

Review of Policy, Regulatory, and Organizational Frameworks of Environment and Health in Ethiopia

Getnet Mitike¹, Achenef Motbainor¹, Abera Kumie¹, Jonathan Samet², Heather Wipfli²

Abstract

Background: Ethiopia produced its Environmental Health Situational Analysis and Needs Assessment (SANA) report in 2010 as part of the global endeavor to characterize and underscore the importance of connecting health and environment. The assessment methods used in SANA 2010 were updated, replicated and used in this SABNA, with a focus on air pollution, occupational safety and health, and climate change.

Objectives: The purpose of the review was to examine national policies and identify gaps in regulations and organizational arrangements that determine Ethiopia's ability to mitigate and eventually prevent the health impacts of air pollution, occupational hazards, and climate change.

Methods: The national policy and regulatory documents were reviewed. Literature was identified through electronic searches. Hard copies of past reports and policies were reviewed whenever necessary. A semi-structured guideline was used to conduct in-depth interviews aimed at identifying gaps and needs.

Results: The Constitution of Ethiopia has policy provisions related to air pollution, occupational safety and health (OSH), and climate change and health. Proclamation No. 300/2002 on Environmental Pollution Control specifies ambient air quality standards and allowable emissions. However, there were no documents that outlined the national or regional strategies that the ministries and agencies could adopt to translate existing policies, legal provisions, or guidelines for air pollution into practical programs. In the same way, a national OSH policy was lacking at the time this review was made on how occupational safety and health should be handled nationally or at lower governing levels as required by the International Occupation Safety and Health and Working Environment Convention No. 155/1981. Ethiopia is a signatory of this Convention.

Conclusions and Recommendations: The results of the situational analysis indicate that there are cross-cutting gaps in the various sectors. Among these, addressing the critical shortage of skilled personnel is an urgent priority. Most stakeholders face acute shortages of professionals and poor retention mechanisms. It is therefore important to

- a) design interventions that focus on capacity building in, for example, aligning curricula with specific needs of ministries, and
- b) equip professionals with the necessary technical skills.

In addition, the results indicate that policies and regulations exist in theory, but in practice, there are inadequate implementation strategies to encourage adherence and enforcement of the regulations and policies [*Ethiop. J. Health Dev.* 2016;30(Special Issue):42-49]

Introduction

International commitments on the environment, development, and health have been observed since the Rio Declaration in 1992. The Rio Declaration focused on consequences and potential hazards of the environment - development interaction with population (1). The Libreville Declaration on Health and Environment in Africa signed by 52 member countries in 2008 clearly delineated the impact of environmental risks on the health of populations and related vulnerabilities. Morbidity and mortality related to poor sanitation, hygiene and unsafe water supply were identified as ongoing major sources of environment related deaths in the country (2). The Declaration also provided broad regional directions to mitigate the impact of environmental risks in member countries (3).

Anchored in the Libreville Declaration, a country-specific Situational Analysis and Needs Assessment (SANA) were conducted in Ethiopia in 2009. The SANA addressed the importance of inter-linkages between health and the environment and the report came out in 2010 (2). The report highlighted the need for a paradigm shift in understanding and dealing with health and environmental issues that often used to be

viewed as separate entities. The main paradigm shift for environmental health policy emerged from Agenda 21, the blueprint for sustainable development in the 21st century. Agenda 21 itself was adopted at the UN Conference on Environment and Development in 1992 (4).

The 2010 SANA report concluded that the existing policies and strategies were fragmented and compounded by major gaps in their coverage. In addition, there was no harmonization in the organizational frameworks. Also, they were not accessible to the lower level (2). Unsurprisingly, there were strong complaints by lower level implementers about the lack of implementing guidelines and enforcing procedures that could assist them to translate the available policies and regulations into practice.

As a foundation for planning a GEO Health Hub, the SANA approach has been followed to address air pollution, occupational health and climate change. (GEO Health Hub is a national and regional center for environmental and occupational health).

¹School of Public Health, college of Health Sciences, Addis Ababa University, Ethiopia;

²Department of Preventive Medicine, Keck School of Medicine, University of Southern California, USA

Next, findings on Policy Regulatory and Organizational Frameworks in Environmental Health in Ethiopia are presented.

The aim of the review was to explore and identify gaps at the national level on policies, regulations, and organizational arrangements that govern Ethiopia's ability to mitigate and eventually prevent the health impacts of air pollution, occupational hazards, and climate change.

Methods

First, published and unpublished national policies, regulatory and other legal documents were reviewed and important notes were taken. Then, the notes were synthesized according to themes. Next, key interviews were conducted with the major stakeholders. Semi-structured questions designed to help identify gaps and needs guided the interview.

Results

The assessment addressed policies, regulatory frameworks, institutional frameworks and strategies in relation to the three themes; namely, air pollution, climate change and health, occupational health and safety.

Policy

Air pollution: The Constitution of the Federal Democratic Republic of Ethiopia (FDRE) is the basis for all development-related policies, legal provisions and related outcomes within the country. The Constitution gives policy provisions regarding air pollution, occupational safety and health, and climate change and health in Ethiopia. For instance, in the Constitution all persons are granted the right to a clean and healthy environment. The government has the duty to ensure this. The Constitution also states that the design and implementation of development programs and projects shall not damage or destroy the environment (5).

Furthermore, the FDRE Health Policy provides guidelines and directives for prevention of environmental pollution resulting from hazardous chemical wastes (6). In addition, the FDRE environmental policy lists objectives and measures to address issues related to air and water pollution (7).

Climate change: Ethiopia's environmental policy addresses climate change through regulations and institutional and strategic mechanisms (7). The policy emphasizes the need for a climate monitoring program, as the country is highly sensitive to climatic variability. It recognizes Ethiopia's environmental, long-term economic and energy interests.

In fact, it is important to mention that a promising development trend is emerging in the country in terms of minimizing atmospheric inputs of greenhouse gases. For example, the energy sector is committed to harnessing hydro, geothermal, and solar energy. None of these produces significant amounts of pollutant gases.

The policy also emphasizes the need to actively protect the ozone layer. It recognizes the vulnerability of the Ethiopian highlands which already have a thin protective atmosphere. The country has often had unbearably prolonged drought seasons mainly due to the country's thin protective atmosphere.

Although more is desirable, and inevitable, efforts are already in place to save the country from facing yet other rounds of hazardous health effects caused by a further exposure to ultraviolet rays (7).

Occupational Health and Safety: At the time this assessment was made, an occupational safety and health policy was under consideration for approval by the House of People's Representatives. In addition to the environmental rights granted by the FDRE Constitution noted above, Article 42/2 guarantees workers the right to a healthy and safe work environment (5).

Regulatory Framework: The regulatory framework for air pollution control in Ethiopia is provided through two articles that describe the process of setting air quality standards. Sub-Article 6/1/b of the Environmental Pollution Control Proclamation No. 300/2002, for example, specifies ambient air quality standards and provides emission limits for stationary and mobile air pollution sources (8).

The FDRE Environmental policy provides the legal framework on climate change for the country (8). Implementation of the policy needs strategic research plans or policy enforcement mechanisms, however.

Occupational safety, health, and workplace regulations are available in two proclamations. In The Food, Medicine and Health Care Administration and Control Proclamation No. 661/2009 (article 23/1), it is stated that any employer shall ensure the availability of occupational health services to his/her employees (9). In Article 23 sub-article 2 of the same proclamation, it is stated that the executive organ shall issue appropriate directives on occupational health and use of machinery (9). Labor Proclamation No. 377/2003, under Sub-Articles 1-8 of Article 92, describes provision for occupational safety, health, and working conditions (10). Summary of the relevant regulations is presented in Table 1 below.

Table 1: Proclamations related to environmental protection and environmental health

No	Proclamation/Regulation No and Date	Title	Sources
1	Proc. No. 9/1995	Proclamation to Provide for the Establishment of the Environmental Protection Authority	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 1 st Year No.9 Addis Ababa-24 th August, 1995.
2	Proc. No. 295/2002	Environnemental Protection Organes Establishment Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 9 th Year No.7 Addis Ababa-3 rd October, 2002.
3	Proc. No. 299/2002	Environmental Impact Assessment Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 9 th Year No. 11 Addis Ababa 3 rd December, 2002
4	Proc. No. 300/2002	Environmental Pollution Control Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 9 th Year No. 12 Addis Ababa3 rd December,2002
5	Proc. No. 655/2009	Bio-safety Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 1 st Year No. 63 Addis Ababa 9 th September,2009
6	Reg. No. 159/2008	Prevention of Industrial Pollution Council of Ministers Regulation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 15 th Year No. 14 Addis Ababa 7 th January,2009
7	Proc. No. 200/2000	Public Health Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 6 th Year No. 28 Addis Ababa 9 th March, 2000
8	Proc. No. 661/2009	Food, Medicine, Health Care Administration and Control Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 16 th Year No. 9 Addis Ababa 13 th January, 2010
9	Proc. No. 377/2003	Labor Proclamation	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 10 th Year No.12 Addis Ababa 26 th F1ebruary 2004
10	Proc. No. 575-2008	Ethiopian Wildlife Development and Conservation Authority Establishment	Federal Negarit Gazeta Of the Federal Democratic Republic of Ethiopia, 14 th Year No 31. Addis Ababa 22 nd May, 2008

Institutional Framework: Article 5/1/b of the federal environmental policy calls for multilevel coordination among the responsible management bodies (e.g., federal to local) to ensure sectoral and cross-sectoral planning and implementation (7). The Environmental Protection Authority (EPA) was established by Proclamation No. 9/1995. The Environmental Organs Establishment Proclamation Number (No.) 295/2002 expanded the mandates of EPA, and further established it as an autonomous organization. The Proclamation decentralized the original central structure of environmental management (11, 12).

Article 15 of the Proclamation calls for each of the 11 national regional states to establish an independent regional environmental agency, or designate an existing agency to lead environmental management. The proclamation also stipulates that all government ministries or agencies establish an environmental unit

to ensure that their activities comply with the environmental standards and laws of the country (11).

At the Federal level, emphasis is given to climate change and its dynamic, cross-sectoral nature. An inter-ministerial steering committee has been established under the chairmanship of the Counselor of the Prime Minister. The Natural Resource Management Department within the Ministry of Agriculture served as host for the committee. The committee also includes representatives from the Ministries of Health, the Ministry of Industry, the Ministry of Water, Energy and Mines, and the Environmental Protection Authority.

The Department of Natural Resource Management also has technical teams mandated to deal with issues concerning climate change. While the federal structure has not yet extended to the regions and other lower

levels of administration, there are climate-related focal persons at the regional level.

In addition to the federal government, there are a number of other organizations working on climate change in the country. The following are a few of such organizations: Climate Change Forum Ethiopia, Farm Africa, the Norwegian Embassy, Department for International Development (i.e., The Department for International Development, the United Kingdom), the European Union, the United Nations Development Program (UNDP), etc.

Under Proclamation No. 4/1995, (Ministry of Labor and Social Affairs (MOLSA) is given the power to determine standards and measures for the safety and health of workers and to follow up on their implementation. In addition, MOLSA is responsible for collecting, compiling and disseminating information on the safety and health of workers (13). There is, however, no national policy that outlines how occupational safety and health should be handled nationally or at lower governing levels as required by the International Occupation Safety and Health and Working Environment Convention No. 155/1981.

Strategy: The implementation and specific modalities for the realization of the objectives set by the Constitution and environmental proclamations are yet to be formulated. There are no documents that outline the national or regional strategies that the ministries and agencies should use as a basis for translating the existing policies, legal provisions, or guidelines for air pollution into practical programs.

The Government of the FDRE has initiated the Climate-Resilient Green Economy (CRGE) as a strategy to protect the country from the adverse effects of climate change, and to build a green economy that will help the country realize its ambition of achieving the status of middle-income before 2025 (15). The CRGE was developed in 2011 and launched at the 17th United Nations Framework Convention on Climate Change (UNFCCC) in Durban, in 2011 (16). It follows a multi-sectoral approach and has so far identified and prioritized more than 60 initiatives. The initiatives help member countries achieve their development goals while limiting their Green House Gas emissions to 150 Mt CO₂e in 2030. This level of emission is estimated to about 250 Mt CO₂e less than the level estimated under a conventional development path.

With respect to OSH, only directive documents are said to be available. A closer look at the interview data obtained from the interviewed experts reveals that the directives themselves need to be revised to make them suitable for the purpose they are desired to serve - accounting for current developments and associated new technologies and health outcomes.

In addition, there is an infection prevention guideline for health care facilities in Ethiopia at the country level although it was not clear whether or not enforcement

procedure at the facility level was available when this assessment was carried out (17).

Capacity: systems, institutional and trained human resource

The presence of a strong environmental policy in the country provides a key starting point to bring about changes to air pollution and other types of environmental contaminations. None of the agencies involved in air pollution control have a structural framework that reaches the lower administration levels. In addition, a strong coordination that assists implementers throughout the country to act synergistically on the common problems is lacking.

More trustworthy relationships are needed, among the federal agencies and the regions, as well as among the regions themselves regarding their responsibilities (18).

Currently, several research institutions appear to be engaged in environmental research in the country. For example, The Ethiopian Health and Nutrition Research Institute, The Ethiopian Institute of Agricultural Research, The Institute of Biodiversity Conservation are just a few to be mentioned. Having such a large number of research centers and institutions that commit themselves to the safety of the environment, provided that there is the desired level of coordination among them, heightens our hope for living in a pollution-free environment much earlier than can be imagined. To realize this goal, there is an urgent need to build the capacities of the research centers and institutions. In particular, institutions at the regional level do not have trained/skilled manpower or adequate financial resources to realize their obligation of protecting the environment (7,18). The comprehensive environmental legislation currently in place has complex and multi-sectoral issues. Implementation of these requires efficient institutional mechanisms (7, 18). Other than just one laboratory and the few instruments available in the Addis Ababa regional Environmental Protection Authority, there are no research institutions and laboratories that are sufficiently equipped to measure air pollutant levels and other environmental contaminants. Sadly enough, there are very few qualified air pollution professionals in the country. Worse still, the ministries responsible for air pollution control themselves have either no trained staff at all or they may have very few trained staff in their offices.

The ministries and the institutions do not seem to have the capacity needed to translate the intervention mechanisms into practice. There is no laboratory equipment in the research institutions that deal with climate change. Only very few instruments that may be used to monitor meteorological events are available in the relevant offices. Even the said few available instruments themselves are old. The only resource available in the Addis Ababa Regional Environmental Protection Authority is a laboratory set up. Other than this, there is no financial capacity to effectively measure and control air pollution.

Not many documents that indicate the availability and capacity of research institutions and laboratories so far established to address OSH-related issues are either available or accessible. However, according to the limited documents reviewed and the interviews conducted, there are very few trained professionals and limited capacity associated with climate change in the country. Activities such as implementing policy development interventions, conducting relevant research, or providing training require much more resource than is currently available and accessible.

The Ministry of Labor and Social Affairs identified the lack of experienced and skilled professionals as the most significant problem in carrying out its duties. Most inspectors are generally trained in basic sciences. None has any specialized OSH training (13). None also has had any opportunity to attend a training that develops the skills needed to use the measuring instruments appropriately. These lacks may fairly, though not adequately, explain why the inspectors fail to properly carry out their monitoring and evaluation responsibilities.

Discussion

The policy assessment reported in this article was made with various officials from pertinent ministries and agencies. Available documents were consulted and key officials were interviewed in the efforts made to obtain relevant data. Attempts were made to explore and identify cross-cutting gaps, constraints, and needs. Lack of implementation plans and shortage of skilled human resources needed, for example, to operate equipment and manage problems in occupational health and safety, climate change, and air pollution, was among the identified critical cross cutting constraints.

Research activities in Ethiopia started in 1966 with the establishment of the Pasteur Institute. The Institute was merged with the former Nutrition Research Institute and formed the present Ethiopian Public Health Institute (EPHI). Needless to say, research plays a uniquely significant role in development activities. In recognition of this, diverse research undertakings have so far been made in both higher learning and national research institutions (19). Partly, this may also explain the country's current aspiration for socio-economic development.

Research activities have been taking place in the country for about half a century, but the information and evidence that is available on issues related to air pollution, climate change, and occupational health and safety is much less than what is desired to be enough to inform relevant policy decisions.

Apparently, no sufficient baseline data or surveillance systems on OSH seem to be available in Ethiopia. Admittedly, there are a few studies that have been carried out in selected factories in the country. The studies are fragmented, however. Given the emerging fast growing trend of industrialization in the country, there is a need for a more coordinated and extended

research that seeks ways of establishing a sustainable relationship between industrialization and the environment.

The beginning of health research in Ethiopia goes back to the beginning of the 19th century, when colonial scientists began the first health-related research in the country (19). However, the focus of the early research was limited to determining the prevalence of diseases in the country at the time. Today, there is little research still on risks of air pollution, climate change and work place hazards. Similarly, there is scant literature on policies, regulations, strategies and capacity of the implementers.

It is important to note that environmental risk factors are addressed, to some extent, though, at the level of policy and framework. However, policy directions and framework plans are not adequately translated inter-sectoral programs of joint actions (2).

There is inadequate coordination and integration among the different stakeholders and partners. Indeed, the structures and regulatory mandates required for the coordination to take place between different ministries are already in place, but implementing the coordination needs yet further and harder work. This finding is consistent with finding reported in SANA in 2010. It was reported in SANA 2010 that of the institutions that address aspects of health and environment in their policies or proclamations and action plans, most of them lacked involvement in activities, programs or projects on health and environment matters (2).

African countries adopted a comprehensive policy framework and an implementation process through the Libreville Declaration on Health and Environment in Africa in order to address different types of environment related health challenges that faced the people of the continent. The declaration is the overall framework used to address health and environment relations coherently by streamlining the actions of the various sectors and stakeholders at all levels (3).

A minimal awareness has been observed among the public, implementers, and decision makers of the contemporary problems. The health impacts of climate change, air pollution, and occupational and workplace hazards are mainly the areas in which little awareness is observed to prevail.

Ethiopia is working towards shifting the economy from a primarily agricultural to a more industry based one. Health risks may result from this transition if the country fails to address sources of potential health risks on time. Similarly, there are health risks that could be aggravated due to climate change and variability. According to the Ethiopian Meteorological Agency report, climate change will increase food insecurity, outbreaks of diseases such as malaria, dengue fever and water borne diseases. Floods are also feared to cause cholera and dysentery. Respiratory diseases associated with droughts, heavy rainfalls which tend to accelerate land degradation and damage to communication

infrastructure are the health risks associated with climate variability (20). Skilled human resources and advanced technologies which - collecting, analyzing and interpreting the data associated with these health risks require - are the inputs that will strengthen policies and regulations to prevent and control the adverse health outcomes.

Inadequate monitoring and documentation of activities persist still in the sector. Documents and data are not available in most organizations and monitoring and evaluation activities are limited. There is an inadequate link between training institutions and the skills required by the ministries. Similar problems used to characterize other African countries. However, countries of the WHO African Region have, since recently, recognized gaps such as lack of institutional arrangements, deficiency in the basis of evidence and insufficiency in human resource competencies. The countries managed to identify such obstacles that retard the adequate implementation of environmental health interventions through adopting the Regional Strategy for Environmental Health in 2002 (4).

No platforms that engage universities and the different stakeholders in curriculum design and joint research activities are available. There is no budget allocated or facilities designated for laboratories, research, or surveillance.

Based on the gaps identified in this SANA, the following needs are indicated:

- Training professionals (both at the undergraduate and graduate levels) should be prioritized at the national level for instruction on occupational health, climate change, and air pollution.
- Training curricula need to be aligned with the country's needs. The universities and the stakeholder (the ministries, for example) should design need-based curricula together.
- Generating evidence, establishing research and surveillance sites and monitoring stations in various sites in Addis Ababa is a priority that arises from the urgent need to monitor particulate matter, emitted gases, and other pollutants.
- Encouraging industries/factories to establish their own stations and to document and report their findings to the concerned ministries.
- Setting indicators for monitoring and evaluating climate change and occupational health and safety, and establishing systems to implement policies and regulations.
- Establishing mechanisms of accountability and systems of coordination at national and organizational levels.
- Increasing awareness of the public and decision makers regarding climate change, air pollution, and occupational health, and improving documentation of the related activities.

Conclusion and Recommendations:

Results of the SANA on the policies, regulations, and regulatory framework show a number of major common constraints in addressing air pollution,

occupational health and safety, and climate change and health. While many policies and regulatory provisions are already on paper, there is inadequate implementation of the policies/strategies and their regulatory provisions. Observation points to the lack of linkages among the various institutions charged with addressing the complexity of the problems and needs related to health, development, and the environment. The results of the situational analysis indicate that there are cross-cutting gaps in the various sectors. Among these, shortage of skilled personnel is an urgent priority. Most of the stakeholders suffer from acute shortages of professionals and poor retention mechanisms.

Research activities to date in air pollution, occupational health, and climate change as related to health are minimal. Consequently, evidence based decision-making and monitoring and evaluation are hampered. Each of the four themes in the SANA is defined by its complexity and multi-sectoral nature; however, mechanisms for coordination and integration are mostly on paper and nonfunctioning in reality. Lack of such mechanisms reduces the engagement of the different stakeholders mandated by the government.

The linkage between universities and concerned ministries indicates a mismatch between what the training institutions are producing and the specific skills required by the ministries, along with poor awareness among many sectors of the related challenges. Furthermore, poor documentation compounds minimal monitoring and evaluation activities.

Based on the findings of the SANA, the following are recommended:

- Designing interventions focusing on capacity building, such as aligning curricula with specific needs of ministries and equipping professionals with the necessary technical skills.
- Building research capacity to improve evidence-based decision-making and enhancing surveillance systems for monitoring and evaluation.
- Clarifying implementation guidelines, procedures of accountability, and coordination mechanisms as required by existing policies and regulations.
- Developing mechanisms for raising awareness in the respective sectors, including policymakers and the public at large

Acknowledgements

The success of this situational analysis was made possible through the data obtained from a large number of offices, organizations and agencies. The contributions made by all, therefore, deserve our genuine appreciation.

The school of Public Health at Addis Ababa University (AAU) and the University of Southern California (USC) in USA extend sincere gratitude to Fogarty International, National Institutes of Health for the financial support that made this review possible through the linked planning grants 5R24 TW009552 [AAU] and 5R24 TW009548 [USC]. We also like to

thank all key Informants in the respective organizations including the Ministry of Agriculture, the Ministry of Health (MOH), the Ministry of Water Resources and Energy, Public Health Emergency Management of MOH, the Federal Environmental Protection Authority (EPA), the Disaster Risk Management and food Security System (DRMFSS), and the National Meteorological Agency (NMA) for providing the information and data needed to complete this needs assessment.

References

1. Günther H. Declaration of The United Nations Conference on the Human Environment (Stockholm Declaration), 1972 and The Rio Declaration on Environment and Development. 1992.
2. Federal Democratic Republic of Ethiopia. Situation Analysis And Needs Assessment (Sana) on The Libreville Declaration on Health And Environment Interlinkage Country Report, Ethiopia Addis Ababa, Ethiopia. 2010.
3. World Health Organization. Public Health & Environment in the African Region: Report on the Work of WHO (2010-2011). 2012.
4. World Health Organization, Regional Office for Africa. The who strategic plan for health and environment in the african region, 2006–2009, Brazzaville, Republic of Congo. 2005.
5. Federal Democratic Republic of Ethiopia. Constitution of Federal Democratic Republic of Ethiopia. Addis Ababa, Ethiopia 1994.
6. Transitional Government of Ethiopia. Health Policy of The Transitional Government of Ethiopia. Addis Ababa 1993.
7. Addis Ababa Environmental Protection Authority, Ministry of Economic Development and Cooperation. Environmental Policy of Ethiopia: Environmental Policy Addis Ababa, Ethiopia April 2, 1997.
8. Federal Democratic Republic of Ethiopia. Environmental Pollution Control Proclamation, Proclamation No. 300/2002 Federal Negarit Gazeta, 2002.
9. Federal Democratic Republic of Ethiopia. Food Medicine and Health Care Administration and Control Proclamation, Proclamation No. 661/2009, Federal Negarit Gazeta, . Addis Ababa, 2009.
10. Federal Democratic Republic of Ethiopia. Labour Proclamation, proclamation No. 377/2003, Federal Negarit Gazeta, . Addis Ababa, 2003.
11. Federal Democratic Republic of Ethiopia. Environmental Protection Authority Establishment Proclamation, Proclamation No. 9/1995. Federal Negarit Gazeta 1995.
12. Federal Democratic Republic of Ethiopia. Environmental Protection Organs Establishment Proclamation, Proclamation No. 295/2002 Federal Negarit Gazeta 2002.
13. Solomon Y. Keil C. A report on Ethiopian Occupational Health and Safety Regulatory Environment.
14. Karl K. Handbook for Joint Safety and Health Committees in the English-Speaking Caribbean. 1997.
15. Federal Democratic Republic of Ethiopia. Ethiopia's Climate-Resilient Green Economy, Green economy strategy. Addis Ababa, September, 2011.
16. Environmental Protection Authority. United Nations Conference on Sustainable Development (Rio+20), National Report of Ethiopia, . 2012.
17. Federal Democratic Republic of Ethiopia. Ministry of Health. Infection Prevention Guidelines for Healthcare Facilities in Ethiopia. 2004.
18. United Nations. Johannesburg Submit, The 2002 Country Profiles Series, Ethiopia. 2002.
19. Johann M, Nelius B. Centre for Research on Science and Technology, Stellenbosch University.
20. School of Economics and Commercial Law. Ethiopia Environment and Climate Analysis, Göteborg University. 2008.

Appendix

Key informants involved in the interview

SN	Name of organization	Position of key informant / Work place-Unit
1	Ministry of Health (3 informants)	Health Extension and Primary Health Service Directorate
2	Environmental Protection Authority, Ethiopia (2 Informants)	1. Monitoring and Evaluation Directorate Director; 2. Environmental Units Program Directorate Director
3	Ministry of Agriculture , Disaster Risk Management and Food Security	Partnership Coordinating Unit
4	Ministry of Water, Irrigation and Energy (2 informants)	1. EIA and Social development Officer; 2. Energy Study and Development Follow up Directorate
5	National Meteorology Agency	Meteorological research and Study Directorate Director
6	Ministry of Labor and Social Affairs (3 informants)	Labor and OHS relations