

Developing a sustainable PhD programme: Experiences from southern Ethiopia

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More than 60 years since most universities in sub-Saharan Africa were founded, a recent review has underlined the poor record of African universities (Fonn et al. 2018). However, the reasons why African research institutions contribute less than 1 per cent of the global expenditures on research and development are complex (Fonn et al. 2018). Whereas countries in sub-Saharan Africa account for 14 per cent of the global population, the same region contributes to less than 1 per cent of the research expenditure. Although the research output may have increased in recent years, in 2007, Ethiopia spent only 0.2 percentage points of its gross national product on research (Tijssen 2007). A recent analysis of research collaboration between European and African universities showed the largest research collaboration is between Europe and South Africa, probably because of the location of research institutions that are both academically good and have adequate research infrastructure (Breugelmans et al. 2015).

The Norwegian Agency for Development Cooperation (Norad) is among the important funders of capacity-building programmes in Africa (Davies and Mullan 2016). In 2012, Norad launched The Norwegian Programme for Capacity Development in Higher Education and Research for Development (Norhed), whose vision is to improve the livelihoods of people in low- and middle-income countries (LMICs) through a programme on higher education. The programme has the following objectives (Jávorka et al. 2018):

- To increase and improve levels of research administered by the countries' own researchers, thereby improving knowledge within each country;
- To produce a more qualified job candidate, enabling a larger and more skilled workforce;
- To enable evidence-based policy and decision making; and
- To enhance gender equality.

Need for evidence-based health policy

Many LMICs experience poverty and high disease burdens, often leading to a vicious cycle where poverty aggravates the disease burden and people with heavy disease burdens exacerbate poverty (Preston 1975). These are some of the reasons why many communities do not have access to good quality basic health services. Public policies that seek to address these challenges will only work if the choices made by decision-makers, technical or political, are informed by the best available evidence. Research is essential in producing sound evidence to inform local, national and international policy that, in turn, has the potential to transform lives for the better.

Policy-making informed by the best available evidence helps to make effective policy decisions. While it may result in changes in legislation, it also occurs in areas such as decisions about resource allocation, regulations and new strategies. Most often, the people making these decisions are government officials and institutional leaders at local, regional and national levels.

Researchers produce evidence that policy makers use for decisions and in return, policy-makers could provide scientists with information and resources that could lead to new research (Choi et al. 2005). However, the way that research findings are implemented into the policy-making process is often complex. It is important that scientists understand this complex process and communicate their findings in a way that policy-makers find acceptable and understandable. Sometimes organisational constraints and lack of appropriate communication channels limit the incorporation of science and technology into policy

(Choi et al. 2005). However, through an interactive process between policy-makers and researchers, it should be possible to build the trust necessary for implementing important scientific findings (Strydom et al. 2010).

Africa, with the largest burden of disease, has few skilled health researchers (Agyepong et al. 2017). In 2013, the World Health Organisation called for renewed efforts in strengthening the health research capacity in African countries as a means towards universal health coverage. Many such initiatives, often originating from high-income countries, have been criticised for failing to strengthen, incorporate, and involve institutions from LMICs in priority setting and publications (Davies and Mullan 2016; Sewankambo et al. 2015). In 2008, the Council on Health Research for Development organised a meeting in Bamako in Mali, West Africa. This was a ministerial meeting and participants included the Global Forum for Health Research, Unesco, the World Health Organization, the World Bank and the Government of Mali. It brought together ministries, researchers, academics, representatives of research-funding agencies, civil society and the private sector. One of the main aims was to focus on the needs of LMICs and give them a stronger voice in the discussion about the requirements for health research in LMICs.

Our South Ethiopia Network of Universities in Public Health (SENUPH) project, supported by Norhed, emerges from the need for the universities to play an important role in educating and training professional staff and future leaders. Therefore, high-level education is important for future health improvements. Strengthening the research capacity in LMICs includes efforts to support individuals' training for PhDs or for postdoctoral training, improving their local institutions' capacity so that they can become high-quality centres in their countries as well as strengthen larger networks. Higher education institutions can share intellectual and social capital with implementing organisations such as ministries of health and NGOs (Agyepong et al. 2017). In such a network, the aim is to provide and enhance evidence-based and informed policy-making for improved health.

PhD training as a means to strengthen development

PhD training strengthens the research capacity of individual universities and their countries. For example, a recent review of externally funded training of postgraduate students in health research at institutions in sub-Saharan Africa showed that most of the master's and PhD grantees were funded by the International Development Research Centre (IDRC) in Canada, Norad and the Wellcome Trust (Abate et al. 2004). Developing quality PhD programmes significantly contributes to improvements in training PhD students and young, local researchers who will become trainers, researchers, political leaders and expert advisers for public decision-making, which contributes to making their countries more competitive on regional, national and international levels.

The need for expanding tertiary-level training in the public health sciences is clear. The burden of health problems, the increasing population pressure and economic challenges suggest the need for effective and efficient programming of both curative and public health interventions (Agyepong et al. 2017). However, the human-resource crisis in present-day Ethiopia has created a major obstacle to implementing the health sector development plan to its fullest extent (Assefa et al. 2017; Girma et al. 2007). After 1991, Ethiopia introduced an ethnic federal governance system made up of regional states and autonomous cities. This restructuring led to the decentralisation of some power to the regions (Bekele and Kjosavik 2016). Decentralisation occurs when the work or activities of an organisation such as a higher education institution or a ministry of health are delegated away from an authoritative, central location. The decentralised governance in the public and private sectors, with a rapid increase in the numbers of universities and health institutions, and the growing number of national and international NGOs, has led to an increasing demand for competent professionals (Assefa et al. 2017).

Ethiopia's government hopes that investing in research and development will promote socio-economic development in the country (FDRE 2016). New PhD programmes have been established to meet Ethiopia's

development needs. Thus, doctoral training has become a focus of universities, researchers, policy-makers, governments and donors across Africa and around the world. The Ethiopian government recognises that high-level education is vital for developing the country (FDRE 2016), which aspires to become a middle-income country by 2025. The Ethiopian government's policy and strategic shift to the mass production of high-level professionals and academics to support programme implementation and the expansion of education opportunities have also posed a large challenge to institutions of higher learning (Assefa et al. 2017).

Reliable, sound evidence often comes from studies that involve an intentional change, for example, through introducing preventive or therapeutic regimens. Such intervention studies can be carried out as medical experiments which aim to improve new treatments or public health programmes. The demand for such evidence-based interventions is increasing, which calls for training enough high-level professionals. Also, offering a long-term training opportunity for academics across the country is used as a mechanism to keep PhD holders within the country and at universities.

Research collaboration between Ethiopia and Norway

Ethiopia and Norway have a long-standing collaboration on research, starting with the establishment of the Armauer Hansen Research Institute in 1968 (Miorner and Britton 1999). This was a research collaboration between Ethiopia, Sweden and Norway, but also included researchers from other European countries and the USA. Several examples of outstanding research came from this which led to a better understanding of leprosy that resulted in better treatment or improved public health control of the disease (Bloom and Godal 1983). Since the mid-1980s, Norwegian researchers have developed a close collaboration with Addis Ababa University, and since the mid-1990s, such research has been expanded to universities in southern Ethiopia, mainly at the universities in Hawassa and Arba Minch (Dare 2007; Datiko 2011; Lindtjørn et al. 2014; Shargie 2007; Shumbullo 2013; Ulesido 2017).

This collaborative research was enabled by the Norwegian institution providing both funds for research and scholarships for Ethiopian researchers to do research-based master's and PhD degrees. These candidates either did the PhDs at universities in Norway or they were trained under a so-called sandwich model where the student did the coursework in the North and most of the research in the South.

There are several definitions of a 'sandwich model'. Some define it as when the doctoral student stays in different universities. Others define it as a stay at two institutions as part of joint supervision ('cotutelle'), where the student is registered at both universities. However, as most often occurred in Norway, the doctoral student was registered at a Norwegian university and a supervisor from an Ethiopian university took part in the supervision. Although there were attempts to include both Ethiopian and Norwegian supervisors, the results often showed that the main research supervisor was from the North. Most often, the research topic was decided between the candidate and the supervisor, with limited involvement of the local university and the health authorities in the South.

The joint PhD degree programme

The 'South Ethiopia Network of Universities in Public Health (SENUPH): Improving Women's Participation in Postgraduate Education' project started in 2014. Its vision is to enhance the capacity of universities in southern Ethiopia to train enough staff to carry out necessary public health work and do essential research to improve the health of the people living in southern Ethiopia. These goals were achieved through the setting up of the following activities:

- Strengthening the research capacity through PhD and master's programmes;
- Establishing and strengthening a network of the universities in southern Ethiopia so that the universities and the Ministry of Health could increase their teaching capacity and train enough staff to meet the demands within the public health sector, including evidence-based health research for policy improvement;

- Substantially increasing the number of women with postgraduate education; and
- Increasing the number of teachers in public health at the universities.

This project has four integrated parts:

1. A PhD programme for all universities, located at Hawassa University;
2. A new master's programme in reproductive health at Dilla University;
3. Strengthening an existing master's programme in nutrition at Wolaita Sodo University; and
4. A new master's programme in medical entomology (with the main focus on malaria control) at Arba Minch University.

By closely collaborating with the Ministry of Health and developing a network of the main universities in southern Ethiopia, we address several important areas such as the relevance of research topics, staff development and improving human capacity in higher education, in public health, reproductive health, nutrition and malaria control. In practice, the Ministry of Health and the PhD programme had regular meetings where PhD students presented their research ideas. Through these interactions, the joint PhD programme received valuable feedback from the Ministry of Health that the research questions were relevant and important for southern Ethiopia.

The joint PhD is a doctorate done at two degree-awarding institutions. Students are fully registered at both universities and must comply with both their admission requirements and assessment regulations. This results in one jointly awarded PhD, with the degree certificate showing two university logos, which is equivalent to PhD degrees offered at European universities. The benefits for students are: access to complementary facilities and resources; exposure to two cultural approaches to research; international student mobility; enhanced acquisition of research and transferable skills, such as negotiation skills and adaptability; and better networking opportunities. Such a joint PhD programme provides PhD-level, taught courses in a high-quality

PhD programme while enhancing knowledge and skill transfer for the supervision of PhD students. In addition, such partnerships between universities of LMICs have a major potential to increase research capacity in both settings.

Developing a joint degree: Experiences and lessons learned

Does the joint degree improve the quality of education in the South? This is a difficult question to answer. However, by adhering to the universities' rules and regulations, candidates are ensured a PhD training that adheres to the quality demands of both universities in the South and North, where courses taken in the South are recognised as equivalent to courses taken at a Northern university and vice versa.

An important element of the joint PhD programme is that the 'home university' is in the South. In our example, the home university is Hawassa University. The student is first registered at Hawassa University where (s)he defines the research topic in close collaboration with the regional health authorities and the local university. Regular meetings are held between the PhD students, supervisors and officials in the Ministry of Health to present research ideas and results. Such a mechanism ensures the research topic is relevant for public health in southern Ethiopia and is prioritised by both institutions of higher education and the authorities implementing the future health programmes. This also enables the research to be relevant for future health policy and translated into action. By having regular and interactive meetings between research students and the Ministry of Health, we strengthened the trust necessary for implementing important scientific findings.

A conventional scholarship for PhD studies assumes that a scholarship holder will stay at a Norwegian institution of higher education for several consecutive years and may visit their home country for data collection. Another approach, which our project did not use, is the 'sandwich model'. In this case, the PhD students carry out their research and studies alternately in their home country and in Norway under continual supervision by a Norwegian academic, and sometimes also including a supervisor from the South, but the doctorate is obtained at

the Norwegian university. Although the sandwich model was favoured by many PhD students who remained in their home institution after graduating from the university in the North, the model's weakness was that the decision-making and funding were most often directed from the North. To alleviate these shortcomings, a process was started to discuss the possibility of establishing a PhD programme where both the partners from the South and the North had an equal share in decision-making and in the management of funds. The idea was that the PhD training should eventually be carried out in the South using resources from the South.

Based on our work with 20 PhD students, of which over 50 per cent are women, we experienced the following: 16 of these students were selected based on an open competition among staff from the South universities, as Norhed allowed only university staff to take part in the competition. Later four students were admitted without any limitations on their line of work.

The research topics had to be within public health and each student proposed his or her research topic. This was followed by consultancy meetings with the Regional Office of the Ministry of Health to ensure the research topics would be within the ministry's prioritised areas. Representatives from the universities also agreed that the topics would be relevant for the major health problems in southern Ethiopia and would also be within areas needing to improve both the health services and the health policy. Thus, the relevance of the proposed research topics was immediately established with the implementing Ministry of Health, which also would employ some of the future graduates. After being admitted to Hawassa University, each student developed his or her research proposal. Later, the students wrote a research protocol, a detailed presentation of the study's methodology, which had to be written in a way that satisfied university PhD requirements. The research protocols were submitted for ethical clearance by the Institutional Ethical Review Board at Hawassa University and later to the Regional Committee for Medical and Health Research Ethics in Norway. Once these procedures were accomplished, the students were admitted to the PhD programme at the University of Bergen.

Three years after starting this programme, students and supervisors were asked what they thought were the strengths and limitations of the joint PhD programme. They were also asked to suggest how to improve the programme. The PhD students found that the joint PhD degree programme was good. They especially appreciated being exposed to a foreign university by taking certain courses at a Norwegian university and having supervisors from the North as well as having the opportunity to present their research results at international scientific conferences. The main weakness that they expressed was the limited supervisory experience in the South. As most of these supervisors had graduated with their PhDs only a few years previously, students advised that the local supervisory and support systems at universities in southern Ethiopia should be strengthened.

Based on these opinions and recommendations from the PhD students, we managed to reallocate some funds to improve the supervisory skills and capacity. This includes supervisors having an opportunity for supervisory skill training in the North, participating in a local supervisory group to exchange experiences, and joining other African supervisors in discussing opportunities and challenges in supervising their PhD students. In addition, supervisors present their research within research groups with peers to exchange experiences, information and learning. Supervisors from the South also present their research at international conferences and publish their own research in peer-reviewed international journals. These efforts will thus resemble postdoctoral work and we believe it will strengthen both their research and supervisory capacities.

All staff and students agreed that this partnership between universities in high- and low-income countries through the joint degree programme, has the potential to increase the capacity and quality at both universities. There has been a great interest from Norwegian researchers to take part in this research collaboration and it has given the University of Bergen the opportunity to collaborate on areas defined by students from the South as important areas of research. This partnership has improved the sharing of scientific ideas and resources between the South and North. In addition, research initiated

by individuals from the South will have the first and corresponding authors from the South.

We believe that this collaborative research environment is addressing critical Ethiopian health issues and health system priorities and that it will result in enhancing the research capacity through relevant PhD and master's programmes. Meanwhile, the research done in the region will aid in defining the future health policy. Our programme includes four universities and the collaboration between them has been strengthened. In addition, supervisors from other Ethiopian universities have taken part in this programme, which has strengthened the links between national universities. Through this collaboration, we were also able to establish a molecular laboratory to study infectious diseases such as malaria, as well as a nutritional laboratory. Modern public health studies need laboratory support (Davies et al. 2017; Greenwood et al. 2012). Such infrastructure is important and can contribute to quality research undertakings and attract further research collaborations. A recent and positive development is that other researchers, research groups and potential students with other funding wish to join this research training programme. Several students have asked to join the programme as it would give them international recognition when doing their PhDs.

Future directions

Recently, a World Bank study showed that sub-Saharan Africa has increased the quantity and quality of research output in the past 20 years (Lan et al. 2014). This growth is strongly linked to advances in health sciences research, most of which is externally funded. Today, health science research accounts for 45 per cent of sub-Saharan research. However, unless the funding for such research also comes from the sub-Saharan African nations, it may not be sustainable.

Therefore, it is vital to maintain and expand the quantity and quality of research at universities in countries such as Ethiopia and especially in southern Ethiopia. It is important to strengthen research-intensive universities. Such work would require growing and consistent investments in human capital, research equipment and administrative support.

Our joint PhD programme increases available training opportunities, boosts the quality of relevant research and thus strengthens the research agenda. It fosters partnerships between universities, stimulates international partnerships, and promotes funding to include quality PhD degrees originating from the South. Registering Ethiopian PhD students at a Northern partner institution ensures the participation of experienced supervisors and monitoring of an individual student's progress. Thus, the joint degree programme helps the development of effective postgraduate training programmes at African universities. It can thus also help to prevent the brain drain. In addition, such a scheme is believed to give greater visibility related to the prestige of the universities and promote a new generation of academics.

The project has succeeded in setting up a PhD programme that has a fair balance of sound, relevant PhD research, a fair gender balance, research courses and motivated PhD students. However, the institutional challenges, especially in the South, include the development of functioning research groups, enhancing grant writing skills and strengthening network building both within the universities and between universities in southern Ethiopia. Solving these institutional challenges is important for continued funding on both sides of the partnership.

The universities in southern Ethiopia are young. Although some of the staff members have attained PhDs and have published scientific papers, few have gained adequate supervisory skills. These universities have so far not institutionalised a postdoctoral system that would qualify researchers for more independent research, research group leadership and supervisory capacity. However, based on experience from the North, postdoctoral fellows need support and mentoring in developing their independent research careers.

The long-term commitment of this project is to ensure continued capacity development in the South. In addition, improving essential research infrastructure, such as laboratory space, biobanks to store biological samples, and internet access, is important to ensure the success of the research projects. With satisfactory infrastructure, universities in the South increase their chances to compete for project grants.

For sustainable research training programmes, it is important to provide graduate students with opportunities for postdoctoral positions and

career development schemes. In addition, the research projects in the university setting need to address the Ethiopian health sector priorities to translate research findings into policy and practice.

The ultimate goal of the joint PhD degree programme between Hawassa University and the University of Bergen has been to establish a good PhD programme at the University in the South. During 2018 and 2019, Hawassa University set up a committee to develop their own PhD curriculum and revise the coursework of the existing joint degree curriculum. The committee critically evaluated the existing courses that were mainly based on courses available at the University of Bergen and adapted the new coursework to meet the specific needs of Ethiopian PhD students. These courses now include more emphasis on English scientific writing skills and on data analysis as well as a closer follow-up of scholarly articles that the students produce. We appreciate these important developments and believe they will improve the quality of the PhD work. From the autumn of 2019 onwards, this PhD programme will be based only in Hawassa, although some students may still be co-supervised by staff from the University of Bergen. In this way, the joint PhD programme has served as a mechanism to establish a high-quality PhD programme in southern Ethiopia.

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References

- Abate G, Aseffa A, Selassie A, Goshu S, Fekade B, WoldeMeskal D et al. (2004) Direct colorimetric assay for rapid detection of rifampin-resistant *Mycobacterium tuberculosis*. *Journal of Clinical Microbiology* 42(2): 871–873
- Agyepong IA, Sewankambo N, Binagwaho A, Coll-Seck AM, Corrah T, Ezech A et al. (2017) The path to longer and healthier lives for all Africans by 2030: The Lancet Commission on the future of health in sub-Saharan Africa. *The Lancet* 390(10114): 2803–2859
- Assefa T, Mariam DH, Mekonnen W and Derbew M (2017) Health system's response for physician workforce shortages and the upcoming crisis in Ethiopia: A grounded theory research. *Human Resources for Health* 15(1): 86
- Bekele YW and Kjosavik DJ (2016) Decentralised local governance and poverty reduction in post-1991 Ethiopia: A political economy study. *Politics and Governance* 4(4): 1–15
- Bloom BR and Godal T (1983) Selective primary health care: Strategies for control of disease in the developing world. *Reviews of Infectious Diseases* 5(4): 765–780
- Bruegelmans JG, Makanga MM, Cardoso AL, Mathewson SB, Sheridan-Jones BR, Gurney KA et al. (2015) Bibliometric assessment of European and sub-Saharan African research output on poverty-related and neglected infectious diseases from 2003 to 2011. *PLoS Neglected Tropical Diseases* 9(8). Available online
- Choi BC, Pang T, Lin V, Puska P, Sherman G, Goddard M et al. (2005) Can scientists and policy makers work together? *Journal of Epidemiology & Community Health* 59(8): 632–637
- Dare DJ (2007) HIV antiretroviral therapy in Ethiopia: Overcoming implementation challenges. PhD thesis, University of Bergen. Available online
- Datiko DG (2011) Improving tuberculosis control in Ethiopia: Performance of TB control programme, community DOTS, and its cost-Effectiveness. PhD thesis, Centre for International Health, University of Bergen. Available online
- Davies J, Abimiku A, Aloba M, Mullan Z, Nugent R, Schneidman M et al. (2017) Sustainable clinical laboratory capacity for health in Africa. *Lancet Global Health* 5(3): e248–e249. Available online
- Davies J and Mullan Z (2016) Research capacity in Africa: Will the sun rise again? *The Lancet Global Health* 4(5): 287
- FDRE (Federal Democratic Republic of Ethiopia) (2016) Growth and Transformation Plan II (GTP II) (2015/16-2019/20). Addis Ababa: National Planning Commission
- Fonn S, Ayiro LP, Cotton P, Habib A, Mbithi PMF, Mtenje A et al. (2018) Repositioning Africa in global knowledge production. *The Lancet* 392(10153): 1163–1166
- Girma S, AG Yohannes, Y Kitaw, Y Ye-Ebiyo, A Seyoum, H Desta and A Teklehaimanot (2007) Human resource development for health in Ethiopia: Challenges of achieving the Millennium Development Goals. *Ethiopian Journal of Health Development* 21(3): 216–231

- Greenwood B, Bhasin A and Targett G (2012) The Gates Malaria Partnership: A consortium approach to malaria research and capacity development. *Tropical Medicine and International Health* 17(5): 558–563
- Jávorka Z, Allinson R, Varnai P and Wain M (2018) *Mid-term Review of the Norwegian Programme for Capacity Development in Higher Education and Research for Development (Norhed)*. Available online
- Lan G, Blom A, Kamalski J, Lau G, Baas J and Adil M (2014) *A Decade of Development in Sub-Saharan African Science, Technology, Engineering and Mathematics Research*. Washington, DC: World Bank
- Lindtjørn B, Loha E, Deressa W, Balkew M, Gebremichael T, Sorteberg A et al. (2014) Strengthening malaria and climate research in Ethiopia. *Malaria Journal* 13(S1): 56
- Miorner H and Britton S (1999) 30 years of successful mycobacteriology research: The AHRI in Addis Ababa, a unique research environment in a developing country. *Lakartidningen* 96(6): 585–587
- Preston SH (1975) The changing relation between mortality and level of economic development. *Population Studies* 29(2): 231–248
- Sewankambo N, Tumwine JK, Tomson G, Obua C, Bwanga F, Waiswa P et al. (2015) Enabling dynamic partnerships through joint degrees between low- and high-income countries for capacity development in global health research: Experience from the Karolinska Institutet/ Makerere University partnership. *PLoS Medicine* 12(2). Available online
- Shargie EB (2007) Trends, challenges and opportunities in tuberculosis control in rural Ethiopia: Epidemiological and operational studies in a resource-constrained setting. PhD thesis, University of Bergen. Available online
- Shumbullo EL (2013) Variation in malaria transmission in southern Ethiopia: The impact of prevention strategies and a need for targeted intervention. PhD thesis, University of Bergen. Available online
- Strydom WF, Funke N, Nienaber S, Nortje K and Steyn M (2010) Evidence-based policy-making: A review. *South African Journal of Science* 106(5/6). Available online
- Tijssen RJW (2007) Africa's contribution to the worldwide research literature: New analytical perspectives, trends, and performance indicators. *Scientometrics* 71(2): 303–327
- Ulesido FM (2017) Malaria vectors in southern Ethiopia: Some challenges and opportunities for vector control. PhD thesis, University of Bergen. Available online