

Political economy of the Ethiopian Science Granting Council

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1. Introduction

The Federal Democratic Republic of Ethiopia (FDRE) is one of the oldest countries in Africa with a remarkable early civilization (Munro-Hay, 1991). Despite this, its scientific research experience is relatively recent. In the 1960s, expatriate staff conducted most research in Ethiopia. In the 1970s, a small but rapidly growing number of Ethiopian researchers began conducting research, laying a foundation for the present-day Research and (Experimental) Development (R&D) activities in the country (Bechere, 2007; Mekuriaw, 2003).

Ethiopia has increasingly shown interest to harness the power of Science and Technology (S&T) for development since the 1970s. A major milestone was the creation of a Science and Technology Commission in 1975. Following a realisation that absence of S&T policy is one of the major obstacles, which prohibited research from contributing to national development, the country formulated a Science, Technology and Innovation (STI) policy in 1993 (Mouton and Boshoff, n.d). After successive restructuring of the Science and Technology Commission, Ethiopia now has the Ministry of Science and Technology (MoST) in place, established in 2008. MoST sets science and technology, and research priorities. In addition, MoST develops guiding frameworks, policies, regulations and strategies, which facilitate the application of STI to accelerate socio-economic development in Ethiopia (for more on the roles and responsibilities of MoST, see: <http://www.most.gov.et/>). A Research and Policy Directorate under MoST hosts a newly organised National Research Council, serving as a Science Granting Council. The National Research Granting Council has funded research projects since 2015. Yet, such research activities have not sufficiently contributed to economic development through increased innovation intensity. As such, Ethiopia is ranked 118th out of 143 countries in the Global Innovation Index as of 2014 (Cornell University et al., 2014). Drawing on insights from interviews of eight key informants in Ethiopia (see Annex 1 for some information about interviewees) and desk research, this national case study sheds some light on the political and economic constraints, which influence the performance of the National Research Granting Council and the overall research landscape of Ethiopia.

This report is structured as follows. The subsequent Section sets the context by highlighting the political, economic, and science and technology situation of the country. Section 3 introduces the Science Granting Council in Ethiopia, and highlights its funding activities as well as policies governing its activities and its interactions with local, regional and international actors. Section 4 and Section 5 highlight political and economic constraints influencing the Science Granting Council, respectively. Finally, Section 6 concludes the case study report.

2. Setting the context

2.1 Political overview

The Federal Democratic Republic of Ethiopia (FDRE) is a vast country located in the horn of Africa. It is the second most populous country in Africa (next to Nigeria), with an estimated population of about 99 million in 2015 (World Bank, 2017). It is also one of the oldest independent countries in world, with a long history of indigenous political system. For most of its history, it was ruled by monarchies. The last monarchy was the reign of Emperor Haile Selassie until he was deposed by pro Marxist-Leninist military dictatorship, the 'Derg', in 1974 (Marcus, 1994). Despite remarkable ancient civilizations and efforts of modernising the country in the early 20th century, successive wars, and

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persistent political instabilities and droughts have resulted in Ethiopia's current status as one of the poorest countries of the world (Marcus, 1994; Ambel et al., 2015).

The current political system (as of early 2017) was established in 1991, following a military overthrow of the Derg regime by ethnically organised forces called the Ethiopian People's Revolutionary Democratic Front (EPRDF). Over the past two decades, EPRDF has consolidated political power and embarked on major economic policies and programmes, such as the 5-year Growth and Transformation Plans (GTPs), which aim to register an annual GDP growth of 11%, primarily driven by industry and exports through private sector development and Foreign Direct Investment (FDI) (Deloitte, 2016; KPMG, 2016).

2.2 Economic overview

Ethiopia has recorded a remarkable economic development recently, with an average real Gross Domestic Product (GDP) growth rate of 10.5 per cent per annum from 2004/05 to 2013/14 (Seid et al., 2015; see also Figure 1). The growth is driven by public investment in infrastructure through the so-called the 'developmental state model' and increased productivity in agriculture (MoFED, 2013; Jalata, 2015). Ethiopia's economy is dominated by agriculture, which contributes to 50% of the country's GDP, 85% of exports, and over 73% of total employment (Altenburg, 2010). While industry and service sectors have been growing since mid-2000s, their contribution to the overall economy has been relatively limited. As of 2015, industry and services contribute only 7% and 20% of the GDP, respectively (KPMG, 2016).

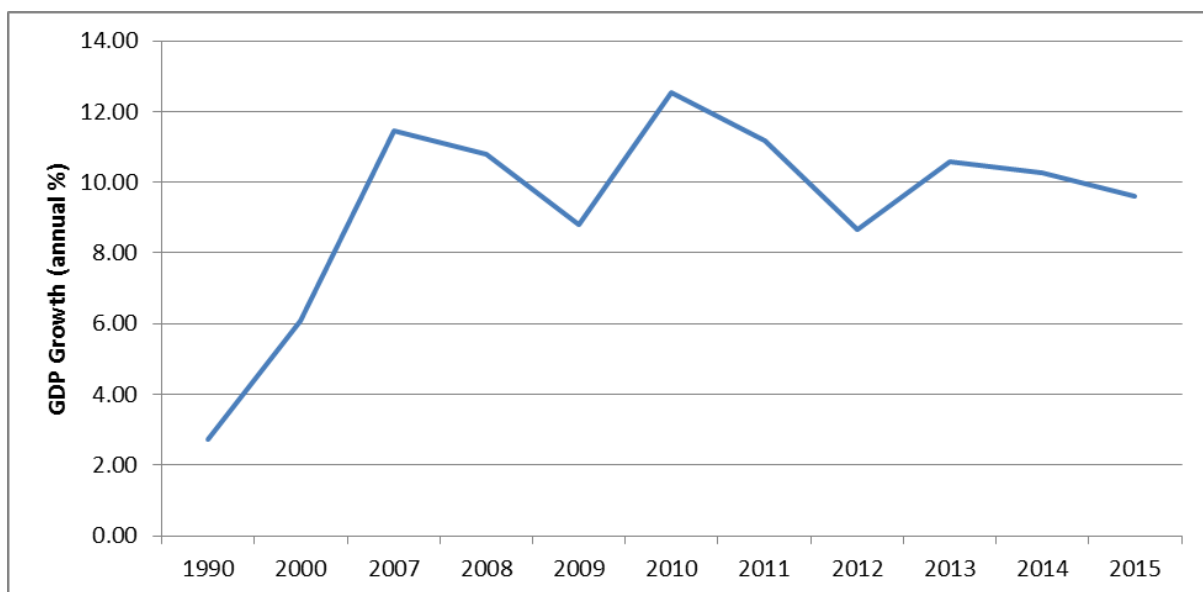


Figure 1: Ethiopia's Gross Domestic Product (GDP) growth from 1990–2015. Data source: World Development Indicators (WDI) database (World Bank, 2017).

Ethiopia is a net importer of many of its basic commodities and industrial products (see Figure 2). Its export is composed of agricultural products such as coffee, oilseeds, khat, pulses, flowers, livestock products, accounting for about 80% of all exports (Altenburg, 2010).

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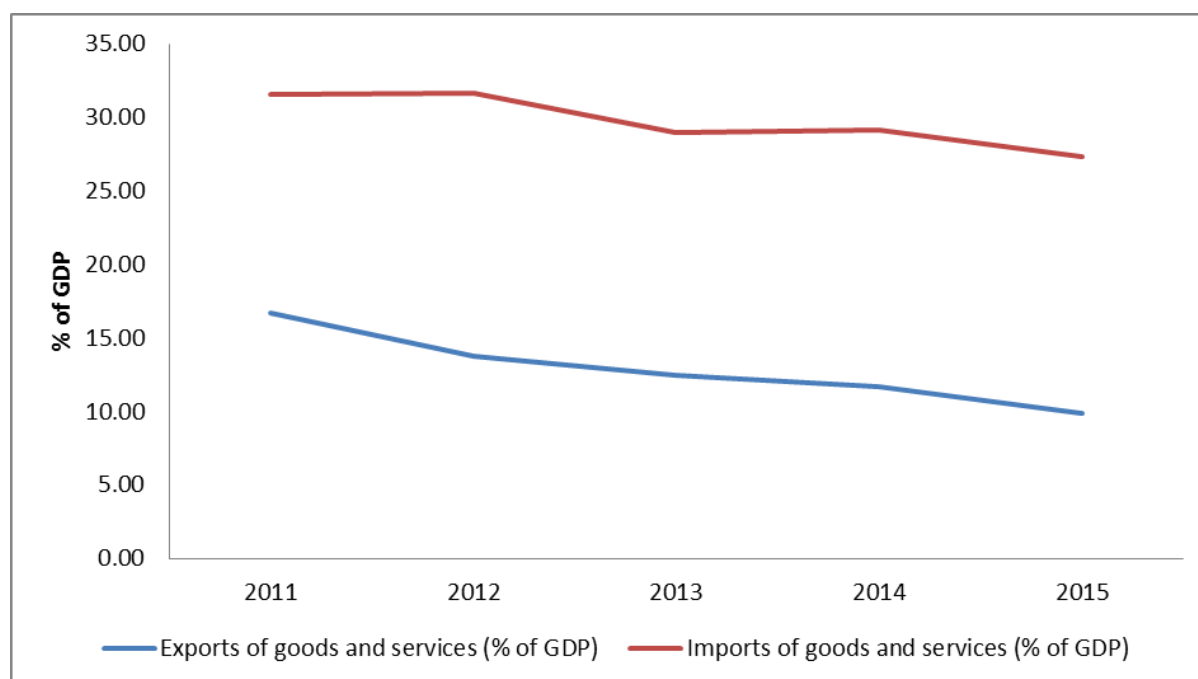


Figure 2: The rate of exports and imports of goods and services (% of GDP) (2011–15). Data source: World Development Indicators (WDI) database (World Bank, 2017).

2.2 Science and technology system overview

Ethiopian Science and Technology Commission (ESTC) was established in December 1975 by proclamation No.62/1975, with a responsibility of planning, coordinating, selecting and approving research programs, projects and activities. After a few years of institutional consolidation, ESTC organised sectoral research councils in the areas of food and agriculture, industry and technology, natural sciences, health, construction, housing, and urban development, education and manpower development, and science and technology popularization (Mouton and Boshoff, n.d).

Following the transition of power from Derg to EPRDF and development of a new economic policy and strategy, there was a renewed realisation about the important role of science and technology in economic development as well as the need to develop science and technology policy (Mouton and Boshoff, n.d). The Government commissioned the development of the first draft of STI policy in 1993. The policy included major goals, such as building ‘national capability to generate, select, import, develop, disseminate and apply appropriate technologies for the realization of the country’s socio-economic objectives’ (FDRE, 2012). The planned strategies to realise these objectives were not fully implemented. This was mainly because of the disruption following the border war with Eritrea between 1998 and 2000 (Mouton and Boshoff, n.d). The Commission was then re-organised as Ethiopian Science and Technology Agency (ESTA) in 1995. ESTA subsequently revised the earlier science and technology policy that outlined a new governance structure. ESTA is upgraded as MoST in 2008 by proclamation No. 604/2008, and further restructured in October 2010.

As of early 2017, MoST is the top government agency that coordinates, supports, and encourages science and technology activities in the country. MoST identifies science and technology R&D

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priorities, facilitates collaboration among the Government, universities and the private sector and oversees human resource development plans in the field of science, technology and innovation. It is responsible for developing mechanisms of incentivizing and rewarding individuals and institutions that have contributed to science and technology significantly. It is also tasked with organising and supporting research councils that facilitate research activities in the country. As of 2017, there are a number of agencies affiliated with MoST. These include: Ethiopian Standard Agency (ESA), National Metrology Institute (NMI), Ethiopian Conformity Assessment Enterprise (ECAE), and Science and Technology Information Centre (STIC).

There are also a number of R&D agencies in key sectors, such as agriculture. As of 2016, there are 16 agricultural research organizations of which half are government owned research centres while the rest are public higher education systems, mostly funded by the Government. Of this, the Ethiopian Institute of Agricultural Research (EIAR) is the most dominant agricultural research agency, employing 669 full time equivalent (FET) researchers in 2011 and more than 13 research centres across the country.

The Ethiopian science and technology landscape also features about 31 accredited public universities. Another four universities are expected to be administered by the Government, increasing the total public universities in the country to 35. Ethiopia also has 59 accredited non-governmental universities and colleges, most of which are based in Addis Ababa. Although the majority of public universities are new, many of them undertake R&D activities. Examples of major universities that are involved in R&D and human resource development include Addis Ababa Science and Technology University (AASTU), Haramaya University (HU), Gondar University, Bahir Dar University, Mekele University, Adama Science and Technology University, Arbaminch University, Jima University and Hawasa University.

There are also a number laboratories and infrastructural agencies, which are part of the Science landscape of Ethiopia. These include: National and Regional Soil Laboratories, Regional Veterinary Laboratories, and Geological Survey of Ethiopia (GSE).

2.3 Science and technology indicators overview

Science and Technology Information Centre (STIC) (2014) has reported recent science and technology and R&D indicators of Ethiopia in detail (see STIC, 2014). Here I will highlight only some of the most important data related to R&D investment, level of R&D, and R&D personnel in four sectors, namely in government, higher education, business enterprises and private non-profits (PNP).

Ethiopia's overall investment in R&D, also called Gross Domestic Expenditure on Research and Experimental Development (GERD), as a percentage of GDP stands at 0.61% as of 2013/14. This is lower than the continental target of 1% of GDP set out by the Executive Council of the African Union on Science and Technology in 2006 (NPCA, 2014) and Ethiopia's target of allocating at least 1.5% of its Gross National Product (GNP) to R&D in its STI policy (FDRE, 2012). However, it is steadily increasing since 2005 (See Figure 3). From the total GERD investment in 2013/14, the Government contributes 79%, while donors contribute 2%. The remaining is contributed by organizations' own funding sources. Donors' contribution to Ethiopia's GERD is declining in recent years. In 2010, for

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example, donors and multilateral and bilateral development agencies contributed about 30% of the GERD.

Sectorally, the public sector is the dominant spender of GERD in Ethiopia, accounting for 76% of the R&D funding and 0.08% of the total GDP (See Table 1). Importantly, however, over 98% of the R&D investment is utilized by public universities and research centres of Ethiopia. Table 1 also shows that Ethiopia's R&D expenditure in the public sectors (Public GERD) as percentage of GDP is lower than that of Kenya, Senegal, Tanzania and Uganda.

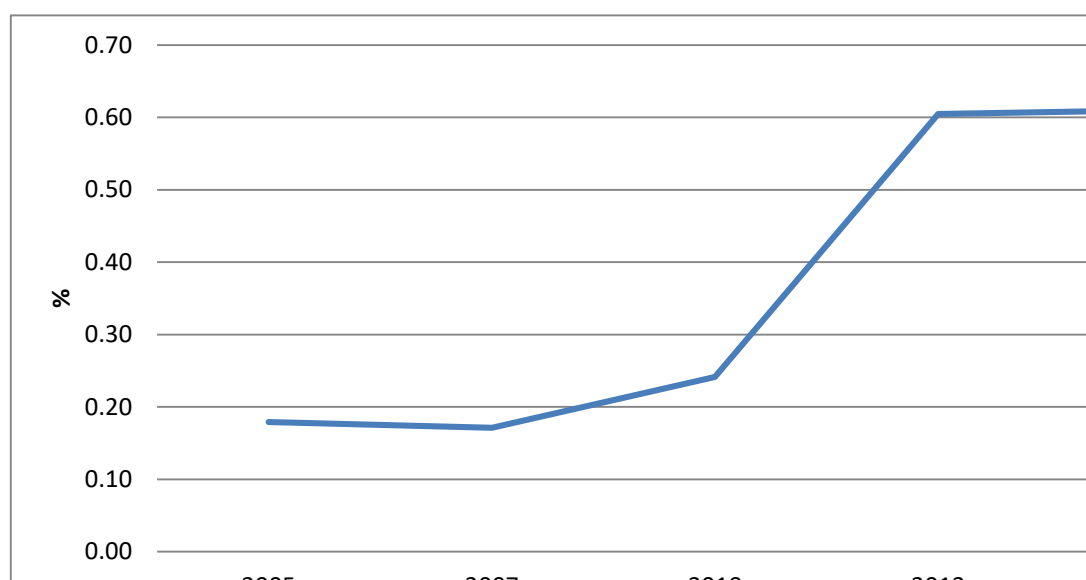


Figure 3: Trend of Ethiopia's GERD investment (2005 to 2014). Data source: World Development Indicators (World Bank, 2017).

Table 1: Sectoral R&D expenditure as percentage of GDP (PPP) in selected African countries as of 2010. Source: NEPAD (2014).

	Ethiopia	Kenya	Senegal	Tanzania	Uganda
R&D expenditure in the public sectors (Public GERD), % of GDP	0.21	0.78	0.45	0.52	0.32
Gross domestic business expenditure on R&D (BERD), % of GDP	0.04	0.09	0.002	-	0.18
Gross domestic private non-profit (PNP) expenditure on R&D, % of GDP	-	0.11	0.09	-	0.01
Gross domestic government expenditure on R&D (GOVERD), % of GDP	0.1	0.4	0.28	0.07	0.19
Gross domestic Higher Education expenditure on R&D (HERD), % of GDP	0.1	0.38	0.17	0.45	0.13

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Note: all percentages are calculated at Purchasing Power Parity (PPP) to ensure comparability.

STIC's report (2014) further reveals that there is higher focus on applied research¹ than on basic research. It reports that about 75% of organizations that reported to have conducted R&D focus on applied research. It also shows that in 2013/14, there were about 18,435 personnel involved in R&D from which 45% hold research position, 30% are support staff and 25% are technicians. Table 2 also shows that 95% of the R&D personnel are concentrated in higher education and government sectors.

Table 2: R&D personnel of Ethiopia by sector (2014). Source: STIC, 2014

	Number of personnel	Percentage
Gross Domestic Higher Education Expenditure on R&D (HERD)	8804	45
Gross Domestic Government Expenditure on R&D (GOVERD)	9141	50
Gross Domestic Business Expenditure on R&D (BERD)	114	0.6
Gross Domestic private non-profit (PNP) expenditure on R&D	376	2

Most researchers in higher institutions have agricultural, social, and medical science academic backgrounds, whereas business sector R&D personnel are involved in humanities, social sciences engineering and technology, and natural sciences. Government R&D personnel are largely agriculturalists and social scientists (STIC, 2014)

3. Science Granting Council (SGC) in Ethiopia

Within its national Science, Technology and Innovation (STI) policy, Ethiopia has proposed the National Science, Technology and Innovation Council (NSTIC) to oversee Science projects relevant to the development of the country (See FDRE, 2012). The NSTIC is led by the Prime Minister and composed of key ministers, such as Minister of Finance and Economic Development, Minister of Education, Minister of Industry, and Minister of Science and Technology. Vice Presidents for Research and Technology Transfer of some universities and representatives of research institutes, such as the Ethiopian Economics Association (EEA), the Forum for Social Studies (FSS) and prominent scientists, are also members. Meeting twice a year, the NSTIC carries out policy advice on resource allocation

¹ Applied research in the context of STIC's survey, and according to key informants, is defined as application of scientific investigation to solve societal challenges.

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for R&D (as percentage of the country's GDP), sets STI research priorities, and oversees national STI competitions².

Ethiopia has a National Research Council, serving as a Science Granting Council, with a secretariat hosted within the Research and Policy Directorate of MoST. As of January 2017, the Science Granting Council is not an 'independent' organ. However, there is strong desire among Secretariat staff to play more autonomous roles (than they currently do). This for example includes coordinating research activities of the country. Since 2015, the National Research Granting Council has started funding and managing research projects—largely in agriculture and health themes—that are believed to contribute to the development of the country. Funded-researchers are exclusively from public research and higher education systems. Under the National Research Granting Council, there are technical committees—experts in their respective fields—which evaluate the quality of research proposed or delivered by researchers.

3.1 Research funding activities of the Science Granting Council

Interviewees from the Ethiopian Academy of Sciences (EAS) and the Ethiopian Environment and Forest Research Institute (EEFRI) reported that in the 1980s and 1990s, research-funding initiatives were introduced by the Ethiopian Science and Technology Commission and later the Ethiopian Science and Technology Agency. In those days, sectorial research councils coordinated research funding activities with financial support from donors, such as the Swedish International Development Cooperation Agency (Sida) and the International Development Research Centre (IDRC). However, the amount of research funding was small; and its scope was limited to sectoral priorities.

According to a researcher from Addis Ababa University, as of 2016/17, universities, health research institutes and agricultural research centres carry out the majority of scientific research in Ethiopia. Donors and collaborative foreign universities are the main sources of funding for research conducted by universities and health research institutes. A key informant from the Ethiopian Academy of sciences reported that foreign partners often come with their own research agendas. Some donors however give autonomy to fund-recipients to set their research agendas and priorities. A case in point is Sida/SAREC support for international and regional thematic research programs, which had given significant financial support to Ethiopian universities in the early 2000s. According to the key informant, agricultural research centres mobilize most of their research funding from the Government and often have the liberty to set their research priorities and agendas based on local needs.

Major research funding by the Government, at national level, started with the newly established National Research Granting Council in 2015. It is reported by interviewees from the Ministry of Science and Technology (MoST) that the Government is the principal source of research fund for the National Research Granting Council, with an annual budget of about Ethiopian Birr (ETB) 20 to 30 million per year³. Each year, the National Research Granting Council earmarks a maximum of 5

²Up to 2016, it has held such competitions six times. The event and the competition process are broadcast on national TV to create awareness on science and technology.

³ 1 US Dollar equals 22.8 Ethiopian Birr (ETB) as of March 2017.

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Million ETB per project for a maximum research period of 3 years. The grant is awarded in the presence of the Prime Minister of Ethiopia, highlighting the political importance placed on funding R&D.

Evidence-based problem identification process is carried out in consultation with professionals in priority sectors, such as agriculture, agro-processing, bio-technology, construction, information technology & electronics, leather, metal and textile. The research priority areas should also be in line with the 11 critical areas and policy directions identified in the STI policy⁴ (see FDRE, 2012 for the critical policy areas). Depending on funding from the Ministry of Finance and Economic Development (MoFED), the National Research Granting Council calls for research proposals. Submissions are open to all local researchers.

Since funding is still inadequate (relative to demand), the National Research Council has set a rigorous screening procedure based on predetermined evaluation criteria. Some of these criteria include:

- a) The research should be applied. It should solve a real problem in the Ethiopian economy and/or result in a product or service that significantly contributes to local development.
- b) The research thematic area should fall within those identified by the NSTIC's strategic directions as well as national research priority areas identified by key sectors.
- c) The planned research should be cross-sectoral and multidisciplinary.
- c) The proposed research should be scientifically, methodologically, and logistically feasible.
- d) The proposed research should be doable within the stated research period.

Submissions should be made under the auspices of a recognised research organisation so that the host institute assumes the day-to-day activities and financial management of the project.

In 2015, about 202 proposals were submitted. From these, only 14 were funded. In 2016, about 288 proposals were submitted. After a lengthy evaluation and screening process, 21 proposals were funded. In 2017, 331 proposals were submitted, and selection process was underway during the field visit of this report. In all the three funding windows, most proposals were on agriculture and health areas, submitted largely by researchers from public universities. Despite the rigorous screening process, most winner proposals are not up to the (high) standard that the National Research Granting Council desires them to be. The Council therefore organises a methodology and project cycle management training once every year for project grantees. Since funding started recently, and most of the funded projects are still in progress, there have not been substantial socio-economic impacts from the research investment. Nevertheless, a newly launched Research Ethics Directorate within MoST aims to ensure that research outputs shall have positive social, economic, and environmental impact.

A technical committee within the MoST disburses research funds in phases under careful monitoring and evaluation of progresses. According to two professional staff at the Ministry of Science and

⁴ This will be elaborated in the upcoming sections.

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Technology (MoST), the progress of the two phases of funding (year 2015 and year 2016) is satisfactory.

Beginning from 2016, MoST has developed 24 technology roadmaps. MSc and PhD students who have aligned their research areas to these road maps can apply for financial support. However, as of early 2017, the National Research Granting Council has not funded PhD or MSc research projects.

3.2 Policies governing the Science Granting Council and R&D in Ethiopia

The most frequently suggested policy that governs STI and research funding activities of the National Research Council is the STI Policy. The STI policy provides a policy direction on how Ethiopia can 'search for, select, adapt and utilize appropriate and effective' foreign technologies that are relevant to Ethiopia's economic, social and environmental context (FDRE, 2012). The overall objective of the policy is "to create a sound science and technology foundation and to coordinate the national technological capability-building efforts so as to enhance competitiveness of the economy and reduce technological dependence of the country" (NPCA, 2014). The policy envisions Ethiopia having accumulated sufficient technological capabilities by 2023, which enable rapid identification, selection, and absorption of imported technologies. It also has a mission of building a strong national innovation system that will create an enabling framework for technological progress. Its historical development (and revision) has considered the policy directions of various policies of the country, such as Agriculture Development-Led Industrialization (ADLI) development strategy, Sustainable Development and Poverty Reduction Program (SDPRP), Agricultural and Rural Development Strategy, Capacity Building Strategy and Education Sector Strategy and Development Program. International development goals, and regional science and technology programs, such as science and technology programs by the African Union (AU) Commission and the New Partnership for Africa's Development (NEPAD), have also been considered.

The revised STI policy (ratified in 2012 by the Council of Ministries) sets out 11 critical policy issues, directions and strategies—of which research is also a key element—through which the activities and agendas of MoST as well as its affiliated institutions and directorates are set out. For example, within the policy, one of the key policy directions is establishing Intellectual Property Management system. The Ethiopian Intellectual Property Office (EIPO) has been established to enforce this strategy. Similarly, one of the elements in the policy is disseminating science and technology information. STIC is established and tasked to enforce this policy direction. The 11 critical policy issues directions and strategies are summarised in Table 3.

According to interviewee from the Ministry of Science and Technology (MoST), STI in Ethiopia is considered as a crosscutting issue that enables or facilitates the implementation of other major policy frameworks, such as the Plan for Accelerated and Sustained Development to End Poverty (PASDEP) and the Industrial Development Strategy. For instance, the Industrial Development Strategy identifies major constraints of industrial growth in Ethiopia, which include inadequate human resource (both technical and managerial), lack of infrastructure, and lack of efficient financial systems. Key informants (such as an interviewee at the Ethiopian Academy of Sciences (EAS)) believe that such constraints can be addressed by the STI policy strategy. Besides, the industrial policy puts a priority on labour-intensive industrial development strategic areas such as agro-processing, textile, garment, leather and metal engineering. It also focuses utilising cheap and abundantly available

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human resource in the country. The policy also asserts that the state has the responsibility of creating an enabling environment for market-based industrial development through infrastructural development and provision of appropriate incentives. These demonstrate some overlap between the Industrial Policy Strategy and STI policy strategies.

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Table 3: Summary of the 11 critical issues and strategies presented in the STI policy of Ethiopia (summarised from FDRE, 2012).

Critical issue	Premise	Examples of strategies included in the policy
Technology transfer	Technology plays a pivotal role in economic development. The experience of 'Asian tigers' illustrates that accumulation of technological capability through importing, learning, adapting and reverse-engineering of technologies is important for economic competitiveness.	Devise system of learning, adapting and utilizing as well as disposing imported technologies, Build national technological capability that will allow for efficient transfer of knowhow and know why, Establish and strengthen foreign direct investment (FDI) and other ways of supporting technology transfer
Human resource development	Technology transfer requires competent technicians, engineers and scientists.	Emphasise on producing engineers, technicians and scientists, Modify enrolment of higher education training systems (70% STEM, science, technology, engineering and mathematics and 30% social sciences)
Manufacturing and Service Providing Enterprises	Ethiopia's longstanding dependence on agriculture (as the biggest contributor of its GDP) is unsustainable. Manufacturing and Service Providing Enterprises should play a significant and complimentary role to agriculture.	Strengthen value chains and linkages between industries, Strengthen enterprises to play a key role of identifying, adapting and utilizing imported technologies
Research	Effective learning, transfer, adaptation and utilization of technology calls for effective research system.	Support research institutes to ensure efficient learning, transfer, adaptation and utilization of technology, Nurture collaborative research among research institutes,

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		Ensure linkage between research institutes and industries
Financing and Incentive Schemes	Effective and efficient technological learning, transfer, adaptation and utilization demands financial incentive, especially in uncompetitive and emerging sectors	Provide financial incentives for industries that are involved in technology transfer, Develop incentive mechanisms that encourage productivity gains through technology
National Quality Infrastructure	Availability of quality infrastructure is a foundation to technological and industrial development.	Establish mandatory standards, Incorporate quality management of infrastructure in the curriculum of higher and technical training systems, Establish national accreditation systems
Universities, Research Institutes, TVET Institutions and Industry Linkage	Universities, Research Institutes, TVET Institutions and Industries are key actors in the national innovation system, which play crucial role in technology importing, adapting and utilisation.	Encourage linkages and collaborations among Universities, research institutes, technical and vocational training institutions and industry
Intellectual Property System	Legal protection of innovations encourages further creativity, which catalyses economic growth through creation of innovative products and services.	Facilitate the positive role of intellectual property for development, Establish national system that that is responsible for protecting intellectual property rights (IPR), Ensure trademarks are sufficiently protected so that healthy competition among businesses is maintained.
Science and Technology Information	'Collecting, organizing, analysing, disseminating, and using information related to science and	Establish a national science and technology information centre,

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	technology is of significant importance for successful technology transfer'	Establish modern systems of information sharing platform, Support science and technology data gathering, management and analysis
Environmental Protection and Development	Environmental protection is necessary for sustained economic development	Create a system that allows for efficient technology use and disposal, Develop local capability for renewable energy technology, Establish environmental safety measures for using radiation-emitting equipment's and handling of environment pollutants
International Cooperation	International collaboration in science and technology initiatives is crucial for information sourcing, capacity building and technology transfer	Incorporate STI capacity building elements in bilateral and multilateral agreements, Encourage experience-sharing and exchange through south-south and south-north cooperation initiatives Encourage joint-research with international partners

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3.3 Science Granting Council's interactions with other actors

Interviewees from the Ministry of Science and Technology (MoST) and the Science Technology and Information Centre (STIC) indicated that MoST has working relationships with other ministries, such as the Ministry of Health, Ministry of Industry and Ministry of Agriculture. It is reported to have good relationships with universities and research centres (many of them indicated in Section 2.3).

Science and technology universities (e.g. Adama Science and Technology University and Addis Ababa Science and Technology University) and agricultural research centres are viewed as major partners on human resource development and research activities, respectively. The Science Granting Council also maintains a strong relationship with the Ministry of Finance and Economic Development (MoFED) since it obtains finances to fund its research projects and run the Secretariat. It also actively interacts with health research institutes on setting health research agendas. Partnerships with other stakeholders are largely on research capacity building and ensuring research projects are in line with the development priorities of the country. MoST also considers industries and the private sector as key stakeholders although interactions among such institutions has historically been 'weak' (IKED, 2006; Mouton et al., 2014). As part of its responsibilities, MoST facilitates the formation of professional academies and associations to increase interactions and collaborations among scientists. A recent example is the support provided to the formation of the Ethiopian Academy of Sciences (EAS).

Collaboration of the National Research Granting Council with international donors and other regional and international research agencies has largely been limited to sharing experiences. This is indicated to be due to several reasons. First, the Council's Secretariat is 'fledgling' and does not have sufficient human resources as well as experiences of managing international collaborations, specifically on research funding matters.

Second, according to a staff at Ministry of Science and Technology (MoST), there is an increasing 'we can do it on our own funding!' attitude by the Government, as it is demonstrated by recent mega infrastructural projects. Interviewees from the Ministry of Science and Technology (MoST) and Science Technology and Information Centre (STIC), however, have stressed that this does not mean that the Research Granting Council does not need financial support from donors. Instead, they indicated that Ethiopia is increasingly committed to allocate its limited financial resources to key development activities, such as R&D. Yet, when possible, funding from diverse sources is viewed to be desirable to supplement government budget. To this effect, an International Relation & Cooperation Directorate within MoST has been established, with a responsibility of forming and nurturing scientific and technological cooperation with countries and international organizations.

Third, international research agencies often pursue direct bilateral linkages with either Ethiopian universities or research centres, without informing the National Research Granting Council. This is attributed to the limited mandates of the National Research Granting Council. A number of interviewees argued that this also acted as a disincentive for more interaction between the SGC and international donors. Interviewees felt that if the SGC has a mandate to regulate such interactions (through research clearance for example), the SGC could have formed a strong international linkage with donors and other research actors.

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Fourth, political, security and economic interests and the degree of bilateral diplomatic relationships between donor Governments and developing countries are viewed to potentially limit the Council's interactions with donors. A staff at the Ministry of Science and Technology (MoST) stated that "donors' support sometimes has political and economic interests attached to it. Aid often comes through government-to-government diplomatic relationships contingent on political preconditions. The Secretariat [of the National Research Granting Council] does not have control over such issues." Attitude problems of international partners, in consideration to Ethiopia's economic and development status, have also been blamed for weak research partnerships.

4. Political (and social) constraints influencing the Science Granting Council and R&D in Ethiopia

Almost all interviewees stated that there is a strong political will to support science and technology and scientific research in Ethiopia. They also reported that most major policies consider science and technology as one of their pillars. Additionally, Altenburg (2010:1) reported that the Government has implemented "...ambitious programmes to strengthen the Technical and Vocational Education System [of Ethiopia] and to set up new universities as well as supporting institutions for specific sectors, e.g. for textile, leather and horticultural products".

While there has been a general agreement that there is a good political commitment and appreciation of the role of STI in economic development by the Government, interviewees directly or indirectly indicated the following 'political' or politics-related (and social) constraints⁵ (potentially) influencing the performance of the National Research Granting Council as well as the overall research environment of Ethiopia.

4.1 Limited mandates of the Science Granting Council

The National Research Granting Council has not been 'fully' institutionalised as of January 2017. This is due to limited policy commitment towards its independent establishment. As such, its mandates are restricted to funding research activities in nationally prioritised research themes. The newly established Research Granting Council neither has the power to coordinate research activities of higher education systems and research centres nor the mandate to influence research priority of such institutions. Some interviewees believe that the National Research Granting Council needs to play bigger role than what it is currently playing with regard to overseeing research activities of the country.

There are also competing visions among different stakeholders on who should be mandated to oversee research activities in Ethiopia. Interviewees from the Ministry of Science and Technology (MoST) believe that the National Research Granting Council should coordinate research activities in all sectors, regions and institutions, arguing that coordination ensures research activities are responsive to needs. The interviewees from the Ministry of Science and Technology (MoST) also indicate that a central coordinator will avoid research duplication and uneven procedures, guidelines and systems across sectors and institutions. Others, in contrast, argue that research mandates and oversights should remain within specific institutions and research centres since this allows decentralised and efficient management. This is also thought to be important because Ethiopia is a

⁵ Some of the factors included here may not be 'political constraints' per se but they were reported by key informants as such.

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vast country with nine semi-autonomous regional states, with steadily increasing number of higher education and research systems.

4.2 Capacity limitation at the Ministry of Science and Technology (MoST)

An interviewee from the Ethiopian Academy of sciences (EAS) also identified capability issues specific to Ministry of Science and Technology (MoST) that influence the National Research Granting Council. These include: problems of awareness (e.g. in the case of biotechnology and genetically modified organisms (GMOs)), and unmanaged expectations of public officials from research outputs, leading to disappointments. Frequent restructuring and reshuffling of officials within MoST is also reported by an interviewee from the Ethiopian Academy of Sciences (EAS) to limit the 'institutional memory' of the organization, hindering it from implementing its major objectives.

4.3 Weak policy implementation

A researcher at Addis Ababa University mentioned that weak policy implementation is a concern in the overall policy cycle of the country. The researcher stated that the Government has formulated good policies for science and technology and higher education. However, the implementation of such policies has rarely been optimal. Supporting this, a researcher at the Ethiopian Environment and Forest Research Institute (EEFRI) stated that the "Government plans and says the right things but such policy directives and rhetoric are not matched up with concrete implementation on the ground."

4.4 Competing interests on research types

There are conflicting views among various actors on whether research funded by the National Research Granting Council continues to be 'applied' because of divergent interests and objectives of the Government and researchers. Whereas some researchers from higher education systems and research centres want to focus on basic research to fill gaps in scientific knowledge, the Government has maintained that nationally-funded research projects should be basic to solve societal problems in line with its major economic policies. These competing interests have occasionally been debated but the focus, as of early 2017, has been on applied research. An interviewee from the Ministry of Science and Technology (MoST) believes that striking a balance on these divergent interests is an issue that requires political decisions from the Government as well as focussed lobbying and substantive justification from researchers and research institutions.

4.5 Bureaucracy with financial management system of research and higher education systems

Bureaucratic financial management approaches are viewed as major administrative challenges influencing research activities across the country. A researcher at Addis Ababa University reported that lengthy and complicated financial administration procedures of institutions often prolong funded projects and frustrate researchers.

4.6 Inappropriate Government funding allocation mechanism to universities

Fund allocation mechanism of the Government is also blamed for many universities' limited focus on research in Ethiopia. An interviewee from Ethiopian Academy of Sciences (EAS) stated that funding allocation, to a certain degree, depends on the number of faculty and department a university has.

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Therefore, universities compete to increase the number of their departments instead of increasing the quality and quantity of their research outputs.

4.7 Lack of awareness about the role of science and technology and research by the public

An interviewee from the Ministry of Science and Technology (MoST) indicated that lack of sufficient understanding of the role of science and technology and innovation by the public is a significant challenge. He indicated that even some professionals are not familiar with the science and technology policy or its role in the economy. To address awareness problems the Ministry of Science and Technology (MoST) has planned to do awareness creation activities. This includes creation of science clubs, science weeks, science parks, and national science academies. In Addis Ababa, the Council has launched 26 science cafes aimed at increasing awareness about the role of science and technology. MoST has also created Science and Technology Awareness Development and Capacity Building Directorate to mitigate lack of awareness about technology and innovation.

4.8 Weak collaboration among universities, government ministries and the private sector

Weak interactive research practice, especially among universities, government ministries and industrial/private sector, is also mentioned a challenge in the STI landscape of Ethiopia.

5. Economic constraints influencing the Science Granting Council and R&D in Ethiopia

5.1. Lack of sufficient financial resources

The most frequently reported economic constraint of research, by more than half of the interviewees, is lack of sufficient financial resources for research. The main source of finance for the National Research Granting Council is the Government. Despite recent increment, the annual budget allocated for the National Research Granting Council is the Government (through the Ministry of Finance and Economic Development (MoFED) is still considered inadequate. One of the interviewees from the Ministry of Science and Technology (MoST) stated that in 2016/17 “the research council had planned to support 40 research projects from a total of over 330 applications. However, the number of grantees is likely to be significantly lower than planned due to financial limitations.” According to an interviewee from the Ministry of Science and Technology (MoST), the most important concern is how to set priorities and effectively and efficiently utilize allocated finance for research activities. Although the research funding experiences of the National Research Granting Council is short-lived, experiences from other sectors and institutions show that Government budget is sometimes wasted, misused, and often unused and returned to the coffers of the Ministry of Finance and Economic Development (MoFED) at the end of each fiscal year. Because of this, the council has to defend and justify its annual budget plan vigorously. This has somewhat limited available project funding and thus the number of grantees every year.

5.2. Unsatisfactory incentive for researchers

Another economic issue that constrains R&D activities in Ethiopia, in general, is incentive mechanism for researchers, which does not fully value and reward efforts. Salaries and other monetary and non-monetary incentives of researchers are perceived to be unsatisfactory. According to an interviewee from Addis Ababa University, the problem is worse in the case of researchers with advanced

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degrees. A researcher from Addis Ababa University and a professional staff from the Ministry of Science and Technology (MoST) noted that researchers often complain about research per diem rate and other incentives, and as a result often prefer to do consultancy and other activities. Some interviewees commented that salary of a principal investigator of a funded project is a fraction of the total project cost. The issue is also contested. According to an interviewee from the Ethiopian Environment and Forest Research Institute (EEFRI), the Government implicitly maintains a view that university and research institute employees are well paid and incentivised compared to other civil service employees. A related problem with lack of attractive remuneration scheme and sufficient incentive for highly skilled researchers is the issue of brain drain. A researcher from Addis Ababa University stated that “the Government has thus far failed to see the cost of losing highly educated youth to western countries”. As of early 2017, the National Research Granting Council is investigating ways of establishing uniform research incentive systems across institutions, including consistent and sufficient per diem for research trips and field studies

5.3. Insufficient human resources and research infrastructure

Insufficient human resources (and low human capability), weak research and communication infrastructure (e.g. lack of state of the art laboratories, low level of internet coverage and speed, poor research logistics, e.g. transport services) have been mentioned as economic-related factors constraining the science, technology and research landscape of Ethiopia”

6. Concluding remarks

The Ethiopian People's Revolutionary Democratic Front (EPRDF) has been determined to bring about broad-based economic development since it came to power in the early 1990s. By creating a mixed market and state-led economic development system, the Government has widely invested in infrastructural projects, such as higher education systems, hydropower dams, telecom systems, roads, and railways. Such investments along with increased agricultural productivity, increased agricultural commodity prices, inflows of development aid and remittance as well as construction boom, have resulted in a strong economic growth for over a decade since the early 2000s (Altenburg, 2010). Such growth, along with increasing state commitment to harness STI, has allowed the country to be able to allocate funding for scientific research. This is demonstrated by the development of a research funding mechanism within MoST in priority areas, such as agriculture, agro-processing, biotechnology, construction, chemical and pharmaceutical sectors. Despite the positive development and increasing R&D investment by the Government, the R&D intensity of the country has been insufficient to contribute to the country's industrialization substantially. The major objective of this national case study was to understand the leading economic and political constraints that influence the performance of the newly organized National Research Granting Council and the overall R&D landscape of Ethiopia.

The assessment reveals that despite an overall political commitment towards R&D and STI in the country, there are some challenges. These include limited incentives to researchers, bureaucratic obstacles of utilizing research fund within research centres and universities, limitations of policy implementation, and frequent restructuring and limited institutional memory within MoST. There are also contested issues among different actors within the Ethiopian R&D landscape that may influence the activities and decision-making processes of the National Research Granting Council. One of these is the issue of whether funding from the National Research Granting Council should be

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channelled to applied or basic research. Researchers from universities and research centres would like some of their basic research funded while the Government policy focuses only on applied research. Priority areas of research funding and mandates of overseeing research activities in the country are also contested by actors. There is a strong desire by the National Research Granting Council's Secretariat to broaden its institutional mandate and centralize funding management, including an oversight on research activities of public and private organizations in the country. It is suggested that this can avoid research duplication and increase efficiency by focusing research on priority areas. Others, however, maintain that such mandates should remain within individual institutions as this allows for decentralized and efficient management. Limited financial resources, lack of research facilities, such as labs, and brain drain are reported to be among the major economic challenges affecting R&D in Ethiopia.

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References

Altenburg, T. (2010). Industrial policy in Ethiopia. Discussion Paper, Deutsches Institut für Entwicklungspolitik (DIE), Bonn. ISBN 978-3-88985-477-3

Ambel, A. A., Mehta, P. A., Yigezu, B. (2015). Multidimensional poverty in Ethiopia: changes in overlapping deprivations. Policy Research working paper; no. WPS 7417. Washington, D.C.: World Bank Group.

BBC (2016). 'Several killed' as Ethiopia police clash with protesters. <http://www.bbc.com/news/world-africa-37004725>

Bechere, E. (2007). Agricultural Research and Development in Ethiopia. International Conference on African Development Archives. Paper 127. http://scholarworks.wmich.edu/africancenter_icad_archive/127

Cornell University, INSEAD, and WIPO (2014). The Global Innovation Index 2014: The Human Factor In innovation, second printing. Fontainebleau, Ithaca, and Geneva. <https://www.globalinnovationindex.org/userfiles/file/reportpdf/gii-2014-v5.pdf>

Deloitte (2016). Ethiopia Economic Outlook 2016: The Story Behind the Numbers. <https://www2.deloitte.com/content/dam/Deloitte/et/Documents/tax/Economic%20Outlook%202016%20ET.pdf>

Federal Democratic Republic of Ethiopia (FDRE) (1995). Constitution of the Federal Democratic Republic of Ethiopia. <http://www.wipo.int/edocs/lexdocs/laws/en/et/et007en.pdf>

Federal Democratic Republic of Ethiopia (FDRE) (2012). Science, Technology and Innovation Policy. <http://www.lawethiopia.com/images/STI20Policy20English20ver.pdf>

Annex 1

IKED (2006). Ethiopia: Innovation and growth in international comparison. Prepared for Triple Helix Conference on Transforming University-Industry-Government Relations in Ethiopia, Addis Ababa, 29th – 31st May, 2006. <http://www.iked.org/pdf/Ethiopia.pdf>

Jalata, G.G. (2015). An African Developmental State: Ethiopia's Emergent Experience. Regional Conference on Building Democratic Developmental States for Economic Transformation in Southern Africa 20 – 22 July 2015, Pretoria, South Africa. <http://www.developmentalstatesconference.com/wp-content/uploads/2015/07/10-Gedion-G.-Jalata.pdf>

KPMG (2016). Economic Snapshot H2, 2016. <https://home.kpmg.com/content/dam/kpmg/za/pdf/2016/10/KPMG-Ethiopia-2016-Snapshot.pdf>

Marcus, H. G. (1994). A History of Ethiopia. Berkeley: University of California Press, <http://ark.cdlib.org/ark:/13030/ft109nb00g/>

Mekuriaw, A. (2003). Research and development capacity building issues in the water sector of Ethiopia, In: McCornick P.G., Kamara A.B. and Tadesse, G. (eds). Integrated water and land management research and capacity building priorities for Ethiopia. Proceedings of a MoWR/EARO/IWMI/ILRI international workshop held at ILRI, Addis Ababa, Ethiopia, 2–4 December 2002. IWMI (International Water Management Institute), Colombo, Sri Lanka, and ILRI (International Livestock Research Institute), Nairobi, Kenya. 267 pp.

MoFED (2013). Brief Note on the 2012/13 GDP Estimates Series. Addis Ababa: Ministry of Finance and Economic Development (MoFED), Federal Republic of Ethiopia.

Mouton, J., Gaillard, J., and van Lill, M. (2014). Science Granting Councils in Sub-Saharan Africa. Final technical report submitted to: International Development Research Centre (IDRC-CRDI). Centre for Research on Evaluation, Science and Technology and IRD, Stellenbosch University. http://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers14-05/010062130.pdf

Munro-Hay, S. (1991). Aksum: An African Civilisation of Late Antiquity. Edinburgh University Press. <http://www.dskmariam.org/artsandlitreature/litreature/pdf/aksum.pdf>

NEPAD Planning and Coordinating Agency (NPCA) (2014). African Innovation Outlook 2014, NPCA, Pretoria African innovation outlook II, 2014

Science and Technology Information Centre (STIC) (2014). Science and Technology Indicator Report. Addis Ababa.

Seid, Y., Taffesse, A. S., and Ali, S.N. (2015). Ethiopia—an agrarian economy in transition. WIDER Working Paper 2015/154. <https://www.wider.unu.edu/sites/default/files/WP2015-154.pdf>

Uchegara, K. E., (2014). Understanding African Relationships: The Case of Eritrean Ethiopian Border Dispute. International Journal of Social Inquiry 7 (1) 63-78

World Bank (2017). World Development Indicators Database. <http://databank.worldbank.org/data/reports.aspx?source=2&country=ETH#>

Annex 1

Mouton, J. Boshoff, N (n.d). Mapping research systems in developing countries: The Science and Technology system of Ethiopia <http://academic.sun.ac.za/crest/unesco/data/Ethiopia.pdf>

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Annex 1: Some details of interviewees.

Interviewees	Date of interview
Researcher at Addis Ababa University (AAU)	23/01/2015
Ministry of Science and Technology (MoST) staff	24/01/2017
Science Technology and Information Centre (STIC) staff	24/01/2017
Ministry of Science and Technology (MoST) staff	23/01/2017
Science Technology and Information Centre (STIC) staff	26/01/2017
Researcher at the Ethiopian Development Research Institute (EDRI)	23/01/2017
Fellow at the Ethiopian Academy of Sciences (EAS)	26/01/2017
Researcher at the Ethiopian Environment and Forest Research Institute (EEFRI)	25/01/2017