Declaration on Health and Environment in Africa in 2008, that the role of HIAs in the environmental assessment process became evident (BOX 1). In addition, African Ministers pledged to promote policies, strategies and institutional capacities to strengthen the links between health and the environment and the monitoring thereof.

#### BOX 1: EXCERPT FROM THE LIBREVILLE DECLARATION ON HEALTH AND ENVIRONMENT IN AFRICA

Recommendation 9:

African countries commit to: *"Instituting the practice of systematic assessment of health and environment risks, in particular through the development of procedures to assess impacts on health, and to produce national environment outlook reports."*

Globally, the next milestone occurred in 2011 with the Rio Political Declaration on Social Determinants of Health, where Heads of State expressed their determination to *"achieve social and health equity through action on social determinants of health and wellbeing by a comprehensive inter- sectorial approach"*.

Since then, there has been acceleration in the global response to integrating health and the social determinants of health into the ESIA<sup>11</sup> process in a more systematic way, as evidenced by the number of integrated environmental and social safeguard systems developed by the main DFIs (e.g. WB, IFC, AfDB) in the past few years. In spite of this, few of these safeguard systems clearly define upfront what is meant by 'social', 'health', 'wellbeing' and 'gender'. In the absence of cogent definitions of these terms, it is not surprising that the treatment of health and gender is inconsistent within and between existing environmental and social (E&S) safeguard systems.

<sup>10</sup>WHO, Gothenburg Consensus Paper, 1999, amended 2006

<sup>11</sup>The EIA process is now more commonly referred to as an environmental and social impact assessment (ESIA) or even an environmental, social and health impact assessment (ESHIA). For the purposes of these guidelines, the terms ESIA and ESMP (environmental and social management plan) will be used (with the assumption that the term 'social' includes 'health').

In the last few years there has been a growing recognition that a broader, more encompassing definition of ‘health’ in the context of large capital projects is needed, and that there are many complex linkages between the diseases themselves, environmental conditions and the social determinants of health. This awareness has led to a number of new or updated E&S safeguard systems where health issues are viewed as a vital part of the social environment and therefore need to be integrated into the ESIA processes.

## 1.2 Health in the context of large capital projects: an integrated approach

In 2015, Gross Domestic Product (GDP) in sub-Saharan Africa (SSA) grew by 4.5%, making it one of the fastest growing economic zones in the world.<sup>12</sup> As part of national economic growth and employment creation strategies, many countries are investing increasing amounts in large capital projects.<sup>13</sup>

The AU’s Agenda 2063 prioritizes large capital projects in the areas of energy, transport and agriculture in Africa. The Agenda aligns with the National Development Plans of many countries on the Continent that seek to promote capital projects as a key strategy for national economic growth. African countries are prioritizing infrastructure development and promoting inclusive growth and sustainable development by expanding transport networks (roads, rail, ports, etc.), exploiting opportunities for energy and extractives, (mining, oil and gas), hydroelectric dams (e.g. Lesotho Highlands Water Project Phase 2, Inga Dam, Grand Renaissance Dam), power stations such as Medupi in South Africa, deep sea ports (e.g. Kribi in Cameroon), oil and natural gas drilling and refineries, export processing zones and expansion in airports. In 2012, for example, the South African Government earmarked US\$113 billion for infrastructure projects. The Angolan government has invested approximately US\$12.7 billion in the last decade, or over 30 per cent of total public investments. Angola expects to spend US\$22.6 billion during 2013-2025 on the construction of new roads and the rehabilitation and maintenance of existing ones. This makes the country one of the highest spenders on road infrastructure in Africa.<sup>14</sup>

In terms of policy, the African Union has developed the program for Infrastructural Development in Africa, the African Mining Vision and the Accelerated Industrial Development for Africa. The SADC Infrastructure Master Plan prioritizes transport, energy, tourism and water related infrastructural development. East Africa and West Africa have also prioritized transport and energy as a way of boosting regional integration and economic growth.



*Ethiopian women selling onions in market (P. Tarr)*

<sup>12</sup>Economic Corporate Network (ECN): [africaexponent.com](http://africaexponent.com)

<sup>13</sup>A capital project is a multi-million-dollar project relating to infrastructure development (e.g. roads, bridges, pipelines, dams, airports, harbours and ports), mines, power generation or large-scale commercial agricultural schemes, which is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. These projects may affect an area broader than the sites or facilities subject to physical works. These types of projects are classified as Category A projects by most leading multi-lateral banks such as World Bank, International Finance Corporation, African Development Bank, etc. and a full ESIA including an Environmental Management Plan is required to manage the impacts of large capital projects.

<sup>14</sup>Infrastructure Journal: [http://www.eaglestone.eu/xms/files/UJ\\_-\\_Rebuilding\\_Angolas\\_Infrastructure\\_150114.pdf](http://www.eaglestone.eu/xms/files/UJ_-_Rebuilding_Angolas_Infrastructure_150114.pdf)

The AfDB has identified five priority areas, which are also called the ‘High Fives’, to advance the transformative agenda over the next 10 years. These are: (a) Light Up and Power Africa, (b) Feed Africa, (c) Integrate Africa, (d) Industrialize Africa, and (e) Improve the Quality of Life for the People of Africa. With increased direct investment targeting commodities and mineral resources, demand from Africa has escalated for improved railways, roads, dams, power station, and other large infrastructure.

In the context of increased infrastructure and capital development, an important determinant of health is migration within and across countries as people seek employment in these large projects. The presence of large numbers of young, male mobile or migrant construction workers for long periods of time can significantly change the social, health and economic dynamics within communities where these capital projects are situated. Pollution and other project-related impacts also cause a variety of non-communicable diseases and disorders for those living within the zones of influence around project sites, while habitat alteration and climate change create conditions that are more conducive to disease vectors.

While the execution of large capital projects undoubtedly improves the quality of life for millions of people, there is a need to (a) ensure that project development does not affect the health of construction workers, (b) exacerbate existing health conditions of project-affected communities, and (c) that the projects are considered as opportunities in themselves for strengthening multi- sectorial health responses in SSA countries in line with WHO’s approach to prevent disease through healthy environments. One of the most effective ways of reducing health impacts associated with projects is to first identify the potential causes of a health impact, and then find ways to avoid, or reduce and manage the negative effects through the use of an integrated socio-ecological paradigm in ESIA’s, as envisaged in the 1986 Ottawa Charter for Health Promotion cited above.

### 1.3 The emergence of the double disease burden

In recent years, there has been a growing awareness that although the traditional communicable diseases of HIV/AIDS, malaria and TB remain the main drivers of mortality in SSA, chronic so-called ‘lifestyle’ conditions such as cardiovascular diseases, respiratory diseases, diabetes and some cancers are also emerging as major causes of death on the continent. The increasing availability of cheap, unhealthy foods, rapid urbanization, pollution and increased stress associated with large capital projects, especially where involuntary resettlement occurs without adequate mitigation, are all recognized causes for the rise in non-communicable diseases. This is resulting in a double disease burden, which African health systems are not sufficiently equipped to handle.<sup>15</sup>

Herein lies the paradox: increased wealth does not necessarily lead to improved health, particularly for the poorest segments of society. Over the last three decades, Africa has been experiencing its longest period of uninterrupted economic growth and it has shown remarkable resilience in the face of the global financial crisis of 2008/9 and its aftermath. Income per capita has more than doubled in 23 African nations since 1990, and GDP growth rates have averaged 5% per year over the last ten years. By 2015, SSA contained seven of the world’s ten fastest-growing economies.<sup>16</sup> But due to institutional weaknesses and failures in governance, this rapid economic growth has generally not resulted in improved health care systems or equality of access to health care for the poor and vulnerable. Indeed, as several studies have found, there are clear links between large capital projects and an increase in disease on and around project sites and infrastructure corridors.

### 1.4 Health and gender

The environmental fraction of the global burden of disease is similar among men and women – 22.8% and 20.6% respectively. The differences vary by type of disease, exposure, biological, behavioral and social criteria, with significant differences in communicable diseases, non-communicable diseases (NCDs) and injuries. Men and women experience many environmental exposures at similar levels, such as exposure to ambient air pollution, unsafe water or noise. Some important differences in exposure can however be noted, such as indoor air pollution, where women and small children are exposed to higher levels than men, as they tend to spend longer

<sup>15</sup>AfDB, 2013.  
<sup>16</sup>Ibid.

hours indoors. Other exposures affect men more than women, such as many occupational risks and TB. The employed percentage of men is about 50% higher than for women globally,<sup>17</sup> and occupational exposures will, accordingly, be more frequent in men.<sup>18</sup> In addition to differential exposure, some gender differences exist in terms of susceptibility to disease where there is a complex set of drivers associated with sexually transmitted infections (STIs) including HIV/AIDS. Women's biological make-up makes them more susceptible to STIs, but cultural and behavioral norms in some societies also contribute to the fact that women bear a higher burden of STIs than men.

Furthermore, other factors, such as reduced access to nutrition, education, employment and income, mean that women can be less likely to enjoy good health. Thus in order to design appropriate and targeted environmental and social management plans (ESMPs), it is important to analyze data disaggregated on the basis of sex and age, and to use a range of 'gender indicators', sensitive to the differences between men and women, to measure impact.<sup>19</sup>

Achieving gender equity in health implies eliminating unnecessary, avoidable and unjust health inequities. It means that women and men have the same opportunity to enjoy living conditions and services that enable them to be in good health. Men's health is in no way more or less important than the health of women or children, but it is different.<sup>20</sup>

## 1.5 Health and climate change

All economic activities which depend directly or indirectly on natural resources are being or will be affected by climate change, but the agricultural sector is where climate change, food security and poverty reduction intersect. For the more than one billion extremely poor and hungry people in developing countries, agriculture is the main source of income and nutrition.<sup>21</sup> For such vulnerable populations, climate change magnifies their health risks. Drought exacerbates hunger and malnutrition and by 2050, it is estimated that one in four people will live in a country affected by chronic or recurring shortages of freshwater.<sup>22</sup> Water scarcity already affects more than 40% of the global population and this is projected to rise. On the other hand, floods and other water-related disasters currently account for 70% of all deaths caused by natural disasters.<sup>23</sup>

Where rainfall and flooding are predicted to increase (e.g. in West Africa), there will be an increased risk associated with vector-borne diseases, especially those carried by mosquitoes and ticks. Outbreaks of Rift Valley Fever have already been linked to El Niño events. It will also heighten the risk of bacterial pathogens associated with stagnant water and flooding such as leptospirosis, anthrax and cryptosporidiosis. Climate stress (heat, inadequate water and fodder) can lower animal immunity and resistance to zoonosis, resulting in increased exposure risks for humans.<sup>24</sup>

On the other hand, drought and increasing aridity are inimical to most pathogens, but hotter, drier conditions will result in greater amounts of dust and respiratory illnesses, while these conditions will also increase the risks of heat stroke for outdoor workers.

Environmental degradation, erosion of natural resources and biodiversity loss caused by poorly planned projects and exacerbated by climate change directly affects food security. This could result in more migration, malnutrition, conflict over scarce resources and loss of livestock and other assets. As the primary providers of food, fuel and water in most developing countries in SSA, women are on the frontline of climate change impacts.<sup>25</sup>

There are however a number of synergies between the measures needed to mitigate climate change and positive health outcomes; for example, by addressing short-lived climate pollutants such as soot, methane and ozone which are produced by burning biomass, and replacing fossil fuels in transport, power production, waste disposal and industry, we are reducing greenhouse gas emissions and improving air quality.<sup>26</sup>

<sup>17</sup>ILO, 2014

<sup>18</sup>WHO, 2016.

<sup>19</sup>Anglo American, 2012.

<sup>20</sup>Ibid.

<sup>21</sup>IFAD, 2013.

<sup>22</sup>[www.un.org/sd/](http://www.un.org/sd/)

<sup>23</sup>Ibid.

<sup>24</sup>IFAD (2016). Guidance Statement on Human Health (in prep.)

<sup>25</sup>IFAD (2013). Climate Change Strategy

<sup>26</sup>[www.un.org/](http://www.un.org/)

# 2

## LEGAL AND POLICY REQUIREMENTS FOR THE INCLUSION OF HEALTH IN ESIA

### 2.1 International commitments

There are many international instruments on health, social and gender issues. Countries who sign these instruments are obliged to implement the commitments through domestication into country laws and policies. Thus the principles contained in these international laws form the foundation for national statutes. It is therefore important to ensure that these are used as a basis for contextualizing projects within the legal framework and in setting targets for the ESMPs. International instruments can be divided into:

- Declarations – not legally binding e.g. Rio Declaration on Environment and Development 1992, the Universal Declaration on Human Rights, and Declaration on the Right to Development (1986);
- Conventions, Covenants, Treaties and Protocols – legally binding on signatory states.

Under international law, there is a right not merely to health care, but to the much broader concept of health. Because rights must be realized inherently within the social sphere, this formulation immediately suggests that determinants of health and ill health are not purely biological or 'natural' but are also factors of societal relations. Thus, a rights perspective is entirely compatible with work in epidemiology that has established social determinants as fundamental causes of disease.<sup>27</sup>

A wide array of international and regional treaties recognizes health as a rights issue. A review of the international instruments and interpretive documents makes it clear that the right to health, as it is enshrined in international law, extends beyond health care to include basic preconditions for health, such as potable water, adequate sanitation and nutrition.<sup>28</sup> Although there is no single global framework convention on health generally, a milestone was reached in 2005 with the WHO Framework Convention on Tobacco Control (FCTC) which is the first global public treaty relating to an aspect of health. It is an evidence-based treaty that reaffirms the right of all people to the highest standard of health.

#### BOX 2: KEY INTERNATIONAL INSTRUMENTS RELATING TO HEALTH, GENDER AND SOCIAL WELFARE

1948 Universal Declaration of Human Rights.  
1966 International Covenant on Economic, Social and Cultural Rights.  
1963 International Convention on the Elimination of All Forms of Racial Discrimination.  
1979 Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW).  
1990 Convention on the Rights of the Child.  
1990 Convention in the Protection of the Rights of all Migrant Workers and Members of their Families.  
1992 The Rio Declaration on Environment and Development.  
1995 Program of Action from the Fourth World Conference on Women.  
2001 UN General Assembly Special Session on HIV/AIDS (UNGASS).  
2005 WHO Framework Convention on Tobacco Control.  
2008 Convention on the Rights of Persons with Disabilities.  
2010 International Labor Organization Recommendation No 200 on HIV and AIDS and the World of Work.  
2011 Rio Political Declaration on Social Determinants of Health.  
2014 International Conference on Population and Development: Beyond 2014.  
2016 UN General Assembly High Level Meeting on Ending AIDS.

<sup>27</sup>Yamin, 2005.

<sup>28</sup>Ibid.

The Conventions, Treaties and Protocols specific to SSA are listed in Box 3.

#### BOX 3: KEY AFRICAN INSTRUMENTS RELATING TO HEALTH AND GENDER

- 1997 The SADC Code on HIV and AIDS and Employment.
- 2008 Libreville Declaration on Health and Environment in Africa.
- 2012 AU Road Map to accelerate progress in HIV, TB and Malaria Responses (replaced in 2016).
- 2003 The Maseru Declaration on HIV and AIDS.
- 2001 The Abuja Declaration and Framework for Action.
- 2006 The Brazzaville Commitment on Scaling Up Towards Universal Access to HIV and AIDS Prevention, Treatment, Care and Support in Africa by 2010.
- 2007 The Johannesburg Declaration of African Union (AU) Ministers of Health.
- 2005 The SADC Framework for HIV and AIDS Mainstreaming.
- 2008 The Addis Ababa Declaration on Gender Policy by the COMESA Heads of State.
- 2007 The EAC Workplace Policy on HIV and AIDS.
- 2011 SADC Gender Mainstreaming Guidelines on HIV and AIDS, TB and Malaria.
- 2016 SADC Protocol on Gender and Development.
- 2016 AU Catalytic Framework to End AIDS, TB and Eliminate Malaria in Africa By 2030.

## 2.2 The sustainable development goals

On September 25th 2015, countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years. For the Sustainable Development Goals (SDGs) to be reached, everyone needs to do their part: governments, the private sector, civil society and ESIA consultants.

ESIAs are uniquely placed to proactively address many of the SDGs at several different levels and to incorporate relevant goals and targets into the ESMP. In this way, all projects could help steer individual countries towards the attainment of these goals and contribute to environmental and social sustainability. Project designs that fail to assimilate the SDG principles should be rejected by government authorities as they would not be contributing to sustainable development.

Health is a cross-cutting issue across many of the SDGs. Those that are particularly relevant to health in the context of large capital projects are summarized in Appendix 3.<sup>29</sup>

## 2.3 WHO global health targets

The WHO has recently set a range of global targets for the main diseases and disorders to be attained by 2025 or 2030. By setting global goals, WHO Member States are required to adopt the global goals into domestic policy and health implementation programs. The global targets are provided for each health issue discussed in Chapter 4 and not repeated here, but it is incumbent on all stakeholders in the ESIA process to strive to use these targets in ESIAs and ESMPs. The targets should also be used by those who monitor project compliance to see how mitigation measures are contributing to the achievement of these goals – both at project-level and nationally.

<sup>29</sup>[www.un.org/sustainable\\_development](http://www.un.org/sustainable_development)



## 2.4 National environmental laws, gender and health policies

Of the 47 countries in SSA, all but three have a dedicated law on the environment<sup>30</sup> and one, South Sudan is currently drafting its law. Of those with an environmental law, 27 (64%) include 'social' in the definition of the term 'environment', while only five include 'health' as part of the definition. It could be assumed that health is considered to be part of 'social' but in the absence of any definitions of the term 'social', this cannot always be taken for granted. Indeed, one of the key findings of the UNDP project since 2010 has been the consistent lack of inclusion of a meaningful health impact assessment in ESIAs for large capital projects across the entire region. This is possibly due to the uncertainty around the definition of the terms 'environment', 'social' and 'health' in the project context and the lack of clarity as to what should and should not be included.

The full list of environmental laws and regulations for SSA countries is presented in Table 2.1.

## 2.5 Operational safeguard policies of development finance institutions

Many projects in SSA are funded through loans from Development Finance Institutions (DFIs) to Borrower countries or private sector companies. The main donors for large capital projects in SSA are the World Bank (WB), International Finance Corporation (IFC), Equator Principles Banks, African Development Bank (AfDB), Japanese International Cooperation Agency (JICA), the German Kreditanstalt für Wiederaufbau (KfW), EXIM Bank (China and South Korea) and the Chinese Government.

### BOX 4: EXAMPLES OF DONOR PROJECT FUNDING IN AFRICA

In August 2016, the Japanese Government announced at the Sixth Tokyo International Conference on African Development (TICAD VI) held in Kenya, a \$30 billion commitment to support infrastructure development in Africa over the next three years. This includes \$10 billion for infrastructure projects to be executed through cooperation with the African Development Bank (AfDB).<sup>31</sup> The Chinese government is also currently involved in infrastructure projects in 35 African countries, amounting to \$13.4 billion in 2013.<sup>32</sup>

Most, but not all of these DFIs have operational environmental and social safeguard systems in place to varying degrees, as shown in Table 2.2. The AfDB developed a Guidance Note on Health in 2016, based on the findings of this UNDP/AfDB joint program on integrating health and gender into ESIAs in SSA, which covers all the main categories of health which may be affected by large capital projects. However, coverage of health issues by the other major DFIs working in SSA is patchy; the IFC/WB Environmental, Health and Safety Guidelines (ESHGs) do not address nutrition, and aspects such as non-communicable diseases (NCDs) and mental health are only addressed in one of the sector guidelines (mining) and none of the others. However, considerable detail is provided in the ESHGs on measures required to manage and monitor pollution-induced diseases and physical injury.

It is important for ESIA practitioners, government authorities and developers/contractors to understand the environmental and social standards required by these donor institutions, but recognizing that some of them are not as comprehensive as they could be. These UNDP/AfDB Guidelines complement the DFI E&S safeguard systems by providing more detailed information on the diseases themselves, how they are spread, who is at risk and how these health issues should be more closely integrated into an ESIA.

More detailed descriptions of the various DFI environmental and social safeguard policies are provided in Appendix 4.

<sup>30</sup>Republic of Congo, São Tomé and Príncipe and Equatorial Guinea do not have environmental laws.

<sup>31</sup>PM Shinzo Abe: 6th Tokyo International Conference on African Development (TICAD), 29th August 2016: <http://www.reuters.com/article/us-africa-japan-idUSKCN112077>

<sup>32</sup>Financial Times, Nov 30 2015: <http://www.ft.com/cms/s/3/716545c0-9529-11e5-ac15-0f7f7945adba.html#axzz4KuC9bToO>

Table 2.1: Inclusion of health and social issues in country environmental laws

Country	Environmental Law and ESIA Regulations	Definition of 'environment' includes 'social'	Definition of the term 'environment' includes 'health'	Socio-economic assessment required in ESIA report
SOUTHERN AFRICA				
Angola	Environmental Framework Law, No 5/98 of 1998 Decree on EIA, No 51/2004	No	Yes	Yes
Botswana	Environmental Assessment Act, No 10 of 2011 Environmental Assessment Regulations, 2012	Yes	Yes	Yes
Democratic Republic of Congo (DRC)	Environmental Protection Act, No 11/009 of 2011	Yes	No	Yes
Lesotho	Environment Act, No 10 of 2008 Guidelines for EIA, 2009	Not in Act Yes in Guidelines	Not in Act Yes in Guidelines	Yes
Madagascar	Environment Charter, Law No 90-033 of 1990 as amended Decree MECIE, No 99-954 as amended	Yes	No	Yes
Malawi	National Environmental Management Act, No 23 of 1996 EIA Guidelines	Yes	No	Yes
Mauritius	Environmental Protection (Amendment) Act, No 6 of 2008	No	No	Yes
Mozambique	Environmental Law, No 20/97 of 1997 Regulations on the EIA Process, Decree No 45 of 2004	Yes	No	Yes
Namibia	Environmental Management Act, No 7 of 2007 EIA Regulations, 2012	Yes	No	Yes
Seychelles	Environmental Protection Act, No 18 of 2016 Environmental Protection (Impact Assessment) Regulations, 1996	Yes	No	Yes
South Africa	National Environmental Management Act, No 107 of 1998 as amended EIA Regulations, 2014	No	Yes	Yes
Swaziland	Environmental Management Act, No 5 of 2002 Environmental Audit, Assessment and Review Regulations of 1996, amended in 2000	No	Yes	Yes
Tanzania	Environmental Management Act, No 20 of 2004 EIA and Audit Regulations, No 349 of 2005	No	No	Yes
Zambia	Environmental Management Act, No 12 of 2011 Environmental Protection and Pollution Control (EIA) Regulations, No 28 of 1997	No	No	Yes
Zimbabwe	Environmental Management Act, No 20:27 of 2002 Environmental Management (EIAs and Ecosystem Protection) regulations, No 7 of 2007	Yes	No	No

Country	Environmental Law and ESIA Regulations	Definition of 'environment' includes 'social'	Definition of the term 'environment' includes 'health'	Socio-economic assessment required in ESIA report
EAST AFRICA				
Burundi	Environmental Code of Burundi: Law No. 1/010 of 30/06/2000	Yes	No	Yes
Comoros	Framework Law No 94-018 on the Environment, 1994	No	No	No
Djibouti	Law No 51/AN/09/6ème L/ Code of the Environment, 2000	Yes	No	No
Eritrea	Environment Proclamation, 1996	Text not accessible		
Ethiopia	Environmental Impact Assessment Procedural Guideline, 2002	Yes	Yes	Yes
Kenya	Environment Impact Assessment Guidelines and Administrative Procedures, 1999 Environmental (Impact Assessment and Audit) Regulations, 2003	No	No	Yes
Rwanda	General Guidelines and Procedure for Environmental Impact Assessment, 2006	Yes	No	Yes
South Sudan	No regulation exists. Draft Environmental Protection Bill, 2010 (under discussion)	-	-	-
Uganda	The National Environmental Act, Cap 153, 1995	Yes	No	No
CENTRAL AFRICA				
Cameroon	Framework Law No 96/12 on Environmental Management, 1996	Yes	No	No
Central African Rep.	Environmental Code of the Central African Republic: Law No. 07.018 of 28 December 2007	Yes	No	No
Chad	Law No 014/PR/98 defining the general principles of environmental protection, 1998	No	No	No
Equatorial Guinea	No laws found			
Gabon	Law No 16/93 Environmental Protection, 1993 Decree No 405/PR/MEFEPEPN, Regulations on Environmental Impact Assessment Studies 2002	Yes	No	No
Rep. of Congo	No laws found	-	-	-
São Tomé & Príncipe	No laws found	-	-	-

Country	Environmental Law and ESIA Regulations	Definition of 'environment' includes 'social'	Definition of the term 'environment' includes 'health'	Socio-economic assessment required in ESIA report
WEST AFRICA				
Benin	Framework Law on Environment 98-030, 1999	Yes	No	No
Burkina Faso	Law on Environmental Code 005/1997, 1997 implemented by the decree No 2001-342, 2001	No definition of environment	No	Yes
Cape Verde	Act No. 86/IV/93, 1993 defining Environmental Policy.	Yes	No	No
Gambia	National Environment Management Act 94/13, 1994 EIA Guidelines, 1999	No definition of environment	No	Yes
Ghana	Environmental Protection Agency Act, 1994 Environmental Assessment Regulations 1999	No definition of environment	No	Yes
Guinea	Code on the Environment, 1987	Yes	No	No
Guinea Bissau	Law No. 10/2010 on Environmental Impact Assessment Regulation, 2010	Yes	No	Social only
Ivory Coast	Law No 96-766 Code of the Environment, 1996	Yes	No	No
Liberia	Act adopting the Environment Protection and Management Law of the Republic of Liberia, 2002 Environmental Impact Assessment Procedural Guideline, 2006	Yes	No	Yes
Mali	Decree 03-594 P RM, Environmental Impact Assessment Studies, 2003	Yes	No	Yes
Mauritania	Law No 2000-045/ Code of the Environment, 2000	Yes	No	No
Niger	Law No 98-56/ Environmental Management, 1998	Yes	No	No
Nigeria	Decree 86-92 Environmental Impact Assessment Decree, 1992	No definition of environment	No	No
Senegal	Law No 2001-01/ Code of the Environment, 2001	Yes	No	Social only
Sierra Leone	The Environment Protection Agency Act, 2008	No	No	Yes
Togo	Framework Law No 2008-005, 2008	Yes	No	No

Table 2.2: Guidance on where health issues are addressed in DFI E&S policies and guidelines (relevant sections in brackets)

DFI Document	Communicable diseases	Non-communicable diseases	Pollution-induced diseases	Vector-borne diseases	Physical injury	Nutrition	Mental health	Occupational health
WB E&SF	ESS4 (15-16)	ESS4 (15)	ESS3 (10-22) ESS4 (15, 17)	ESS4 (15)	ESS4 (10-13)	-	-	ESS2 (20-21)
IFC Performance Standards	PS4 (9-10)	-	PS3 (10-17) PS4 (7, 9)	PS4 (9-10)	PS4 (6)	-	-	PS2 (23) PS4 (7)
IFC/WB EHS Guidelines	3.6 Disease Prevention. 4.3 Construction / Decommissioning.  Mining sector guidelines.	Mining sector guidelines	1.1 Air Emissions, Air Quality. 1.3 Wastewater, Water Quality. 1.5 Hazardous Materials. 1.7 Noise. 1.8 Contaminated Land. 3.1 Water Quality. 3.5 Transport of Hazmats. 4.1 Construction / Decommissioning. Relevant sector guidelines, especially: • Mining; • Toll Roads; • Crop Production; • Airports	3.6 Disease Prevention.  Mining sector guidelines	3.2 Structural Safety. 3.4 Traffic Safety. 3.6 Construction/Decommissioning.  Relevant sector guidelines, especially: • Mining; • Thermal power; • Toll Roads	-	Mining sector guidelines	1.5 Hazardous Materials. 1.6 Waste Management. 1.8 Contaminated Land. 2.0 OHS 4.2 Construction/Decommissioning.  Relevant sector guidelines
AfDB ISS	GN on Health  All sector keysheets	GN on Health	OS4 GN on Health  Most sector keysheets on water-borne disease Specific key sheets for: • Livestock; • Oil and Gas; • Geothermal Power; • Mining	GN on Health  Most sector keysheets	GN on Health  All sector keysheets	GN on Health  Sector keysheets on: • Biofuels; • Artisanal Fisheries; • Forestry	GN on Health	OS5 GN on Health  All sector keysheets refer to ILO standards
KfW Sustainability Guidelines	See WB and IFC	See WB and IFC	See WB and IFC	See WB and IFC	See WB and IFC	See WB and IFC	See WB and IFC	See WB and IFC
JICA	Not specified	Not specified	Not specified	Not specified	Not specified	Not specified	Not specified	Not specified

## 2.6 Industry norms and standards

In addition to international and national laws and standards, there are a number of industry groups that have developed guidance on social and health impact assessment for their industry members. Of particular note, is the guidance produced by the International Council for Mining and Metals (ICMM) and IPIECA, the global oil and gas industry association for environmental and social issues.

ICMM produced guidance on health risk assessment in 2009, which focuses on the occupational health environment, followed by Good Practice Guidance on Health Impact Assessment in 2010. The latter provides guidance on the HIA process, which is useful, not just for the mining industry, but for other large capital projects as well. The authors highlight the importance of identifying the environmental and social determinants of health and how these are all inter-related, thus necessitating an integrated approach.

IPIECA has also published a separate guidance document on HIA, in which the same recommendation regarding integrative approaches is repeated. The IPIECA guide is more substantial and contains considerable detail on processes and methods, for example, several epidemiological tools for calculating health outcomes are presented. Also, the range of potential impacts included in the HIA guide is larger – including issues such as cultural health practices, psychosocial health, accidents and injuries, and non-communicable diseases (see Appendix 2 for these and other guidelines).



# 3

## ROLES AND RESPONSIBILITIES: IMPROVING THE INTEGRATED RESPONSE TO HEALTH IN ESIA

There are numerous organizations, institutions, companies and private individuals who are usually involved (or should be included) in ESIA for large capital projects in one way or another. These Guidelines will be of value to each of the groups shown below.

Table 3.1: Main actors in the ESIA process

Government Authorities	Proponent/Developer, Contractors, Suppliers	Consultants	Civil Society Stakeholders
Environmental authorities	Project owner and/or operator	Lead consultants (ESIA)	Directly affected parties
Line ministries (e.g. those responsible for roads, water, energy, mines etc.)	Contractors and sub-contractors	Specialists (social, gender, health, culture)	Interested parties
National AIDS agency or commission or council	Government and parastatals	Public participation specialists	Civil society organizations, (especially related to health and gender)
Other ministries (e.g. Health, Social Services, Gender, National Planning, Finance etc.)	Suppliers and transporters (supply chain)	Construction environmental and social control officers	Community-based organizations
Inter-ministerial environmental committees	Business organizations (e.g. Chamber of Commerce, Chamber of Mines, ICMM, Business and HIV and AIDS initiatives)		Non-governmental organizations, international organizations and UN agencies (e.g. IOM, ILO)
Local government and traditional leaders			Labour unions
Tender boards			

The groups listed above all have a role to play in the EA process in terms of the legislative and administrative structures, but there may be many other groups that could benefit from the information contained in these Guidelines, such as:

- Development Finance Institutions;
- Universities and other tertiary institutions;
- Legal practitioners;
- Media;
- Policymakers;
- NGOs (in general); and
- Regional economic communities (SADC, EAC, COMESA, ECOWAS, ECCAS).

It can be seen from Table 3.2 that the various stakeholders take on either a guiding, reviewing or commenting function, or they provide input into the EA at different stages of the process.

Table 3.2: Roles and responsibilities of different stakeholders in the ESIA process

Guide and review Monitor and enforce	Comment	ESIA steps	Knowledge and data inputs
Environmental authorities Line ministries	National Planning Commission	Screening	Proponent/developer
Environmental authorities Line ministries	DFIs	Scoping	EA consultant Proponent's design team NAC Health, social and gender ministries
	Authority stakeholders Directly affected parties NGOs, CSOs and CBOs	Public consultation	EA consultant Proponent/developer Directly affected parties Traditional leaders
Environmental authorities Line ministries DFIs	Directly affected parties NGOs, CSOs and CBOs DFIs	Detailed environmental and social assessment (ESIA)	EA consultant Social/health specialists Proponent's design team NAC Health, social and gender ministries
Environmental authorities	Authority stakeholders Directly affected parties NGOs, CSOs and CBOs	ESMP	EA consultant Social/health specialists Proponent's design team Construction managers
Environmental authorities Health, social and gender ministries DFIs Resident Engineer	Directly affected parties NGOs, CSOs and CBOs	Construction	Proponent/developer Construction managers and workers Suppliers Environmental site officer
Environmental authorities Health, social and gender ministries DFIs	Directly affected parties NGOs, CSOs and CBOs	Operations	Proponent/developer Operations managers Project HSE officer Workforce, Suppliers

Most of the stakeholders listed know the roles that they have to play, but there is still a challenge to ensure that environmental, social and health issues are better integrated into decision-making. Options for improving integration are described in the sub-sections below.

### 3.1 Government authorities

The success of sustainable environmental decision-making depends on comprehensive cooperation between ministries, departments and agencies (MDAs) beyond the traditional ambit of environmental authorities. Reviews of many of the institutional frameworks in SSA countries revealed that the environmental authorities seldom include social and/or health specialists on their review teams and the levels of cooperation with other ministries such as health and gender are generally low.

Even where integration is envisaged, actual integration can still be challenging; government authorities consulted during the UNDP/AfDB workshops felt they had insufficient expertise to fully appreciate the health implications of the decision they were making and engagement with health professionals varied widely.<sup>33</sup> On the question of integration, Bond (2004) concluded that it *“will not work without considerable effort to get various organizations/ departments working together, and will only facilitate the consideration of health... in those cases where EIA is currently required – and this doesn't necessarily coincide with all those cases where significant health impacts may arise [where an ESIA is not required]”*.<sup>34</sup>

<sup>33</sup>Fehr et al. (2014) and UNDP/AfDB workshop reports (2010-16)

<sup>34</sup>Bond, 2004

One of the key areas that needs to be strengthened is the role of the health ministry and national AIDS council (NAC) as participants in the ESIA process, particularly around making data available to consultants, alerting them to relevant government policies and targets for health and gender, ensuring that proposed mitigation measures are consistent with the national strategic framework for health, and acting as reviewers of ESIA where there may be significant adverse health effects.

There are a number of options that could be considered by government authorities to improve the level of cooperation and decision-making to achieve sustainable development outcomes, such as:

- ESIA consultants could arrange joint authority meetings including representatives from the national and local MDAs of environment, health, gender, labor and the relevant line ministries at the outset of all large capital projects, rather than hold separate one-on-one meetings. The aims of this meeting would be to:
  - Identify sources of data and how to obtain it;
  - Identify relevant policies and laws relating to health, gender and social issues;
  - Identify national targets for health indicators that should be met on the project;
  - Establish a joint 'task team' to review all ESIA documents and carry out compliance monitoring;
- Appoint social and health impact specialists (in the environmental MDA) to assist with ESIA review and monitoring; or
- Establish a multi-disciplinary review team to evaluate ESIA for all large capital projects which includes representatives from the MDAs of environment, health, gender, social welfare, labor, and the relevant line ministry;
- Create or revise ESIA review forms to include health and gender criteria;
- Review and revise ESIA laws, regulations and guidelines to clearly define 'health' and 'gender' and 'social' and make the inclusion of these issues an explicit requirement;
- Conduct joint compliance monitoring missions with other relevant ministries such as health, gender, labor, etc., and impose meaningful penalties for non-compliance;
- Re-activate and energize the inter-ministerial committees for the environment (where they exist) to ensure a more holistic approach to social and economic sustainability at government policy and planning levels;
- Work with the tender boards and government tender adjudicators to include more stringent criteria for evaluation of potential contractors based on environmental and social track records (BOX 5).

#### BOX 5: CHOICE OF CONTRACTOR CRITICAL FOR THE SUCCESSFUL IMPLEMENTATION OF THE ESMP

One of the key findings from a case study analysis of seven AfDB-funded road projects in Southern Africa was that the choice of contractor with a good environmental and social track record was critical for the successful implementation of the requirements of the ESMP. The study also found that the role of the Resident Engineer or Client's Representative on site was crucial to ensure that the ESMP was being implemented as envisaged.<sup>35</sup>

### 3.2 ESIA consultants

The ESIA is usually conducted by a multi-disciplinary team of consultants, under the leadership of a lead consultant. The lead consultant is responsible for assembling a competent, qualified and experienced group of specialists to conduct the ESIA. It is also the lead consultant's role to ensure that all issues – biophysical, social (including gender and health), and economic - are properly integrated in the ESIA. Below is a list of options that could be considered by consultants to improve the integration of the key findings from specialist studies into a concise summary of what the implications of the project are for the local environment and society as a whole – not just in the short-term, but the long-term consequences of development also need to be synthesized.

Options to improve integration include the following:

- Convene a joint authorities meeting (as described above) to ensure that all relevant MDAs are informed about the project and that the project is contextualized in terms of national laws, policies, goals and targets;
- Careful selection of the team of specialists including social and health impact professionals who are

<sup>35</sup>AfDB, 2016

knowledgeable about the project area and the people who live there;

- Hold at least two ‘integration workshops’ with the entire ESIA study team. The first, to be held during the development of the terms of reference for the ESIA (i.e. towards the end of the scoping phase) or, at the outset of the impact assessment stage, should aim to:
  - Establish a common data base about the environment (including socio-economic) and the project, so that the team is working from the same baseline;
  - Identify the key issues to be studied – the use of linkage diagrams, causal chain analysis or other techniques should be used to obtain an understanding of both the direct impacts and the secondary and other indirect effects, so that these are included in the relevant specialist studies;
  - Identify gaps and overlaps between and within the individual specialists’ terms of reference (ToRs) (refer to the IPIECA Guidelines on HIA (Appendix 2) for a useful summary of inter-disciplinary synergies);<sup>36</sup>
  - Identify key data requirements and information inputs and outputs in order to develop a detailed work programme;
  - Define the study assumptions and identify upfront the limitations and constraints and find ways to overcome these;
  - Identify the system, format and criteria to be used in the impact assessment and to determine significance
  - Identify project alternatives;
- The second ‘integration workshop’ should be held following submission of the first draft specialist reports, with the aim of:
  - Conducting an alternatives assessment using a range of biophysical, technical, financial and social criteria using appropriate models and tools;
  - Understanding the key direct and indirect project impacts and the inter-relatedness between biological, physical, social and health (see s. 5.5);
  - Understanding where the cumulative, antagonistic and synergistic effects are using tools such as linkage diagrams or computer-generated programmes;
  - Discuss how to avoid or minimize significant negative impacts and where mitigation can be applied to achieve the maximum effect;
  - Discuss how to enhance project benefits;
  - Identify and cost the required mitigation measures;
  - Understanding the implications of the findings for the project design team.

The environment is an integrated system and therefore needs to be managed through an integrated approach to ESIA.

### 3.3 Business owners, developers, contractors and resident engineers

There are two types of proponent: private-sector developers and government (or public-sector). Irrespective of whether the project is a public, private or a public–private development, all require a team to design and engineer the project, a workforce to build and operate it, and suppliers to provide all the raw materials and other inputs for construction and ongoing project operations. The proponent, contractor and supplier, and Resident Engineer (RE),<sup>37</sup> therefore play different but key roles at all stages in the ESIA process, as shown in Table 3.2.

#### 3.3.1 Owners, Developers and Proponents

By law, all large capital development projects need to have an approved ESIA prior to development, so there are many opportunities throughout the ESIA process for the proponent or developer to give consideration to health and gender-related issues in the design, planning, construction and implementation of the project. This can be achieved by:

<sup>36</sup>IPIECA, 2016.

<sup>37</sup>Sometimes also known as the Supervising Consultant, Client’s Representative or Project Management Unit

- formulating appropriate corporate policies relating to health, safety and the environment, with a specific focus on health and gender in the workplace;
- adopting a positive mind-set to corporate social responsibility by committing adequate human and financial resources to the social and health programs identified; and
- ensuring that ESIA's are properly planned, scoped and budgeted to include health and gender-related issues.<sup>38</sup>

The ICMM recognizes that the health and wellbeing of the workforce and their families is critical for business to be successful. In addition to the cost of occupational ill health in terms of preventable human suffering, which affects not just workers but their families and communities, work-related illness also directly impacts on the productivity and bottom line of companies in all sectors, not just the mining and metals sector. This is usually through:

- higher absenteeism;
- under-utilization of expensive production plants;
- decreases in economies of scale;
- lower worker morale;
- higher turnover rate;
- loss of skilled and experienced workers;
- loss of investment in training and development;
- difficulties in recruiting new high-quality workers.<sup>39</sup>

Alongside this, companies will also have to bear the costs of:

- health care for the affected workers;
- compensation and/or damages to sick or disabled workers or to the families of workers that are killed;
- higher insurance premiums;
- legal advice;
- regulatory fines;
- damage to premises and equipment;
- disputes and protracted negotiations with trade unions, public authorities and/or local residents;
- loss of reputation;
- loss of business;
- loss of competitiveness; and
- in high-profile cases the, complete or partial, loss of the license to operate.<sup>40</sup>

A proactive approach to preventing ill health and maximizing health and wellbeing benefits can improve the financial performance of a project and parent company. Key bottom line benefits include:

- Speedier achievement of a project's license to operate;
- Lower planning and associated legal and consultancy costs;
- Access to international funding;
- Lower risk of disruptive protest or sabotage;
- Lower risk of damage to a project and parent company's reputation;
- Lower risk of future community-led liability and litigation;
- Reduced absenteeism and health care costs for employees from local communities;
- Improved general employee morale.<sup>41</sup>

<sup>38</sup>UNDP, 2013

<sup>39</sup>ICMM, 2009

<sup>40</sup>ICMM, 2009

<sup>41</sup>ICMM, 2010

### 3.3.2 Contractors and Resident Engineers

The main developer or project proponent (public or private) usually appoints a main contractor to build the project. The main contractor, in turn, will enter into several subcontracts for various project components. These subcontractors may range from international suppliers of equipment and materials, to contractors for specific installations (e.g. electricity), to local suppliers of goods and services.

Large government projects funded by DFIs require the Borrower, and by extension the contractor, to comply with the conditions contained in the loan agreement, which may include environmental and social key performance indicators and make reference to the approved ESIA and ESMP.

For all projects in countries where there are environmental laws and regulations, the environmental license or permit usually requires the developer to comply with the ESMP developed for project construction and operation.

## 3.4 Civil society

The environmental laws in many countries of SSA require the proponent or his/her ESIA consultants to conduct a public consultation program, thereby allowing civil society to express concerns and aspirations about a proposed project and to comment on the ESIA process. The main roles of civil society stakeholders in the ESIA process are to participate in the public consultation process and to act as a ‘watchdog’ against biased reporting (by the ESIA consultants), bad decisions (by the authorities) and poor implementation (by the proponent). Civil society groups can also be valuable sources of local knowledge.<sup>42</sup>

Civil society is made up of a very broad range of people and organizations, each with differing levels of education, perceptions, beliefs, values and self-interest. Often stakeholders will have diametrically opposed views of a proposed project, and balancing these interests requires careful facilitation by the public participation consultants.

In summary, all parties have a role to play to ensure that the health issues which may arise from large capital projects are correctly identified and assessed using available, reliable data and that the mitigation measures identified are implemented on the ground throughout the project life cycle (see also s. 5.4).



*Hydroelectric generation plant and transmission lines*

<sup>42</sup>UNDP, 2013

# 4

## IDENTIFICATION OF HEALTH ISSUES AND DRIVERS ASSOCIATED WITH PROJECT ACTIVITIES

The aim of this Chapter is to look at the most common diseases and disorders associated with the construction and operation of large capital projects. The information is presented from the perspective of environmental assessment practitioners and developers rather than from a medical point of view. Thus for the purposes of these Guidelines, health impacts are categorized by **causative factor** or **development impact**, which is the way that impacts are assessed in an ESIA. For example, all non-occupational health issues caused by pollution (inorganic or microbiological) are discussed under the heading 'Pollution-induced Diseases and Disorders'. Using the same logic, while it can be argued that malaria is a communicable disease, the main cause of malaria is the occurrence of a suitable breeding ground for Anopheles mosquitoes. During the construction and operation of many different types of projects, habitats may be created that are conducive to mosquitoes and bilharzia snails, thus the associated health issues are discussed under a separate category – 'Vector-borne Diseases'.

*"Health is a precondition for and an outcome and indicator of all three dimensions of sustainable development, and sustainable development can be achieved only in the absence of a high prevalence of debilitating communicable and non-communicable diseases, including emerging and re-emerging diseases."*<sup>43</sup>

Depending on the type and location of a project (or plan or program), health impacts may fall into one of more of the following categories:

- Communicable diseases;
- Non-communicable diseases, caused by lifestyle risk factors;
- Pollution-induced diseases and disorders (including water-borne diseases);
- Vector-borne diseases;
- Physical injury (outside the workplace);
- Nutritional disorders;
- Mental health;
- Occupational health;
- Emerging health issues and pandemics.

Each sub-section below provides a brief description of the disease and its prevalence, how it's transmitted or caused, identifies the groups of people who are most at risk and provides the global targets to reduce the incidence of the disease or health issue. The latter can be used by ESIA consultants and government authorities to inform the goals and targets for health mitigation in the ESMP. Each section ends with a list of possible mitigation options that can be considered by developers and consultants to prevent or minimize the health risks of the proposed project.

### 4.1 Communicable diseases

The main communicable or infectious diseases associated with capital projects are:

- Sexually transmitted infections (STIs) including HIV/AIDS;
- Tuberculosis (TB);
- Hepatitis; and
- Meningitis

<sup>43</sup>UN General Assembly Political Declaration on HIV and AIDS, 7th June 2016



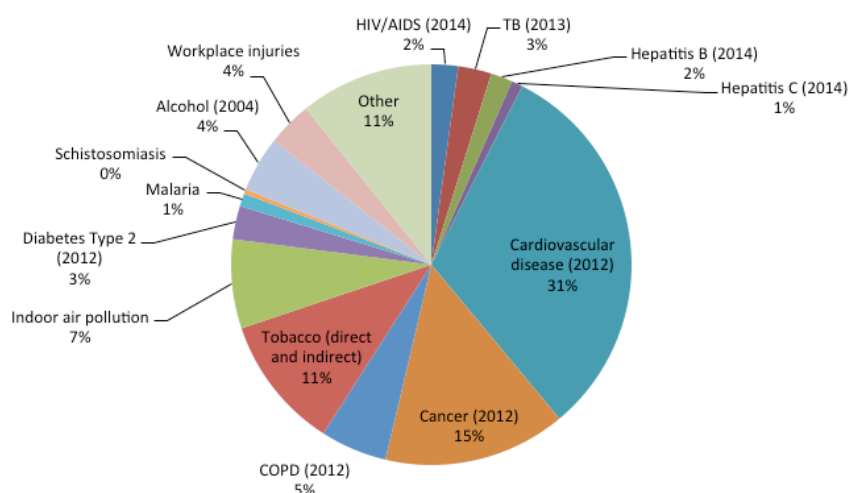
Locations where the free flow of traffic is impeded e.g. at ferry crossings and border posts, often become an HIV 'hotspot'. (B Walmsley)

#### 4.1.1 HIV/AIDS

HIV/AIDS continues to be a major global public health issue, having claimed more than 34 million lives so far. Even though the total number of AIDS-related deaths has been falling over the past ten years and is now at its lowest level since 2005, it is estimated that some 1.2 million people died in 2014, of which 73% were in SSA (Figure 4.1). At the end of 2013, there were approximately 35 million people living with HIV, 70% of who live in SSA. Approximately 2 million people became newly infected with HIV in 2014 globally, with 75% of these being in SSA (UNAIDS, 2014).

HIV is spread through direct contact of bodily fluids from an infected person to an uninfected person primarily as a result of unprotected sexual intercourse, and from blood contamination resulting from direct contact, blood transfusions and shared needles. All development projects employ large numbers of people to construct and operate them; the opportunities presented by the presence of a mostly male workforce, who may be far from home, with disposable income, can result in increased risky sexual behavior with people from the communities surrounding large project sites e.g. mining operations (BOX 6), agricultural projects and along transportation corridors (BOX 7).

**Figure 4.1: Causes of total deaths per year (percent)**



#### BOX 6: GENDER-BASED VIOLENCE AND HIV

One in four women living in a key platinum mining area in South Africa has been raped in her lifetime and about half the women in Rustenburg have been subjected to sexual violence. However only about 5% of the rape cases were reported to relevant authorities. The research, by Médecins Sans Frontières (MSF), suggested that a very low number of these women were aware of how to prevent HIV and pregnancy following rape (e.g. post-exposure prophylaxis and the 'morning-after' pill) or where to access to such services.

MSF also reported that unemployment in the area was particularly high amongst migrant women who come to the area hoping to benefit from the local mining economy, but end up being dependent on commercial sex work.<sup>44</sup>

#### BOX 7: ZAMBIAN RESPONSE

The Zambian Government through the Modes of Transmission study has highlighted mobility as one of the six key drivers of the HIV epidemic in the country. In response, it has established a national campaign to initiate, revitalise and scale up innovative HIV prevention programs for mobile populations.<sup>45</sup>

#### Who's at Risk?

Women and girls are considered to be most at risk of contracting HIV in these settings, with female sex workers being 13.5 times more likely to be HIV positive than the general female adult population. In addition, all migrant and mobile populations such as construction workers, miners, seasonal agricultural workers, truck drivers, seafarers, etc., are also at risk, albeit at a slightly lower level.<sup>46</sup> Outsourced workers (rather than those directly employed by a company) tend not to be covered by corporate health screening policies and health programs and are thus far more vulnerable to disease.

The subsequent transmission of HIV has now been shown to have had significant long-term consequences in the affected communities – an impact on a country's health system and economic development that has largely been underestimated in most ESIA's.

In spite of a considerable amount of ongoing research there is still no cure for AIDS. However, effective treatment with life-saving antiretroviral (ARV) drugs can control the virus so that people with HIV can enjoy healthy and productive lives. There are two major challenges to the effective treatment of the disease: only 45% of people in SSA know their status; and the roll out of ARVs in SSA has not been consistent in every country. The average ARV coverage in SSA is only 37%, but this can range from as high as 63% in Botswana to 20% in Nigeria for example.<sup>47</sup> Thus one of the mitigation measures that should be routinely included in a project ESMP would be to promote voluntary counselling and testing (VCT) for the workforce as well as the project affected communities.

#### Targets

UNAIDS has set an ambitious treatment target to help end the AIDS epidemic by 2020:

- 90% of all people living with HIV (PLHIV) will know their status;
- 90% of all people diagnosed with HIV will receive sustained anti-retroviral treatment (ART); and
- 90% of all people receiving ART will have viral suppression.<sup>48</sup>

The aim of these goals is to achieve the fast-track global targets of:

- Reduce new HIV infections to less than 500,000/year by 2020;
- Reduce the number of AIDS-related deaths to less than 500,000/year by 2020; and
- Eliminate HIV-related stigma and discrimination by 2020.<sup>49</sup>

<sup>44</sup>[www.bbc.com/news/world-africa-37097941](http://www.bbc.com/news/world-africa-37097941)

<sup>45</sup>Zambian Government (undated).

<sup>46</sup>WHO, 2016.

<sup>47</sup>UNAIDS, 2014

<sup>48</sup>UNAIDS, 2014

<sup>49</sup>UN General Assembly High Level Meeting on Ending AIDS. The Political Declaration on HIV and AIDS reaffirms the 2001 UN General Assembly Declaration of Commitment to HIV/AIDS and the 2006 and 2011 Political declarations as well as the Addis Ababa Action Agenda of the 3rd International Conference on Financing for development (UN General Assembly A/70/L.52, 7th June 2016).

These targets have been incorporated into the AUC's Catalytic Framework on HIV and AIDS, TB and the Elimination of Malaria in Africa by 2030, and are intended to ensure that the SDG3 goal of ending the AIDS epidemic by 2030 is met.

#### 4.1.2 Sexually transmitted infections (STIs)

STIs are caused by more than 30 different bacteria, viruses and parasites and are spread predominantly by sexual contact, including vaginal, anal and oral sex. Eight of these pathogens have been linked to the greatest incidence of illness. Of these 8 infections, 4 are currently curable: syphilis, gonorrhea, chlamydia and trichomoniasis. The other four viral infections are currently incurable (hepatitis B, herpes, HIV, and human papillomavirus), but can be mitigated or modulated through treatment and other mitigation measures.

More than 1 million people globally acquire a sexually transmitted infection (STI) every day and each year, an estimated 500 million people become ill with one of four curable STIs – 18% of whom are in SSA. Of concern is that some STIs can increase the risk of HIV acquisition three-fold or more, and can have serious consequences beyond the immediate impact of the infection itself, through mother-to-child transmission of infections, foetal and neonatal deaths, cervical cancer and other chronic diseases.

##### Who's at Risk?

As with HIV, the spread of STIs is exacerbated in the communities surrounding development projects due to risky sexual behavior and similar groups of people are at risk.

##### Targets

The WHO has developed a draft document with proposed targets relating to STIs for adoption by the 69th World Health Assembly in May 2016. In this document, WHO's Vision in relation to STIs is that there should be zero STI-related complications and deaths, and zero discrimination in a world where people living with STIs are able to live long and healthy lives. To achieve this, WHO has proposed the following targets for 2030:<sup>50</sup>

- 90% reduction of syphilis incidence globally (versus 2018 global baseline);
- 90% reduction of gonorrhea incidence globally (versus 2018 global baseline);
- ≤50% cases of congenital syphilis per 100,000 live births in 80% of countries;
- 80% human papillomavirus vaccine coverage for 9-13 year olds in 80% of countries.

#### 4.1.3 Tuberculosis

Tuberculosis is a lung disease which has been present in the world for centuries. It is caused by bacteria (*Mycobacterium tuberculosis*) that most often affect the lungs.<sup>51</sup> Tuberculosis is curable and preventable. It is transmitted via direct contact with sputum and aerosol droplets from affected persons. The use of tobacco greatly increases the risk of TB, with more than 20% of new cases globally being attributable to tobacco smoking. TB is the second largest infectious cause of death among young people and adults globally (after HIV/AIDS); in 2013, 9 million people worldwide contracted the disease and 1.5 million died from it (WHO, 2015) (Figure 4.1). More than 95% of these deaths were reported from low to middle income countries; nine out of the 22 TB high-burdened countries which account for 80% of all new TB cases arising each year are in SSA.<sup>52</sup>

TB has been present amongst mine workers for decades. There are generally higher TB incidences among mineworkers than the general population, with mineworkers being three times more likely to contract TB than the general population. For instance the rate of TB incidence per 100,000 people in South Africa in the general population is 948, while the rate among mineworkers is 2,500-3,000. The spread of TB by mineworkers is a huge public health problem and financial burden across southern African countries such as Lesotho,

<sup>50</sup>WHO, 2015

<sup>51</sup>There are other forms of TB, such as laryngeal and various forms of extra-pulmonary TB, but these are far less common.

<sup>52</sup>Tarilton, 2015

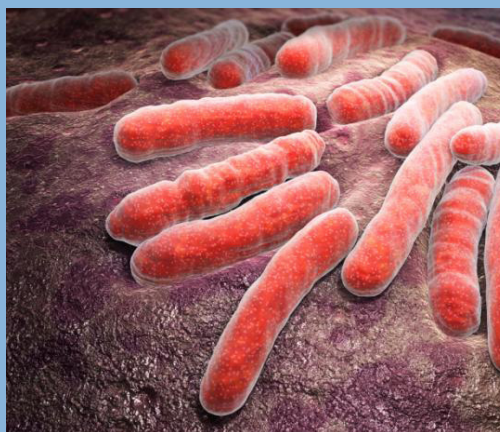
Mozambique, Swaziland and South Africa due to migrant and mobile worker movement. Since promotion of the extractives sector is one of the industrialization strategies in many SSA countries, TB should be a major issue of concern in the ESIA for all mining projects.

#### BOX 8: TB RISK IN SA GOLD MINERS

Where miners are HIV positive, they have a 4.4% increased risk of TB

Where miners have silicosis, they have a 2.7% heightened risk of TB.

Although most people can be cured of their active TB with appropriate treatment, silicosis and HIV infection greatly increase the risk of recurrent tuberculosis, which may produce cumulative lung damage and result in work incapacity.<sup>53</sup> Thus the economic impact is high owing to the size of the problem and the fact that in all the affected countries, the majority of those affected are the economically active segment of the population.



*Lungs affected with TB*



#### Who's at Risk?

TB is a significant workplace challenge because of the airborne nature of the disease. In the workplace, employees can contract TB directly from actively infected persons or from breathing in air that contains the bacteria. The risk of workers contracting TB is higher in situations where they are in congregated settings, such as dormitory accommodation in construction camps and on transport systems.

The TB epidemic is aggravated not only by tobacco use, but also by malnutrition and weakened immune systems. With the high prevalence of HIV in the SSA region, people who are HIV positive are 26-31 times more likely to get TB than healthy counterparts. In Africa as a whole, 41% of TB patients have HIV and in South Africa for instance, an average of 75% of those with TB are also HIV positive. In a further complication, TB accelerates progression to AIDS.

#### Targets

In recognition of the huge burden of TB on national economies, the WHO has set out a Vision for a world free of TB by 2035. This target was also envisioned in the SADC Declaration on TB in the Mining Sector in 2012. The milestones and targets are shown in Table 4.1. This Vision has been endorsed by all member states at the 2014 World Health Assembly and is included in SDG3.

<sup>53</sup>ICMM guidance on HIV TB and malaria

Table 4.1: WHO milestones, targets and goals to end TB by 2035

Vision	A world free of TB			
Indicators	Milestones		SDG Targets	End TB Goal
	2020	2025	2030	2035
1. Reduce number of TB deaths globally compared with 2015	35%	75%	90%	95%
2. Reduce TB case incidence globally compared with 2015	20%	50%	80%	90%
3. Reduce the number of affected families facing catastrophic costs due to TB	0	0	0	0

These targets are supported by SDG3a which advocates the strengthening of the implementation of the WHO Framework Convention on Tobacco Control in all countries.

#### 4.1.4 Hepatitis

According to the WHO, global mortality due to viral hepatitis is now outstripping deaths from HIV, tuberculosis or malaria, and whereas deaths as a result of HIV and malaria have been declining for several years due to improvements in prevention and treatment coverage, mortality due to hepatitis A, B and C is still rising. Approximately 80% of all deaths from liver cancer are a consequence of viral hepatitis.

Hepatitis is an infectious disease which causes inflammation of the liver. Acute hepatitis can be self-healing with time or it can progress to chronic hepatitis which can cause fibrosis, cirrhosis or even cancer of the liver. In SSA, Hepatitis A, B and C are the most common forms of hepatitis.

##### Who's at Risk?

Hepatitis A is transmitted by faecal contamination of water or food. While it does not cause chronic liver disease and is rarely fatal,<sup>54</sup> it particularly affects children (who may play in contaminated water), poor areas with no formal sanitation systems, and men having sex with men.<sup>55</sup> Microbiological water contamination is often associated with informal settlements which spring up around construction sites as aspirant job seekers look for work. The unplanned nature of such settlements is conducive to poor sanitary conditions.

Hepatitis B used to be the most common form of hepatitis globally until the introduction of effective vaccinations in the 1980s. However in endemic areas in low to middle income countries,<sup>56</sup> 10% of the adult population may have hepatitis B and it causes 980,000 deaths per year worldwide. In SSA the carrier rate in the general population can be up to 20% in some areas.<sup>57</sup>

##### Who's at Risk?

Because the hepatitis B virus is transmitted via blood, semen or vaginal fluids, sex workers, men having sex with men (MSM), people who inject drugs (PWID) and health care workers are particularly at risk, especially if their immune system is already compromised e.g. with HIV. Thus, as with HIV and STIs, risky sexual behavior around project sites and along transportation routes can result in an increase in hepatitis B<sup>58</sup> in the workforce and general population.

The WHO estimates that the global prevalence of Hepatitis C is 2.8%, with 130-150 million people infected (2015). SSA accounts for nearly 20% of the global total.<sup>59</sup> As it has received less attention than other forms of hepatitis, there are still no vaccinations available and thus half a million people die of Hepatitis C per year.<sup>60</sup>

<sup>54</sup>WHO Fact Sheet

<sup>55</sup>[www.webmd.com](http://www.webmd.com)

<sup>56</sup>The category 'low to middle income countries' includes almost all countries in SSA.

<sup>57</sup>WHO, 2015

<sup>58</sup>[www.webmd.com](http://www.webmd.com)

<sup>59</sup>Layden et al., 2014

<sup>60</sup>WHO, 2015

### Who's at Risk?

The causes of transmission are less well known compared to Hepatitis B, but the virus is spread via blood and thus, as with Hepatitis B, health care workers, PWID and possibly those with multiple and concurrent sexual partners are susceptible to the disease.

### Targets

The WHO has proposed new global targets for the diagnosis, treatment and cure of viral hepatitis, signaling a major increase in momentum towards elimination of viral hepatitis by 2030 – one of the goals of SDG3. The proposed new targets are:

- 90% reduction in new cases of chronic hepatitis B and C;
- 65% reduction in hepatitis B and C deaths;
- 80% of treatment-eligible persons with chronic hepatitis B and C infections are treated.

## 4.1.5 Meningitis

Meningococcal meningitis is a bacterial form of meningitis, a serious infection of the thin lining that surrounds the brain and spinal cord. Even when the disease is diagnosed early and adequate treatment is started, 5% to 10% of patients die, typically within 24 to 48 hours after the onset of symptoms.<sup>61</sup>

The extended meningitis belt of SSA, stretching from Senegal in the west to Ethiopia in the east (26 countries), has the highest rates of the disease, but sporadic outbreaks of this disease occur throughout SSA. Before 2010 and the mass preventive immunization campaigns, Group A meningococcus accounted for an estimated 80–85% of all cases in the meningitis belt, with epidemics occurring at intervals of 7–14 years. Since then, the proportion of the A serogroup has declined dramatically. Several vaccines are available to control the disease and as of January 2015, over 217 million persons have received meningococcal A conjugate vaccine in 15 countries of the African belt.

### Who's at Risk?

The bacteria are transmitted from person-to-person through droplets of respiratory or throat secretions from carriers. Close and prolonged contact – such as kissing, sneezing or coughing on someone, or living in close quarters (such as in hostels), sharing eating or drinking utensils with an infected person (a carrier) – facilitates the spread of the disease.

### Targets

There are no global targets for meningitis, but the WHO has committed to roll out a new vaccination programme focussing on the 1-29 year old group by 2016, with the aim of eliminating meningococcal A epidemics from the 26 countries in the meningitis belt.

*Potential mitigation measures for communicable diseases (see also s. 4.8):*

### Employment

- Develop a recruitment strategy to discourage hiring workers 'at the gate';
- Recruit locally;
- Conduct skills training to ensure a local source of labour;
- Conduct more rigorous health baseline assessments, including for example, mapping of TB hotspots, especially in labour-sending areas;
- Conduct pre-employment health screening to ensure that TB-positive workers are not placed in high riskwork areas and that they receive the correct medical treatment;

<sup>61</sup>WHO Fact Sheet

### **Accommodation and transportation facilities**

- Provide sufficiently sized accommodation facilities to meet the maximum expected capacity of workers on site;
- Ensure adequate ventilation in accommodation, recreational and work areas;
- Provide adequate transportation to site (prevent overcrowding);

### **Worker health**

- Adopt an integrated approach to the prevention, treatment, care, support and impact mitigation of TB, HIV, silicosis and other occupational diseases;<sup>62</sup>
- Develop an annual wellness programme and increase worker health awareness about the risks and linkages between lifestyle and health e.g. smoking, diet, exercise, safe sex, hygiene and sanitation;
- Minimise exposure to silica dust and provide all employees with PPE, together with ongoing training programmes on the correct use of PPE;<sup>63</sup>
- Promote voluntary medical male circumcision;
- Roll out the ILO HIV workplace policy;
- Appoint peer educators from within the workforce who can act as HIV focal points;
- Encourage employees to know their HIV status and provide paid time off to attend HIV voluntary counselling and testing (VCT) and TB screening;
- Conduct regular HIV, TB and silicosis surveillance and prevention programmes;<sup>64</sup>
- Conduct awareness programmes on how to prevent STIs from occurring, post-exposure actions, preventing mother to child transmission and the linkages between STIs and other diseases such as vector- and water-borne diseases, malnutrition, etc.;
- Prohibit smoking in the workplace and indoor communal areas;
- Promote leisure opportunities (e.g. sport) and participation in community volunteer programmes;
- Employ a site health care professional;
- Provide male and female condoms in all ablution blocks and provide information on the correct usage of condoms;

### **Going beyond the workforce**

- Promote family planning in the community, particularly targeting teenage girls and young women;
- Set up a community forum to ensure two-way dialogue about communicable diseases including how they are transmitted, prevention measures, treatment options and de-stigmatisation;
- Appoint and train peer educators in the workplace and local community;
- Develop a Behaviour Change Communications (BCC) Plan to ensure that the message about communicable diseases is constantly fresh and interesting, and communicated to local communities;
- Promote VCT within project-affected communities;
- Form partnerships with local health authorities and NGOs to coordinate disease prevention initiatives and monitoring.

#### **BOX 9: COST-EFFECTIVENESS OF HIV PREVENTION**

In 2003, Business for Social Responsibility found that some US companies have estimated costs between \$3,500 and \$6,000 per year for each worker with HIV/AIDS... studies of South African firms indicate that cost savings due to investment in prevention and education programs are as high as 3.5 to 7.5 times the cost of the intervention.

## **4.2 Non-communicable diseases**

Before we talk about non-communicable diseases (NCDs), a distinction needs to be made between NCDs caused by behavioral risk factors, which are addressed in this section, and those caused by environmental pollution or environmental factors which are described in s. 4.3.

<sup>62</sup>SADC Declaration on TB in the Mining Sector, 2012

<sup>63</sup>Ibid.

<sup>64</sup>Ibid.

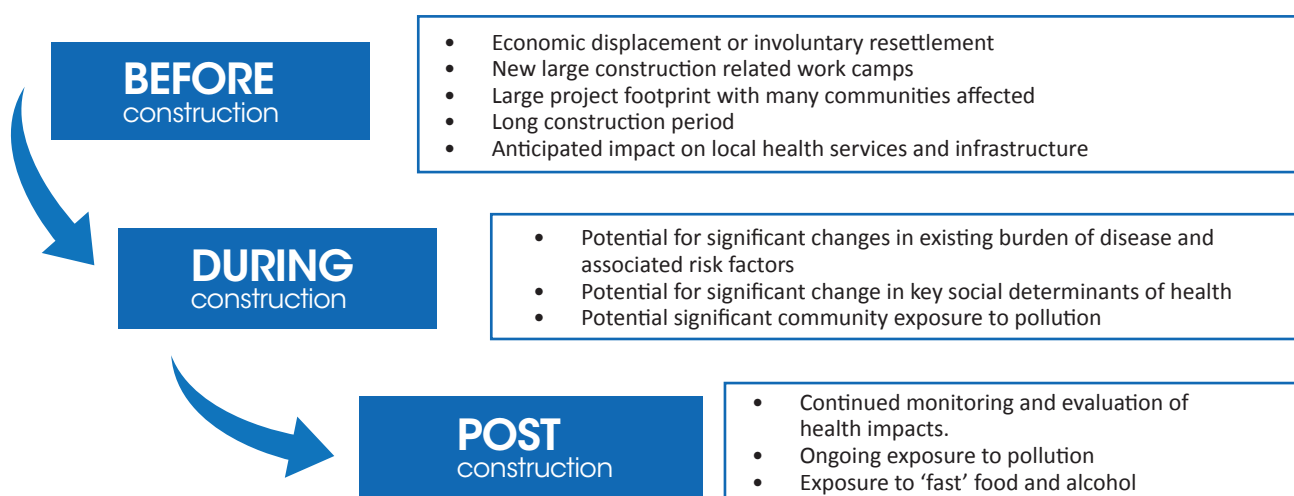


*Rural shops are often stocked with products which are high in salt, fats and carbohydrates. (B Walmsley)*

Traditionally, most of the health impacts considered in ESIA focus on the construction phase; but because of the long-wave nature of non-communicable diseases, emphasis also needs to be placed on the operational phase of large capital projects such as mining operations. Non-communicable diseases (NCDs), predominately cardiovascular diseases, cancers, respiratory diseases, diabetes, hypertension and alcoholism are not uncommon in capital projects.<sup>65</sup>

Capital projects can drastically change community livelihood patterns by increasing household income, bringing greater economic prosperity, greater food availability and the ability to make more diverse food choices. Unfortunately capital projects can also change the food and retail environment in surrounding communities, thus exposing people to cheap, less nutritious foods that are high in carbohydrates, additives and fats including processed, unhealthy fast food items, as well as alcohol and tobacco. Increased consumption of these unhealthy foodstuffs is leading to widespread weight and obesity issues and diabetes amongst all sectors of society, including the poor.

Significant and sudden changes in income and product availability can also increase the harmful use of alcohol and tobacco both in the local community and amongst project employees. As with other dimensions of health, the risk of NCDs should be considered at each stage of the project life-cycle (Figure 4.2).

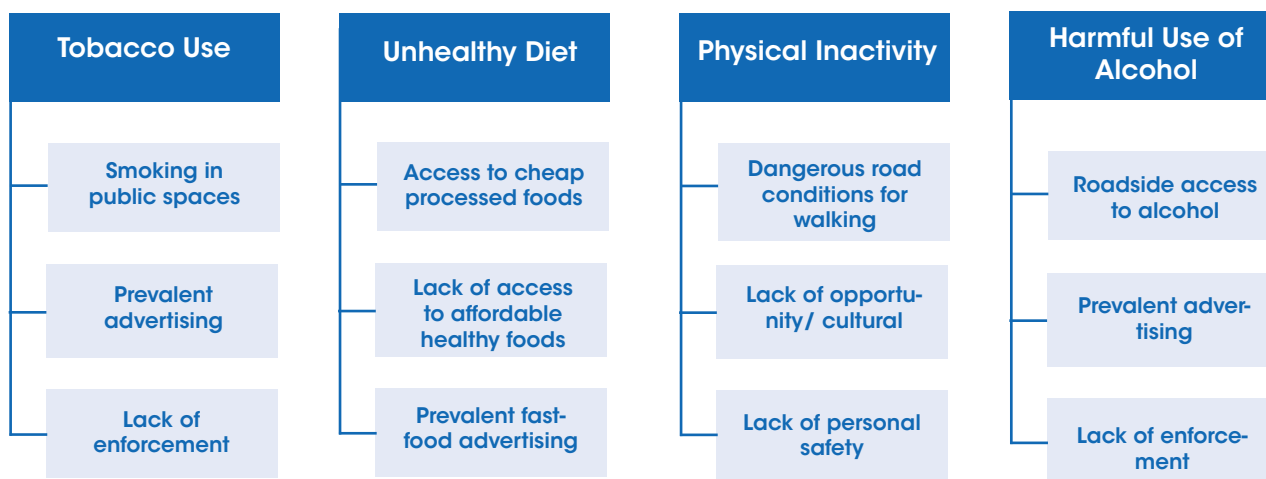


**Figure 4.2: Integration of NCDs in impact assessment stages**

<sup>65</sup> UNDP, 2016

<sup>66</sup> Report on the Second Regional Technical Meeting on Health, Gender and Capital projects in Africa, 8-10 June 2015, Centurion, South Africa.

Integrating the risk factors shown in Figure 4.3 into ESIA facilitates sustainable development by providing a more complete understanding of longer-term project impacts. Applying an NCD investment framework to the project will help weigh the costs and benefits and prioritize certain actions which could easily be integrated into a range of infrastructure development work plans to mitigate the long-lasting project effects on the prevalence of NCDs.<sup>66</sup>



**Figure 4.3: Possible behavioural risk factors for NCDs** (Adapted from: UNDP, 2015)

Communicable diseases and NCDs are not separate challenges; they share behavioural risk factors, as well as social, economic and environmental determinants,<sup>67</sup> for example:

- Excessive or 'binge' alcohol consumption can result in risky behaviour which in turn can accelerate HIV transmission and treatment failure;
- Cancer prevalence is higher amongst people with HIV, even those on ART;
- People with diabetes have been found to have a 46% increased risk of malaria infection,<sup>68</sup>
- Tobacco use doubles the risk of TB infection and recurrence; and<sup>69</sup>
- Harmful use of alcohol triples TB infection and triples the rate of treatment failure.<sup>70</sup>

**Table 4.2: Documented evidence between NCDs, their risk factors and selected communicable diseases.**

	Risk factors	HIV	TB	Malaria
NCD metabolic risk factors	Raised blood pressure	XX	0	XX
	Overweight/obese	XX	X	0
	Raised blood glucose	XX	XX	X
	Raised lipids	XX	X	X
NCD behavioural risk factors	Unhealthy diet	XX	X	0
	Physical inactivity	X	0	0
	Tobacco use	XX	XX	0
	Harmful use of alcohol	XX	XX	0
NCDs	Cardio-vascular disease	XX	X	0
	Cancers	X	XX	0
	Diabetes	XX	XX	XX
	Chronic respiratory diseases	XX	XX	X

Where XX indicates strong evidence of co-morbidity; X indicates some evidence of co-morbidity; and 0 indicates little or no evidence.

<sup>67</sup> UNDP, 2016

<sup>68</sup> D Tarlton, UNDP

<sup>69</sup> WHO fact sheet

<sup>70</sup> Gegia, Magee et al., 2015

In addition to the linkages between NCDs and communicable diseases shown in Table 4.2 above, NCDs are closely linked to ambient air pollution and occupational exposure to various substances (see sections 4.3 and 4.8). There is also a growing body of evidence linking the following (see also Tables 4.4 and 4.5):

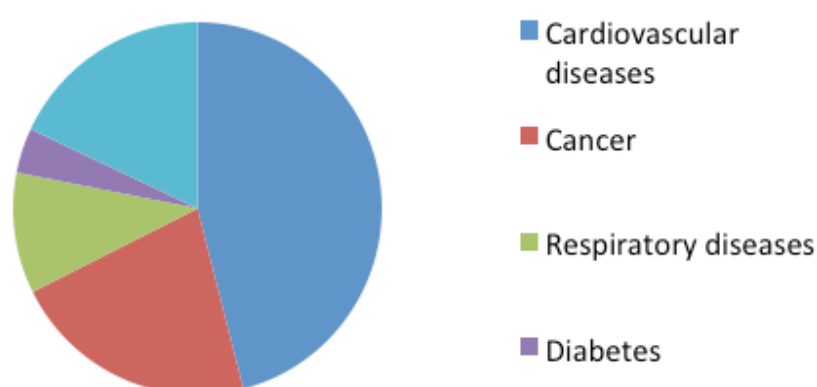
- Pesticides and cancer;
- Indoor air pollution and COPD, heart disease and stroke;
- Heavy metal and complex chemical pollution in soil, water and air is linked to cancer, COPD, heart disease and stroke;
- Ionizing radiation and cancer;
- Asbestos and cancer.

The point is that NCDs do not exist in a vacuum, thus action on environmental, social and occupational risk factors also has benefits for a range of other illnesses and *vice versa*. These diseases can be mitigated when cost-effective preventative actions are built into projects from the beginning. Furthermore, proactive actions on NCDs can complement other development initiatives such as: prevention of HIV, TB, and malaria, promoting gender equality and social sustainability. Integration of health impacts and NCD mitigation strategies into infrastructure impact assessments has to occur throughout the process (life cycle) of capital projects (see s. 5.5).

NCDs kill approximately 43 million people per year, 75% of whom (28 million) live in low to middle income countries. Four conditions: cardiovascular disease (heart attack, stroke), cancer, respiratory diseases and diabetes account for almost 80% of all deaths, with cardiovascular diseases accounting for 46% or 17.5 million deaths per year (see Figures 4.1 and 4.4).<sup>71</sup>

World leaders have recognised NCDs and injuries as urgent priorities for action in the SDGs.

**Figure 4.4: Percent of global deaths due to NCDs**



NCDs usually have a long duration and slow progression. The main drivers are: ageing, rapid and unplanned urbanisation and behavioural risk factors. The latter includes use of tobacco, unhealthy diet, lack of exercise and the harmful use of alcohol, which individually or together can cause:

- Raised blood pressure;
- High body mass and obesity;
- Hyperglycaemia (high blood glucose);
- Hyperlipidemia (high blood fat).

Poverty is closely linked to NCDs due to increased vulnerability, greater risks of exposure to harmful substances and limited access to preventative health care services. The WHO has thus identified the rise in NCDs in low and middle income countries as a major threat to the achievement of the Millennium Development Goals (MDGs) and the post-2015 Sustainable Development Goals (SDGs).<sup>72</sup>

<sup>71</sup>WHO, News Release 17/08/16

<sup>72</sup>WHO, 2013

### 4.2.1 Cardiovascular disease

Cardiovascular diseases such as ischaemic heart disease (IHD), strokes, high blood pressure etc., are caused by disorders of the heart and blood vessels. The main risk factors are: tobacco use, physical inactivity, unhealthy diet, obesity, harmful use of alcohol, and indoor air pollution. Cardiovascular diseases are the primary causes of death globally; 17.5 million people died of these diseases in 2012, accounting for 31% of all deaths (Figure 4.1). Of these, 75% occurred in low to middle income countries, which causes a major social and economic burden, especially on top of already high communicable disease burdens.<sup>73</sup> A large proportion of this (18% of IHD burden) is caused by using biomass and solid fuels for cooking, heating and lighting (see s. 4.2.3 below).<sup>74</sup>

#### Who's at Risk?

As noted above, there are numerous and complex links between NCDs and other diseases. Those most at risk around large capital projects fall into two groups: people who are employed on the project and residents of communities located adjacent to the project site. Project workers may be more vulnerable to NCDs due to occupational exposure to hazardous substances, and some studies have shown that peer pressure and/or job stress can lead to increased tobacco use and alcohol consumption.<sup>75</sup> Residents of local communities located near project sites, particularly in rural areas, may be living in poverty and may be more susceptible to pollution and, in the case of women, to sexually transmitted infections such as HIV which is closely associated with cardiovascular diseases (see Table 4.2).

### 4.2.2 Cancer

Another leading cause of morbidity and mortality worldwide is cancer, with approximately 14 million new cases diagnosed in 2012. Cancer was the cause of 8.2 million deaths in 2012 (Figure 4.1).<sup>76</sup> The prognosis does not look good; according to the WHO, the number of new cases is expected to increase by 70% over the next two decades i.e. to over 22 million cases per year – mostly in Africa, Asia and Central and South America.

One third of all cancer deaths may be attributed to the four behavioral and dietary risks: tobacco use (the largest contributor to lung cancer), unhealthy diet (high carbohydrates and saturated fats), lack of exercise and harmful use of alcohol (implicated in liver, colon, rectal and breast cancers). Other causes of cancer include exposure to physical and chemical carcinogens via environmental pollutants (see sections 4.3 and 4.8.3 below), biological carcinogens such as infections by certain viruses such as hepatitis B and C (see s. 4.1 above), ageing and preconditions, such as HIV and STIs, which increase the risks of cervical cancer.

#### Who's at Risk?

In the context of large capital projects, the people with the highest cancer risks are those who either work in, or live close to the following types of developments:

- Metal smelters;
- Mining operations;
- Iron and steel plants;
- Chemical factories;
- Oil refineries;
- Nuclear power plants;
- Thermal power plants;
- Waste incinerators;
- Roads with heavy traffic volumes.

Tobacco smokers;

People with STIs, hepatitis, TB (possibly caused by the same or other large capital projects nearby);

Those who use biomass or solid fuels for cooking and are therefore exposed to indoor air pollution.

<sup>73</sup>UNDP, 2016

<sup>74</sup>WHO, 2016

<sup>75</sup>Gegia, Magee et al., 2015 and Cheng and Cheng, 2016

<sup>76</sup>WHO, 2014

### 4.2.3 Respiratory diseases

Respiratory diseases, also known collectively as Chronic Obstructive Pulmonary Disorders (COPD), include pneumonia, bronchitis, emphysema, and asthma. In advanced forms these can be life threatening as they affect breathing. Almost one million people worldwide died of COPD in 2013, accounting for 18% of under-five child mortality that year<sup>77</sup> (Figures 4.1 and 4.4). More than 90% of these occurred in low to middle income countries.<sup>78</sup> There are several different modes of exposure to COPD:

- Behavioral e.g. smoking tobacco;
- Socio-economic factors such as lack of access to grid electricity and thus reliance on fossil fuels and wood for heating and cooking leading to indoor air pollution. Crowding, in-migration and informal settlements also cause increased exposure to respiratory diseases;
- Pollution (see section 4.3 below);
- Occupational exposure to fumes, gases, particulates (PM10) (see section 4.8 below).

The primary cause of COPD is tobacco smoke, both directly through smoking and indirectly through inhalation of second-hand smoke. There are more than 4,000 chemicals in tobacco smoke, of which at least 250 are known to be harmful and more than 50 are known to cause cancer. According to the WHO, the tobacco epidemic is one of the biggest public health threats the world has ever faced, killing around 6 million people a year.<sup>79</sup> More than 5 million of those deaths are the result of direct tobacco use while more than 600,000 are the result of non-smokers being exposed to second-hand smoke. Tobacco users who die prematurely deprive their families of income, raise the cost of health care and hinder economic development.



*Graphic illustration of the effect of smoking on the lungs.*

#### **Who's at Risk?**

There are numerous reasons why people smoke tobacco, but in the context of large capital projects, the main drivers for people to take up smoking for the first time, to relapse back to smoking and to smoke more, are boredom, job stress and peer pressure.

<sup>77</sup>WHO, 2016

<sup>78</sup>WHO

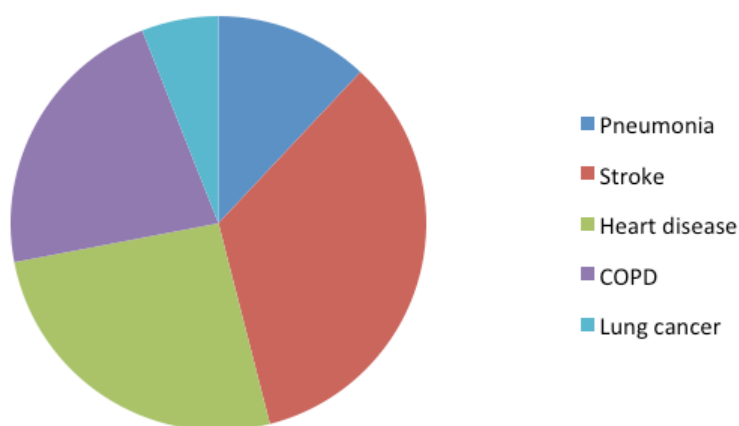
<sup>79</sup>WHO, 2014

Approximately 3 billion people cook and heat their homes using open fires and simple biomass-burning stoves. Respiratory illnesses attributable to indoor air pollution such as pneumonia, cardiovascular diseases and cancer account for 33% of all COPD-related disease-burden in 2012, more than half of which is borne by children under 5 (Figure 4.5).<sup>80</sup>

#### Who's at Risk?

The highest burden of respiratory illness from indoor air pollution occurs in low income countries where people are often most vulnerable due to existing diseases e.g. TB, malaria or HIV and who have little access to effective health care or alternative sources of cheap energy. One of the biggest problems occurs near coal mines where communities scavenge for, are given or sold poor quality coal for their own use. The smog effects around these communities, particularly in winter are particularly severe.

**Figure 4.5: Diseases caused by indoor air pollution (percent)**



The use of biomass and fossil fuels for cooking and heating has other indirect impacts on the social and biophysical environments: gathering fuel wood takes time and energy thus removing women and children from other productive tasks and school respectively; black carbon and methane emitted by inefficient combustion contribute to climate change and the lack of access to safe forms of power can lead to injuries, fires, poisoning and burns, amongst others.

#### 4.2.4 Type 2 Diabetes

Diabetes may be classified as Type 1 and Type 2. The former is quite rare and usually occurs in children (thus it is often known as Juvenile Diabetes) and it is caused by medical problems not by lifestyle factors. Type 2 diabetes on the other hand is a chronic disease in which the pancreas does not produce enough insulin, or where the body cannot effectively use all the insulin produced. Since insulin regulates the blood sugar levels in the body, an impaired system can lead to damage to the heart, blood vessels, eyes, kidneys and nerves. Blindness, kidney failure and limb amputation are common outcomes for people suffering from diabetes.

In 2014, the global prevalence rate of diabetes was estimated by the WHO to be 9% of adults and it caused 1.5 million deaths in 2012 (Figure 4.5). A large proportion (>80%) of diabetes deaths occurred in low to middle income countries and it is estimated that this will increase to become the seventh leading cause of death by 2030.<sup>81</sup>

<sup>80</sup>WHO, 2016  
<sup>81</sup>WHO, 2014

### Who's at Risk?

Type 2 diabetes can affect anyone who has excess body weight, is inactive and has a poor diet. On project sites, diet may be the main contributing factor, as canteens often serve meals and refreshments that are high in carbohydrates, salt and sugar.

Development often brings with it a changed food and retail environment, with high levels of advertising promoting cheap 'fast' foods, sugary drinks (BOX 10) and alcohol. Exposure to these products, particularly where there is little background knowledge and understanding of the detrimental effects that they can cause, can lead to obesity and ultimately diabetes.

#### BOX 10: IMPACT OF SUGARY DRINKS ON DIABETES RISK

It is estimated that people who consume 1 to 2 cans of sugary drinks per day have a 26% greater risk of developing type 2 diabetes compared to those who rarely consume such drinks. On average a single can of a sugary drink contains around 40 g of free sugars (equivalent to 10 teaspoons of table sugar).<sup>82</sup>

### 4.2.5 Harmful use of alcohol

The harmful use of alcohol is the third-ranked global risk factor contributing to death, disease and injury.<sup>83</sup> According to the WHO, 2011, the harmful use of alcohol accounted for 2.5 million deaths in 2004 (more than HIV, TB) (Figure 4.1). Of these, six times more men than women died of alcohol-related illnesses and injuries. Alcohol is the causal factor in 60 types of disease and injuries and is the component cause in 200 others. The effects are determined by the complex relationship between the volume (of pure alcohol) consumed, the type or quality of the beverage and the pattern of drinking.

Alcohol not only adversely affects the drinker, but many other people may be indirectly affected. For the drinker of harmful quantities and types of alcohol, there are increased risks of alcohol dependence, liver cirrhosis, cancers, epilepsy, stroke, heart attack and injuries (intentional and unintentional). However, persons under the influence of alcohol can cause significant impacts on other people through road traffic and workplace accidents and domestic abuse. Harmful alcohol consumption also adversely affects unborn babies (foetal alcohol syndrome) and can lead to a diminished responsibility regarding safe sex, with the resulting spread of HIV and other STIs. All of these health and social issues are extremely costly to society resulting in increased medical, societal, and psychological costs, lost productivity, crime and violence.

### Who's at Risk?

While the development of large capital projects can bring a range of benefits to local communities such as employment and disposable income, it can also increase the attraction of, and access to alcoholic beverages through: increased availability and affordability of alcohol (especially home-brew); increased spending money; boredom and stress; alluring advertising; peer pressure from work colleagues; and social aspirations. Recent studies have also found that outsourced workers are more likely to drink, both in the workplace and after hours, than direct employees due to a lack of direct management control, monitoring and enforcement.<sup>84</sup>

While the direct impacts on health from the harmful use of alcohol may affect more men than women, the indirect health effects may be felt more acutely by women. Of note is that alcohol consumption weakens the human immune system, thus aggravating the spread of infectious diseases such as HIV, TB and STIs. Lower socio-economic development and status generally means that the health problems related to the harmful use of alcohol are exacerbated; this is in part due to the fact that the risk factors for communicable diseases and NCDs are already high e.g. overcrowding, poor water quality and sanitation, malnutrition, unsafe working conditions, poor access to counseling and alcohol treatment clinics, etc.

<sup>82</sup>WHO, 2016a

<sup>83</sup>WHO, 2011

<sup>84</sup>Cheng and Cheng, 2016

### **NCD targets**

To strengthen national efforts to address the burden of NCDs, the 66th World Health Assembly endorsed the WHO Global Action Plan for the Prevention and Control of NCDs 2013-2020.<sup>85</sup> The global action plan offers a paradigm shift by providing a road map and a menu of policy options for Member States, WHO, other UN organizations and intergovernmental organizations, NGOs and the private sector which, when implemented collectively between 2013 and 2020, will attain 9 voluntary global targets:

- A 25% relative reduction in risk of premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases;
- At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context;
- A 10% relative reduction in the prevalence of insufficient physical activity;
- A 30% relative reduction in mean population intake of salt/sodium;
- A relative reduction in the prevalence of current tobacco use in persons aged more than 15 years old;
- A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances;
- Half the rise in diabetes and obesity;
- At least 50% of eligible people receive drug therapy and counselling to prevent heart attacks and strokes;
- An 80% availability of affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities.

The SDGs complement this Vision: SDG3.4 aims to reduce premature deaths from NCDs by one third by 2030 through improved prevention and treatment measures. SDG3.5 addresses narcotic and alcohol abuse, while SDG3a supports the WHO's Framework Convention on Tobacco Control. SDG7 aims to ensure that there is access to affordable, reliable, sustainable and modern energy for all to reduce the risks of indoor air pollution.

### **Development triggers relating to non-communicable diseases:**

- Exposure to tobacco smoking and second hand smoke;
- Increased access to, and availability of alcohol, drugs, unhealthy food;
- Use of biomass and poor quality coal for cooking, lighting and heating;
- Lack of exercise opportunities;
- Existing burden of disease.

### **Potential mitigation measures to prevent or control non-communicable diseases:**

- Conduct wellness programmes on site to raise the awareness of project managers, contractors and all other project workers to the linkages between smoking, excessive consumption of alcohol, poor diet, lack of exercise and NCDs;
- Create and enforce no-smoking areas in and around the workplace;
- Raise nutrition standards in canteen food; promote healthy food and discourage the consumption of foods and beverages high in sugar, salt and fat, through pricing mechanisms for example;
- Zero alcohol policy in the workplace and worker camps;
- Work with the local police to prevent the establishment of bars/taverns next to the workplace selling cheap branded and home-brew alcohol;
- Encourage participation in sports by creating a football pitch and/or volleyball court, and sponsor teams and team events e.g. between developer and community teams;
- Provide clean-burning fuel or solar cookers to local communities to reduce dependence on wood and low grade coal;
- Form partnerships with local NGOs to roll out community programmes aimed at increasing wellness awareness.

<sup>85</sup>WHA Resolution WHA66.10

## 4.3 Pollution-induced diseases and disorders

### 4.3.1 Introduction

This section focuses on the health impacts caused by various forms of pollution on people living within the zones of influence of the pollution plumes. Occupational exposures are addressed in s. 4.8.

This is a complex field because the health effects depend on the contaminants involved, the concentrations of the contaminant, the period of exposure, and the mobility and pathway of the contaminant from its source to human beings. For this reason, each project has to be assessed in terms of its nature, location, potential pollution, the assimilative capacity of the environment, cumulative effects and the vulnerability of the surrounding population. Where the health risks are potentially high, it is essential that a HIA specialist is included in the ESIA project team. The main sources of pollution associated with large capital projects include:

- Mines, quarries and smelters;
- Oil and gas exploration, production and refining;
- Industrial processes, e.g. paint, fertiliser and iron and steel manufacturing;
- Waste incineration and landfills;
- Transportation;
- Fossil fuel production;
- Energy generation and transmission;
- Commercial agriculture.

SSA is endowed with a range of minerals, natural resources and hydrocarbon deposits; six of the world's ten fastest growing economies are found in this region, based on the exploitation of these commodities and others. However, weak environmental controls (legislative and institutional) and a lack of effective monitoring mean that pollution and its health side effects is a fast-growing issue in many rural and urban communities.

### 4.3.2 Air, water and soil pollution

The main pathways for environmental pollution to reach humans are via the water, air and soil. Table 4.3 shows the various direct and indirect ways people become exposed to pollution through the different environmental media.



*Gold mining on, and adjacent to a river can cause severe chemical pollution affecting downstream users.*  
(P Tarr)

Table 4.3: Pollution exposure pathways

Medium	Direct exposure pathway	Indirect exposure pathway
Water	Ingestion of water; Skin contact with water.	Consumption of crops irrigated with contaminated water; Consumption of fish and other aquatic fauna from contaminated waters; Washing clothes in contaminated water (especially water with asbestos particles).
Air	Inhalation of particulate matter (PM10) and fumes/gases; Skin contact with particulates, vapour; Direct exposure to ionising radiation.	Deposition of particulates on soil and foliage, uptake by stock and wildlife, consumption of meat and milk products by people; Uptake by crops, consumption by people.
Soil	Direct contact with skin.	Consumption of crops grown in contaminated soil; Consumption of products from animals which have consumed plants grown in contaminated soil.

Table 4.4 provides an indication of the common sources of pollution caused by development projects, the exposure pathways and the typical health effects.

#### BOX 11: LINK BETWEEN AMBIENT AIR POLLUTION AND ISCHAEMIC HEART DISEASE

The most important environmental risk factor implicated in IHD is ambient air pollution, which increases the risk of the development of, and death from IHD. Exposure to ambient air pollution can reduce life expectancy by up to several years and was responsible for about 24% of the global incidence of IHD in 2012.<sup>86</sup>

Table 4.4: Typical pollution-induced health effects

Pollution type	Source	Pathway	Effect
Faecal pollution	Informal settlements, malfunctioning sewage treatment plants, lack of sanitation and access to clean water	Water	Water-borne diseases e.g. cholera, typhoid, diarrhoea, giardia
Pesticides	Crop spraying Harvesting and consumption of treated products	Water, air, soil	Congenital abnormalities, cancer
Indoor smoke (CO, CO <sub>2</sub> )	Burning of fuel indoors for cooking, heat, light	Air	COPD (lung diseases) Heart disease, stroke
Heavy metals in particulates and fumes (Co, Cu, Hg, As, Cd, Pb, CN, Zn, Cr <sup>VI</sup> )	Smelters, sewage sludge, tailings dumps, industrial processes, power plants, vehicles, incinerators (see Table 4.4 below for more detail)	Air, water, soil	Cancers, organ damage, neurotoxic effects, bone damage, skin lesions, COPD, heart disease and stroke (see Table 4.4 below for more detail)
Ionising radiation (Rn, Th, Ra, U)	Uranium mines, heavy mineral mines, nuclear power plants, industrial processes	Air, water	Cancers (skin, bone, oesophagus, stomach, colon, rectum, brain, thyroid, salivary glands)
Asbestos	Mines, tailings dumps, old buildings, power stations	Air, water	Asbestosis (Mesothelioma) Cancer of ovaries, stomach, larynx
Silica	Smelters, grit blasting, ore processing	Air	Silicosis
Complex chemicals (e.g. PCBs, POPs, solvents, PAH)	Energy industry, manufacturing	Air, water	Cancers, congenital disorders, heart disease and stroke, endocrine disruption

Some of the specific health impacts caused by heavy metals are summarised in Table 4.5.

Table 4.5: Typical health hazards associated with heavy metals

Heavy metal	Some typical sources	Health effects
Cadmium (Cd) (global production increasing)	Phosphate fertiliser manufacture Sewage sludge Non-ferrous metal smelters Fuel Mine waste dumps	Kidney damage Bone effects Possible carcinogen
Mercury (Hg)	Artisanal gold retorting Coal burning Non-ferrous metal smelters Chlor-alkali plants	Neurological damage
Lead (Pb)	Smelter emissions Petrol fumes from vehicles (especially along roads) Lead-based paints Mine waste dumps	Neurotoxic effects Developmental effects in children
Arsenic (As)	Pesticides Smelter emissions Thermal power plants Wood processing	Lung, bladder, kidney and skin cancers Disturbances to gastrointestinal, cardiovascular and central nervous systems Death
Copper (Cu)	Smelter emissions Mine waste dumps Sewage sludge	Wilson's Disease Renal damage Gastrointestinal disorders Central nervous system irritation
Cobalt (Co)	Smelter emissions Mine waste dumps	COPD Cardiac effects Congestion of the liver, kidneys, and conjunctiva Immunological effects
Vanadium (V)	Smelter emissions Mine waste dumps	Respiratory problems Central nervous system effects Skin irritation
Selenium (Se)	Pesticides	Respiratory problems Effects on skin, nails, teeth, hair Listlessness
Cyanide (CN)	Gold processing plants	Small amounts: central nervous system disorders, rapid breathing and heart rate. Large amounts: convulsions, loss of consciousness, low blood pressure, respiratory failure, death



*Copper, lead, uranium and silica in tailings dust from an abandoned mine are affecting the health of soldiers at a nearby army base. (Geological Survey of Namibia)*

### Who's at Risk?

Anyone who lives and works within a pollution plume or on sites with historical contamination, has a heightened risk of being affected by the diseases and disorders listed above. The risk can be determined by calculating the **probability of exposure** to a contaminant by the various pathways, and the **severity of the consequences** of that exposure. Thus those people who come into contact with a pollutant via numerous sources on a regular basis will have a higher risk than those who are only occasionally exposed. For example, local communities who drink water, wash clothes, swim, water their cattle and irrigate their crops with contaminated water over a life time will be at far greater risk than a visitor passing through the area. Often children are considered to have a higher risk as they have greater contact with the soil.

### Targets

There are no individual targets for pollution-induced diseases and disorders, but SDG3.9 requires a substantial reduction in the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by 2030. SDG12 calls for the following to be attained:

- By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment;
- By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse;
- Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle;



*Significant acid, salt and metal pollution from a nearby copper mine affecting downstream users.*  
(Geological Survey of Namibia)

### Development triggers for exposure to chemical pollution:

- Discharge of wastewater and effluent causing water pollution;
- Emission of gases and fumes, respirable dust, silica and heavy metal particulates from mining, quarrying, smelters, waste dumps, landfills, industrial processes, manufacturing, thermal power stations, incinerators, artisanal mining, sewage sludge, pesticides, unsealed roads;
- Soil and crop pollution from deposition of heavy metals and pesticides via aerial deposition and/or use of polluted water for irrigation;
- Uncontained asbestos waste;

- Ionising and non-ionising radiation from certain mine wastes;
- Increased traffic (exposure to lead);
- Presence of high voltage powerlines.

**Potential mitigation measures to prevent or minimise exposure to chemical pollution:**

- Prevent uncontrolled discharge of wastewater and industrial effluent into natural water courses in excess of permit limits;
- Provide improved water infrastructure for local population—especially if the existing water resources are being contaminated, and/or flow is reduced due to upstream abstraction by the project and/or groundwater levels and yields are affected by project activities;
- Rehabilitate all disturbed areas as soon as possible to prevent dust and erosion;
- Carry out dust suppression on all unpaved roads;
- Wash vehicle wheels before accessing public roads from non-paved site roads;
- Cover truck loads to prevent egress of dust when travelling along public roads;
- Cover or otherwise prevent dust emissions from material storage stockpiles e.g. using water, netting, chemical binding agents, etc.;
- Rehabilitation all tailings storage facilities and slimes dams as soon as possible to prevent dust and erosion of contaminated material into water courses. If ongoing rehabilitation is not possible, prevent dust using netting, windrows, vegetation, chemical binding agents, etc.;
- Ensure that all stacks are designed according to latest technology with adequate filter and scrubbing systems to prevent emission of gases and heavy metal particulates in excess of permit limits;
- Ensure all wastes containing radioactive materials are adequately covered to prevent emission of radon gas and movement of radionuclides into the wider environment;
- Ensure that all asbestos-containing wastes are contained to prevent egress to the environment by air or water;
- Prevent any settlements from being developed in the immediate downwind zone of any mine or industrial waste dump or within 50m of high voltage transmission lines;
- Locate any resettled people in an environment which will not be within the zone of influence of any air or water-borne pollution or within 50m of high voltage transmission lines;
- Maintain strict health and safety protocols regarding the use of pesticides on crops and the disposal of containers and waste chemicals.



*Poor or no sanitation can influence the spread of water - borne diseases. (B. Walmsley)*

### 4.3.3 Water-borne diseases

#### BOX 12: WASTEWATER POLLUTION

Man is polluting water faster than nature can recycle and purify water in rivers and lakes. More than 80% of wastewater resulting from human activities is discharged into rivers/sea without any pollution removal. Each day, nearly 1,000 children die due to preventable water and sanitation-related diarrheal diseases.

At least 1.8 billion people globally use a source of water that is faecally-contaminated and 2.4 billion people lack access to basic sanitation services e.g. toilets and latrines.<sup>87</sup>

One of the most common pathways for pathogens to enter the human body is from ingestion of, or contact with water polluted with human and/or animal excreta. The use of treated sewage effluent to irrigate crops and landscaped installations (parks, gardens, golf courses, etc.) has been practised for decades and there are strict controls over the quality of this water in most developed countries.

The main pathways for water-borne diseases in low to middle income countries are via the use of partially treated or untreated sewage effluent: a) where sewage effluent is deliberately used for irrigation in an attempt to conserve freshwater resources, while at the same time adding 'cheap' nutrient and organic matter to the soil or growth medium; and b) where untreated sewage effluent and excreta wash into reservoirs, dams, rivers or canals and the contaminated water is unintentionally used for irrigation, drinking or washing (BOX 13). The exposure pathways for humans from both these paradigms are via: a) direct consumption and handling of polluted water; and b), indirect consumption through food irrigated or washed with polluted water and contaminated animal products.

Between 4 and 20 million hectares of land were estimated to be under wastewater irrigation in 2010.<sup>88</sup>

#### BOX 13: SANITATION

Only 64% of the global population has access to improved sanitation and 14% still practise open defecation, which promotes the spread of diarrhoeal diseases through direct and indirect contact with excreta and flies. Only 19% wash their hands with soap after defecation, which exacerbates the problem.<sup>89</sup>

There are four groups of pathogens implicated in water-borne diseases in humans:

**Bacteria** – the faeces from an infected person allows the spread of that infection to others. Diarrhoeal diseases are one of the main contributors to global child mortality, causing 20% of all deaths in children under five.<sup>90</sup>

**Viruses** – the five most important groups of pathogenic-excreted viruses are: adenoviruses, enteroviruses, hepatitis A virus, reoviruses and diarrhoea-causing viruses such as rotavirus.

**Protozoa** – many species of protozoa can infect humans and cause diarrhoea and dysentery. Infective forms of these protozoa are often passed as cysts in the faeces. The three most common pathogenic species are: *Giardia lamblia*, *Balantidium coli* and *Entamoeba histolytica*.

**Helminths or parasitic worms** – many of these species have humans as the host, but most do not multiply within the human host. These species often have complex life cycles with different developmental stages occurring in different intermediate hosts which could be soil, water, plant life or animals. These complex interactions need to be understood when designing and planning irrigation schemes, water supply and sanitation projects to prevent the cycle of infection and re-infection. Roundworms, whipworms and hookworms (nematodes) and flat worms (tape worms and flukes) form the two main groups of helminths in waste water (BOX 14).

<sup>87</sup> www.un.org

<sup>88</sup> WHO, 2016

<sup>89</sup> WHO, 2016

<sup>90</sup> www.fao.org

#### BOX 14: HELMINTHIC DISEASES

More than 2 billion people worldwide are affected by helminthic diseases, which cause problems with physical growth and cognitive development and aggravate micro-nutrient deficiencies and anemia, if left untreated. Anti-helminthic drugs are the main interventions but re-infection is common in areas where the environment continues to be conducive to maintaining the transmission cycle (see BOX 13 above). Therefore the provision of improved sanitation, backed up by health and hygiene education, is essential as well.

##### Who's at Risk?

Whether a person actually becomes infected depends on a number of factors such as:

- Volume of excreta in the wastewater (containing pathogens);
- Latency (period of time from excretion to infection of a new host);
- Persistence (viability of the organism outside the human body);
- Multiplication (whether the organism can multiply outside the human body);
- Infective dose (amount needed to cause infection);
- Host response (immunity of the person);
- Presence of non-human hosts such as schistosomes.

The risk therefore can be calculated by determining the probability of exposure and the severity of the consequences of that exposure. Thus anyone who comes into regular contact with faecally polluted water via several exposure pathways e.g. consumption of water, consumption of crops irrigated with polluted water and direct skin contact, as well as those with an existing disease burden, will be most at risk. This usually will be the poorest of the poor and often children are most at risk.

Wastewater and excreta are also present in the aquaculture industry. This industry has seen a massive growth in the past 2-3 decades from 16.8 million tonnes globally in 1990 to 73.8 million tonnes in 2014. The industry is dominated by a few Asian countries, but the industry is on the rise in SSA in countries such as Nigeria, Ghana and Ivory Coast in West Africa, Kenya and Uganda in East Africa and South Africa, Namibia, Zambia, Zimbabwe, Malawi and Mozambique in Southern Africa.<sup>91</sup>

Waterborne pathogens may enter the food chain via the use of contaminated water as a culture medium, or through the direct input of animal excreta as a source of nutrients e.g. chicken manure. The pathogens which typically bioaccumulate in finfish and shellfish are: *Campylobacter jejuni*, *Vibrio cholera*, *Salmonella* spp., *Shigella* spp., *Escherichia coli* and *Enterococcus* spp. Helminthic, parasitic and viral pathogens have been documented in wastewater-fed aquaculture environments such as *Schistoma marisoni*, *Cryptosporidium parvum*, *Giardia intestinalis*, novoviruses, rotaviruses and hepatitis A.

The use of waste water in aquaculture can also result in the accumulation of heavy metals and organic chemicals from pesticides, fungicides and general runoff from agricultural or industrial land. The most infamous example of this occurred in the city of Minamata in Kumamoto Prefecture, Japan in 1956 (BOX 15).

#### BOX 15: MINAMATA DISEASE

The disease which became known as Minamata Disease was caused by the release of methyl mercury in the industrial effluent from the chemical factory belonging to Chisso Corporation, which continued from 1932 to 1968. This highly toxic chemical bio-accumulated in shellfish and fish in Minamata Bay and the Shiranui Sea, which, when eaten by the local populace, resulted in mercury poisoning causing neurological damage.

Cadmium and lead have also been found in elevated levels in fish; cadmium can cause kidney and bone damage, while lead has neurotoxic effects and affects brain development in children. The main exposure pathway for these metals is through the direct consumption of contaminated finfish and shellfish.

<sup>90</sup>WHO, 2016

### Who's at Risk?

Pathogens and heavy metals cause health risks for workers at aquaculture farms and processing plants who come into daily contact with contaminated water, as well as for those who consume such products.

### Targets

The main aim of SDG6 is to ensure that there is universal access to water and sanitation. Some of the relevant targets are:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all;
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations;
- By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally;
- Support and strengthen the participation of local communities in improving water and sanitation management.

### Development triggers for water-borne diseases:

- Poor, over-burdened or non-existent sanitation systems in construction camps, operating plants and remote work sites;
- Inadequate housing and ablution facilities for project workers;
- Overcrowding and informal settlements (induced by the presence of a large capital project);
- Poor personal hygiene;
- Polluted drinking water supplies for workers and their families – either present prior to project development or caused by the project;
- Use of wastewater on crops and in aquaculture projects;
- Inadvertent use of polluted water for irrigation and aquaculture (due to runoff over faecally-polluted areas);
- Climate change;
- Existing burden of disease (e.g. HIV, malaria, diarrhoeal diseases, etc).

### Potential mitigation measures for water-borne diseases:

- Provide sufficient quantities of clean drinking water to all workers, especially those working outdoors and in the heat;
- Provide adequate male and female ablution facilities at worker camps and all field camps / construction sites (e.g. portaloos);
- Ensure that sewage treatment plants or soakaways have sufficient capacity and are regularly pumped out to prevent overflow;
- Ensure that sewage treatment plants are regularly serviced and monitored to ensure that the effluent meets the design specifications;
- Target Corporate Social Responsibility programmes at community water and sanitation projects;
- Promote hygiene awareness in the workplace and surrounding schools and community;
- Promote the use of personal protective equipment (PPE) for all workers handling faecally-contaminated wastewater e.g. irrigation workers, wastewater treatment plant personnel, aquaculture workers;
- Do not use faecally-contaminated water for those crops that are eaten uncooked or which come into close contact with irrigation water e.g. carrots, lettuce, spray-irrigated fruit);
- Do not use faecally-contaminated water in aquaculture projects;
- Continually monitor water to ensure that it is fit for purpose and compliant with national or WHO guideline limits for wastewater.

#### BOX 16: COST-EFFECTIVE INTERVENTIONS TO IMPROVE WATER QUALITY

Interventions that improve water supply, water quality and sanitation were found to be especially beneficial in low income countries.

An investment of US\$1 in such programmes led to a return of between US\$5 and US\$6. Interventions that improve water quality reduce diarrhoea morbidity in people living with HIV by 43%.<sup>92</sup>

## 4.4 Vector-borne diseases

Vectors are living organisms that can transmit infectious diseases between humans or from animals to humans. Every year there are more than 1 billion cases and over 1 million deaths globally from vector-borne diseases such as malaria, dengue fever, schistosomiasis, human African trypanosomiasis, leishmaniasis, yellow fever and onchocerciasis (to name a few). Vector-borne diseases account for over 17% of all infectious diseases. Distribution of these diseases is determined by a complex dynamic of environmental and social factors.

Many of these vectors are bloodsucking insects, which ingest disease-producing micro-organisms during a blood meal from an infected host (human or animal) and later inject it into a new host during their subsequent blood meal. Mosquitoes are the best known disease vector. Others include ticks, flies, sandflies, fleas, triatomine bugs and some freshwater aquatic snails (Table 4.6). The risks of vector-borne diseases can be increased by creating suitable habitats for vector growth and reproduction and where an existing disease burden already exists e.g. from communicable or zoonotic diseases. Many of the environmental drivers shown in Table 4.6 are caused or exacerbated by the development of large capital projects, including large-scale agricultural schemes.

Table 4.6: Common disease vectors, diseases and environmental drivers in SSA

Primary Vector	Diseases	Environmental driver
Mosquitoes: <i>Aedes</i> spp	<ul style="list-style-type: none"><li>Chikungunya</li><li>Dengue fever</li><li>Rift Valley fever</li><li>Yellow fever</li><li>Zika</li></ul>	Standing, stagnant water in pools, puddles, containers provide suitable breeding habitats for mosquitoes; Dams and irrigation schemes Changes in land use; Resettlement schemes
Mosquitoes: <i>Anopheles</i> spp	<ul style="list-style-type: none"><li>Malaria</li></ul>	Standing, stagnant water in pools, puddles, containers, dams, rivers; Dams and irrigation schemes; Changes in land use
Mosquitoes: <i>Culex</i> spp., <i>Anopheles gambiae</i> and <i>A. funestus</i>	<ul style="list-style-type: none"><li>Lymphatic filariasis</li><li>West Nile fever</li></ul>	Standing, stagnant water in pools, puddles, containers; Dams and irrigation schemes; Pigs
Sandflies	<ul style="list-style-type: none"><li>Leishmaniasis</li><li>Sandfly fever (phlebotomus fever)</li></ul>	Deforestation and opening new areas; Construction of dams and irrigation schemes; Livestock kraals; House construction; Rodents are an important reservoir; Resettlement schemes
Ticks	<ul style="list-style-type: none"><li>Relapsing fever (<i>borreliosis</i> or tick bite fever)</li></ul>	Presence of cattle and wildlife especially rodents; Opening up new areas; Greater contact between stock, wildlife and humans
Tsetse flies	<ul style="list-style-type: none"><li>Sleeping sickness (African trypanosomiasis)</li></ul>	Contact between wildlife and cattle; Access into new areas
Fleas	<ul style="list-style-type: none"><li>Plague (transmitted by fleas from rats to humans)</li><li>Rickettsiosis</li></ul>	Presence of rodents

<sup>92</sup>WHO, 2016

Primary Vector	Diseases	Environmental driver
Black flies	<ul style="list-style-type: none"> <li>Onchocerciasis (river blindness)</li> </ul>	Fast-flowing rivers and streams provide suitable habitat for Simulium spp
Aquatic snails	<ul style="list-style-type: none"> <li>Schistosomiasis (bilharziasis)</li> </ul>	Pools and slow moving rivers and streams; Dams and irrigation schemes
Fruit bats (Pteropodidae)	<ul style="list-style-type: none"> <li>Ebola virus</li> <li>Marburg Haemorrhagic Fever</li> </ul>	Presence of fruiting trees

The main vector-borne diseases in SSA associated with development projects are malaria, schistosomiasis, onchocerciasis (river blindness) and dengue fever, which are discussed in more detail below.

#### 4.4.1 Malaria

Malaria is the most important vector-borne disease globally. It is caused by species of protozoan parasites belonging to the genus *Plasmodium*, which are transmitted by the bites of infected *Anopheles* mosquitoes. In 2013, it caused more than half a million deaths, mostly amongst children in SSA. *Anopheles* mosquitoes breed in a wide range of habitats, but show a preference for clean, unpolluted, stagnant or slowly moving water.

Worldwide, approximately 198 million cases of malaria with 584,000 deaths are reported annually, 90% of which occur in Africa (Figure 4.1). DRC, Nigeria, Tanzania, Uganda, Mozambique and Ivory Coast alone account for almost half of the global malaria cases. The direct economic cost is estimated to be USD12 billion a year, which accounts for a loss of 1.3% of GDP growth per year in Africa.<sup>93</sup>

##### Who's at Risk?

Everyone who lives and works in malaria-endemic areas is at risk, but children are particularly susceptible, as well as those people who have an existing disease burden, suffer from malnutrition or are unable to access mitigation support in the form of treated bed nets, area spraying programmes and prophylaxis.

##### BOX 17: MALARIA AND HIV

People infected with HIV are more susceptible to malaria, with malaria increasing the concentration of HIV in the blood by up to sevenfold.<sup>94</sup>

##### Targets

In an effort to reverse these trends, the WHO aims to eliminate malaria from at least 35 countries, achieve a 90% reduction in mortality, and a 90% reduction in malaria cases from the 2015 baseline by 2030, as can be seen in the table below.

<sup>93</sup>Roll Back Malaria, 2015

<sup>94</sup>ICCM, 2008

Table 4.7: WHO 2016-2030 malaria targets

Vision	A world free of malaria		
Goals	Milestones		Targets
	2020	2025	2030
Reduce malaria mortality rates globally compared with 2015	≥40%	≥75%	≥90%
Reduce malaria case incidence globally compared with 2015	≥40%	≥75%	≥90%
Eliminate malaria from countries in which malaria was transmitted in 2015	At least 10 countries	At least 20 countries	At least 35 countries
Prevent re-establishment of malaria in all countries that are malaria-free	Re-establishment prevented	Re-establishment prevented	Re-establishment prevented

Source: WHO, 2015

Even though malaria mortality has decreased by 54% in SSA in the period 2000-2013, these ambitious targets are subject to the following challenges:

- Most countries are still far from universal malaria control coverage due to biological and systemic challenges;
- Resistance to treatment and to insecticides is increasing;
- Funding is below the global target of US\$5 billion per year; and
- Non-health sectors are not sufficiently involved.

#### Development triggers for malaria:

Both WHO and the affiliated Roll Back Malaria (RBM) partnership have identified a number of aggravating factors for the spread of malaria directly related to large capital projects. These include:

- Poor water management - pools of water (large or small) are breeding sites for mosquitoes;
- Creation of dams, weirs, reservoirs, canals, but also excavations for mining and other capital works, where environments are created which are conducive to breeding mosquitoes. For example RBM have found that dams in semi-arid areas may intensify malaria transmission by more than 50%;
- Location (or resettlement) of people close to water resources for food security / economic purposes;
- Land use changes, especially deforestation: an increase in deforestation of just 4% can increase malaria incidence by as much as 48% during the process;
- Perturbations in natural habitat and ecological processes can result in complex changes which affect predator-prey relations and vector distribution;
- Climate change;
- Worsening socio-economic conditions;
- Vector and drug resistance (32% of events).

Furthermore, migration/mobility induced as a result of development, has a high impact on malaria transmission. Below are some examples:

- Migrant and mobile workers, who have different immunity levels and can acquire malaria or carry vectors, are a threat to malaria elimination;
- Migrant and mobile workers often self-medicate themselves or use sub-standard drugs due to lack of access to health services creating risk of drug resistance;
- Relocated and displaced populations, particularly in areas where poverty levels are high and/or where people are already weakened through disease, have a much higher risk of contracting malaria.

#### BOX 18: GLOBAL COMMITMENTS TO MALARIA CONTROL IN PROJECTS

One of the main aims of the Harare Declaration on Malaria Prevention and Control in the Context of African Economic Recovery and Development of the OAU (1997) is to:

*“promote essential multi-sectoral action to ensure that projects and activities do not create vector breeding and expose workers, families and communities to an increased risk of malaria”.*

In addition, in 2013 the RBM/UNDP Multi-sectoral Action Framework for Malaria includes the recommendation that: *“development banks [must] ensure that [the] infrastructure projects they finance, consider impacts on malaria incidence and be designed to avoid any increase”.*

#### 4.4.2 Schistosomiasis

Schistosomiasis, also known as Bilharzia, is a chronic vector-borne disease which is endemic in many parts of Africa. It is caused by contact with water which contains infected parasites or schistosomes which are carried by snail hosts. It can also be perpetuated from faeces of infected humans which enter water bodies, as these contain the parasite. The parasites infect the urinary tract and intestines, which if left untreated, can with time lead to liver damage, kidney failure, infertility or bladder cancer.<sup>95</sup> It can also cause genital sores which make infected persons more vulnerable to HIV. In children it can cause poor growth and learning difficulties. It affects about 210 million people annually and between 12,000 and 200,000 die from it every year.

##### Who's at Risk?

Children are particularly susceptible to the disease from swimming in infected water, but anyone who comes into contact with infected water while doing laundry, fishing, farming (especially irrigation workers) can contract the disease.

##### Targets

It is second only to malaria in terms of economic impact from a vector-borne disease and is listed as a Neglected Tropical Disease.<sup>96</sup> WHO has set a target of complete elimination in the worst affected countries in SSA by 2020.

#### 4.4.3 Onchocerciasis

Onchocerciasis (or river blindness) is a disease caused by the parasitic filarial worm *Onchocerca volvulus*. It is the second most important cause of blindness after Trachoma. Almost all infected people live in 31 countries in West and Central Africa and its distribution is closely linked to the occurrence of its vectors – blackflies of the genus Simuliidae. Repeated exposure to bites in endemic areas leads to high parasitic loads in the body, itching, skin conditions and visual impairment, which can lead to permanent blindness if left untreated. Simuliid blackflies breed in fast-flowing rivers and streams, both in the natural state or in river systems that have been altered due to the construction of dams, weirs and other water control structures. Evidence suggests that transmission can be increased by forest degradation and clearance.

##### Who's at Risk?

People in West and Central Africa who live near rivers hosting large populations of blackflies.

##### Targets

WHO targets the elimination of onchocerciasis (river blindness) in selected African countries by 2020.<sup>97</sup>

#### 4.4.4 Dengue fever

Dengue fever is the most rapidly spreading mosquito-borne virus in the world at present. There is considerable under-reporting and misdiagnosis of this disease and global estimates vary considerably. Dengue is related

<sup>95</sup>Heymann, 2008

<sup>96</sup>Resolution 66.12 adopted by the World Health Assembly in 2013

<sup>97</sup>WHO, 2012

to West Nile and Yellow Fever viruses, with infected persons presenting with 'flu-like symptoms, which left untreated can be deadly, especially in children.

Rapid urbanization, unreliable drinking water, increased population mobility and global trade are important determinants of the resurgence of this disease.<sup>98</sup> There is no specific treatment for Dengue fever and so strategies to prevent it focus on control of the population densities of the mosquito vectors, *Aedes aegypti* and *A. albopictus*, through source reduction and reducing human/vector contact. They breed in clean man-made and natural pools of water close to human dwellings.

### Who's at Risk?

Everyone who lives and works in areas where there are large populations of *Aedes* mosquitoes is at risk, but children are particularly susceptible, as well as those people who have an existing disease burden and/or suffer from malnutrition.

### Targets

WHO has not yet set specific targets for the reduction in the incidence of dengue fever until more is known about the disease and the effectiveness of control measures.

### Development triggers for vector-borne diseases:

- Large and small bodies of water, canals, weirs, irrigation schemes, ponds, pools, puddles (mosquitoes, aquatic snails, sandflies);
- Creation of riffles and shallow, fast flowing water (blackflies);
- Presence of livestock (ticks, tsetse fly);
- Deforestation (mosquitoes, sandflies);
- Presence of rodents (fleas);
- Existing burden of disease (e.g. HIV, diarrhoeal diseases, zoonoses).

### Potential mitigation measures to prevent or control vector-borne diseases:

#### Prevention and control

- Provide insecticide-treated mosquito nets in malarial areas and access to prophylaxis;
- Provide screens on all doors and windows;
- Conduct house spraying with insecticide to reduce vector lifespan;<sup>99</sup>
- Apply larvicides or biological controls to reduce vector populations;
- Conduct participative health impact assessments and derive community-driven mitigation measures. For example, obtain community buy-in to ensure that people do not live within 1km of a newly created shoreline (as it has been shown that people living close to water bodies have a 20 times greater risk of infection than those residing more than 5km away);
- Conduct regular risk assessments through the life of a project to ensure that malaria risks are properly identified at each project stage with appropriate, targeted, management actions;

#### Project design options

- Specify dam designs and dam operational processes to minimise mosquito, blackfly and bilharzia snail habitat e.g. shoreline morphology, water level manipulation, prevent weed proliferation and dying vegetative matter, etc.;
- Consider alternative irrigation systems to reduce vector-borne disease risk;
- In resettlement projects, ensure that the new houses are less conducive to harbouring mosquitoes than traditional huts;

#### Habitat control measures

- Clear invasive aquatic vegetation;
- Maintain all gutters, drains, canals and waterways to prevent pools and seepage;
- Rehabilitate all road borrow pits and excavations to prevent ponding of water, or redirect storm water away from active pits using cut-off drains;

<sup>98</sup>WHO, 2012

<sup>99</sup>The efficacy of these controls may be affected by the development of insecticide-resistant species of mosquitoes.

- Specify that all disturbed areas should be re-vegetated, with reforestation programmes where appropriate;
- Cover all domestic water supply containers and tanks;

#### *Worker health*

- Ensure adequate levels of nutrition in camp canteens;
- Hold tool box talks and awareness campaigns about malaria causes and prevention.

#### BOX 19: VALUE OF ENVIRONMENTAL CONTROLS FOR MALARIA REDUCTION

WHO has estimated that 40% of the malaria burden in Africa could be reduced through the introduction of environmental controls.

## 4.5 Physical injury

This section looks at injuries which may occur outside the workplace; occupational injuries are addressed in s. 4.8.1.

Physical injuries associated with large capital projects can be caused by an increase in road or rail traffic, unsafe working practices and unsafe structures and landforms. One of the most overlooked aspects in many ESIA's is the impact of increased traffic (BOX 20).

#### BOX 20: EXAMPLE OF THE CUMULATIVE IMPACTS OF TRAFFIC

The Strategic Environmental Assessment for the Namibian uranium 'rush' predicted a cumulative increase in traffic of 54% on the main road (B2) from Swakopmund due to the potential simultaneous development of several uranium mines in the area – this on a road that was already congested and had a very high accident rate due to poor visibility (fog is common), poor road condition and differential travel speeds (fast cars and slow heavy vehicles).



*Abandoned mines are often a cause of death or injury.* (Geological Survey of Namibia)

The risk is not only to other drivers, but to communities whose villages straddle rural roads, which can become the main access route to a construction site or are upgraded to regional transportation corridors. While the aims of these road improvement projects are to facilitate access to markets and provide quicker and easier modes of transport, the reality is that the new roads typically do not cater for the large numbers of pedestrians and cyclists who use them and who are placed at much greater risk of personal injury due to speeding traffic. A combination of high speed, poor road quality and a lack of awareness about traffic can lead to death or injury of people living, working and walking along those roads (BOX 21).

## BOX 21: ROAD SAFETY AND AWARENESS

An AfDB compliance audit of the Mozambique section of the Nacala Road Corridor noted that there was an increase in accidents after the new, faster road was completed, but it also found that in one section, all the new road signs had been stolen, underlining the need for community sensitisation around road safety.<sup>100</sup>

Physical injuries such as drowning, falling and smothering can also be caused by unrestricted access to unsafe structures and unrehabilitated mine dumps, dams, open pits, borrow pits, excavations and trenches, old mine adits and declines, etc. Drowning is the leading injury in children under five years old.<sup>101</sup>

### Who's at Risk?

The risks of injury from traffic accidents are high for any road users – either as drivers or passengers in vehicles, or as non-motorised road users, especially those who are not used to speeding traffic. Those who erect market stalls next to a new or upgraded road – usually women, are especially at risk, as are children.

Children, illegal and artisanal miners are most likely to incur physical injuries from accessing unsafe structures and landforms.

### Targets

SDG3.6 aims to halve the number of global deaths and injuries resulting from road traffic accidents by 2020.



*If new road designs do not cater for large volumes of non-motorised traffic, there is a much higher potential for accidents and injuries.*(B. Walmsley)

### Development triggers:

- Increased traffic, especially heavy vehicles;
- Speeding;
- Insufficient separation of traffic and pedestrians and cyclists;
- Lack of road safety awareness amongst local communities and pedestrians;
- Poor vehicle maintenance;
- Unprotected high structures;
- Poorly controlled storage and use of explosives;
- Community and/or worker violence and unrest;
- Uncontrolled public access to active work sites;
- Uncontrolled public access to un-rehabilitated sites (e.g. borrow pits, open pits, adits, etc) where falling, drowning and other injuries are likely;
- Unstable landforms.

<sup>100</sup>AfDB, 2015  
<sup>101</sup>WHO, 2016

#### Potential mitigation measures:

- Ongoing defensive driving training for all truck drivers including suppliers and sub-contractors;
- Regular vehicle and equipment maintenance;
- Construct speed humps or other traffic calming measures in villages and other sensitive areas;
- Erect, maintain and enforce appropriate signage and barriers to access to dangerous work areas;
- Impose speed controls within construction areas;
- Ongoing rehabilitation of borrow pits, quarries and other excavations during construction to make safe;
- Construct dams, tailings dams, waste rock dumps and other large waste storage structures according to international safety guidance to prevent mass slope failure;
- Decommissioning, rehabilitation and site closure at the end of construction or operations to make the site safe;
- Communicate with local communities about risks of unauthorised access, etc.;
- Conduct road safety awareness campaigns in local communities and schools.

## 4.6 Nutritional disorders

Malnutrition occurs when a person is not getting enough food or not getting the right sort of food. Even if people get enough to eat, they will become malnourished if the food they eat does not provide the proper amounts of micronutrients - vitamins and minerals - to meet daily nutritional requirements. This affects childhood growth and development, disease resistance, work productivity and foetal development in malnourished mothers.

Disease and malnutrition are closely linked; sometimes disease is the result of malnutrition, sometimes it is a contributing cause. Giardiasis for example, which is commonly transmitted through water or food contamination leads to malabsorption of nutrients and thus is closely linked to malnutrition. In fact, malnutrition is the largest single contributor to disease in the world, according to the UN's Standing Committee on Nutrition.

Under-nourishment is usually caused by insufficient intake of high-quality food. This is often related to high food prices and poverty and may be aggravated by the presence of disease, which increases the body's nutrient requirements. Under-nutrition affects school performance and studies have shown it often leads to a lower income as an adult, thus perpetuating the poverty cycle. It also causes women to give birth to low birth-weight babies.<sup>102</sup>

#### BOX 22: THE COST OF HUNGER

A World Food Programme Report on the Cost of Hunger in Africa in 2014 found that:<sup>103</sup>

- Ethiopia lost an estimated US\$4.7 billion in 2009 because of child under-nutrition. This is equivalent to 16.5 % of the country's Gross Domestic Product (GDP).
- 40% of adults were stunted as children in Egypt. This represents more than 20 million people of working age who are not able to achieve their potential, as a consequence of child under-nutrition.
- Child under-nutrition costs Swaziland around US\$92 million per year in lost worker productivity.
- Uganda spends around US\$254 million per year treating cases of diarrhoea, anaemia and respiratory infections linked to malnutrition. The early deaths among children each year from causes related to hunger reduce Uganda's labour force by some 3.8%. That amounts to some 934 million working hours lost every year due to an absent workforce.

Large capital projects can contribute to the alleviation of malnutrition by creating employment and facilitating easier access to markets, but at the same time, some types of projects take up good quality agricultural land for non-food production purposes and therefore reduce the amount of food grown locally, driving up prices and possibly resulting in malnutrition.

There may also be risks associated with increased availability and affordability of manufactured food products

<sup>102</sup>www.wfp.org

<sup>103</sup>WFP, 2014.



that are high in fat, salt and carbohydrates. The worldwide prevalence of obesity more than doubled between 1980 and 2014; an estimated 39% of adults were overweight in 2014 and 13% were obese.<sup>104</sup>

### Who's at Risk?

Obesity and micronutrient deficiencies can co-occur when calorie intake is high and the food eaten is low in essential vitamins and minerals. This is a particular risk in regions of rapid economic development, where the influx of cash income into a subsistence economy can disrupt traditional patterns of food production, food distribution, land access and water use. These impacts often fall disproportionately on those most susceptible and least able to cope such as those on very low incomes, children, those with existing disease/disability and the elderly.<sup>105</sup>

### Targets

The WHO's global nutrition targets for 2025 are:

- 40% reduction in the number of children under-5 who are stunted;
- 50% reduction of anaemia in women of reproductive age;
- 30% reduction in low birth weight;
- No increase in children being overweight;
- Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%;
- Reduce and maintain childhood wasting to less than 5%.

These targets are supported by SDG2 which aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture by 2030.

### Development triggers associated with nutritional disorders:

- Loss of agricultural land/fishing areas or access to land/fishing areas;
- Changes in land use and vegetative cover;
- Contamination of crops, soil, water and grazing resulting in decreased productivity of crops and/or ill health or death of livestock;
- Introduction of invasive species;
- Loss of livelihood;
- Changes in harvesting and consumption patterns;
- Involuntary resettlement;
- Demographic changes e.g. influx of people to an area with existing food and/or land shortages;
- Inflation of food prices due to project procurement;
- Availability of, and access to cheap high saturated fat, salt and carbohydrate foods;
- Existing disease burden such as diarrhoeal diseases.

### Potential mitigation measures to prevent or control nutritional disorders:

- Provide adequate compensation for lost agricultural land, fishing areas or access to resources in terms of country or donor guidelines;
- Provide adequate compensation for loss of livelihood;
- Provide nutritious, healthy food in staff canteens;
- Promote healthy eating and diet;
- Provide re-training programmes for those whose livelihoods will be lost or diminished.

## 4.7 Mental health

Access to jobs, income, goods and services can enhance mental health and wellbeing and reduce stress. Having a sense of control over one's life is crucial for mental wellbeing, so large capital projects can improve mental health by reducing poverty, increasing self-esteem and empowering local communities.<sup>106</sup> However, if not well managed, there are many aspects of development that can lead to stress, anxiety, depression and even suicide.

<sup>104</sup>WHO, 2016a

<sup>105</sup>CMM, 2013

<sup>106</sup>CMM, 2013



*Typical construction camp for workers. Local women tend to be employed in the laundry and canteen.*  
(B. Walmsley)

### **Development triggers of mental health conditions:**

The causes of these mental health conditions on and around the construction and operation of a development project include:

- Loss of land, access to land and livelihoods;
- Involuntary physical displacement and resettlement, and associated social upheaval;
- Loss of access to, or physical destruction of historical, spiritual and/or cultural sites;
- Exhumation and relocation of graves;
- Social and cultural conflicts associated with an influx of migrant workers and/or foreigners;
- Community or worker violence;
- Security concerns;
- Substance abuse;
- Increased sickness and death;
- Powerlessness;
- Increased conflict over compensation payments, or between perceived project beneficiaries and those who are adversely impacted;
- Uncertainty;
- Noise and vibration which can affect sleep patterns and concentration;
- Visual and aesthetic impacts, including loss of sense of place and belonging;
- Exposure to certain chemicals e.g. mercury.

### **Who's at Risk?**

Although many of these impacts are inherently known, there is very little hard evidence and monitoring data to demonstrate the severity and extent of mental illness which may **be directly attributable** to specific developments. The key issue is resilience: some groups or sectors of communities may be more resilient to change than others. Those who are more resilient will adapt their lives and livelihoods to accommodate the changes. These people are usually better educated, have various alternative livelihood options available and greater resources to make the adaptations required.

However, those who are less resilient and more vulnerable to change do not have the means and resources to adapt to perturbations in their lives, irrespective of whether change happens rapidly or over a longer period of time. While the more resilient group may suffer short-term stress and anxiety, it will recede once the necessary physical and mental adaptations have been made. The more vulnerable sectors of society on the other hand are likely to suffer chronic mental health issues, which often go undetected and undiagnosed. Furthermore, people who suffer from stress-related illnesses are also more prone to communicable and non-communicable diseases discussed in sections 4.1 and 4.2 above.

### Targets

There are no specific global targets for mental health, but SDG 3.4 advocates the promotion of mental health and wellbeing, and SDG 3.5 lists “the prevention and treatment of substance abuse”, which is often considered to be a mental health challenge.

### Potential mitigation measures:

- Provide adequate compensation for lost agricultural land or access to resources in terms of country or donor guidelines;
- Provide adequate compensation for loss of livelihood;
- Carry out grave removals and relocations according to local practices and/or national guidelines and with the consent of all those involved;
- Restrict noise levels to WHO standards in residential areas;
- Restrict working hours to daytime and weekdays near residential areas and sensitive receptors e.g. churches, hospitals and schools;
- Use low noise-emitting equipment and machinery or house in sound-proof buildings near residential areas and sensitive receptors;
- Erect noise screens to reduce noise levels near sensitive receptors;
- Monitor vibration levels and keep within accepted limits near sensitive receptors;
- Conduct building condition surveys of structures near to blast sites or where activities create vibration e.g. heavy rolling of road surfaces;
- Maintain a complaints log and address all complaints within 24 hours;
- Set up a 24 hour hotline;
- Appoint a community liaison officer;
- Maintain an open dialogue with all affected parties;
- Locate noisy activities away from schools, hospitals, old age homes and other sensitive sites;
- Carry out a visual impact assessment;
- Revegetate disturbed areas as soon as possible to reduce dust and visual scarring.

## 4.8 Occupational health

Unsafe and unhealthy working conditions are problematic everywhere. In the ILO report on the Prevention of Occupational Diseases (2013), it is estimated that of the 2.34 million annual work-related deaths, the vast majority – approximately 2.02 million – are due to occupational diseases. This represents an average of 5,500 deaths per day. The most critical sectors are agriculture, mining, construction and the informal sector. Occupational diseases carry an enormous cost – for workers and their families, as well as for economic and social development. The ILO (2013) estimates that occupational accidents and diseases result in an annual 4% loss in global gross domestic product (GDP), or about US\$2.8 trillion, in direct and indirect costs of injuries and diseases.

### Targets

The ILO has not set targets as such for improvements in occupational health, but the Plan of Action 2010-2016 placed emphasis on the need to encourage countries who have not yet done so, to ratify and implement the key occupational health and safety (OHS) Conventions and to promote a national culture of preventing OHS accidents and diseases.<sup>107</sup>

The types of occupational diseases vary from country to country and depend both on the nature of industry in each country, but also on the degree of monitoring and enforcement of workplace occupational health and safety standards by government authorities. Well-known occupational diseases, such as pneumoconiosis, remain widespread, while relatively new occupational diseases, such as mental and musculoskeletal disorders (MSDs), are on the rise.<sup>108</sup> The main occupational health issues associated with construction projects, mining, energy and agricultural projects are:

<sup>107</sup>ILO, 2010  
<sup>108</sup>ILO, 2013

- Traumatic injury;
- Respiratory illnesses;
- Cancer and other disorders from exposure to chemicals;
- Noise-induced hearing loss;
- Zoonoses;
- Dermatoses;
- Heat and cold stress;
- Musculo-skeletal disorders (MSD).

#### 4.8.1 Traumatic injury

A large number of deaths and disabilities are caused each year by accidents in the workplace involving machinery, moving equipment, working with explosives, unsafe structures, construction and farm vehicles and hand tools. The more mechanised the project, the greater the risk of accidents, especially if vehicles and equipment are not properly maintained and basic training and safety measures are not put in place. Falls from heights and ladders are also a major cause of death and injury either directly from the trauma of the fall, or indirectly if the fall occurs for example, in grain silos or into animal manure pits, where the cause of death would be suffocation or inhalation of toxic gases respectively.

#### 4.8.2 Respiratory illnesses

Millions of workers continue to be at risk of pneumoconiosis (especially silicosis, coal-worker's pneumoconiosis, and asbestos-related diseases) due to widespread exposures to crystalline silica, coal dust, asbestos and various mineral dusts in mining, quarrying, construction and other manufacturing processes. Pneumoconiosis has long latency periods and can often go undiagnosed and unreported. The associated illnesses (chronic obstructive pulmonary disease, silico-tuberculosis, silica- and asbestos-related cancers) often cause permanent disability or premature death.<sup>109</sup>

Occupational exposure to fumes, gas (primarily H<sub>2</sub>S, SO<sub>2</sub>, CO), and respirable particulates (PM10) is also a cause of a range of respiratory system diseases and disorders. Mining, smelting, landfills, many industrial



*Threshing teff in Ethiopia with no respiratory protection.*

(P Tarr)

Agricultural workers are exposed to a number of dusts and gases in the workplace that can cause acute and chronic respiratory diseases. Exposures that play an important role in causing respiratory disorders include grain dust, fibres, dust and gases in animal confinement units, mould (e.g. aflatoxins),<sup>110</sup> thermophilic

processes and agriculture are the main industries in which workers may be exposed to airborne pollutants hazardous to their health. In most larger, listed companies, workers are afforded protection from exposure to health hazards, but in many smaller industries and mines, in countries where there is little to no control over occupational health, workers are often exposed to pollutants at damaging concentrations. For example, illegal retorting of gold using mercury can lead to neurological damage and premature death. Exposure to metal tank house fumes can cause pneumoconiosis, and nasal sinus cancer has been linked to exposure from nickel subsulphide. Acute pneumonia can be caused by exposure to blasting fumes.

<sup>109</sup>ILO, 2013

<sup>110</sup>Aflatoxins are poisonous and cancer-causing chemicals that are produced by certain moulds (*Aspergillus flavus* and *Aspergillus parasiticus*) which grow in soil, decaying vegetation, hay, and grains. They are regularly found in improperly stored staple commodities such as cassava, chilli peppers, corn, cotton seed, millet, peanuts, rice, sorghum, sunflower seeds, tree nuts, wheat, and a variety of spices. When contaminated food is processed, aflatoxins enter the general food supply where they have been found in both pet and human foods, as well as in feedstocks for agricultural animals. Animals fed contaminated food can pass aflatoxin transformation products into eggs, milk products, and meat. Children are particularly affected by aflatoxin exposure, which leads to stunted growth, delayed development, liver damage, and liver cancer. Adults have a higher tolerance to exposure, but are also at risk.

bacteria in hay and grain, and silo gas. Many of the bio-aerosols inhaled by agricultural workers are rich in endotoxin, which has been associated with both acute and chronic illness.

Workers in biofuels and oil crop processing facilities may be exposed to ethanol vapors, vegetable oil mists, hexane and other solvents, acids and bases.

Specific respiratory problems in sugar cane production are linked to combustion gases and particulates during cane burning activities, while sugar processing workers may develop bagassosis, and interstitial lung disease from processing bagasse, without adequate PPE.

Inorganic dust inhalation can also cause respiratory ailments, particularly if the dust is rich in silica. Farm workers are most at risk of inhaling respirable particulates when working in the fields in dry, hot conditions without any protective equipment, while it is a common ailment in the mining sector.

#### 4.8.3 Cancer and other disorders from exposure to chemicals

In addition to the respiratory ailments described above, exposure to chemicals in the workplace has been implicated in a wide range of cancers – indeed, occupational exposure to carcinogens causes between 2 - 8% of all cancers. Some of the more common cancers and their links to the workplace are listed below.<sup>111</sup>

##### **Lung cancer:**

- Asbestos
- Diesel and engine exhaust
- Hexavalent chrome
- Silica
- Respirable dust
- Coking plants
- Aluminium production
- Paint.

##### **Mouth and larynx cancer:**

- Asbestos
- Poly-aromatic hydrocarbons
- Engine exhaust
- Respirable dust
- Fumes

##### **Lymphomas, multiple myelomas, leukaemia:**

- Benzene (production of dyes, rubber, pesticides)
- Formaldehyde (commonly used in manufacturing)
- Rubber manufacturing
- Ionizing radiation
- Pesticide and herbicide production
- Solvents e.g. dichloromethane, trichloroethylene
- Petroleum refining (limited evidence)
- X-rays and gamma rays
- Low frequency magnetic fields e.g. from power lines (limited evidence)

##### **Melanoma and skin cancers:**

- Ultra-violet radiation
- PCBs
- Asbestos
- Soot
- Ionising radiation

The term 'pesticide' is used to refer to a range of chemicals used to kill, control or repel animal pests, weeds, fungi, bacteria and other pathogens. Pesticides pose risks of short- and long-term illness to farm workers and their families, as well as adjacent communities and product consumers. Workers who mix, load or apply pesticides can be exposed to toxic pesticides due to spills and splashes, defective, missing or inadequate protective equipment, direct spray, or drift. Farm workers may be exposed to pesticides in a variety of ways, including: working in a field where pesticides have recently been applied; breathing in pesticide 'drift' from adjoining or nearby fields; working in a pesticide-treated field without appropriate PPE; eating with pesticide-contaminated hands; eating contaminated fruits and vegetables; and eating in a pesticide-contaminated field. Workers may also be exposed to pesticides if they drink from, wash their hands, or bathe in irrigation canals or holding ponds, where pesticides can accumulate. Pesticides can enter the human body through inhalation, ingestion, or by dermal penetration through the skin.

The WHO estimates that there are 3 million cases of pesticide poisoning each year and up to 220,000 deaths,

<sup>111</sup>WHO, 2016

mostly in developing countries. Pesticide exposure can cause a range of neurological health effects such as memory loss, loss of coordination, reduced stimulus response, impacts on vision, altered or uncontrollable mood and behaviour and reduced motor skills. Pesticides have also been linked to cancer, hormone disruption and problems with reproductive and foetal development (Table 4.8). Workers in orchards and fruit farms, vegetable production, and cotton pickers as well as children, are particularly susceptible to pesticide poisoning.

**Table 4.8: Common pesticides and their health effects**

Pesticide group	Documented health effects
Organochlorines e.g. dichloropropene	Loss of sensation around the mouth, hypersensitivity to light, sound and touch, dizziness, tremors, nausea and vomiting, nervousness and confusion, reproductive system.
Organophosphates e.g. chlorpyrifos and Carbamates e.g. aldicarb, carbaryl	Increased salivation and perspiration, narrowing of pupils, nausea, diarrhoea, decrease in blood pressure, muscle weakness and fatigue. Also affects the brain, reproductive systems and linked to cancer.
Pyrethroids	Hyper-excitation, aggressiveness, loss of coordination, tremors and seizures, allergic skin response. Some pyrethroids can cause cancer, reproductive or developmental effects or endocrine system disruption.
Dioxins (TCDD) (2,4-D and 2,4,5-T)	Birth defects, cancers, liver disease and other illnesses.
Phenoxyacetic acid (2,4-D)	Non-Hodgkins Lymphoma.
Methyl bromide	Affects skin, eyes, brain and respiratory systems. May cause fluid in lungs, headaches, tremors, paralysis and convulsions.

#### 4.8.4 Noise-induced hearing loss

Many workers in mining, quarrying, energy, heavy industry, manufacturing, construction, agriculture and forestry are frequently exposed for prolonged periods of time to high levels of noise from blast furnaces, crushing plants, rock drills, machinery, power tools, tractors etc., which can affect hearing to a greater or lesser extent without adequate hearing protection.

#### 4.8.5 Zoonotic diseases

Diseases that can be transmitted between animals and humans are known as zoonotic diseases or zoonoses. About 60% of all human diseases and 75% of all emerging infectious diseases are zoonotic, largely from pigs, poultry, cattle, sheep, goats and camels.

Zoonotic diseases, such as bird 'flu and bovine TB, can have a significant effect on both the affected animals and humans in terms of health and economic impact. There is a strong association between poverty, hunger, livestock keeping and zoonoses, but actual data about notifiable diseases is poor to non-existent in most low to middle income countries. An extensive literature survey by Grace et al (2012) indicated that the most affected countries in SSA are: Nigeria, Burkina Faso, Mali, Ghana (in that order).

Thirteen zoonoses<sup>112</sup> have been found to be responsible for 2.2 million human deaths per year, mostly in five countries (China, India, Ethiopia, Nigeria and Bangladesh) where 44% of the world's poorest livestock keepers live. The impact of these diseases is compounded by the severity of the disease and its amenability (or not) to agricultural controls. The main drivers of the spread of zoonotic diseases are: increased access into previously undisturbed areas, changes in land use and vegetative cover and via the introduction of invasive species. Resettlement may be an indirect driver of ecosystem change that can result in adverse health impacts if people are resettled into habitat containing zoonotic disease hosts.<sup>113</sup> The main livestock types and the associated zoonoses are indicated in Table 4.9.

<sup>112</sup>Zoonotic gastrointestinal disease, Leptospirosis, Cysticercosis, Bovine TB, Rabies, Leishmaniasis, Brucellosis, Echinococcosis, Toxoplasmosis, Q Fever, Zoonotic trypanosomiasis, Hepatitis E, Anthrax.

<sup>113</sup>PIECA, 2010



*Close contact with cattle can result in zoonotic diseases without basic controls in place. (P.Tarr)*

**Table 4.9: Livestock and associated zoonotic diseases**

Livestock type ( <b>Primary carriers in bold</b> )	Zoonoses
Cattle, llamas and pigs	Bovine TB
Cattle, <b>sheep, goats and pigs</b>	Human brucellosis
Pigs	Cysticercosis
Sheep, <b>goats and cattle</b>	Q Fever
Cattle, sheep, <b>pigs, rabbits (secondary hosts) via rodents (primary hosts)</b>	Leptospirosis
Poultry	Avian influenza or Bird Flu
Sheep, <b>goats, cattle, camels, pigs (secondary hosts)</b>	Echinococcosis
Cattle, <b>sheep</b>	Anthrax

There are three basic means of controlling the spread of zoonoses:

- **Personal protective actions and equipment**, such as, hand hygiene, the use of appropriate gloves and outer protection, facial and respiratory protection and the tracking of aggressive animals, so that restraints are used when necessary.
- **Environmental infection control**, such as cleaning and disinfecting surfaces and equipment, early diagnosis and treatment, vaccinating healthy animals, isolating diseased animals, disposing of infected tissues or dead animals appropriately and controlling the infestation of pests which can be a carrier of these infections.
- **Worker health**, such as vaccinating workers, health surveillance, providing good nutrition to workers, early diagnosis and treatment and providing proper awareness training and education.

#### 4.8.6 Dermatoses

All outdoor workers are exposed to the sun and as a result, an increased risk of skin cancer. Basal cell carcinoma and lip cancer are two of the most common types of cancer in agricultural workers. Melanoma and other skin cancers accounted for nearly 100,000 deaths in 2012 due to the exposure of outdoor workers to ultra-violet radiation from the sun. Contact with a range of agricultural materials e.g. fertilisers, pesticides, other farm

chemicals, fibres, thorns and leaves can also cause dermatological reactions such as eczema, rashes, itching, and urticaria.

In the mining, petrochemical and industry sectors, contact with a wide range of chemicals including acids, alkalis, solvents, fuels, lubricants and resins can cause burns, contact dermatitis and cancer. The salts of some metals such as nickel and chromium can also cause skin disorders.<sup>114</sup>

In some countries, children from smallholder tobacco farming households are frequently employed to provide family income. These children are especially vulnerable to 'green tobacco sickness', which is caused by the nicotine that is absorbed through the skin from the handling of wet tobacco leaves.

#### 4.8.7 Heat and cold stress

Extreme heat or cold in the workplace can be both stressful and bring on adverse health reactions, such as heat stroke and hypothermia respectively. The recommended measures to combat heat stroke are to provide sufficient shade, water and rest breaks, as well as adequate head covering. The risks of hypothermia can be reduced by providing warm shelter, hot drinks and food, adequate rest breaks and warm clothing including hats, boots and gloves.

#### 4.8.8 Musculo-skeletal disorders

Any workplace activities that require repetitive work, heavy lifting, stretching or bending, exposure to vibration and working in confined spaces can cause musculo-skeletal disorders such as rheumatoid arthritis, osteoarthritis, back and neck pain, gout and joint disorders. Those most at risk include mine workers, farmers (especially crop pickers), forestry workers, fishermen, production workers, etc.

#### **Occupational Health: Who's at Risk?**

Occupational diseases and disorders affect anyone who is employed in a place of work, but those who are in occupations where there are high levels of pollution, mechanization and danger – especially in the absence of adequate health and safety control measures and protection, are more at risk of contracting a disease or being injured than office workers for example. Globally, there are more men than women employed, and some industries tend to employ more men than women due to the nature of the work (e.g. in mining, road construction) and therefore men will tend to be more at risk than women in these sectors. However, there are some situations where more women than men may be employed, such as in hospitals or some agricultural sectors, and in these cases, women will bear the proportional burden of associated disease and injury. Furthermore, pregnant women are particularly vulnerable to workplace health issues due to the adverse effects not only on themselves, but on their unborn child. There is however, growing evidence that outsourced or sub-contracted workers display higher levels of injuries and absenteeism due to poor health than employees who are directly employed by the principal contractor. The link between outsourcing and poor occupational health and safety outcomes operates through multiple pathways, including economic pressures, poor coordination of OHS policy implementation, lack of consideration for basic human rights and workplace rights, as well as regulatory failures.<sup>115</sup>

Finally, although banned under several international conventions (see BOX 2), there are still situations in SSA where children are 'employed'. Some of the occupational exposures described above (especially airborne pollutants) can have severe impacts on growth and cognitive development in children and the impacts can be exacerbated by the presence of other health issues such as malnutrition, HIV, malaria, schistosomiasis, giardiasis, etc.

<sup>114</sup>ICMM, 2012

## Potential mitigation measures for occupational health:

### *During project design phase and ESIA*

- An occupational health and safety expert should be included in either the project design team or the ESIA team to identify potential OHS impacts and to recommend ways to prevent or otherwise minimise potential adverse effects;
- A high degree of cooperation will be needed between the OHS specialist and the social and health specialists to coordinate their understanding of the issues between the workplace and the broader community and *vice versa*;
- Develop a comprehensive OHS policy.

### *During construction and operation*

- Provide comprehensive OHS induction training for all new employees, sub-contractors and suppliers and present a mandatory shorter introduction to site OHS for visitors;
- Appoint health and safety representatives from the workforce;
- Appoint peer educators from the workforce to reinforce disease prevention programs (e.g. on HIV, TB, malaria, STIs, etc);
- Appoint a full-time doctor or qualified nurse to run the camp clinic;
- Provide all employees with correct PPE and provide training on how to use it correctly and why it is important;
- Enforce the use of correct PPE by all sub-contractors and suppliers while on site or conducting project related business;
- Conduct regular internal and external OHS audits to ensure that all the structural and procedural control measures are in place and working properly – this should also extend to sub-contractors and suppliers;
- Offer wellness programs to all employees and outsourced staff regarding health issues such as smoking, alcohol use, disease prevention, personal hygiene, diet and nutrition, exercise, etc.;
- Promote sport and exercise;
- Implement a zero alcohol policy on site;
- Ban smoking indoors and only allow it in designated areas;
- Work with local police to prevent the sale of alcohol (especially home-brew) at the gate or near work sites;
- Offer more healthy meal options in the canteen;
- Allow paid time off work to attend the clinic or hospital and for regular HIV and TB testing.



*Agricultural workers often have to carry heavy loads. (P.Tarr)*

## 4.9 Emerging health issues and pandemics

### 4.9.1 Introduction

Emerging infectious diseases (EIDs) are defined as infections that have newly appeared in a population or have existed previously but are rapidly increasing in incidence or geographic range.<sup>116</sup> Between 1940 and 2004, 335 EIDs were reported globally, concentrated in hotspots located mainly in low-latitude developing countries; these remain a significant threat to global health and the global economy despite attention to their identification, surveillance, epidemiology, containment and prevention.<sup>117</sup>

Nearly three-quarters of emerging infectious diseases originate from wildlife. Three wild animal groups, which comprise approximately 70 percent of mammal species, are considered most likely to spread new infections to people: bats (coronavirus responsible for SARS; filovirus responsible for Ebola and Marburg, Nipah and rabies viruses), rodents (Lassa, hanta and monkeypox viruses) and non-human primates (yellow fever viruses). As EIDs originate from animals, there has been a growing global focus on the development of systems that focus on surveillance at the animal-human environment interface, lending further support to what is known as the 'One Health' approach.<sup>118</sup> Disease emergence or re-emergence can result from a number of factors:

- **Land use changes:** human encroachment, habitat fragmentation, biodiversity loss, ecosystem changes, alteration in ecosystem services, opening up of previously undisturbed areas, urbanisation and industrial development, water resources development and poor sanitation.
- **Food system changes:** intensifying and expanding farming areas, greater livestock densities, increased contact of livestock and wildlife, trade globalisation, unregulated or irregular use of antibiotic drugs and vaccines.
- **Human behaviour:** hunting and/or consumption patterns, increased contact with wildlife, cultural practices and processes, travel, breakdown or minimal governance and enforcement of laws and regulations, increasing drug resistance. There is documented evidence that epidemics spread more rapidly where large capital projects are being executed, due to the presence of large numbers of migrant and mobile workers.<sup>119</sup>
- **Environmental systems:** climate change, natural disasters, desertification.<sup>120</sup>

Any projects which by their nature occur in remote areas e.g. mining, oil and gas developments and associated infrastructure (pipelines), transportation projects, etc., may open up EID 'hotspots', especially where there are relatively weak health systems (BOX 23). By assessing and managing the risk of EIDs through well-informed social and health impact assessments, companies operating in these areas play a crucial role in preventing or minimising the occurrence of EIDs. But traditionally, health impact assessments (separate studies or as part of the SIA) have failed to identify the non-human vector pathways, especially zoonotic pathogens, as potential routes for disease transmission.

#### BOX 23: VULNERABILITY OF STATES TO THE OUTBREAK OF EIDS

States which may have experienced decades of instability and have weak governance systems – especially health care, may be particularly vulnerable to the outbreak of EIDs. Chad for example is currently embarking on multiple large infrastructure projects such as railway connections to Cameroon and Sudan, a new airport, oil development in the Dossau Basin and other major mining projects.

<sup>116</sup>Morse, 1995

<sup>117</sup>Jones et al., 2008 quoted in IPIECA, 2016

<sup>118</sup>The One Health approach is defined as a collaborative effort of multiple disciplines to attain optimal health for people, animals and the environment (IPIECA, 2016).

<sup>119</sup>USAID, 2005

<sup>120</sup>Adapted from IPIECA, 2016

#### BOX 24: EMERGING INFECTIOUS DISEASES AND MINING

In 2007, an outbreak of Marburg Haemorrhagic fever occurred among mine workers in Kamwenge and Ibanda District in Uganda. In 2004, outbreaks of pneumonic plague and leptospirosis (associated with rats) occurred in a miner's camp in DRC.<sup>121</sup>

In contrast to diseases such as malaria and HIV, EIDs have a low risk probability, but can have devastating consequences, as shown by the Ebola outbreak.

By adopting a proactive approach to health in the context of large capital projects, companies can be better prepared for, and react to health emergencies e.g. the Ebola outbreak in West Africa in 2014-15 as well Zika and other mosquito borne diseases. Having the tools to understand the health consequences of development activities can thus increase the resilience of companies and governments to cope with such epidemics around large capital projects.

#### 4.9.2 Avian influenza A(H5N1) virus

Avian influenza (AI) is an infectious viral disease of birds (especially wild water fowl such as ducks and geese), often causing no apparent signs of illness. AI viruses can sometimes spread to domestic poultry and cause large-scale outbreaks of serious disease. Some of these AI viruses have also been reported to cross the species barrier and cause disease in humans and other mammals.<sup>122</sup>

The A(H5N1) virus subtype, a highly pathogenic AI virus, first infected humans in 1997 during a poultry outbreak in Hong Kong. Since its widespread re-emergence in 2003 and 2004, this avian virus has spread from Asia to Europe and Africa and has become entrenched in poultry in some countries, resulting in millions of poultry infections, several hundred human cases, and many human deaths. Outbreaks in poultry have seriously impacted livelihoods, the economy and international trade in affected countries.

#### 4.9.3 Ebola

The Ebola virus causes an acute, serious illness which is often fatal if untreated. Ebola virus disease first appeared in 1976 in 2 simultaneous outbreaks, one in Nzara in what is now South Sudan, and the other in Yambuku, DRC. The latter occurred in a village near the Ebola River, from which the disease takes its name.

The 2014 outbreak in West Africa is the largest and most complex Ebola outbreak since the virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It also spread between countries starting in Guinea then spreading across land borders to Sierra Leone and Liberia, and to some other countries via air travellers.

It is thought that fruit bats of the Pteropodidae family are natural Ebola virus hosts. Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest. Ebola then spreads through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.

#### BOX 25: IMPACT OF EBOLA ON THE MINING INDUSTRY IN LIBERIA, SIERRA LEONE AND GUINEA

Prior to the outbreak of Ebola, mining represented 14% and 17% of Liberia's and Sierra Leone's GDP, respectively. A World Bank assessment predicted shrinking economies for these countries in the second half of 2014, and a forgone income across these two countries and Guinea in 2015 of about \$1.6 billion. This is more than 12% of their

<sup>121</sup>IPIECA, 2016  
<sup>122</sup>WHO Fact Sheet

combined GDP. Declining national output has translated into weaker revenues, while government spending needs have grown, further weakening public finances.

The WHO recommends the following risk reduction measures:

- **Reducing the risk of wildlife-to-human transmission** from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.
- **Reducing the risk of human-to-human transmission** from direct or close contact with people with Ebola symptoms, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients.
- **Reducing the risk of possible sexual transmission**, based on further analysis of ongoing research and consideration by the WHO Advisory Group on the Ebola Virus Disease Response, WHO recommends that male survivors of Ebola virus disease practice safe sex and hygiene for 12 months from onset of symptoms or until their semen tests negative twice for Ebola virus.
- **Outbreak containment measures**, including prompt and safe burial of the dead, identifying people who may have been in contact with someone infected with Ebola and monitoring their health for 21 days, the importance of separating the healthy from the sick to prevent further spread, and the importance of good hygiene and maintaining a clean environment.

#### 4.9.4 ZIKA virus

Following the ZIKA virus disease outbreak in north-eastern Brazil in February 2015, the virus has dramatically expanded its geographic boundaries and is now actively transmitted in more than 60 countries in South, Central and North Americas, the Caribbean region and Pacific Ocean Islands. In mid-2016 it was also reported from the Cape Verde islands and Guinea Bissau in West Africa.<sup>123</sup>

Zika virus infection causes mostly asymptomatic or mild febrile (feverish) illness and it has been positively linked as a cause of microcephaly<sup>124</sup> and Guillain Barré syndrome.<sup>125</sup> The virus is spread from human to human via infected mosquitoes, but it can also be transmitted sexually, through blood transfusions and from mother to child.

#### 4.9.5 Yellow fever

Yellow fever is a viral disease, found in tropical regions of Africa and the Americas. The “yellow” in the name refers to the jaundice that affects some patients. It principally affects humans and monkeys, and is transmitted via the bite of Aedes mosquitoes. It can produce devastating outbreaks, which can be prevented and controlled by mass vaccination campaigns.<sup>126</sup>

In 2016, there was an outbreak of yellow fever in Angola and DRC, which claimed the lives of nearly 400 people and resulted in more than 6,000 suspected cases. The disease is being brought under control through a large-scale vaccination program.<sup>127</sup>

#### Who's at Risk of EIDs?

Anyone who lives in areas with a known risk of these diseases is at risk if an outbreak occurs, and those living in cramped conditions are even more susceptible to the transmission of disease, especially where health care systems are weak. However, people with an already compromised immune system due to an existing disease e.g. malaria, HIV, or those suffering from malnutrition, will be more vulnerable to these disease outbreaks.

<sup>123</sup>Centre for Emerging and Zoonotic Diseases, NICD-NHLS, August 2016

<sup>124</sup>An abnormal smallness of the head of babies associated with incomplete brain development (CDC)

<sup>125</sup>A disorder in which the body's immune system attacks part of the peripheral nervous system.

<sup>126</sup>[www.afro.who.int/en/yellow-fever.html](http://www.afro.who.int/en/yellow-fever.html)

<sup>127</sup>Ibid.

## Potential mitigation measures:

### *New projects*

- In cases where a new project is planned in an area with a known EID risk, it is important to conduct a thorough health risk assessment at the project planning stage and to decide whether to accept the health risks or not;
- If the risk is deemed acceptable, then it is imperative to put in place adequate disease prevention measures such as health screening prior to employment and before visiting the site, as well as rapid response procedures in the event that an EID is found on site or in a neighbouring community;

### *Existing projects*

- When a disease epidemic is confirmed in the country where the project is located, immediately put in place disease screening and prevention measures and devise a rapid response program as described above.

# 5

# INTEGRATION OF HEALTH ISSUES INTO THE ESIA PROCESS

## 5.1 Introduction

This chapter assumes that readers are familiar with the ESIA process and it is therefore not intended to be a guide on how to do an ESIA. Rather, the aim of this chapter is to highlight areas within the standard ESIA process where the integration of health and social (including gender) issues can be strengthened, focussing on the following:

- Screening and project categorisation to take into account social sensitivity and health;
- How to decide whether to do an inclusive SIA, or separate studies on social, health and gender impact assessments;
- How to ensure that all stakeholders participate in the ESIA process;
- How to integrate biophysical and socio-economic findings in an ESIA;
- Addressing gender: disaggregation of impacts; mitigation measures;
- How to review an ESIA/ESMP to ensure that health (and social) issues have been integrated;
- Costing health mitigation;
- How to ensure that the ESMP requirements are being implemented on the ground – getting the best possible results.

Integration refers not only to the synthesis of all specialist studies into a coherent analysis of the impact of a project on the environment in its widest sense, but it also refers to the need for environmental (including health and social) issues to be addressed at each stage of the process (Figure 5.1)

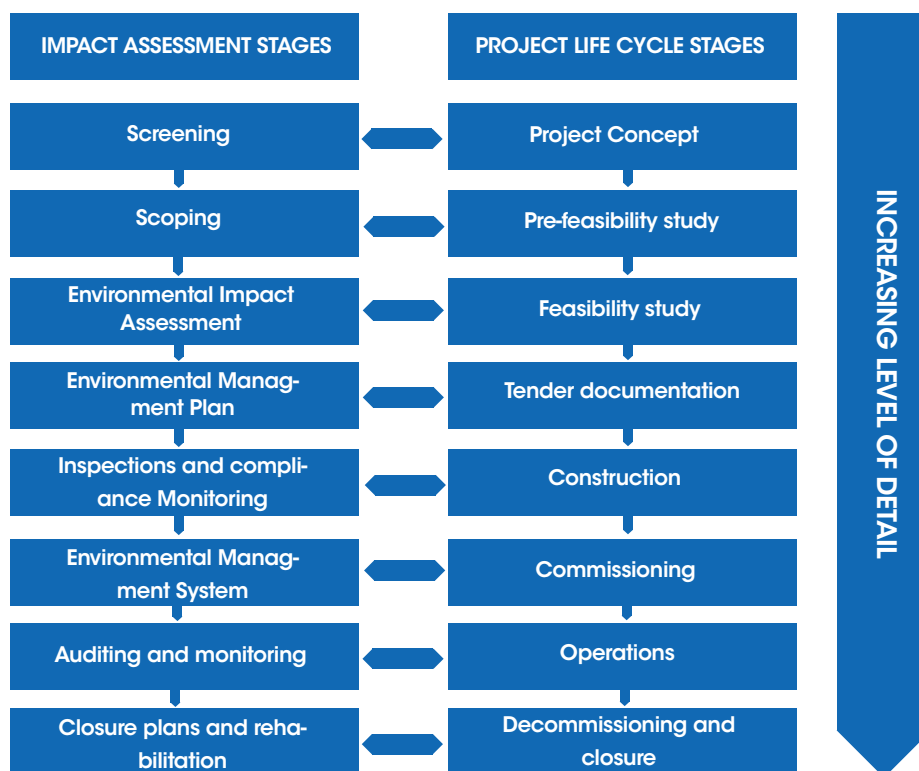


Figure 5.1: Synchronization of the ESIA and project life cycle stages



## 5.2 Screening and project categorisation

Screening determines whether a development proposal requires an environmental assessment or not, and if so, what level of assessment would be appropriate. Screening is, therefore, a decision-making process that is initiated during the early stages of the development of a project proposal.<sup>128</sup> Screening is usually based on a project's size and scope and/or the sensitivity of the biophysical environment; it is rarely based on social sensitivity or vulnerability. As a result, some projects are perhaps erroneously classified as Category B projects, which do not require a full ESIA (BOX 26).

### BOX 26: INCORRECT SCREENING OF A ROAD DEVELOPMENT PROJECT IN SWAZILAND

A major road upgrade through a dense urban and peri-urban area in Swaziland, was classed by AfDB as a Category B project because the road length was less than the screening threshold of 50 km. However, given the sensitivity of land use and social issues in the urban environment and the country's extremely high HIV prevalence rate<sup>129</sup> (and vulnerability), the project should have been classed as a Category A project.

To evaluate the degree of vulnerability and risk to communicable and non-communicable diseases, vector-borne diseases, pollution-induced effects, malnutrition, injury, mental illness and occupational health issues, a high level situation assessment needs to be performed at the screening stage to determine the following:

- The current prevalence rate for HIV, STIs and TB in the project-affected area, including along transportation corridors to and from the project site;
- The presence of malaria and/or the potential to create suitable habitat for disease vectors such as mosquitoes, snails, sandflies, blackflies, etc.;
- The nutritional status, particularly amongst children, the elderly and pregnant women;
- Unemployment levels in the project affected area and in the region and/or country (to determine the potential for an influx of male job seekers and the opportunities presented for young women and girls to earn money through commercial sex work);
- Need for involuntary resettlement;<sup>130</sup>
- Whether livelihood options will be lost or diminished through economic displacement by the proposed development;
- Presence of cultural practices which disempower women and or create situations where women become more vulnerable to abuse and disease;
- Adequacy of health care facilities to test, diagnose and treat the range of diseases which might be directly or indirectly caused by the project;
- Levels of sexual health awareness including reproductive health;
- Potential for cumulative impacts on health such as the presence of existing or planned activities which are causing or could cause additive or antagonistic health effects or which could make people more vulnerable to disease, e.g.:
  - o Air, soil or water pollution from existing/new mines, industries, agrichemicals, etc.;
  - o Increased road traffic;
  - o Presence of large numbers of migrant workers, job seekers, refugees or mobile contract workers in the project district;
  - o High levels of indoor air pollution;
  - o Cramped, unsanitary living conditions and/or informal housing where there is no formal sewerage or waste disposal system in place;
- Vulnerability to the negative health effects of climate change (flooding, drought, vectors, disease pathogens).

If any of these situations exist or are highly likely to occur, the proposed project (BOX 27) should be deemed to have a significant social (health) risk and should therefore be categorised as a Category A project requiring an ESIA.

<sup>128</sup>DEAT, 2002d

<sup>129</sup>The highest in the world at 28.8% ([www.unaids.org/en/regionscountries/countries/swaziland](http://www.unaids.org/en/regionscountries/countries/swaziland) )

<sup>130</sup>Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use (IFC, 2012a)

#### BOX 27: PROJECTS WHICH COULD INCREASE SOCIAL VULNERABILITY AND RISK OF DISEASE

- Construction of dams and other water development projects
- Irrigation schemes
- Large-scale agricultural projects
- Transportation projects (roads, railways, ports, airports)
- Energy generation and transmission
- Mines
- Oil and gas
- Manufacturing plants
- Manufacture, transportation and use of hazardous materials
- Large-scale deforestation and/or habitat loss and/or opening up new areas
- Introduction of alien invasive species
- Resettlement
- Waste disposal (landfill, incineration, energy conversion)

### 5.3 Scoping and determination of specialist studies

The primary output from scoping is the ToR for the ESIA and any specialist studies. The ToR usually have to be approved by the relevant authorities, and scrutinised by the DFI where external funding is being provided.

Most countries have their own Regulations or Guidelines which set out the processes to be followed during scoping and the content of scoping reports. There are also many guidelines available on scoping in general. The aim of this section is to provide guidance on how to decide whether to do a standalone, comprehensive SIA that includes health, gender and all other social issues, or to conduct separate specialist studies.

Recently, there has been much debate<sup>131</sup> as to whether there should be separate specialist studies on social impact assessment (SIA), health impact assessment (HIA), human rights impact assessment (HRIA), gender impact assessment (GIA) and so on, or just one comprehensive SIA. While it could be argued that separate assessments give more prominence to the topic being assessed,<sup>132</sup> and in certain circumstances this may be necessary (see BOX 29), it also means that issues that should be considered in an holistic manner become isolated – the ‘silo’ effect. Separate studies thus become an end in themselves rather than as an input to an integrated SIA.



If we take a commonly-accepted definition of ‘social’ (BOX 28) as being inclusive of gender, health and the social determinants of health (Table 5.1), it is clear that for many projects, a comprehensive SIA should be sufficient to address the main health and gender issues arising from a project. Including all these issues in one study also helps to promote integration and helps to avoid duplication, minimise overlaps, use baseline data more efficiently and promotes closer integration of environmental exposure, social interactions and behaviours and health outcomes.<sup>133</sup> Furthermore, the WB strongly advocates the inclusion of health under SIA in its new Environmental and Social Framework (ESF).<sup>134</sup>

<sup>131</sup>Diwan et al., 2000; Lehto and Ritsakis; 2000, Bond, 2004; Fehr et al, 2014; Morrison-Saunders, Pope et al. 2014.

<sup>132</sup>Lehto and Ritsakis, 2000

<sup>133</sup>PIECA, 2016

<sup>134</sup>A Khawaja, World Bank Workshop on Disadvantaged Groups, Vienna, June 2016

**BOX 28: A COMPREHENSIVE SOCIAL IMPACT ASSESSMENT SHOULD INCLUDE THE FOLLOWING:**

- Demographic structure (age, gender, population growth);
- Settlement and migration patterns;
- Education and skills;
- Local economy, employment (formal and informal sectors);
- Livelihoods and livelihood options;
- Use of ecosystem services;
- Land use and land tenure (property rights);
- Community health and wellbeing (including health status and drivers of disease);
- Gender roles and equality;
- Culture (shared beliefs, customs, values, language and religion);
- Cultural heritage (physical and spiritual);
- Local governance structures and decision-making;
- Community services (schools, tertiary institutions, health care, water and sanitation, power supply, communications);
- Indigenous knowledge.<sup>135</sup>

Health issues thus have a central place in SIA. Many of the social impacts of projects could also be described as health impacts, and *vice versa* in SIA. This means that the determinants of health should be addressed when a SIA is carried out properly (Table 5.1).<sup>136</sup>

**Table 5.1: Social and economic determinants of health**

Health determinant	Societal and health benefits	Negative social and health effects
Prosperity	Access to new goods and services Improved employment prospects Improved quality of life and living standards Increased access to amenities Access to better health care Improved nutrition	Changing societal roles and importance Breakdown in social cohesion Increased demand for commercial sex work Unemployment due to lack of adequate skills
Housing and shelter	New or improved accommodation Acquisition of land or house Home improvements Increased demand for rental	Housing shortages Price inflation Higher rentals Overcrowding Informal settlements
Water supply and sanitation	Improved water supply systems Improved water quality Improved sanitation Improved health Improved use of time	Pollution (malfunctioning sewage treatment plants) Impact on water flow and groundwater resources Reduced downstream water availability for other uses Impact on ecosystem services
Transportation and connectivity	Improved infrastructure Better, easier, quicker access to markets, schools, clinics, etc. Less wear and tear on vehicles	Increased traffic accidents Air pollution Noise Chemical spillages Polluted runoff Impedance of natural drainage systems affecting ecosystem services Increased human trafficking Spread of disease vectors Barriers to access (to fields, schools, services, other villages, etc)

<sup>135</sup>Adapted from Vancloy, 2003

<sup>136</sup>Ibid.

Learning and education	Skills development Better employment prospects Development/improvement of schools Construction of libraries and skills development centres (adult training) Girls and boys receive primary and secondary education	Loss of traditional skills Employment ceases when project is completed Unskilled, illiterate people lose out
Crime and safety	More employment therefore less need to commit crime	More money and goods in circulation therefore greater incentives to commit crime Increased abuse of alcohol and drugs leads to increase in crime and safety risks
Health, social care and public services	Increased funding Strengthened partnerships Better health care	Added pressures due to increase in population
Commercial goods and services	Wider range of medicines, food products and household goods	Increased cost of food Risk of increased consumption of unhealthy 'fast foods', alcohol, drugs, cigarettes Increased spending on gambling Increase in commercial sex work
Social capital and social cohesion	Increased prosperity for the whole community	Community tensions if there is inequitable distribution of jobs and wealth Influx of people Divisions between those for and against the project Cultural clashes
Governance and public policy	Can form strong public-private partnerships and augment government services if there is a sound system of governance in country	If there is weak governance, then more difficult to form partnerships and make a difference
Landscape change	Improved waste management services could improve aesthetics (less litter)	Impact on quality of life and wellbeing Cultural changes Impact on other economic activities if removed or displaced

Given the multitude of associations between potential determinants and human health, it is a challenge to adequately differentiate between causality and mere association. Nevertheless, a focused view on health and impact assessments requires awareness of essential trends and perspectives in the field. For an adequate consideration of health in impact assessments, the following essential elements need to be included in the assessment (see also Appendix 5 for a sample Terms of Reference for an HIA).<sup>137</sup>

- Determination of the scope of the study based on the movement of disease carriers. For example, long-haul truckers are considered to be an important driver of HIV/AIDS transmission, and changes in land use and/or in-migration may trigger new disease emergence (see s. 4.9).<sup>138</sup>
- Explicit analysis of health-related issues;
- Comprehensive consideration of health determinants including physical and social environment, personal behaviour, and the capacity of the health care system;
- Causal pathways from health determinants to health outcomes, including interactions (as described in Chapter 4);
- Distribution of health impacts across various subgroups within an affected population (health equity) (Chapter 4); and
- Utilization of health data to inform the analysis and possibly quantify health impacts.<sup>139</sup> Quantitative approaches are typically based on epidemiologic data and methods, including causality criteria, dose-response curves, health metrics, and modelling.<sup>140</sup>

<sup>137</sup>Harris Roxas et al., 2009

<sup>138</sup>PIECA, 2016

<sup>139</sup>Fehr et al., 2014

<sup>140</sup>Kemm, 2012:25-37

The ICMM has identified many benefits from undertaking an HIA – which could apply to any business, not just the extractives sector, such as:

- Establish an accurate health baseline for future comparison during project development, operations and closure;
- Identify and maximize the positive community health and wellbeing impacts and opportunities that a project can bring;
- Identify, avoid and minimize, through changes to the project design and implementation, the unintended negative community health and wellbeing impacts that can arise;
- Identify existing community health problems, which could amplify the impact of a proposed project and affect its viability;
- Identify country-specific health regulations which may affect the proposed project;
- Provide a process through which the project can work in partnership with local health, social care, and welfare services to jointly alleviate these health problems;
- Form one part of a broader community and local stakeholder involvement and engagement process that can build trust, draw out any community concerns and generate a dialogue about the best ways that the project can benefit local communities;
- Help to make explicit the potential trade-offs between community health and wellbeing and other economic, environmental and social objectives of the proposed project;
- Provide an equitable, transparent and evidence-based approach to planning and funding community health infrastructure and development activities to protect and enhance sustainable local livelihoods;
- Help to jointly negotiate those aspects of community health and wellbeing which are the responsibility of the project and those aspects which are the responsibility of local government and local public services;
- Help to manage project sustainability and obtain a long-term licence to operate.<sup>141</sup>

HIAs undertaken in resource-poor settings are particularly challenged by limited baseline population health data<sup>142</sup> and limited information about existing health, social and environmental vulnerabilities.<sup>143</sup> In these situations, it is necessary to use proxy data to try and understand the health status of the potentially affected people. Proxy indicators can include:

- Sentinel survey data of pregnant women (to assess HIV prevalence);
- Incidence (new infection) rates of communicable diseases;
- Alcohol abuse figures;
- Prevalence of TB;
- Nutritional status in the area (e.g. stunting, under- and mal-nourishment, obesity);
- Teenage and unplanned pregnancies;
- Mortality rate and causes;
- Other STIs;
- Data extrapolation from Ministry of Health;
- Key informant interviews, especially with local healthcare workers and NGOs based in the project area.

While there are many benefits of conducting one comprehensive, integrated SIA, there are occasions when a separate health and/or gender and/or human rights impact assessment may be necessary. The decision needs to be made on a project by project basis, depending on the nature and scope of the proposed development and the sensitivity and vulnerability of project-affected parties (BOX 29).

#### BOX 29: CIRCUMSTANCES WHEN SEPARATE SPECIALIST STUDIES MAY BE REQUIRED

##### Health Impact Assessment

- Where there is a high risk of community exposure to hazardous materials and emissions;
- Where the project will require significant inputs of agrochemicals such as fertilisers, pesticides and antibiotics;

<sup>141</sup>ICMM, 2010

<sup>142</sup>Winkler et al. 2010

<sup>143</sup>Kværner et al. 2006). Harris-Roxas et al., 2009

- Where intensive livestock projects are being proposed;
- Where water is to be used for irrigation or aquaculture which could be polluted;
- Where large numbers of construction workers and/or migrant workers will be required;
- Where there is an existing high burden of disease and/or malnutrition in the project area;
- Where there are existing high levels of pollution in the area (cumulative effects);
- Where there are long, diverse linear features associated with a new project e.g. pipelines, powerlines, roads, canals, etc., which may impact community health far away from the 'core' project site;
- Where health care services are weak and health risks are high;
- Where there are significant stakeholder concerns.

#### Human Rights Impact Assessment

- When the country has restrictions on freedom of association or expression;
- Where there is or may be widespread and/or systematic discrimination against vulnerable groups e.g. commercial sex workers, LBGTI groups, PLHIV, ethnic groups, indigenous people, women;
- When a state's governance system is in violation of human rights (HR),<sup>144</sup>
- A project context with a history of significant HR issues and where the host country government and judiciary have not systematically addressed unresolved allegations;
- Evidence of weak governance and poor enforcement of the rule of law, including limited access to justice;
- High levels of bribery and corruption in-country;
- Labour issues in contractors and sub-contractors such as child labour, worker exploitation;
- Post-conflict and politically or religiously sensitive areas;
- Security concerns;<sup>145</sup>
- Legacy human rights issues e.g. artisanal mining;
- High levels of poverty or inequality in the project area;
- Complex land tenure regimes or absence of clear property rights.

#### Gender Impact Assessment

- Where there are levels of gender inequality in the project-affected communities;
- Where gender roles and responsibilities will be significantly affected;
- Where livelihoods will be significantly affected;
- Where project benefits are likely to be skewed to one gender at the expense of the other.

When separate specialist studies are conducted, they need to be integrated into the overall approach to the ESIA in order to:

- Avoid duplication of work and data collection;
- Minimise gaps and overlaps between specialist studies;
- Obtain baseline data in the most cost-effective and efficient way to benefit all studies;
- Ensure maximum use of data by several ESIA specialists;
- Adopt a unified impact assessment methodology so that impacts are rated according to a common risk matrix;
- Better understand the inter-relationships and linkages between health, social, biological and physical components of the environment (see s. 5.5);
- Develop a coordinated monitoring and surveillance system to monitor risks in an integrated manner.<sup>146</sup>

## 5.4 Public consultation and stakeholder mapping

Social Impact Assessment is **not** the same as public participation.<sup>147</sup> The former involves using social survey techniques such as structured questionnaires, one-on-one meetings and social profiling to gather social and health data in order to obtain a social baseline (see Appendix 2 for guidance on SIA). The latter process (public participation) should be a two-stage process: during scoping to provide information about the project

<sup>144</sup>Ruggie, 2011 and Ruggie, 2007

<sup>145</sup>PIECA, 2013

<sup>146</sup>PIECA, 2016

<sup>147</sup>Vancloy et al., 2015

and to solicit issues and concerns from the public; and again during the ESIA phase to demonstrate how issues raised will be avoided, reduced or otherwise managed. Social surveys are *data-gathering exercises*, while public consultation aims to *solicit issues and concerns*. However, often the two are confused, by both ESIA consultants and the authorities. It should also be noted that the public consultation process is usually a mandatory requirement in most ESIA laws in SSA and has to be done in a prescribed manner, whereas the need for, and the scale and scope of social surveys will depend on the type of project and its location.

#### BOX 30: TERMINOLOGY

The terms ‘public involvement’, ‘public consultation’, ‘public participation’ and ‘stakeholder engagement’ are essentially synonymous.<sup>148</sup>

There are numerous regulations on the minimum requirements for public consultation and guidelines on best practice which shall not be repeated here;<sup>149</sup> the following is, however, a list of recommendations on how health and gender issues can be better incorporated into the public consultation process:

- Identify the zones of influence of the project, especially those which may affect health such as the air and water pollution plumes, areas of existing or potential soil contamination, danger zones which may pose a safety risk, routes for the transportation of hazardous materials and/or wastes, radiation hazards, all those communities which may be affected by noise, dust, vibration from project-induced traffic. Once these zones have been mapped, all the people living in these zones need to be included as potentially affected parties and consulted accordingly;
- Identify all those who may be vulnerable to exposure to health risks including communicable diseases, as well as vector-borne, water-borne and pollution-induced diseases and disorders (BOX 31). Vulnerability may be caused by an existing disease burden, malnutrition, involuntary resettlement, or the inability to express grievances about a project due to poverty, literacy, lack of knowledge about rights and how to express them, illegal status, etc. This requires a thorough stakeholder analysis by consultants who are knowledgeable about the affected communities;
- Based on the stakeholder mapping exercise, draw up a stakeholder engagement plan which will ensure that the means of communication are appropriate to the target audience. This includes the type of meeting, content of the presentation, the way the information is presented, the time of day and year chosen for meetings, cultural sensitivities, use of language and dress code;
- Carry out capacity building to inform people of their rights, the modes of engagement, and an unbiased appraisal of the specific issues associated with the proposed project;
- Encourage participation and provide affected parties with an honest assessment of health risks and how they will be mitigated.

#### BOX 31: EXAMPLES OF INDIVIDUALS OR GROUPS THAT MAY BE VULNERABLE OR MARGINALISED

- Minorities (ethnic, linguistic, religious, political);
- Women and widows;
- Children and young people including young heads of household;
- Single-headed households;
- Elderly people
- Landless people or people without formal title to land;
- Nomadic people;
- Informal or casual workers;
- Migrants, illegal settlers, refugees and displaced persons;
- Indigenous peoples;
- People with disabilities;
- LGBTI individuals;
- PLHIV or other marginalising diseases;
- Poor, illiterate and unemployed.<sup>150</sup>

<sup>148</sup>Vancley et al., 2015

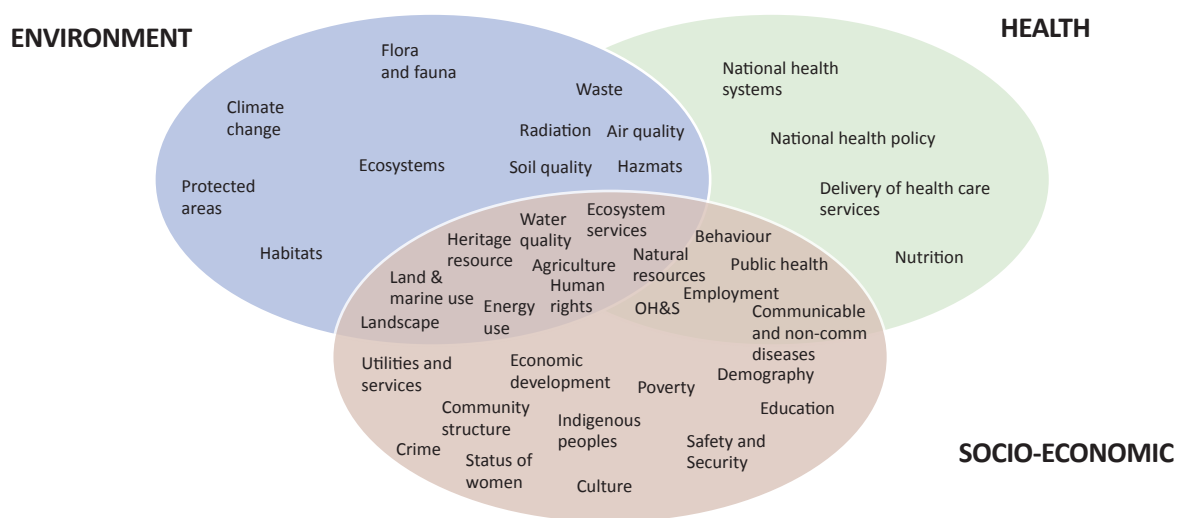
<sup>149</sup>E.g. SAIEA (2005). A One-Stop Participation Guide: A Handbook for Public Participation in EA in Southern Africa. Calabash Project. CommonGround and SAIEA. IFC (2007). Stakeholder Engagement: A Good Practice Handbook for Companies doing Business in Emerging Markets. Washington.

<sup>150</sup>PIECA, 2013

## 5.5 ESIA: How to integrate biophysical and socio-economic findings

The aim of this section is to provide some guidance on how to identify, not just the direct impacts of a development, but the indirect effects and how the social, biophysical and health environments are interlinked. Figure 5.2 highlights the complexity of the environment, as well as the main areas of overlap between the biophysical, social and health domains.<sup>151</sup>

In many cases project activities do not impact on health directly but through a chain of events beginning upstream in the causal web of health determinants, as shown in Figures 5.3 to 5.8. Many health impacts become manifest at some distance (in space and/or time) from the initial action and effectively become externalities – a foresight failure. Indeed when these indirect impacts are more significant than the direct effects of a project activity, the failure to identify them is magnified. Adequate consideration of human health, therefore, calls for integration of upstream analyses (as provided largely by experts from various fields outside health) with more downstream analyses involving specific health expertise.<sup>152</sup>



**Figure 5.2: Key environmental, social and health issues and their interrelationships<sup>153</sup>**

Figures 5.3 – 5.8 provide an indication of the direct and indirect effects of some typical project activities on health, and where mitigation needs to be applied for the most effective results. On the figures, blue shading indicates a physical effect; green shading: biological (non-human) effect; orange shading: socio-economic effect; dark pink shading: health effect.

The aim of these diagrams is to demonstrate the following:

- Most health impacts occur at several removes from the cause (activity);
- The degree of inter-relationships between the physical, biological, social and health domains;
- Mitigation is most effective when it is applied as near to the cause as possible, and becomes increasingly difficult and costly for the proponent the further down the impact chain one goes;
- Without timely mitigation, the costs are usually borne by the poorest of the poor and ultimately, the tax payer.

<sup>151</sup> IPIECA, 2016

<sup>152</sup> Fehr et al, 2014

<sup>153</sup> From IPIECA, 2016

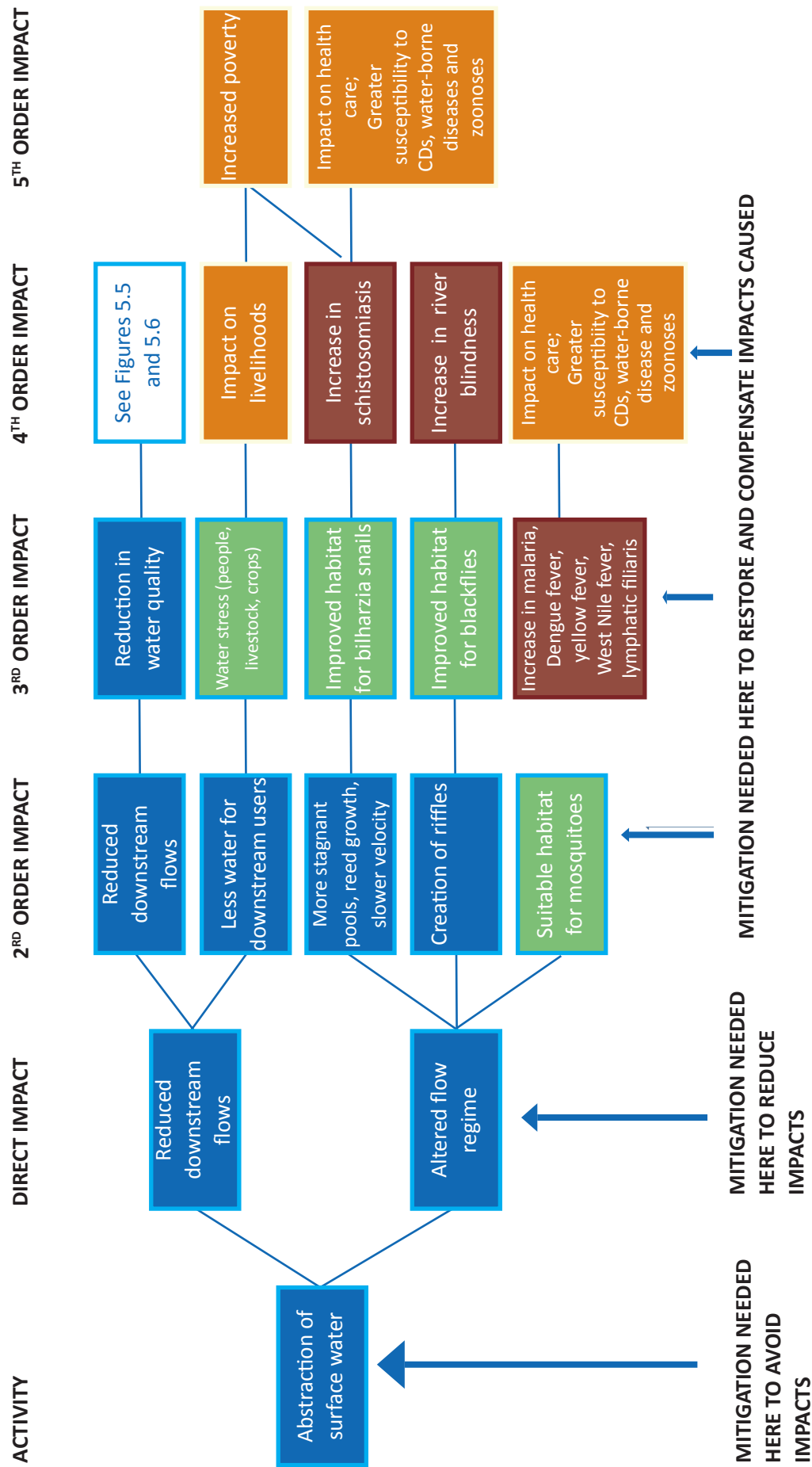


Figure 5.3: Direct and indirect impacts caused by surface water abstraction

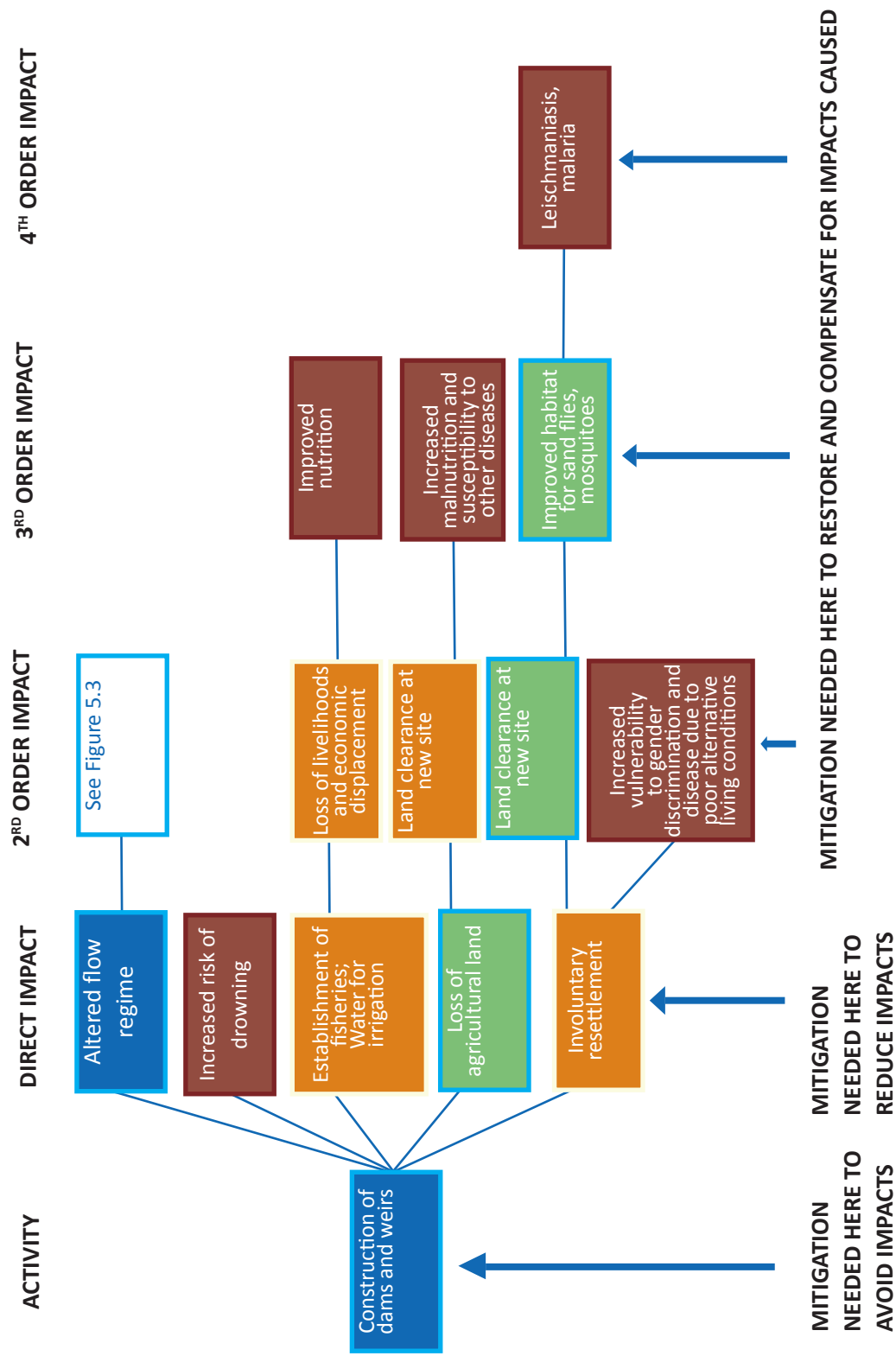


Figure 5.4: Direct and indirect impacts caused by construction of dams and weirs

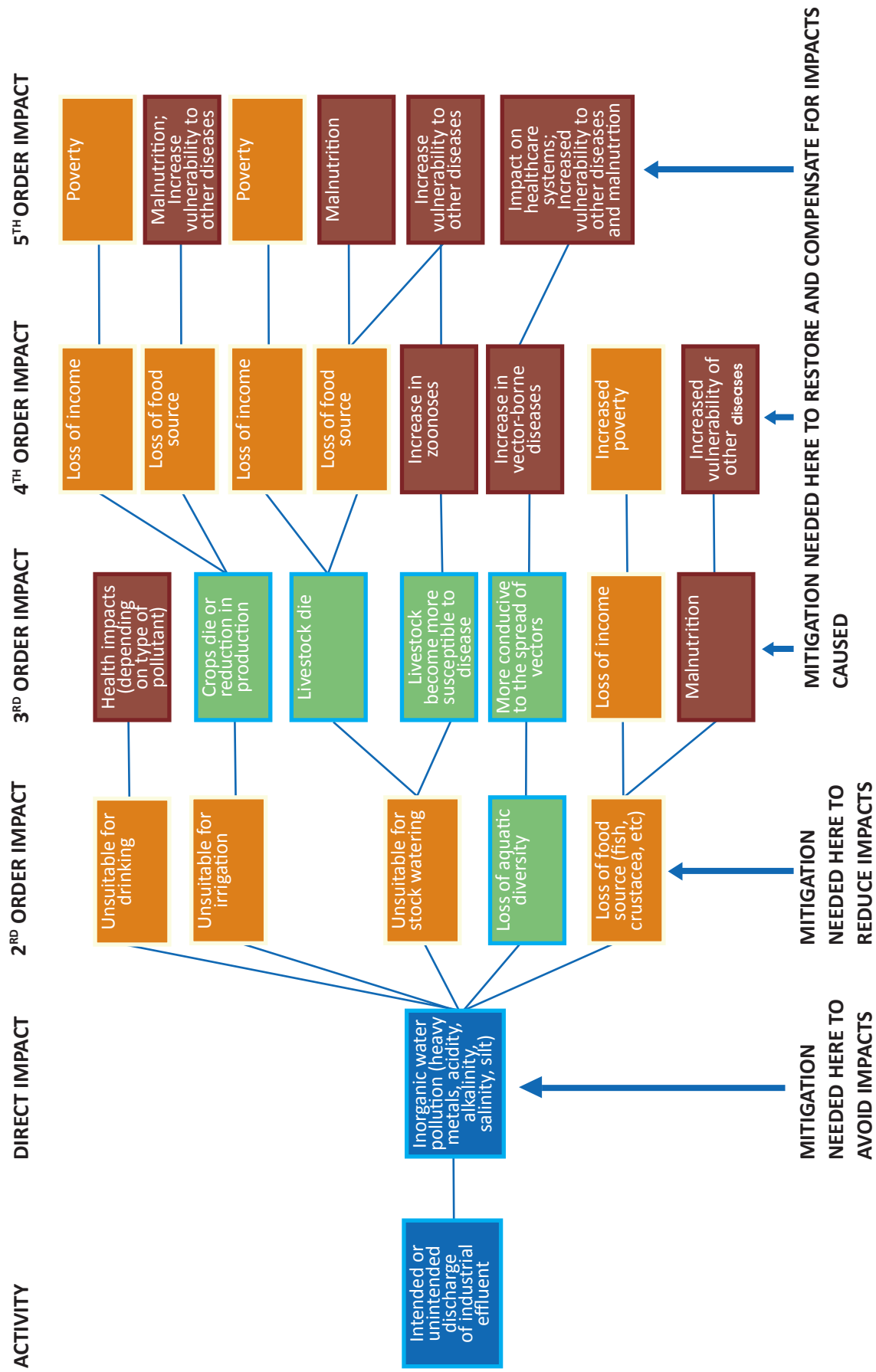


Figure 5.5: Direct and indirect impacts caused by inorganic water pollution

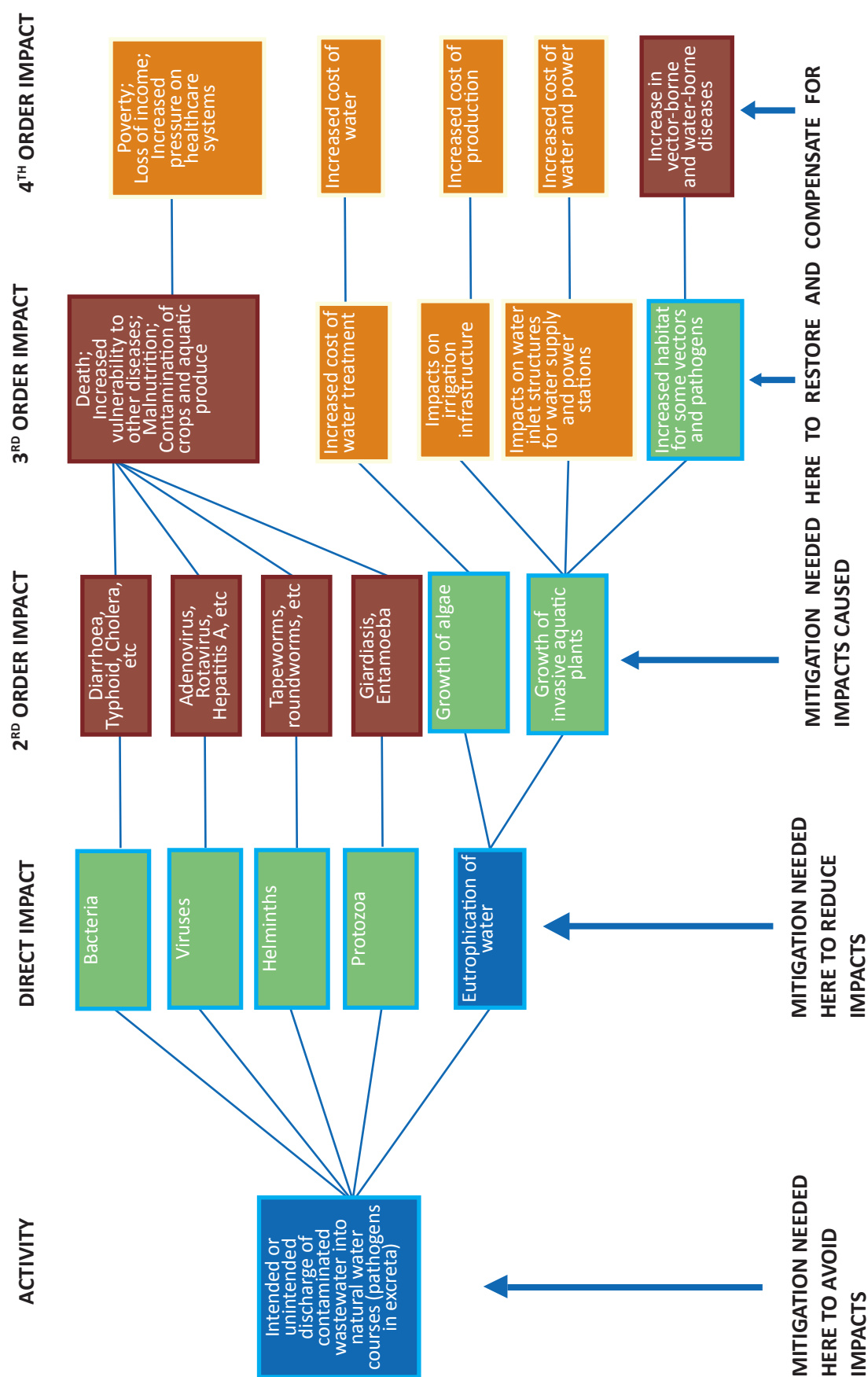


Figure 5.6: Direct and indirect impacts caused by microbiological water pollution

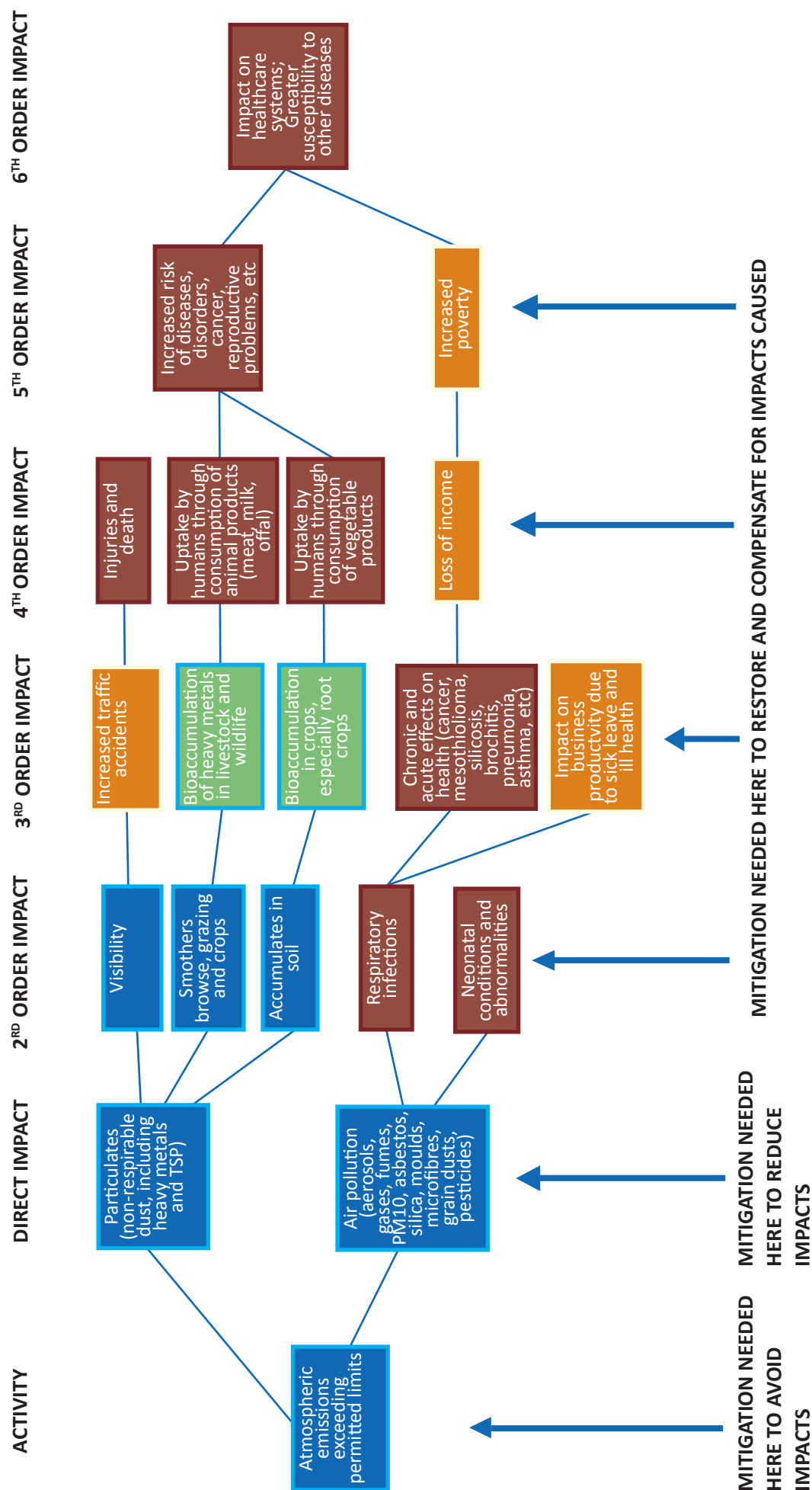


Figure 5.7: Direct and indirect impacts caused by air pollution

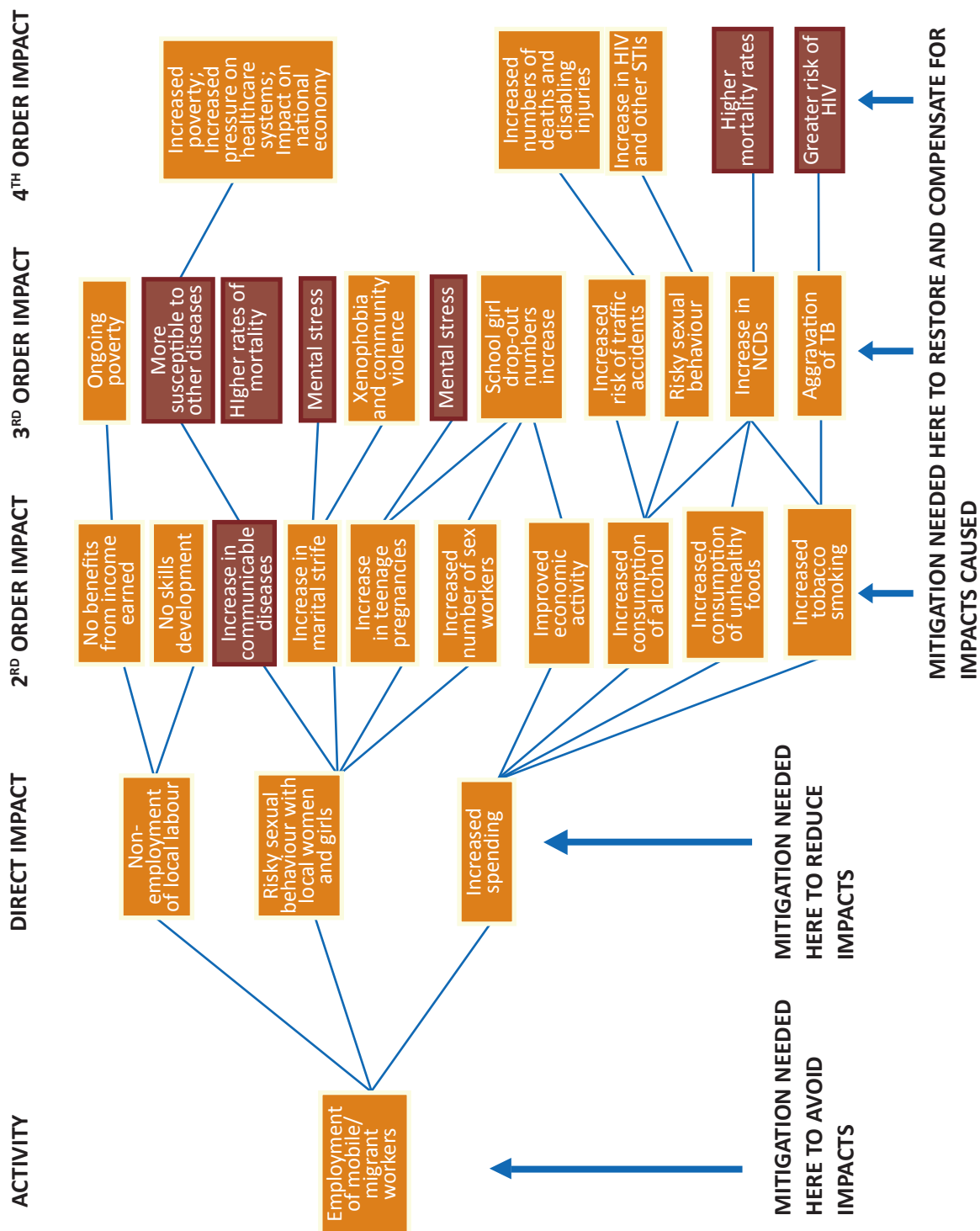


Figure 5.8 : Direct and indirect impacts of employment of migrant and mobile workers

## 5.6 Important gender considerations

Even though most constitutions and laws treat women and men as equals, the reality is that women in many parts of SSA still do not have equal access to and control over material and non-material resources and assets and thus structural gender inequalities are still embedded in our society; by continuing to address people suffering inequalities in an equal way causes, in practice, the perpetuation of these inequalities. To avoid this, it is necessary to address the different needs and interests of women and men, to identify gender inequalities in terms of access to and control of resources, to consider the impact of roles and gender-based stereotypes, to anticipate the possible differential effects on women and men and to ensure that the outcomes of large capital projects will support gender equality.<sup>154</sup>

If target groups are defined only in broad terms (young people, migrants, the sick, elderly, students, the poor, etc.) and there is little or no analysis of gender differences within the target groups, it is impossible to ensure that — or evaluate whether — the planned intervention meets the needs of women and men within the broader groups.<sup>155</sup> Some guidance on how to improve the consideration of gender in ESIs is provided below.

- Collect recent socio-economic data for the project area which is disaggregated on the basis of sex and age. Complement quantitative data – especially if such data is lacking or very out of date, with qualitative insights obtained during the social survey and from local government, clinics, CBOs, and other CSOs working in the proposed project area;
- Identify existing gender inequality regarding disease burden, access to healthcare, jobs, livelihoods, mobility, access to resources, etc.;
- Obtain the views, aspirations and concerns of different groups during the public consultation process:
  - o What are the differing expectations between men and women about the project?
  - o Will the planned project affect either group differently and in what way? Who will gain, who will lose?
  - o How can differential impacts be mitigated?
- Consider opportunities for work which meets the skills and abilities of both men and women;
- Analyse the situation by asking the following questions:
  - o Will the distribution of income between men and women change and in what way?
  - o Will the use of time for productive work between men and women change and in what way?
  - o Will women's perception of, and actual security change?
  - o Will women's employment rate be increased and what will be the social consequences of this?
  - o Will women or men benefit from skills training?
  - o Will roles and responsibilities for men and women in the household change and in what way? What would be the consequences of this in the society in question?
  - o Are there equal opportunities to benefit from the project?
  - o Will women have an increased or decreased role in decision-making?
  - o Will gender-based violence increase?
  - o Whose health will be most affected? See Table 5.2 below for guidance;
  - o Are gender stereotypes embedded in the culture of the area?

<sup>154</sup>European Institute for Gender Equality, 2016

<sup>155</sup>*Ibid.*

Table 5.2: Differential health impacts from projects in SSA by age and gender

Health impact	Girls(<15 years)	Boys (<15 years)	Women (15-49 years)	Men (15-49 years)	Over 50s
HIV and STIs	XX	X	XXX	XX	X
TB			XX	XXX	X
Hepatitis A	XXX	XXX		XX	
Hepatitis B & C			XXX	XXX	
Meningitis	XXX	XXX	X	X	
Cardiovascular disease			XX	XX	XXX
Cancer			XX	XX	XXX
Respirable diseases	XX	XX	XX	XXX	XX
Type 2 diabetes			XXX	XXX	XXX
Alcohol abuse			X	XXX	X
Water-borne diseases	XXX	XXX	XX	XX	X
Chemical water pollution	XXX	XXX	XXX	XXX	XXX
Ambient air pollution	XXX	XXX	XXX	XX	XXX
Malaria	XXX	XXX	XX	XX	X
Schistosomiasis	XXX	XXX	XX	XX	
Onchocerciasis	X	X	X	X	X
Dengue	X	X	X	X	X
Physical injury (ex. Workplace)	XXX	XXX	XX	XX	XX
Malnutrition	XXX	XXX	XXX	X	XX
Mental health			XX	XX	XXX
Occupational diseases			X	XXX	X

XXX = high risk; XX = medium risk; X = low risk

Once the gender analysis has been undertaken, it will be possible to develop focussed mitigation measures to address gender inequalities which may be caused by the project. These could include:

- Setting and achieving gender employment targets;
- Running business skills development programmes for women (BOX 32);
- Providing on-the-job skills training for women;
- Providing separate accommodation and ablution facilities, especially portable toilets at remote work sites;
- Providing paid maternity leave;
- Conducting community-based wellness campaigns such as HIV/AIDS sensitisation programmes, road safety awareness campaigns;
- Conducting gender awareness programmes with the workforce and in local communities;
- Providing female condoms and information about birth control and family planning.

#### BOX 32: LITTLE ROCK CONSTRUCTION COMPANY: AN EXAMPLE OF EMPOWERING WOMEN

Beginning in 2008, Lonmin, with funding from the IFC, embarked on a three-year program to deliver sustainable benefits to the communities surrounding its platinum mines in South Africa, where there was 60-65% unemployment. The company provided intensive training and mentoring on business skills, tendering, contract management and project management to prospective contractors, as well financial assistance through a business 'incubator' centre. One of the companies that took advantage of this opportunity was an all-woman owned and staffed contractor called Little Rock Construction Company. The company was awarded three small civil engineering contracts on the mine to start with, worth R25 million in 2007-08. All three contracts were executed on time and in budget, resulting in many more contracts from the mine and other clients. Other components of the Lonmin/IFC partnership included a Women in Mining program, an HIV/AIDS workplace and community support programme and a Community Development Program focusing on women. This work won the 2008 Social Sustainability Award at the annual Nedbank Capital Green Mining Awards.

## 5.7 How to review an ESIA/ESMP to ensure that health and gender issues have been addressed

The key questions to ask about health and gender when reviewing an ESIA and ESMP are listed in Table 5.3 below.<sup>156</sup> The table can be used to inform government reviewers, but it is also useful for ESIA practitioners to check the scope and content of their ESIA/ESMP prior to submitting it for approval.

Table 5.3: ESIA/ESMP review criteria relating to health

ESIA Process and Decision-making
<ul style="list-style-type: none"><li>• Does the ESIA comply with the approved ToR for the project, especially the ToR for the integrated Social Impact Assessment?</li><li>• Does the ESIA comply with the conditions of approval regarding health issued by the country's environmental authorities and the funding agency's loan conditions (where applicable)?</li><li>• Does the ESIA comply with the donor agency's E&amp;S safeguards particularly those relating to health and gender (where applicable)?</li><li>• Does the ESIA provide sufficient, quantitative, scientifically derived information on the baseline health status and the potential short- and long-term, direct and indirect health impacts, to make an informed decision regarding the desirability and social sustainability of the project?</li><li>• Does the environmental authority have the capacity (human, technical, financial) to monitor and enforce the implementation of health mitigation measures effectively?</li><li>• Does the health ministry have the capacity to provide adequate health care facilities to test, diagnose and treat any new health issues that might arise due to the presence of the project?</li></ul>
Law and Policy
<ul style="list-style-type: none"><li>• Does the ESIA comply with the national laws governing environmental assessment, particularly in addressing health issues?</li><li>• Have the predicted impacts in the ESIA been contextualized in terms of the country's commitment to international goals, such as: SDGs, Three Ones, Getting to Zero, WHO Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013-2020, WHO Framework Convention on Tobacco Control, WHO targets on TB, malaria, hepatitis and nutrition, ILO Conventions and Plan of Action, etc.?</li><li>• Have the predicted impacts in the ESIA been contextualized in terms of the country's environmental and health policies and targets regarding: communicable diseases, non-communicable diseases, vector control, pollution and waste, chemicals, workplace health and safety?</li></ul>

<sup>156</sup> These questions only relate to the inclusion of health and gender issues in the ESIA and is therefore not an exhaustive review checklist.

<b>Consultation</b>
<ul style="list-style-type: none"> <li>• Were vulnerable groups identified in the stakeholder analysis?</li> <li>• If yes, were appropriate consultation methods employed to discuss their issues and concerns, especially those relating to health and gender?</li> <li>• Were the health concerns raised by the stakeholders meaningfully addressed in the ESIA?</li> <li>• Did the process include capacity building to assist local communities to engage in the process in a meaningful manner?</li> </ul>
<b>Impact assessment (relating to health aspects)</b>
<p><i>General</i></p> <ul style="list-style-type: none"> <li>• Does the ESIA contain detailed information on the source/origin of the workforce and the terms of employment?</li> <li>• Is there a breakdown of the labor requirements per skill category and gender?</li> <li>• Are the accommodation, recreation and ablution arrangements for men and women described?</li> <li>• Are worker transportation arrangements described?</li> <li>• Is the location of the worker camp identified and described in relation to local communities?</li> <li>• Does the ESIA identify all pollution, waste types and sources and the respective zones of influence?</li> <li>• Does the ESIA identify all the pollution exposure pathways – for workers and local communities?</li> <li>• Does the ESIA identify all the transportation routes to the project site and the affected communities along the route(s)?</li> <li>• Is there an analysis of ecosystem services and the dependence of local communities on such services?</li> <li>• Have the authors of the ESIA provided an integrated, concise synthesis of the linkages and interdependencies between the social, cultural, economic and biophysical environments?</li> <li>• Have the indirect (secondary, tertiary) impacts been identified and assessed?</li> <li>• Is there an analysis of ecosystem service and the dependence of local communities on such services?</li> <li>• Have the authors of the ESIA provided an integrated, concise synthesis of the linkages and interdependencies between the social, cultural, economic and biophysical environments?</li> <li>• Have the indirect (secondary, tertiary) impacts been identified and assessed?</li> <li>• Are the impacts analyzed on a disaggregated basis according to the differential impacts which may be experienced by different segments of the community e.g. women and children, elderly, poor (see Table 5.2 for guidance on gender)?</li> </ul> <p><i>Social Impact Assessment</i></p> <ul style="list-style-type: none"> <li>• Does the SIA include a gender assessment (if relevant)?</li> <li>• Does the SIA include a cultural assessment (if relevant)?</li> <li>• Does the SIA address broad human rights issues including the right to health?</li> <li>• Did the SIA consultants use local knowledge to inform their findings?</li> </ul> <p><i>Health Impact Assessment (either as part of the SIA or if included as a separate study)</i></p> <ul style="list-style-type: none"> <li>• Is there a specialist study on health? If not, do the report authors provide reasons why not?</li> <li>• Does the HIA describe any limitations or constraints for the study, list all the assumptions and identify data gaps and deficiencies?</li> <li>• Does the HIA clearly describe the methodology used to undertake the health assessment, including the use of predictive models?</li> <li>• Are the findings and conclusions justified given the project type and location and/or previous Bank experience?</li> <li>• Does the HIA provide an analysis of the local health care facilities and their capacity to cope with additional health issues arising directly and indirectly from the proposed project?</li> <li>• Were key health professionals at country, region and district level consulted during the study?</li> <li>• Have the most recent baseline health statistics on CDs, NCDs, vector-borne diseases, existing pollution induced diseases and disorders, nutrition, maternal health and mental health for the project area been provided, disaggregated on the basis of sex and age (see Table 5.2 for guidance)?</li> </ul>

- Have the key health drivers for each type of disease been identified?
- Have the predicted health impacts been quantified – short, and long-term, direct and indirect, temporary and permanent?
- Have the specific health impacts been disaggregated on the basis of men and women as well as other vulnerable groups e.g. children, orphans, elderly, and poor?
- In cases where resettlement is planned, have the specific health issues associated with resettlement been addressed e.g. maternal health care, water-borne and vector-borne diseases, etc.?
- Have the health costs associated with resettlement been included in the compensation?

#### ESMP

- Does the ESMP set out for each health impact, the required mitigation actions, the goals/targets, the responsible persons, key performance indicators, timeframe and costs?
- Are the proposed mitigation actions likely to be achieved and effective?
- Does the proponent have the capacity to implement the specified mitigation plan?
- Does the ESMP include a detailed health monitoring plan which sets out what, where, why, when, how and by whom monitoring should be undertaken?
- In cases where third parties are contracted to carry out monitoring activities, have they been provided with sufficient budget and clear terms of reference?
- Does the ESMP specify that there will be permanent environmental and social officers on staff for each project phase?
- Does the ESMP include recommendations for ongoing engagement with the local community, including vulnerable groups e.g. women?

## 5.8 Costing mitigation for health prevention and control

The ESMP is a detailed action plan to implement the mitigation measures identified in the ESIA. It should specify in detail the following for each impact identified:

- Mitigation measure required to avoid, reduce, remedy/restore or compensate each impact;
- Enhancement measures to ensure that the envisaged project benefits actually materialise according to the following enhancement hierarchy:
  - o **build in benefits for all** in project design, budgeting, staffing and investment;
  - o **affirmative action for equity** e.g. targeted measures to ensure that disadvantaged groups reap the benefits from the project such as through health education and disease prevention programmes;
  - o **make healthy choices the easy choice** e.g. subsidising healthy food options in the canteen, promoting active leisure and sporting opportunities, rewarding healthy lifestyles;
  - o **proactive education and information** relating to communicable diseases, NCDs, nutrition, occupational health, etc.
- Goals/targets of objectives to be met e.g. national targets on health, SDGs;<sup>157</sup>
- Key performance indicators e.g. 90% of the workforce knows their HIV status (in line with the UNAIDS 2020 target);
- Person responsible for implementing the mitigation measure or engaging a partner to implement the required actions, such as a local clinic to carry out regular VCT;
- Time-frame, i.e. over what period must the mitigation measure be applied; and
- Budget for each measure including support of local service providers and joint initiatives e.g. health monitoring.

Each mitigation measure must be:

- Implementable;
- Proven to work;

- Socially and culturally acceptable to the affected community; and
- Cost effective.

In terms of health impacts, the primary goal of the ESMP is to avoid impacts on health if at all possible through design interventions (see Figures 5.3 – 5.8). In most cases, the cost to avoid impacts on health will be far less than having to provide remedies, restoration and compensation once health has been adversely affected.

There are two aspects which need special consideration here: one is to identify the health mitigation measures that are proven to work and which are cost-effective. There is no point spending money on an intervention that has proven to be ineffective. Therefore, mitigation and enhancement measures are best identified and developed in partnership with local stakeholders, including local community representatives, government officials, health service/public health officials and community health and development workers who know what works best. Ideally, a wider group of local people would also be involved through public meetings or workshops where the potential health impacts of the project, as well as ways to minimize the negatives and maximize the positives, are discussed. This should also provide an opportunity to identify the measures that are most socially acceptable to local communities, and that experience in the locality suggests are likely to be most effective.<sup>158</sup>

Before discussing measures with local communities and other stakeholders, it is useful to develop draft mitigation and enhancement measures from previous HIAs (where possible), industry best practice and research evidence on the effectiveness of risk control and public health interventions.<sup>159</sup>

The second aspect is how to determine the cost of the health and gender mitigation measures. This will depend entirely on the country of the project, the nature and scope of the project, the healthcare situation in the host country, the health status of surrounding communities, the number of employees and where they are from and numerous other factors. This emphasises the need for the ESIA project team to include a qualified and experienced health impact assessment specialist.

Once a budget for health and gender mitigation has been developed, it needs to be approved by the developer/proponent and included as detailed line items in the Bill of Materials in the tender documents. Part of the tender adjudication process should therefore check whether the contractor has sufficient funds for gender and health mitigation and that these are adequately ring-fenced. The tender adjudication process should also include consideration of whether the contractor has the capability and desire to ensure that the money is actually spent on health and gender mitigation or not.

For the reasons outlined above, it is not possible to provide specific guidance on mitigation costing here, as each intervention will have to be separately priced based on project circumstances and location. However, the following documents provide some guidance on how to cost health mitigation measures that are effective in delivering the results to meet the targets set in the ESMP.

**Remme, M. Siapka, M. et al. (2014). The Cost and Cost-effectiveness of Gender-responsive Interventions for HIV: a Systematic Review. J. of the International AIDS Society, 2014, 17, 19228.**

Harmful gender norms and inequalities, including gender-based violence, are important structural barriers to effective HIV programming. The authors assess current evidence on what forms of gender-responsive intervention may enhance the effectiveness of basic HIV programmes and be cost-effective. The findings suggest that couple counselling for the prevention of vertical transmission; gender empowerment, community mobilization, and female condom promotion for female sex workers; expanded female condom distribution for the general population; and post-exposure HIV prophylaxis for rape survivors are cost-effective HIV interventions.

<sup>158</sup> ICMM, 2013

<sup>159</sup> Ibid.

**WHO/Medical Research Council (South Africa): Integrated Healthcare Technology Package Simulation Tool.**

**Objective:** To help users improve health service delivery by identifying the optimal mix of resources needed for interventions. Can also determine resources needed to achieve a certain level of coverage.

**Intended users:** Planners, decision-makers and managers at all levels of healthcare system, technical assistance agencies.

**Application:** the model has over 6000 built-in health scenarios

**Website:** [www.who.int/pmnch/topics/economics/costing\\_tools/en/index9.html](http://www.who.int/pmnch/topics/economics/costing_tools/en/index9.html)

**UNFPA: Reproductive Health Costing Tool**

**Objective:** To help users estimate cost to scale up a package of reproductive health services from current to universal levels. Can also be used to cost required health system improvements.

**Intended users:** Health planners at the country level, consultants

**Application:** HIV/AIDS prevention and treatment, condom promotion for commercial sex workers, MSM and other vulnerable groups

**Website:** [www.who.int/pmnch/topics/economics/costing\\_tools/en/index15.html](http://www.who.int/pmnch/topics/economics/costing_tools/en/index15.html)

**Constella Futures/Futures International: Goals Model**

**Objectives:** This tool allows users to determine the effect of resource allocation on achievement of HIV/AIDS goals.

**Intended users:** National, multidisciplinary team of government planners and civil society advocates addressing HIV/AIDS.

**Application:** VCT, social marketing, behaviour change interventions for high-risk/vulnerable populations including MSM, sex workers, and PWID. Condom promotion, PMTCT, ARVs, monitoring and evaluation, capacity building. This tool answers the following questions: How much funding is required to achieve the goals of the strategic plan? What goals can be achieved with the available resources? What is the effect of alternate patterns of resource allocation on the achievement of program goals? What training is required to deliver the projected services?

**Website:** [www.futuresinstitute.org/pages/resources.aspx](http://www.futuresinstitute.org/pages/resources.aspx)

**USAID and Management Services for Health: Core Plus**

**Objective:** To estimate the expected number of each type of intervention and the costs of individual and packages of interventions as part of cost of integrated primary health care facilities.

**Intended users:** Planners and managers of government, private and NGO primary health care services.

**Application:** a range of scenarios of actual and predicted services and actual and normative costs for various health interventions.

**Website:** <http://erc.msh.org/toolkit/Tool.cfm>

**WHO: Planning and Budgeting for TB Control**

**Objective:** To develop comprehensive plans and budgets for TB control (all recommended interventions) within the framework of WHO's Stop TB Strategy and Stop TB Partnership's Global Plan to Stop TB.

**Intended users:** TB program planners at the country level

**Application:** Costing for HIV testing for TB patients, ARVs for HIV+ TB patients when TB and HIV treatment overlap

**Website:** [http://www.who.int/tb/dots/planning\\_budgeting\\_tool/en/index.html](http://www.who.int/tb/dots/planning_budgeting_tool/en/index.html)

In almost all projects, the successful implementation of the health and gender interventions listed in the ESMP will require:

- Dedicated personnel on the developer's team with sufficient resources to implement the required measures; and
- The formation of partnerships with local government authorities (e.g. district health officials, local NAC office), and health NGOs working in the area; and
- The use of independent service providers.

## 5.9 How to ensure that the ESMP is implemented effectively

In all cases, several organisations and institutions need to fulfil their mandated tasks and work together to ensure that the required environmental and social issues are actually addressed on site. The most important first step is to ensure that the ESMP is included in the contract documents so that the tenderers can price their work accordingly. E&S requirements need to be set out in detail in the Bill of quantities so that future auditors can monitor expenditure versus budget.

On all large capital projects, the project 'owner' (which may be the government or Borrower, a private sector company or a public-private partnership) appoints a Resident Engineer (RE) or Supervising Consultant who is responsible for ensuring that the Contractor implements the project according to the approved designs and the conditions of contract. The RE can make the difference between a project being compliant with the legally required E&S conditions, or not, particularly in countries where government supervision is weak. In order to improve the integration of health and gender into project execution, the RE needs to:

- Appoint a full-time Environmental and Social Officer;
- Make sure the contractor implements all requirements of the ESMP, especially those relating to the health of the workforce and surrounding communities, as well as gender targets;
- Impose penalties for non-compliance;
- Include E&S issues in weekly/monthly meetings and reports to the client;
- Monitoring and reporting on expenditure on E&S issues on monthly basis to the client;
- Annual budgets for all E&S mitigation measures are to be reviewed and revised annually.

The contractor can ensure that all E&S requirements set out in the ESMP are implemented by:

- Appointing strong environmental control and social/community liaison officers – preferably from the local communities in which they work;
- Allocating sufficient budgets and resources for the E&S officers to do their jobs;
- Conducting regular toolbox talks on safety, health and wellness (including issues relating to non-communicable diseases, smoking, alcohol abuse, gender-based violence, etc.);
- Setting up a clinic with a doctor or qualified nurse to provide health care and advice to all workers;
- Ensuring that all sub-contractors are aware of, and comply with the E&S terms of the contract, loan conditions and/or ESMP;
- Establishing Community Liaison Committees and meeting regularly to discuss issues of mutual importance, especially concerning health and safety;
- Forming partnerships with locally-based NGOs, CBOs to provide gender and health awareness and disease prevention training and to monitor health and social issues on behalf of the contractor;
- Providing regular reports on E&S issues at meetings and in monthly reports, including progress against targets.

### BOX 33: VALUE OF HIRING LOCALLY

A case study analysis of seven AfDB-funded road projects in southern Africa found that one of the most effective ways of reducing communicable diseases around construction camps was to employ as many local men and women as possible. This reduced the number of sex workers around the camps and the women employed by the project reported that they felt empowered by earning an income and not being dependent on others. Furthermore, the income earned was being spent in the local communities and the project was able to contribute more directly to socio-economic upliftment.<sup>160</sup>

The *Zambian Road Sector Guidelines* recommend that HIV/AIDS and gender service providers should be sourced locally (e.g. CBOs, locally-based NGOs) because they are often domiciled in the project area, have better understanding of local issues, customs and cultures and have lower transactional costs e.g. travel.<sup>161</sup>

Another key component of ensuring that project ESMPs are implemented on the ground is for the regulatory authorities to carry out compliance audits. These would be most effective when they are conducted jointly with other ministries such as health, gender and labour as well as the environmental authorities.

DFIs are also required to conduct monitoring missions to check that the project is compliant with the loan conditions – which often includes the ESMP requirements as a general condition, because the ESMP is usually a legal document.

In both cases – government or DFI – compliance auditing should follow the same systematic procedure. The main objective of a compliance audit is to check project conformance with the legal requirements contained in the approved ESMP and/or the Loan Agreement. Auditing also provides the authorities and/or the DFI with an opportunity to determine the effectiveness of various mitigation measures to minimise or prevent negative impacts or enhance project benefits. Feedback from compliance audits can contribute to a cycle of continual improvement. Compliance audits need to be conducted by a team comprising environmental, social / health experts, with the team leader having prior experience in auditing.

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<sup>160</sup> AfDB, 2016

<sup>161</sup> *Zambian Government* (undated)

# 6

## SUMMARY AND CONCLUSIONS

In summary, a thorough, health- and gender-inclusive ESIA should be seen, not as a cost to companies, but as a wise investment in risk management. An integrated approach to environmental management will help to:

- Reduce risks and downstream costs by proactively identifying impacts and putting in place measures to eliminate or reduce adverse effects;
- Avoid future litigation, penalties and stop-orders which can be expensive and damaging to the company's reputation and share-price;
- Nurture human capital by promoting wellness within the workforce and the surrounding community and minimising absenteeism due to sickness and disability;
- Reduce the burden on national health services;
- Provide companies with a social licence to operate;
- Foster good relations with local communities through targeted, demand-driven corporate social responsibility investments and adopting a cooperative approach to problem-solving;
- Identify opportunities for enhancing short- and long-term project benefits such as skills development, local procurement and gender empowerment.

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# Appendix 1: Recommendations from the 2nd Regional Technical Meeting on Health, Gender Equality and Capital Projects in Africa, 2015<sup>162</sup>

## **a. Improving integration**

Impact assessments across the continent need to better integrate broader health issues other than HIV, such as TB, malaria, hepatitis, vector-borne diseases, and impacts of alcohol and drug use. Additionally, integration within regions, within countries, within/between MDAs is important to reduce costs and bring out comprehensive EIAs.

## **b. Emphasizing Strategic Environmental Assessments**

While talking about strengthening EIAs to address challenges around broader health, gender equality, occupational health and workplace rights issues we should also emphasize the value of SEAs as a key entry point, especially given the trans-boundary nature of many large capital projects planned as part of Africa's Agenda 2063 and the Program of Infrastructure Development in Africa (PIDA).

## **c. Harmonizing basic elements of EA policies across the region**

Harmonization of environmental assessment laws and guidelines at regional level is therefore important in order to more effectively address cross border projects.

## **d. Revising the existing guideline integrating health (HIV) and gender issues into environmental assessments**

The guideline for integrating HIV and gender issues into environmental impact assessments in eastern and southern Africa needs to be revised to integrate broader health, gender equality, occupational health, and workplace rights issues.

## **e. Building and sustaining capacities for social impact assessments**

Capacity building among government authorities, universities, practitioners, and politicians on the need to balance environmental impacts with that of social impacts especially those related to health (communicable and non-communicable diseases), gender and occupational health and migration health should be an ongoing process. This should also include empowerment and involvement of CSOs, interested groups and affected communities to take ownership and become more actively involved in monitoring project compliance.

## **f. Supporting policy review and reforms**

Policies and laws should be reviewed and revised to ensure integration of health, gender equality, occupational health, and workplace rights issues. Moreover the project should try to pin down specific interventions items for integration.

## **g. Championing the initiatives cause**

AUC, AfDB, and UNDP should endeavor to increase advocacy, policy advisory and support at continental level (e.g. through the Pan-African Parliament), and within the different regional economic blocks such as SADC, ECOWAS, COMESA, EAC, so as to strengthen EIAs for greater health outcomes. It is also recommended that a continental-wide as well as country level champions need to be identified for increased advocacy of this project.

## **h. Investing in quality research**

Research and analysis around improved integration of health and gender issues within EIAs needs to be promoted to maintain effectiveness of EIAs. It is also important that different metrics/tools are developed

<sup>162</sup> Held from 8-10 June, 2015 at the Protea Hotel, Centurion, South Africa.

to track effectiveness of health expenditure and the usefulness of EIAs to target broader health and gender equality issues. Country level assessments should be regularly carried out to track progress of participating countries in this respect.

**i. Domesticating exploration of EAs as a tool for health financing**

It is recommended that country specific strategies are developed to use EAs for health financing. This strategy should also consider and promote public-private partnerships for increased domestic health financing whenever large capital projects are planned or implemented.

**j. Resource mobilization for scaling up and sustaining the initiative**

There should be an increased emphasis and funding to monitor project compliance. It is also recommended that existing channels for funding including the Global Fund should be explored to enable countries to source additional funding to help ground the project on a strong footing at country level.

# Appendix 2: Other useful guidelines on health and gender

## **Social Impact Assessment**

- Anglo American (2012). Socio-economic Assessment Toolbox. Version 3, London, UK.
- IAIA (2003). Social Impact Assessment: International Principles. IAIA Special Publication Series No 2, May 2003.
- IFC/World Bank Group (2012). Environmental Health and Social Guidelines. Washington.
- The Danish Institute for Human Rights (2013). Integrating Human Rights into Environmental, Social and Health Impact Assessments: A Practical Guide for the Oil and Gas Industry. IPIECA, London, UK.
- Vanclay F, et al (2015). Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects. IAIA, April 2015.

## **Health Impact Assessment**

- Asian Development Bank (2003). A Primer on Health Impacts of Development Projects.
- Birley M, (2011). Health Impact Assessment: Principles and Practice. Earthscan/Routledge, London, UK.
- Birley M, (1995). The Health Impact Assessment of Development Projects. London: HMSO.
- California Department of Public Health (2010). A Guide to Impact Assessment.
- Harris-Roxas B, Viliani F, Bond A, Cave B, Divall M, Furu P et al (2012). Health Impact Assessment: the State of the Art. IAPA 30(1): 43-52.
- Heymann, DL (2008). Control of Communicable Diseases Manual. Washington.
- <http://healthimpactassessment.blogspot.com> (provides a list of useful HIA websites)
- IAIA (2006). Health Impact Assessment: International Best Practice Principles. IAIA 2006.
- ICMM (2007). Health Risk Assessment Guidance for Metals. Fact sheets for indirect exposure via the environment/consumer exposure. London.
- ICMM (2008). Good Practice Guidance on HIV/AIDS, Tuberculosis and Malaria. ICMM, London, UK.
- ICMM (2009). Best Practice Guidance on Occupational Health Risk Assessment. ICMM, London, UK
- ICMM (2010). Best Practice Guidance on Health Impact Assessment. ICMM, London, UK.
- IFC (2009). Introduction to Health Impact Assessment. Washington, USA
- IPIECA and the International Association of Oil and Gas Producers (2016). Health Impact Assessment: A Guide for the Oil and Gas Industry. IPIECA, London, UK.
- Kemm J, Parry J and Palmer S, (Eds) (2004). Health Impact Assessment: Concepts, Theory, Techniques and Applications. Oxford University Press, Oxford, UK.
- Mindell, J. et al, (2003). A Glossary of HIA. Journal of Epidemiology and Community Health.
- Vohra, S. (2003). A Rapid Guide to HIA. Adapted from A. Harris, Centre for HIA, IOM.
- World Health Organization websites:
  - [www.who.int/topics/health\\_impact\\_assessment/en/](http://www.who.int/topics/health_impact_assessment/en/)
  - [www.who.int/hia/tools/toolkit/en/](http://www.who.int/hia/tools/toolkit/en/) (provides a list of published guidance on HIA)
- WHO (1982). Manual on the Management of Mosquito Control with Special Emphasis on Malaria Vectors.
- WHO (1986). Ottawa Charter for Health Promotion. WHO Europe.
- WHO (2006). Guidelines for Recreational Water Environments.
- WHO (2006). Guidelines for the Safe Use of Wastewater, Excreta and Grey Water.
- WHO (2011). Guidelines for Drinking Water Quality.
- WHO (2014). Guidelines for Indoor Air Quality.
- WHO (2015). Sanitation Safety Planning and Water Safety Planning.
- Zambian Government (undated). Planning and Implementation Guidelines of HIV/AIDS Component in Road Contracts. National Road Fund Agency, Road development Agency and National AIDS Council.

### **Gender Impact Assessment**

- European Institute for Gender Equality (2016). Gender Impact Assessment: Gender Mainstreaming Toolkit. Lithuania.
- ITC/ILO (2014). Financing for Gender Equality (draft).
- National Commission for the Promotion of Gender Equality (2010). Gender Mainstreaming in Practice: Step-by-Step Guide for Gender Impact Assessment. Malta.

# Appendix 3: Selected Sustainable Development Goals

## Goal 2: Zero Hunger

Rapid degradation of soils, freshwater, oceans, forests and biodiversity, together with increased pressure on these dwindling resources from climate change can result in mass migration to urban areas and/or widespread hunger. Already, about 23% of people in SSA are under-nourished and poor nutrition causes nearly half the deaths in children under 5 years old; one in three children suffers stunted growth. Thus the aims of this SDG are to end hunger, achieve food security and improved nutrition through the promotion of sustainable agriculture and limiting the loss of biodiversity and important ecosystem services.

## Goal 3: Good Health and Wellbeing

Although some major strides were made under the MDGs e.g. the global malaria incidence rate has fallen by about 37% and mortality by 58%, there are still some major areas of concern: more than 6 million children die before the age of five; HIV is the leading cause of death for people of reproductive age and AIDS is now the leading cause of death amongst adolescents (aged 10-19) in SSA. The Goal 3 targets to address these and other health issues in the context of project ESIA are:

- By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases;
- By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being;
- Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol;
- By 2020, halve the number of global deaths and injuries from road traffic accidents;
- By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs;
- By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination;
- Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate.

## Goal 5: Gender Equality

In spite of progress made in terms of the MDGs, women and girls continue to suffer discrimination and violence across the globe. The aims of this SDG are therefore to achieve gender equality and empower all women and girls.

### OPPORTUNITY COSTS OF COLLECTING WATER

UNICEF has highlighted that the opportunity cost from a lack of access to water disproportionately falls on women and girls who collectively spend as much as 200 million hours per day collecting water (rather than attending school or more productive livelihoods). The UN estimated in 2016 that in SSA, improved drinking water sources are more than 30 minutes away for 29% of the population.<sup>163</sup>

## Goal 6: Clean Water and Sanitation

Water scarcity, poor water quality and inadequate sanitation negatively impact food security, livelihood choices, health and educational opportunities for poor families throughout SSA. The main aim of this SDG is to ensure that there is universal access to water and sanitation. Some of the relevant Goal 6 targets are:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all;

<sup>163</sup> [www.un.org/sustainable\\_development/](http://www.un.org/sustainable_development/)

- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations;
- By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally;
- By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity;
- By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate;
- By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes;
- Support and strengthen the participation of local communities in improving water and sanitation management.

### **Goal 7: Affordable and Clean Energy**

Three billion people rely on biomass (wood, charcoal, animal waste) and poor quality coal for cooking and heating, which has major impacts on health – particularly respiratory tract infections. The aim of this SDG is to ensure access to affordable, reliable, sustainable and modern energy for all.

### **Goal 8: Decent Work and Economic Growth**

Sustainable economic growth will require societies to create conditions that allow people to have quality jobs that stimulate the economy while not harming the environment or their health.

### **Goal 9: Industry, Innovation and Infrastructure**

It has long been recognised that growth in productivity and incomes, and improvements in health and education outcomes, require investment in infrastructure, such as transportation systems, energy, water.

### **Goal 11: Sustainable Cities and Communities**

Rapid urbanisation (often unplanned) is exerting pressure on freshwater supplies, sewerage systems, living environmental and public health. Cities therefore need to be planned in such a way as to make them more inclusive, safer, resilient and sustainable.

### **Goal 12: Responsible Consumption and Production**

Over-consumption of food is detrimental to our health and environment. Land degradation, declining soil fertility, unsustainable water use, over-fishing and degradation of the marine environment are all lessening the ability of the natural resource base to supply food and ecosystem services to an ever-increasing population. Selected targets include:

- By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment;
- By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse;
- Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle;
- Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

**Goal 13: Climate Action**

Take urgent action to combat climate change and its impacts on the environment, society and health.

**Goal 14: Life below Water**

Conserve and sustainably use the oceans, seas and marine resources for the benefit of all.

**Goal 15: Life on Land**

Sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.

# Appendix 4: Summary of DFI requirements relating to health and gender<sup>164</sup>

## World Bank

The World Bank's new Environmental and Social Framework (ESF) was announced on 4th August 2016. The aim of the ESF is to support poverty reduction and build shared prosperity for all Bank-funded projects. The focus has also shifted from concentrating on the contents of ESIA's (as per the old Operational Policies) to now ensuring that the ESIA/ESMP commitments are being implemented on the ground as well. The key to this is institutional strengthening in Borrower countries to ensure stricter enforcement by national governments.

The ESF has consolidated and built upon the old system of Operational Policies, Bank Procedures and Good Practice Notes, as shown in Table A4.1 below.

Differential health impacts from projects in SSA by age and gender		
New standard	Building on:	Main changes
ESS1: Assessment and Management of ES Risks and Impacts	OP/BP4.01 (Environmental Assessment)	More emphasis of social assessment, non-discrimination; adaptive management and timeframe for compliance; harmonized approach with other development partners; building and strengthening Borrower's framework; monitoring and reporting across the entire project cycle
ESS2: Labor and Working Conditions	OP/BP 4.01 and EHS Guidelines	Prohibiting child labor; focus on OHS, grievance mechanisms; non-discrimination and equal opportunity; freedom of association and collective bargaining respecting national laws
ESS3: Resource Efficiency and Pollution Prevention and Management	OP4.09 (Pest Management) and EHS Guidelines	Efficient management of energy, water and other resources and materials; estimation and reduction of GHG emissions where technically and financially feasible
ESS4: Community Health and Safety	OP/BP 4.37 (Safety of Dams) and EHS Guidelines	Focus on risks and impacts on communities through design and safety of infrastructure, equipment, services, traffic and hazardous materials; plan for emergency preparedness and response; management of security personnel
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	OP/BP 4.12 (Involuntary Resettlement)	Greater clarity on land titling, access to common resources, voluntary transactions, use of escrows and in-situ resettlement; distinction between forced eviction and eminent domain
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	OP/BP 4.04 (Natural Habitats) and OP/BP4.36 (Forests)	Requirement to assess and mitigate impacts on biodiversity and manage living natural resources; address the impact on livelihood of the communities; requirements related to primary suppliers
ESS7: Indigenous Peoples (IP)	OP/BP 4.10 (Indigenous Peoples)	Clearer definitions; introduction of free, prior and informed consent (FPIC) in specified circumstances; greater protection of IPs in voluntary isolation
ESS8: Cultural Heritage	OP/BP4.11 (Physical Cultural Resources)	Adopt chance find procedure, enhanced consultation with affected communities; intangible cultural heritage; community consultations for commercialization of cultural heritage
ESS9: Financial Intermediaries (FI)	OP/BP 4.01	Establish E&S procedures proportional to FI nature and project risks and impacts; annual reporting to Bank
ESS10: Information Disclosure and Stakeholder Engagement	Consolidates WB engagement provisions	Meaningful consultants; enhance stakeholder engagement; access to information and grievance redress.



One of the key new principles is that the ESF establishes non-discrimination as a core principle in accordance with the Bank's commitment to protect the poor and other vulnerable groups<sup>165</sup> from adverse impact caused by WB-financed projects. It thus provides for a stronger assessment of discrimination towards individuals or groups where they may be adversely affected by a project, less able to take advantage of project benefits and/or where they may be excluded from or unable to fully participate in mainstream consultation processes.

The implications for ESIA practitioners and Borrower governments are:

- The Borrower (or ESIA consultant) will need to identify individuals and groups that may be differentially or disproportionately affected by the project due to their vulnerable status (ESS10);
- The Borrower (or ESIA consultant) will have to identify different interests within the community such as those of the youth, elderly, women, men, ethnic and cultural minorities, etc, who may have different concerns and priorities and who may require different or separate forms of engagement (ESS10);
- The Stakeholder Engagement Plan will need to include differentiated, tailored measures to allow the effective participation of those identified as disadvantaged or vulnerable (ESS10);
- ESIA's must show impacts disaggregated on the basis of different disadvantaged or vulnerable groups identified during the stakeholder analysis (ESS1);
- The ESMP must identify differentiated measures to ensure that vulnerable groups are not at a disadvantage in sharing project benefits and opportunities – this will require more detailed demographic data collection and analysis, and will be particularly important where resettlement and economic displacement may occur;
- Development of an Environmental and Social Commitment Plan (ESCP). The WB will monitor environmental and social performance and provide support and capacity building as needed in accordance with the legal loan agreement and the ESCP;<sup>166</sup>
- Depending on potential significance of the risks and impacts, Borrowers may be required to obtain independent, third party specialist reviews of all or part of the ESIA.

Both the WB and IFC (see below) use the EHS Guidelines (EHSGs) as a technical source of information during project appraisal. The EHSGs contain the performance levels and measures that are normally acceptable to the WB/IFC, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. For WB or IFC-financed projects, application of the EHSGs to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to IFC, become project- or site-specific requirements. The General EHSGs are arranged under the following main headings and sub-headings:

#### **Environmental**

- Air emissions and ambient air quality;
- Energy conservation;
- Wastewater and ambient water quality;
- Water conservation;
- Hazardous materials management;
- Waste management;
- Noise;
- Contaminated land.

#### **Occupational health and safety**

- General facility design and operation;
- Communication and training;
- Physical hazards;
- Chemical hazards;

<sup>165</sup>Discrimination on the basis of age, gender, disability, religion, sexual orientation and gender identity.

<sup>166</sup>WB Fact Sheet, Proposed ESS4

- Biological hazards;
- Radiological hazards;
- Personal protective equipment;
- Special hazard environments;
- Monitoring.

#### **Community health and safety**

- Water quality and availability;
- Structural safety of project infrastructure;
- Life and fire safety;
- Traffic safety;
- Transport of hazardous materials;
- Disease prevention;
- Emergency preparedness and response.

#### **Construction and decommissioning**

- Environment;
- Occupational health and safety;
- Community health and safety.

**In addition, there are 63 sector-specific EHSs categorised under the following industry headings:<sup>167</sup>**

- Forestry;
- Agribusiness/food production;
- Chemicals;
- Oil and gas;
- Infrastructure;
- Mining;
- General manufacturing;
- Power.

### **International Finance Corporation and Equator Principles Banks**

The International Finance Corporation is part of the World Bank Group, but targets its lending to the private sector. Furthermore, nearly 80 banks and financial institutions have voluntarily adopted the Equator Principles, which are based on IFC's Performance Standards.

The International Finance Corporation (IFC) system is based on a set of Performance Standards (PS) and the EHSs referred to above. The PSs provide guidelines for private sector borrowers on how to identify risks and impacts and are designed to help avoid, mitigate and manage risks and impacts to ensure that proposed developments are sustainable. IFC requires its clients to apply the eight PSs throughout the life of an investment by IFC (IFC, 2012). The eight PSs are:

**Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts** establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project. A number of Guidance Notes (GN) have been issued under PS1; the most notable in the context of this Guideline are: GN 44 and 45 on Human Rights, GN48 on Disadvantaged and Vulnerable Groups and GN50 on Gender.

The scope of application of **PS2: Labour and Working Conditions** is for directly employed workers, contracted workers and supply chain workers. The section on OHS requires clients to follow good industry practice as set out in the WB/IFC EHSs and to address the following specific areas:

<sup>167</sup>All the sector guidelines can be found on the [www.ifc.org](http://www.ifc.org) website

- Identification of potential hazards to workers, particularly those that may be life threatening – these may include physical, chemical, biological and radiological hazards;
- Provision of preventative and protective measures;
- Training of workers;
- Documentation and reporting of occupational accidents, diseases and incidents; and
- Emergency prevention, preparedness and response arrangements.

In its widest interpretation, this could include infectious diseases (biological risks), but it is not clear. The requirement to report occupational diseases refers to issues such as mesothelioma i.e. diseases caused by exposure to pollutants in the workplace, not those obtained through social interactions. This PS very much refers to the workplace and not social interactions between the workforce and surrounding communities.

The PS requires migrant workers to be engaged on “*substantially equivalent terms and conditions to non-migrant workers carrying out similar work.*” The client must provide accommodation and basic services to all workers irrespective of origin, including:

- Minimum space;
- Supply of water, adequate sewage and garbage disposal;
- Appropriate protection against heat, cold, damp, noise, fire and disease-carrying animals;
- Adequate sanitary and washing facilities;
- Ventilation;
- Cooking and storage facilities;
- Natural and artificial lighting;
- Basic medical services (in some cases).

This does not make any mention of the need for separate and appropriate accommodation and ablution facilities for women, nor does it require the client to provide any form of recreational facilities. The need to provide basic medical services “*only in some cases*” is also deemed to be inadequate.

The **PS4 on Community Health, Safety and Security** recognises that project activities, equipment and infrastructure can increase community exposure to risks and impacts, or aggravate existing health issues. PS4 acknowledges that while it is the government’s mandate to promote the health, safety and security of the public, the borrower is also responsible for avoiding or minimising risks and impacts to community health, safety and security from project-related activities, particularly on vulnerable groups.

The requirements of PS4 focus on:

- The design of infrastructure and equipment to reduce safety risks;
- Management and safety of hazardous materials to avoid or minimise risks of community and worker exposure to hazards especially those that might be life-threatening;
- Loss of ecosystem services and the impacts this may have on community vulnerability, health and safety;
- Potential community exposure to water-borne, water-based, water-related and vector-borne diseases and communicable diseases that could result from project activities, taking into consideration the differentiated exposure to, and higher sensitivity of vulnerable groups;
- Emergency preparedness and response in relation to community safety.

Again, this focuses on a rather narrow interpretation of health risks in the development context, being limited to the consideration of physical safety, loss of access to resources, water-based pollution (not air) and emergency preparedness.

PS4 is complemented by the General EHS Guidelines on Community Health and Safety, (see s. 2.5.1).

**PS5 on Land Acquisition and Involuntary Resettlement** recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use the land. It provides guidance on the procedures and studies required to ensure that resettlement does not result in adverse socio-economic impacts. Interestingly, it requires that any consultation process should ensure that women's perspectives are obtained and that their interests are factored into all aspects of resettlement planning and implementation. It also recognises that project impacts may impact on men's and women's livelihoods differently and that compensation mechanisms may need to be tailored accordingly.

## **African Development Bank**

In 2013, the African Development Bank (AfDB) approved its new Integrated Safeguards System (ISS) to update its environmental and social safeguards and to support inclusive and sustainable growth in Africa. The ISS consists of:

- An **Integrated Safeguards Policy Statement** declaring the Bank's commitment to environmental and social sustainability and the management of risks associated with non-compliance with the Bank's Policies and Procedures;
- **Operational Safeguards (OSs)** – which are a set of five brief and focused policy statements that clearly set out the operational requirements with which Bank-financed operations must comply (see below);
- A revised set of **Environmental and Social Assessment Procedures (ESAPs)** that provide information on the specific procedures that the Bank and its borrowers or clients should follow to ensure that Bank operations meet the requirements of the OSs at each stage of the Bank's project cycle; and
- **Integrated Environmental and Social Impact Assessment (IESIA)** Guidance Notes which provide technical guidance to the Bank's borrowers on standards and sector issues and methodological approaches or standards and management measures relevant to meeting the requirements of the OSs. A new Guidance Note was added in 2016 on Health in ESAs for Development Projects, which covers the main health categories described in Chapter 4 of this Guideline.

The ISS is designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects. The safeguards aim to:

- Avoid adverse impacts of projects on the environment and affected people, while maximising potential development benefits to the extent possible;
- Minimise, mitigate, and/or compensate for adverse impacts on the environment and affected people when avoidance is not possible; and
- Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

The five operational Safeguards (OSs) are:

**OS 1: Environmental and Social Assessment (ESIA).** This overarching safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements.

**OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation.** This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporates a number of refinements designed to improve the operational effectiveness of those requirements. In particular, it embraces comprehensive and forward-looking notions of livelihood and assets, accounting for their social, cultural, and economic dimensions. It also adopts a definition of community and common property that emphasises the need to maintain social cohesion, community

<sup>169</sup>Health, as defined by the WHO is a multi-dimensional concept which encompasses a complete state of physical, mental and social wellbeing and not merely the absence of disease or infirmity.

<sup>170</sup>Health risks in the context of development projects, and for the purposes of this ToR, include: communicable diseases, non-communicable diseases, vector-borne diseases, pollution-induced diseases including water-borne diseases, physical injuries, nutritional disorders, mental health issues and occupational diseases and disorders (see Chapter 4 of these Guidelines).

structures, and the social inter-linkages that common property provides.

The safeguard retains the requirement to provide compensation at full replacement cost; reiterates the importance of a resettlement plan that improves standards of living, income earning capacity, and overall means of livelihood; and emphasises the need to ensure that social considerations, such as gender, age, and stakes in the project outcome, do not disenfranchise particular project-affected people.

**OS 3: Biodiversity and Ecosystem Services.** This safeguard aims to conserve biological diversity and promote the sustainable use of natural resources. It also translates the commitments in the Bank's policy on integrated water resources management and the UN Convention on Biological Diversity into operational requirements.

**OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency.** This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow. It also introduces vulnerability analysis and monitoring of greenhouse gas emissions levels and provides a detailed analysis of the possible reduction or compensatory measures framework.

**OS 5: Labour Conditions, Health and Safety.** This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It covers working conditions, workers' organisations, occupational health and safety and avoidance of child labour or forced labour. It also ensures greater harmonisation with most other MDBs.

The Guidance Notes provide sector key sheets for 30 specific project types within four key sector areas: Transport, Energy and Electricity, Agriculture and Agribusiness, and Water Supply and Sanitation.

### **KfW Development Bank**

KfW Development Bank funds investments and related advisory services in developing and emerging countries on behalf of the German Federal Government. The Sustainability Guidelines of 2014 set out the environmental and social policies that govern KfW's operations with a view to contributing to sustainable development within the meaning of the German Federal Government's Sustainability Strategy. The starting position for its business operations is the implementation of human rights. These provide the basis for developing specific principles for all KfW's work, while also incorporating some important social aspects. The priority areas of KfW's activities in developing countries include social development, environmental and climate protection and the conservation of natural resources.

KfW benchmarks the environmental, climate and social compatibility of projects on their compliance with the environmental and social standards of the partner country and the national licensing or certification requirements. However, KfW also acknowledges that these may be weak or non-existent in some countries, and so the bank applies those of the World Bank Group EHS Guidelines and IFC Performance Standards and other equivalent standards issued by regional development banks or by the European Union.

### **Japanese International Cooperation Agency**

The Guidelines for Environmental and Social Considerations (2010) have to be implemented by host country governments, borrowers and project proponents when engaging in cooperation activities with JICA. In assessing potential projects for development assistance, JICA seeks to ensure that a wide range of E&S impacts have been assessed and that the E&S costs and benefits have been quantified. JICA also places great emphasis on the need for E&S mitigation measures to be implemented and monitored.

#### EXAMPLE OF AN INCLUSIVE DEFINITION OF THE TERM 'SOCIAL' (JICA)

*"...environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety. Items to be addressed in the specific project are narrowed down to the needed ones through the scoping process."*<sup>168</sup>

<sup>168</sup>JICA (2010). Guidelines for Environmental and Social Considerations. Japan.

# Appendix 5: Sample ToR for a comprehensive HIA

A separate Health Impact Assessment study<sup>169</sup> (i.e. separate from the SIA) is indicated for Category A projects, especially in the following circumstances:

- Where there is a high risk of community exposure to hazardous materials and emissions;
- Where the project will require significant inputs of agrochemicals such as fertilizers, pesticides and antibiotics;
- Where large-scale, commercial livestock projects are being proposed;
- Where water is to be used for irrigation or aquaculture which could be polluted;
- Where large numbers of construction workers and/or migrant workers will be required;
- Where there is an existing high burden of disease and/or malnutrition in the project area;
- Where there are existing high levels of pollution in the area (cumulative effects);
- Where there are long, diverse linear features associated with a new project e.g. pipelines, power lines, roads, canals, etc., which may impact community health far away from the 'core' project site;
- Where health care services are weak and health risks are high;
- Where there are significant stakeholder concerns.

The degree of detail and scope of a Health Impact Assessment (HIA) for a development project will depend on the type of project, its location and the vulnerability of targeted groups to health risks.<sup>170</sup> As such the ToR needs to be tailored to account for these variables, but should broadly cover the following:

## Introduction and project background

Introduce the project, its rationale and justification, country ownership, location, main inputs and outputs, overall time-frame etc.

## Scope of work

Specify the spatial and temporal boundaries for the HIA.

Explicitly state what should be included and excluded.

The scope of work should be divided into four phases or activities:

1. A rapid appraisal or scoping;
2. Baseline health description using existing documents, survey findings, data from Ministry of Health and/or National AIDS Council;
3. Health impact assessment based on the baseline evidence;
4. Development of a community health management plan based on priority impacts.

The consultants are requested to provide a detailed description of the methodology they propose to use to undertake the following activities:

## Rapid appraisal (scoping)

This component of work should be based on existing data and should include the following activities:

- Project definition from a health perspective. This will be carried out by reviewing all existing project documents and other available literature. This will include evaluating projects in similar settings in the country or region. Analyze any initial environment and social assessments, and review any meeting minutes or reports from stakeholder consultation.
- Review country-specific legal and policy frameworks for relevant health issues which may affect the planned project, particularly the health targets which the country has committed to.

<sup>169</sup> Health, as defined by the WHO is a multi-dimensional concept which encompasses a complete state of physical, mental and social wellbeing and not merely the absence of disease or infirmity.

<sup>170</sup> Health risks in the context of development projects, and for the purposes of this ToR, include: communicable diseases, non-communicable diseases, vector-borne diseases, pollution-induced diseases including water-borne diseases, physical injuries, nutritional disorders, mental health issues and occupational diseases and disorders (see Chapter 4 of these Guidelines).

- Country and community health profiling:
  - o Describe the baseline health status at a national, regional and district level with a focus to detect project-attributable or general potential health hazards using existing data sourced from the country's ministry of health, National AIDS Council, other government agencies as well as international agencies working in the health arena such as UNAIDS, WFP, WHO, UNICEF, etc. This is desktop work.
  - o Define and profile the communities that may be affected by the project development, especially those who are most vulnerable. This will be in relation to both directly and indirectly affected communities. This process must be aligned to the social and specialist studies and have a focus on communities that will be directly and indirectly impacted.
  - o Identify key health risks in the community.
- Produce a scoping report to feed into the overall project scoping report. The scoping report must include a detailed ToR for the specialist health impact assessment (HIA) to be conducted as part of the ESIA. The ToR for the HIA should include, but not be limited to, the following tasks:

### **Baseline health description**

- Describe the baseline health status of communities in relation to the project. This will be based on the availability of data from the rapid appraisal and be supported by new data collected in the social baseline and other specialist studies e.g. those relating to water and air pollution. To properly analyse the effects of the project on health, the baseline data on health and social indicators need to be:
  - o as up to date as possible;
  - o in quantitative form if possible; and
  - o collected in both aggregated and dis-aggregated forms – for example, local health data, socio-economic statistics, health facility information etc. should be provided at country, regional and local level and by gender, where relevant;
- Conduct a gender assessment to determine the key drivers with regards to health issues:
  - o Women's ability to express issues and concerns around their health;
  - o Different responses to project impacts;
  - o Employment on the project and what that means in terms of communicable diseases and other health issues;
  - o Sexual behaviors (traditional and sex work);
  - o Trafficking of women and children.
- Conduct a cultural assessment (or coordinate with the specialists undertaking such as study) to understand certain behaviors and customary practices which may increase the risks of communicable diseases (e.g. societal attitudes towards women, concurrent partners, condoms, HIV and inter-generational sex).
- Perform key informant interviews with local stakeholders in the project area to support the definition of the baseline health status. These could potentially include:
  - o local medical officer – a key representative that can provide information and highlight relevant health challenges in the area;
  - o district medical office;
  - o regional, district and local authorities, particularly those involved with water, livestock extension services, sanitation and health;
  - o local/district/regional HIV and AIDS program managers;
  - o community health/social workers;
  - o health care workers and peer educators;
  - o Country Program Management Team (if the project is being funded by one of the main DFIs);
  - o managers of NGOs or aid agencies working in the area;
  - o UNAIDS country representative or national AIDS council representative;
  - o WHO/UNICEF country representatives; and
  - o rural development agencies.
- Conduct surveys on knowledge levels and attitudes about health issues, especially towards HIV/STIs,

vector-borne and zoonotic diseases, before project construction starts, mid-way through construction and at the end of construction to determine whether the mitigation measures have had the required positive effect.

- Time the surveys, key informant interviews and behavior change communications program to avoid peak agricultural periods such as sowing and harvesting because farmers and their families may not be available at those times.
- The social and specialist teams are likely to meet a similar range of key informants; therefore, the consultants need to hold a planning workshop to define their areas of study and to coordinate their meetings (see below).

### **Impact Assessment**

- Consider the potential impacts of the proposed project on the health of the affected communities and relate them to the different life cycle stages of the project. Specific issues to be assessed include:
  - o Increased prevalence of diseases and disorders as a result of the project;
  - o Existing aggravating factors which may increase the risk of disease transmission in the project area, such as over-crowding, poor sanitation and waste management practices, existing disease burden e.g. HIV, malaria, existing high levels of air, water or soil pollution, poverty, inadequate health care facilities, post-conflict situations, etc.;
  - o The impact of climate change on health, nutrition, disease and disease vectors;
  - o The number of orphans in the project area; and
  - o Effects of poor health on the project due to training and replacement costs of staff that may leave because of sick leave and compassionate leave.
- Consider alternative options and recommendations for mitigation/management of priority impacts. Recommend measures to avoid/mitigate negative health impacts and enhance benefits which may result from the project at each project stage.
- Determine the health needs of the community based on health strategies, infrastructure, programs, service priorities, delivery plans and challenges.

### **Community health management plan**

The consultants must apply the mitigation hierarchy to address the negative health impacts of the project: Avoid, Reduce, Remedy and Compensate.

Seek to identify partners that may assist with any health support opportunities. These should include the local authorities, agricultural extension officers, non-governmental agencies and even donor agencies.

- Develop a community health management plan based on the findings of the HIA and SIA. The team will evaluate the sustainability of all recommended actions and strategies, to assist the long term-planning.
- Recommend methods for monitoring and evaluating the potential impacts if this is possible from gathered data. Key indicators will be listed as part of the plan, together with a surveillance strategy.
- Collect additional baseline data to inform specific mitigation and management elements and support health impact surveillance and costing.
- Develop a monitoring information system/database.
- Integrate the health management plan into the project ESMP.

The HIA consultants must prepare a final report for inclusion in the overall ESIA report. The ESIA consultants will provide the HIA consultants with the impact assessment methodology to be followed.

## **Additional Elements:**

### **Workshops**

A number of workshops to be attended by all the specialists will be conducted to support the project, including:

- planning workshop;
- workshop to support baseline data collection;
- impact assessment workshop; and
- community health and community development workshop.

The impact assessment consultants shall organize workshops with the design team early on, so that comparisons can be made well before the final site is selected and the final costs and benefits are calculated.

The aims of these workshops are to:

- Eliminate gaps and overlaps within and between specialist studies;
- Ensure cost-effective data collection in terms of scope and format so it can be used by other specialists;
- Determine individual study inputs and outputs in terms of work scheduling;
- Coordinate field surveys work in order to avoid stakeholder fatigue.

### **Peer review**

As the health impacts are considered to be extremely sensitive, the HIA and its deliverables may need to be peer reviewed by an external independent expert.

Summary of international conventions, protocols and agreements relating to health and gender that have been ratified by SSA countries

# Appendix 6: List of relevant international and regional conventions relating to health and gender

Summary of international conventions, protocols and agreements relating to health and gender that have been ratified (R), acceded to (A) or signed (S) by SSA countries

Country	International Covenant on Economic, Social and Cultural Rights.	Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW).	Convention on the Rights of the Child.	Convention in the Protection of the Rights of all Migrant Workers and Members of their Families	WHO Framework Convention on Tobacco Control	Convention on the Rights of Persons with Disabilities	African Charter on Human and People's Rights
<b>Southern Africa</b>							
Angola	A	A	R	-	R	R	R
Botswana	-	R	R	-	R	-	R
DRC	R	R	R	-	R	R	R
Lesotho	R	R	R	R	R	R	R
Madagascar	R	R	R	R	R	S	R
Malawi	A	A	A	-	-	R	R
Mauritius	R	A	A	-	R	R	R
Mozambique	-	A	R	R	S	R	R
Namibia	A	-	R	-	R	R	R
Seychelles	A	A	A	A	R	R	R
<b>South Africa</b>	R	R	R	-	R	R	R
Tanzania	R	R	-	-	-	-	R
Zambia	R	R	R	-	A	R	R
Zimbabwe	R	A	R	-	A	R	R
<b>East Africa</b>						-	
Burundi	A	R	R	-	R	R	R
Comoros	S	A	R	S	R	S	R
Djibouti	A	A	R	-	R	R	R
Eritrea	A	A	R	-	-	-	R
Ethiopia	R	R	A	-	R	R	R
Kenya	R	A	R	-	R	R	R
Rwanda	R	R	R	A	R	R	R
South Sudan	-	A	A	-	-	-	-
Uganda	R	R	R	A	R	R	R
<b>Central Africa</b>				-	-	-	
Cameroon	R	R	R	S	R	-	R

Central African Rep.	R	A	R	-	R	S	R
Chad	A	A	R	S	R	S	R
Equatorial Guinea	R	A	A	-	A	-	R
Gabon	R	R	R	S	R	R	R
Rep. of Congo	R	R	R	S	R	R	R
São Tomé & Príncipe	S	R	A	S	R	-	R
<b>West Africa</b>							
Benin	A	R	R	S	R	R	R
Burkina Faso	R	A	R	R	R	R	R
Cape Verde	A	A	A	A	R	R	R
Gambia	-	R	R	-	R	-	R
Ghana	R	R	R	R	R	R	R
Guinea	R	R	A	A	R	R	R
Guinea Bissau	A	R	R	S	A	R	R
Ivory Coast	A	R	R	-	-	-	R
Liberia	S	A	R	S	R	R	R
Mali	R	R	R	A	R	R	R
Mauritania	A	A	R	A	R	R	R
Niger	R	A	R	A	R		R
Nigeria	A	R	R	A	R	R	R
Senegal	R	R	R	A	R	R	R
Sierra Leone	A	R	R	S	A	R	R
Togo	R	A	R	S	R	R	R



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