

CLIMATE IMPACTS RESEARCH CAPACITY AND LEADERSHIP ENHANCEMENT (CIRCLE)

Scientific Outputs Report 2020



The Association
of Commonwealth
Universities



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Executive Summary

The Climate Impacts Research Capacity and Leadership Enhancement (CIRCLE) programme is an initiative of the UK's Department for International Development (DFID). Managed by the Association of Commonwealth Universities (ACU), the programme is a response to the shortage of local scientists contributing to knowledge on the impacts of climate change on local development in sub-Saharan Africa. Therefore, the principle aim of CIRCLE is to increase the volume of locally produced, high quality research products into the impacts of climate change in sub-Saharan Africa by increasing the research capacity of African scientists.

CIRCLE adopted an innovative, dual approach to strengthening research capacity of both supporting individual academics to undertake research, while also working with their home institutions to develop better professional development systems. To this end, between 2014-2017, 97 CIRCLE Visiting Fellowships (CVF) were completed while 31 institutions participated in the CIRCLE Institutional Strengthening Programme (ISP).

The CIRCLE Scientific Outputs Report indicates the success of CIRCLE in strengthening the research capacity of African scientists by presenting evidence of the scientific outputs of the alumni of CVF programme. Scientific outputs are defined as research products in three broad categories:

- Scientific publications such as peer-reviewed journal articles, non-peer-reviewed journal articles, and book chapters
- Scientific communication such as conferences and other events
- Non-academic communication such as with policy makers, businesses, and local communities

Scientific Publications

82% of CVF Alumni have submitted or published at least one manuscript aimed at scientific audiences since the beginning of CIRCLE, with a total of 461 manuscripts being published or accepted for publication at the time of reporting. Scientific outputs in this area are substantial for both female and male academics, with 90% and 77% of female and male alumni respectively having submitted or published a manuscript. A higher proportion of post-PhD alumni had published at least one manuscript, while post-PhD alumni also had a significantly higher average number of publications per fellow. The majority of scientific publications were published between 0-2 years post-fellowship, although our data shows it takes longer for female alumni to get their research published.

CIRCLE develops a network of support for academics involved in the Fellowship programme. The data shows that a significant proportion of publications involve a member of an alumni's CIRCLE network, and there is no consistent decline over time, suggesting that once networks are established, they are sustained.

With peer-reviewed journal articles it is possible to determine whether research findings have been published in reputable journals. The majority of CVF Alumni publications are in reputable journals, while it is more likely that a manuscript will be published in a reputable journal if a CIRCLE fellow is a lead author on the manuscript. Over three quarters of peer-reviewed journal publications are open access, some of which have been directly supported by the CIRCLE Publication Fund.

Scientific Communication

87% of CVF Alumni have communicated their research findings at conferences and events through delivering presentations or contributing to conference proceedings, with 73 fellows supported to do so by the CIRCLE Conference & Training Fund.

320 presentations delivered by 80 researchers are analysed in this report. As with scientific publications, female academics were more likely to present on their research findings. The countries with the lowest proportion of reported presenters are Ethiopia and Sudan, where the language of instruction in universities is not English or French. The majority of global scientific publishing and presenting is in English and French and this report suggests that non-English or -French-speaking researchers could be at a disadvantage on the global stage.

CIRCLE Alumni have presented in 36 countries across 6 continents. Approximately half of all presentations were delivered outside of the presenter's home country, with little difference between genders. It is slightly more common for post-PhD alumni to present outside their home country. In general, a slightly higher proportion of post-PhD alumni have presented.

The CIRCLE network has supported CVF Alumni in presenting their work to academic audiences, with CIRCLE Host and Home Institutions, as well as other CVF Alumni, organising events where CVF Alumni have presented.

Communicating with non-academic audiences

82% of CVF Alumni have conducted activities designed to communicate their research findings with non-academic audiences. There is little difference between the proportions of genders conducting activities, although it is more likely for post-PhD alumni to conduct activities. To support activities in this area, CIRCLE launched a Research Uptake Fund. To date, the fund has supported 60 fellows. 20 fellows have conducted activities without direct financial support from CIRCLE. Therefore, of those that have conducted activities designed to communicate with non-academic audiences, 75% have solely relied on CIRCLE funding, indicating that external support has been crucial in this area in sub-Saharan Africa to-date.

This report presents data from reporting of CIRCLE-funded activities. In total, 144 activities have been delivered, including workshops, training sessions, field demonstrations, meetings, and the development of informative materials. The total number of stakeholders engaged through these activities is approximately 3,400. The types of stakeholders engaged cover a wide variety of groups, including local community members and leaders, students, local government, researchers, NGOs, media, and policy makers. The types of outputs produced include training manuals, factsheets, infographics, reports, flyers, policy briefs, video/audio recordings, blogs, radio programmes, forms/cooperatives, and newspaper articles.

The CIRCLE Network has played an important role in supporting CVF Alumni in this area and have been involved in a number of activities.

Recommendations

The learning from this report provides 6 key recommendations for future research capacity building programmes in sub-Saharan Africa:

1. Achieve a gender balanced pool of fellows
2. Create international networks of support
3. Include specific support funds for participants
4. Conduct research capacity strengthening training
5. Fund year-long research fellowships
6. Improve data collection processes for evidencing capacity strengthening

Acknowledgments

This report was produced as part of the Climate Impacts Research Capacity and Leadership Enhancement (CIRCLE) Programme, funded with UK Aid from the British people.

Information included in this report has been generated by Alumni of the CIRCLE Visiting Fellowship (CVF) programme. Data has been provided through numerous progress reports and online surveys with the support of all our partners.

Thank you to our CVF Alumni for their support in the production of this report.

This CIRCLE Scientifics Output Report was prepared by:

George Lakey, ACU CIRCLE Programme Officer

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Introduction

The Climate Impacts Research Capacity and Leadership Enhancement (CIRCLE) programme is an initiative of the UK's Department for International Development (DFID). Managed by the Association of Commonwealth Universities (ACU), the programme is a response to the shortage of local scientists contributing to knowledge on the impacts of climate change on local development in sub-Saharan Africa. Therefore, the principle aim of CIRCLE is to increase the volume of locally produced, high quality research products into the impacts of climate change in sub-Saharan Africa by increasing the research capacity of African scientists.

CIRCLE adopted an innovative, dual approach to strengthening research capacity of both supporting individual academics to undertake research, while also working with their home institutions to develop better professional development systems. To this end, between 2014-2017, 97 CIRCLE Visiting Fellowships (CVF) were completed while 31 institutions participated in the CIRCLE Institutional Strengthening Programme (ISP).

One indicator of the success of the CIRCLE programme in its aim of strengthening research capacity is evidence of the scientific outputs produced by participants of the Fellowships. This report speaks directly to this indicator by analysing the scientific outputs produced by our Fellowship alumni in three areas: scientific publications; scientific communication; and communicating with non-academic audiences. It is important to analyse scientific outputs in these three areas as research findings of the alumni of the CVF programme have gone beyond looking at the impacts of climate change and have helped form mitigation and adaptation techniques. Communicating these to both academic and non-academic stakeholders is important. Findings from this report will inform recommendations to DFID's proposed Climate and Resilience Framework (CLARE).¹

For the purposes of this report, research capacity is defined as the ability to produce research products, both in terms of the ability of individual researchers and the support available to them. Research products are defined broadly and cover:

- Scientific publications such as peer-reviewed journal articles, non-peer-reviewed journal articles, and book chapters
- Scientific communication such as conferences and other events
- Non-academic communication such as with policy makers, businesses, and local communities

Capacity strengthening is therefore defined here as an increase in ability to produce the above research products.

The data used in this report has been collected over the course of the CIRCLE programme, mainly through biannual CVF Follow-up Reports and reporting on activities funded through the CIRCLE Research Uptake Fund.² The data group consists of 97 alumni of the CVF programme and their scientific outputs.³ This report will look at three main demographic areas to analyse the success of fellows in achieving scientific outputs and to determine the success of CIRCLE in supporting this. These areas are gender, country of residence, and highest degree level. For the total alumni group, the breakdown in these three areas are found in Table's 1-3 below and the report will analyse the dataset in proportion to these numbers. Therefore, and in particular for any analysis done by country, caveats must be made upfront that the numbers do differ quite substantially, and consideration must be given to this.

CIRCLE had an expressed aim of achieving a gender balanced pool of fellows. Following 3 withdrawals from the programme, the alumni group consists of 49 (51%) female fellows and 48 (49%) male fellows (see Table 1). This allows for strong comparison across genders.

| | |
|---------------|----|
| FEMALE | 49 |
| MALE | 48 |

Table 1. Gender-split of CVF Alumni

Alumni of the CVF programme span 9 sub-Saharan African countries (see Table 2). As mentioned above, the number of fellows from each country differs substantially, with a high proportion from Nigeria in particular.

¹ DFID's proposed Climate and Resilience Framework (CLARE) will bring DFID's current range of climate research programmes into a single portfolio. Research capacity strengthening will be a substantial feature within this portfolio.

² The CIRCLE Research Uptake Fund has had 4 rounds to-date, funding 144 activities related to the communication of research findings with non-scientific audiences.

³ 100 CIRCLE Visiting Fellowships awarded, 3 fellows subsequently withdrew from the programme leaving a group of 97 alumni.

Although analysis is done proportionally, cross-country comparisons are given with the understanding that there are significant differences in numbers from each country.

| | |
|---------------------|----|
| ETHIOPIA | 13 |
| GHANA | 16 |
| KENYA | 6 |
| NIGERIA | 37 |
| SOUTH AFRICA | 7 |
| SUDAN | 2 |
| TANZANIA | 9 |
| UGANDA | 3 |
| ZIMBABWE | 4 |

Table 2. CVF Alumni by Home Country

It has been widely noted that there is a shortage in academics with PhD-level education in sub-Saharan Africa.⁴ Therefore, it is important that Master's-level academics, who are conducting research, writing publications, and teaching students are also supported. CIRCLE therefore offered fellowships to academics at both post-master's and post-PhD level (see Table 3 for breakdown). This report analyses whether there is any difference in output between these groups.

| | |
|--------------------------------|----|
| PHD (OR EQUIVALENT) | 60 |
| MASTERS (OR EQUIVALENT) | 37 |

Table 3. CVF Alumni by Degree Level

The report will be structured as follows:

1. Scientific publications
2. Scientific communication
3. Communicating with non-academic audiences
4. Recommendations for CLARE

⁴ See for example, <https://www.universityworldnews.com/post.php?story=20180719073910721> and https://www.britishcouncil.org/sites/default/files/h233_07_synthesis_report_final_web.pdf

Scientific Outputs of the CIRCLE Visiting Fellowship Alumni

This section of the report analyses the scientific outputs of the alumni of the CIRCLE Visiting Fellowship (CVF) programme. Scientific outputs will be analysed in three distinct categories:

- Scientific publications such as peer-reviewed journal articles, non-peer-reviewed journal articles, and book chapters
- Scientific communication such as conferences and other events
- Non-academic communication such as with policy makers, businesses, and local communities

These are taken in turn.

Scientific Publications

The CIRCLE programme, via biannual CVF Follow-up Reports and ad hoc updates from fellows, has collected data on the publications of alumni of the CVF programme. In terms of publications for scientific audiences, this includes publications in peer-reviewed and non-peer-reviewed journals, as well as book chapters. Since the start of the programme, we have been informed of 461 manuscripts being published or accepted for publication in peer-reviewed journals, non-peer-reviewed journals, and edited books by our fellows. 80/97 fellows had submitted or published at least one manuscript aimed at scientific audiences, representing 82% of our alumni.

While African scientists are underrepresented in global climate change publications generally, female academics in sub-Saharan Africa often face further barriers to achieving their full potential in terms of research capacity. The CIRCLE programme thus had a specific target of achieving a gender balanced pool of fellows. Representing any differences between genders is therefore important. Since the beginning of the programme, female fellows have been more likely to publish a manuscript in a peer-reviewed journal, non-peer-reviewed journal, or edited book (see Figure 1). 90% of female alumni have published a manuscript while 77% of male alumni have. However, male alumni do have a slightly higher average number of publications per fellow, with 5 published manuscripts per fellow compared with 4.5 for females. For both genders, these outputs are substantial.

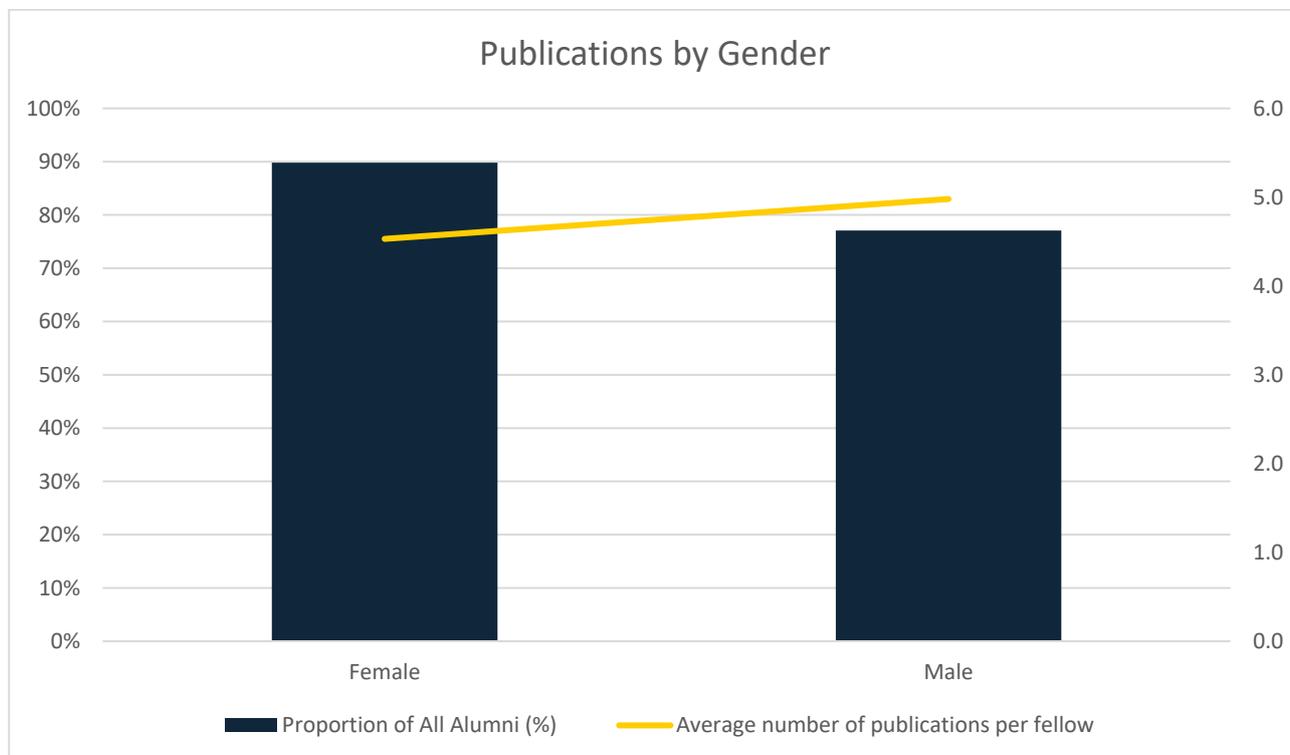


Figure 1. Gender comparison of the proportion of CVF Alumni publishing and the average number of publications per fellow

Alumni of the CVF programme span 9 sub-Saharan African countries, and at least one fellow from all 9 countries have published. As can be seen in Figure 2, 50% or more fellows from each country have published, evidencing extensive scientific outputs from across the countries where CIRCLE has worked (see Figure 2). Nevertheless, this is not consistent across countries. Very high proportions of fellows from Ghana, Kenya, Nigeria, and Zimbabwe have published, with 94%, 83%, 97%, and 100% respectively, while Sudan has had

50% publish. It is interesting that Ethiopia and Sudan, where the language of instruction in universities is not English or French, have the lowest proportion of fellows publishing. This could represent a barrier to publishing for researchers not based in countries where English and French are the principal language of instruction.

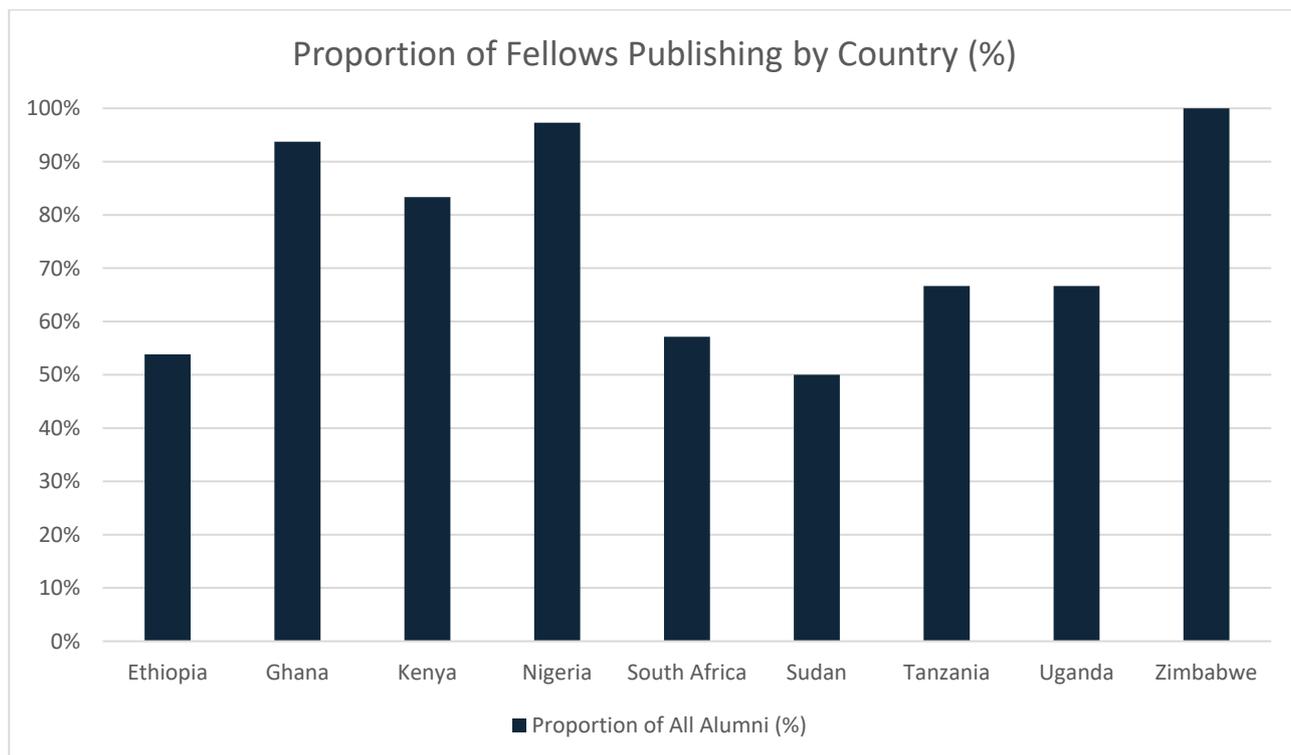


Figure 2. Country comparison of the proportion of fellows publishing

If we look at the number of manuscripts published by country, it is clear that the volume of publications from Nigerian alumni is substantial (see Figure 3). We see a much higher proportion of manuscripts being published by Nigerian fellows when compared with their proportion of the entire alumni group. This is due to a higher number of publications per Nigerian fellow. The number of publications per fellow in each country are found in Figure 4 below. More research should be conducted to understand the conditions in each country that could result in these different publication numbers.

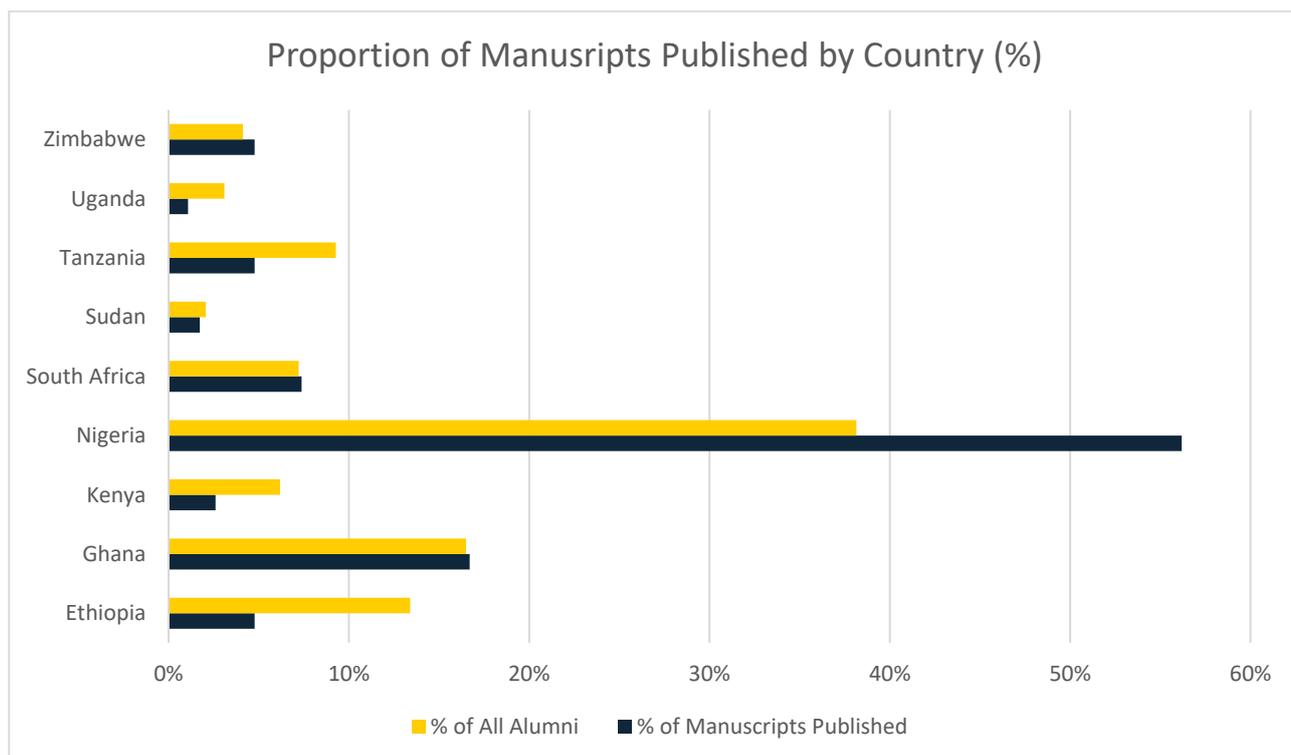


Figure 3. Proportion of manuscripts published by country

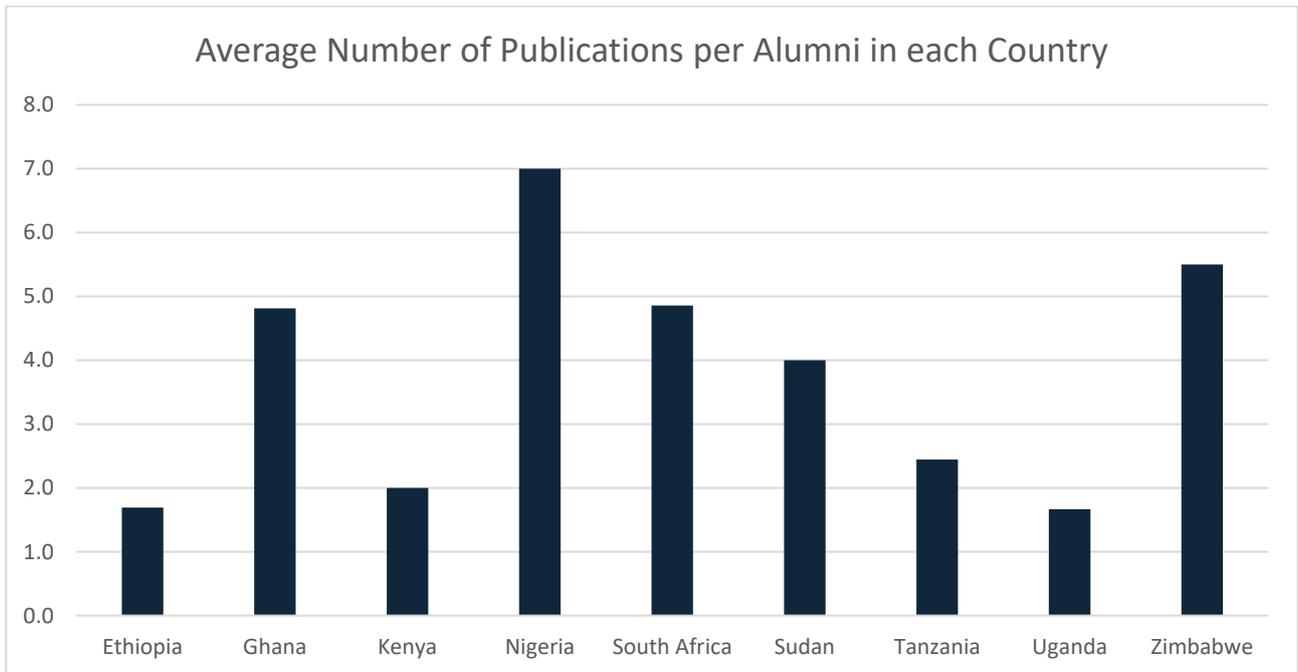


Figure 4. Country comparison of the average number of the publications per alumni

CIRCLE accepted applications to the CVF programme from researchers at both post-master's and post-PhD level. Part of the reasoning behind this is due to the relatively low proportion of academics in sub-Saharan African institutions having PhDs. Nevertheless, these academics are teaching students, conducting research, and producing research outputs. 37 fellows were post-master's, while 60 were post-PhD at the time of their Fellowships.⁵

As would be expected, a slightly higher proportion of PhD fellows have published when compared with the overall proportion. However, this is a very slight difference, suggesting that post-master's academics in sub-Saharan Africa can be as productive when supported (see Figure 5). Post-PhD fellows are generally more productive. The average number of publications per post-PhD fellow is substantially higher than post-master's fellows (see Figure 5). This does suggest that extra training and support might be beneficial for those at a lower degree level.

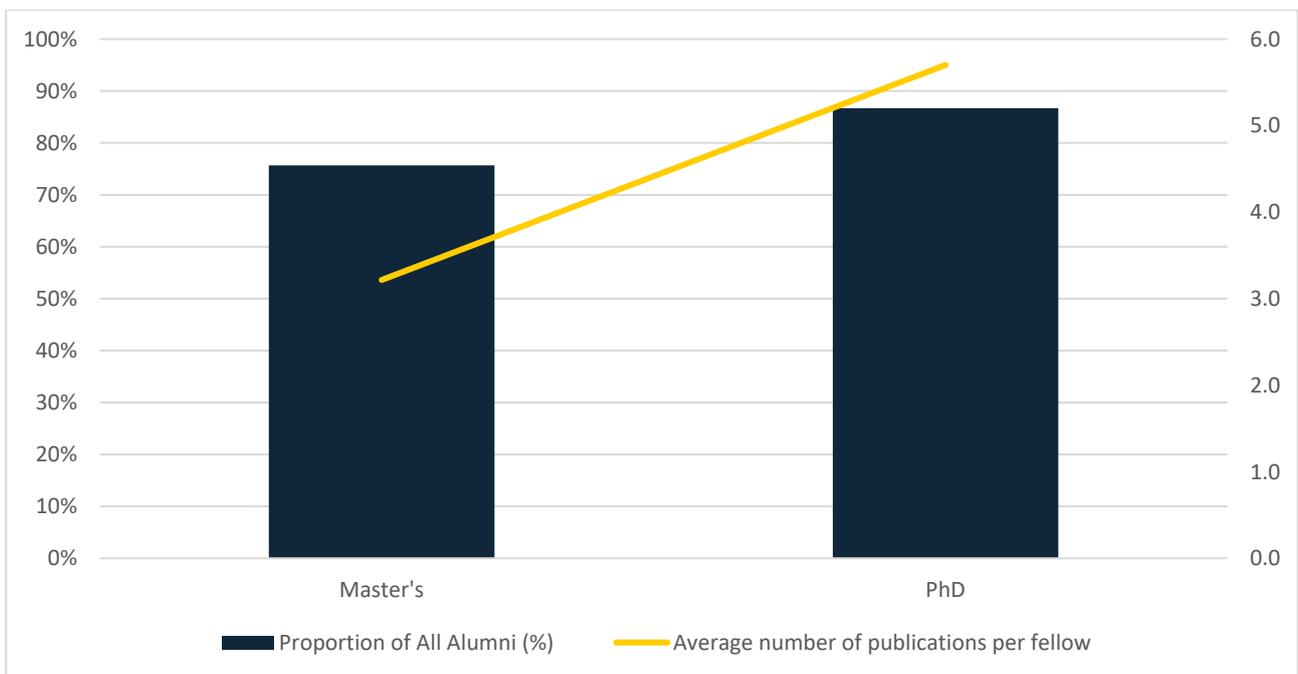


Figure 5. Degree level comparison of the proportion of CVF Alumni publishing and the average number of publications per fellow

⁵ Since completing their Fellowship, 6 post-master's fellows have begun studying for a PhD but are still categorised as post-master's.

The CIRCLE Visiting Fellowship allowed academics at sub-Saharan African universities to spend a year solely focused on the research aspect of their career, giving them a break from teaching and administrative workloads. We would therefore expect the programme to ensure that these academics are more prolific in producing scientific outputs such as academic publications. By analysing the published manuscripts that include research findings from the research conducted during their fellowship (termed CIRCLE research), we can indicate the time it has taken to publish. Figure 6 provides a breakdown of how long it has taken a fellow to publish CIRCLE research since the completion of their fellowship. As can be seen, a significant majority of publications were published between 0-2 years post-fellowship, with the majority of these being 0-1 years. This could be because the year-long fellowship can give researchers the time to focus solely on conducting research, analysing data, and writing up findings and this publication time reflects the peer-review processes and other bottlenecks.

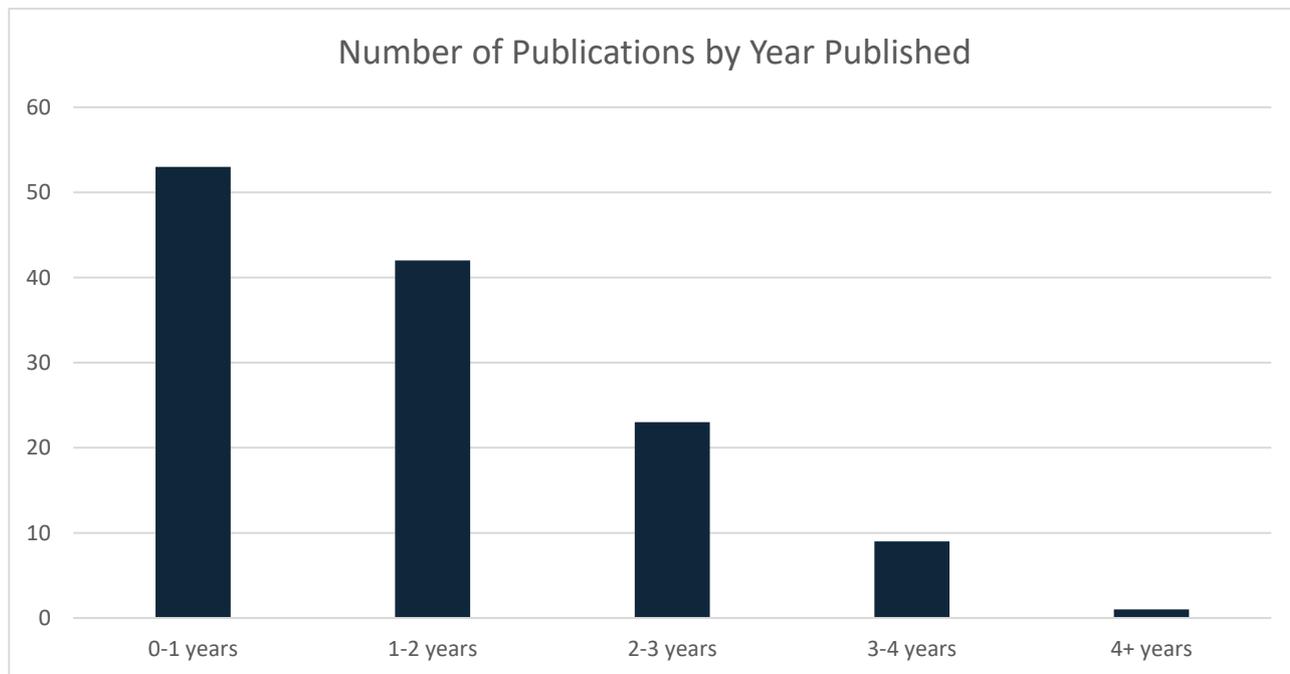


Figure 6. Number of publications published by year since fellowship completion

There is a slight difference in time taken to publish CIRCLE research when analysed by gender (see Figure 7). Male fellows were more likely to publish between 0-1 years post-fellowship. This suggests that female fellows may need more support in translating their research findings into published articles.

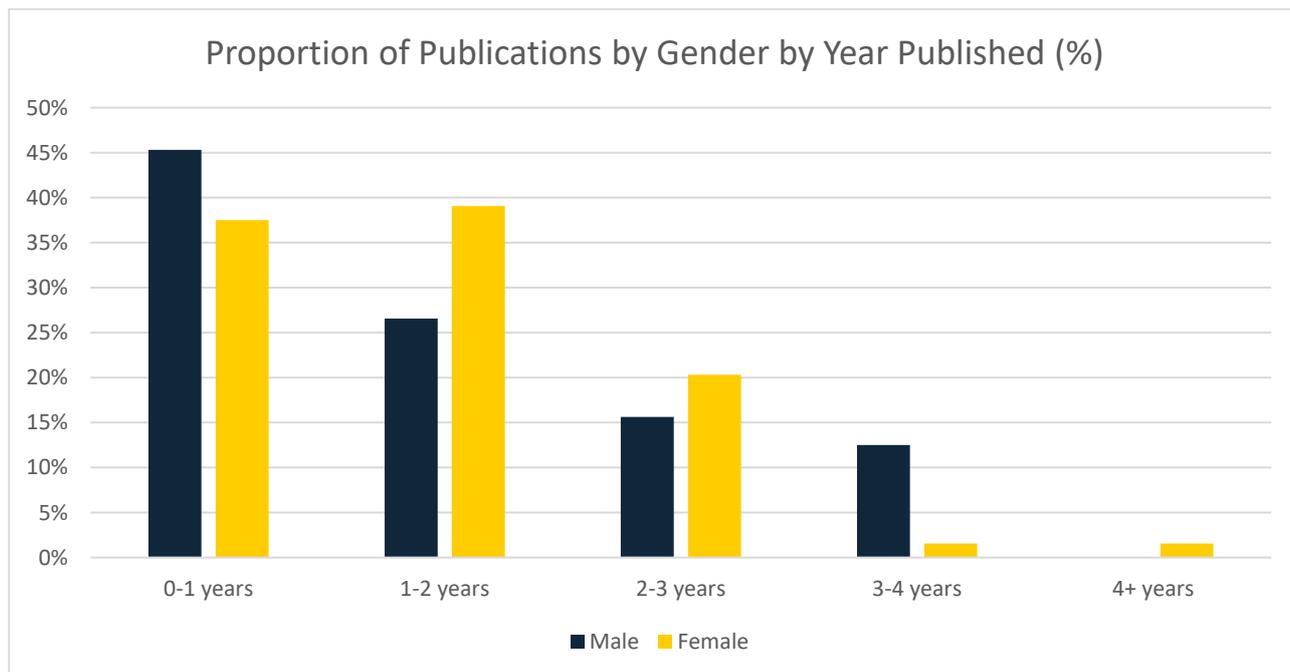


Figure 7. Gender comparison of the proportion of publications by year since fellowship completion

CIRCLE seeks to develop a network of support for academics involved in the programme. Fellows are assigned a mentor at their home institution, a supervisor at their host institution, and a specialist advisor at a third-party institution. Fellows are also encouraged to network with other CVFs both at their host and home institution. This network of support developed through CIRCLE can support academics in their capacity to produce scientific outputs such as academic publications. As can be seen in Figure 8, fellows were most likely to collaborate with their home mentor when writing manuscripts. However, we might expect to see a decline in collaboration over time, particularly in collaboration with host supervisors and specialist advisors given the time since the completion of the fellowship. This however does not seem to be the case, suggesting that once networks are established, they are sustained beyond the life cycle of the project.

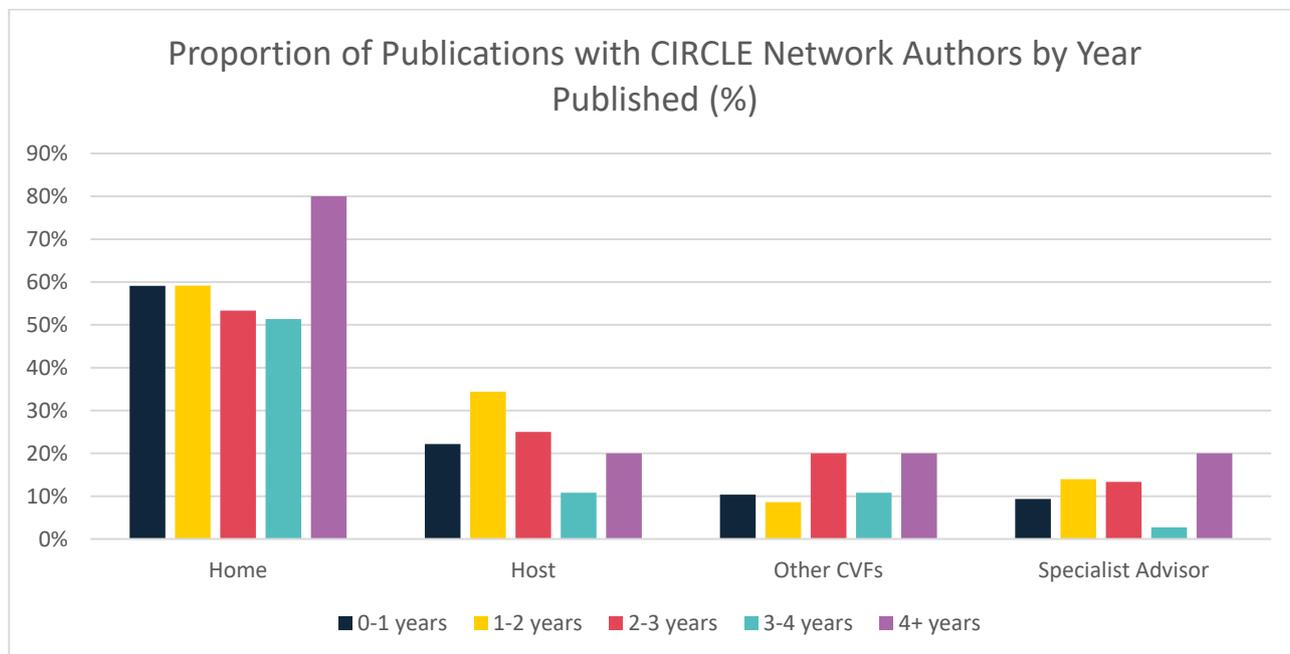


Figure 8. Proportion of publications with CIRCLE network authors by year since fellowship completion

With peer-reviewed journal publications, it is possible to assess the quality of journals being published in by determining whether they are reputable or not. When we analyse the quality of journals being published in by the type of collaborator, we get some interesting data. Generally, CIRCLE Alumni are publishing in reputable journals. However, it is noticeable that when a host supervisor or specialist advisor is an author on the manuscript, it is more likely that the journal publishing in is reputable (see Figure 9). There could be a number of reasons for this; the high quality of support offered to fellows via this specific collaborator or that these groups are co-authors on papers resulting from work done during the CIRCLE fellowship, which could evidence that having sufficient time to conduct research and write at a high standard is beneficial.

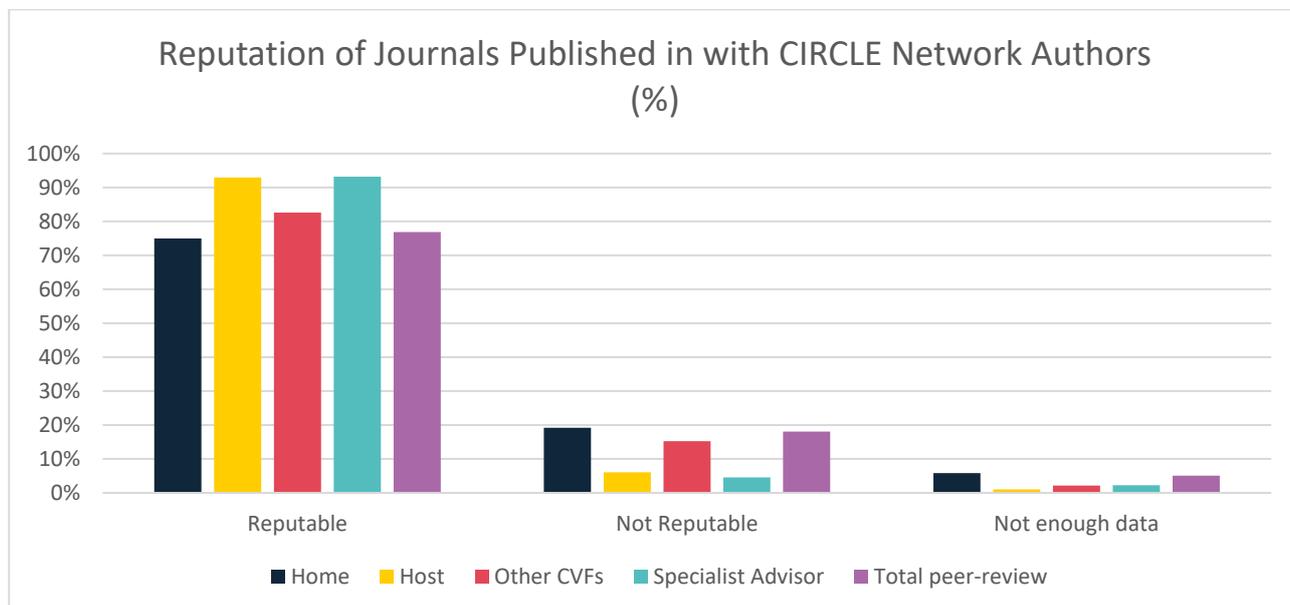


Figure 9. Proportion of publications with CIRCLE network authors published in reputable journals

Figure 10 suggests that whether a CIRCLE fellow is a lead or co-author on a manuscript has a significant impact on whether it is published in a reputable journal or not. This indicates that CIRCLE fellows are either producing quality research outputs that are desired by reputable journals or that they are ensuring that they are submitting to reputable journals, or a mixture of both. Some training was delivered through the CIRCLE programme on identifying predatory journals. CIRCLE also places emphasis on submitting to journals deemed to be reputable.

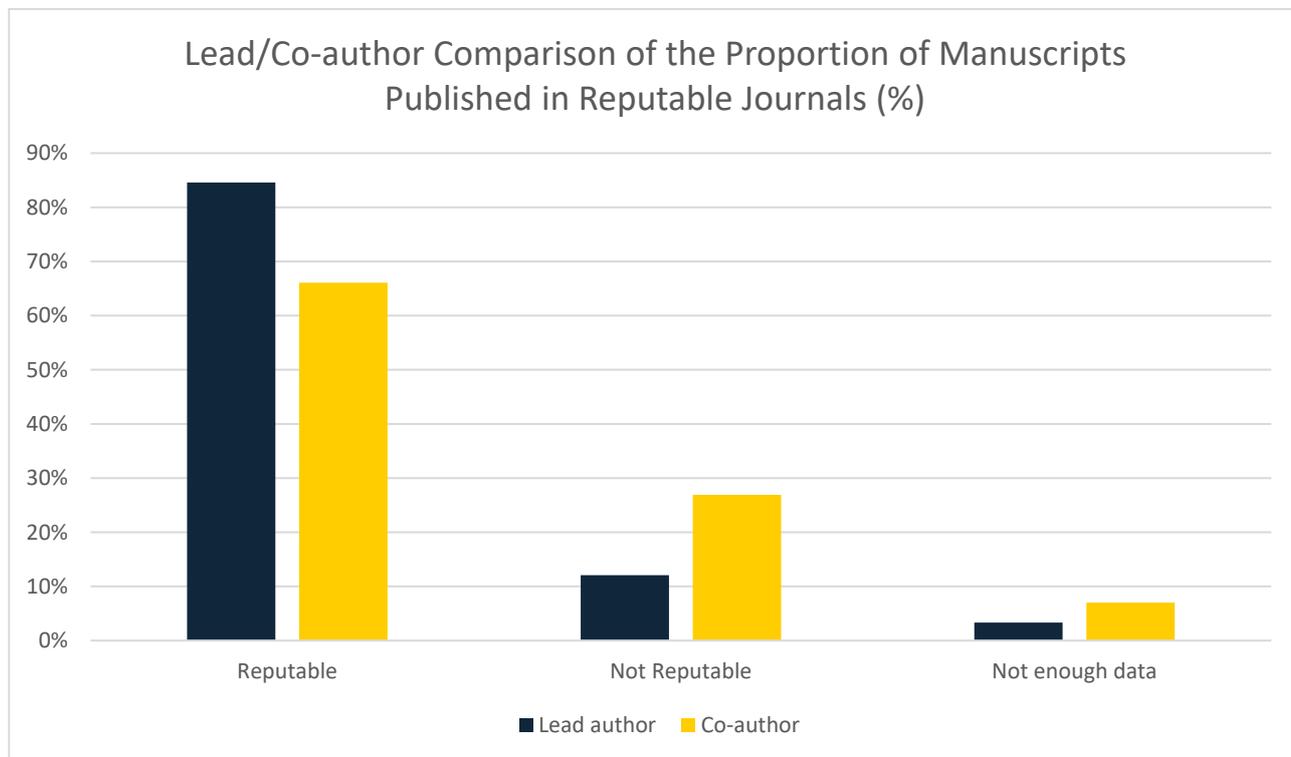


Figure 10. Proportion of manuscripts published in reputable journals by CVF Alumni Lead or Co-Author

To increase the potential uptake of research findings, CIRCLE has encouraged alumni of the programme to publish their work in open access journals. As can be seen in Figure 11 below, over three quarters of articles published in peer-reviewed journals are open access.

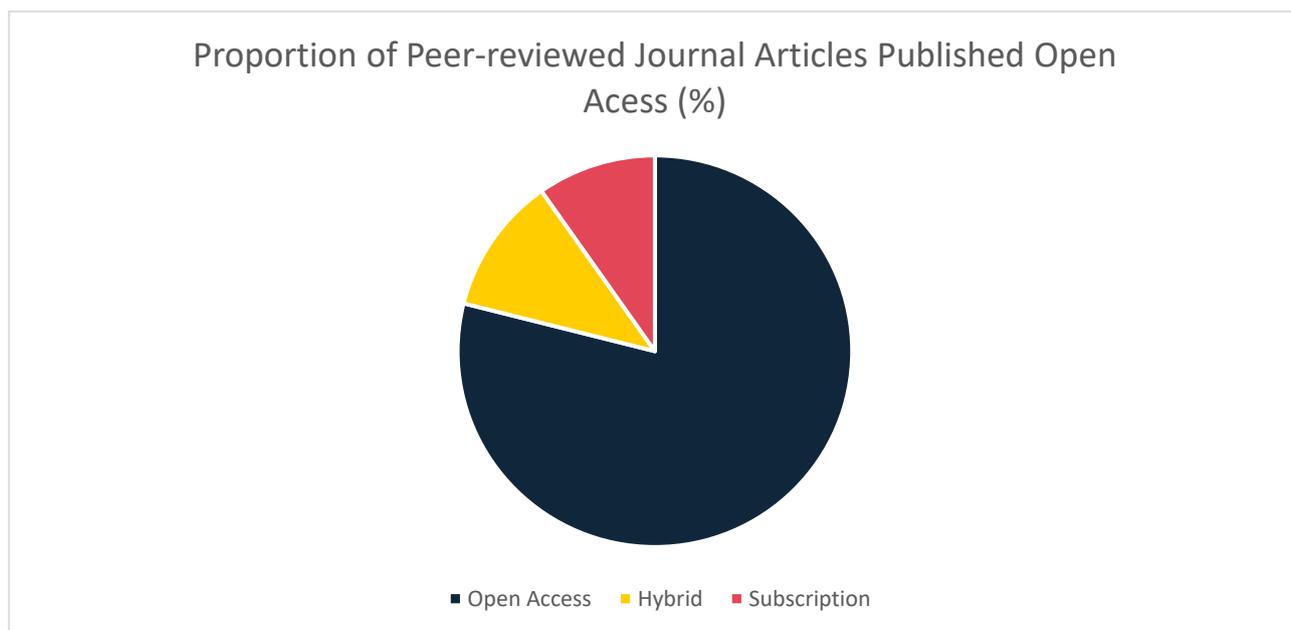


Figure 11. Proportion of CVF Alumni peer-reviewed journal articles published open access

However, publishing open access articles in reputable journals can be costly, especially for early career researchers in sub-Saharan Africa. To support fellows, CIRCLE launched the CIRCLE Publication Fund which could cover article processing fees to enable fellows to publish open access research articles based on their CIRCLE research in reputable journals.

To date, the CIRCLE Publication Fund has supported the publication of 55 articles, at an average of \$1,200 per article.

Publications by research theme are displayed in Figure 12 below. All publications are related to climate research, however a significant proportion of publications focus on agriculture. On average, agriculture contributes to 15% of total GDP in sub-Saharan Africa, employs more than half of the total labour force, and in many countries women comprise at least half of the labour force.⁶ Additionally, smallholder farms make up approximately 80% of all farms in sub-Saharan Africa and employ approximately 175 million people.⁷ As such, the impacts of climate change in sub-Saharan Africa will potentially be most keenly felt by individuals within the agriculture sector and as such research into this area is vital.

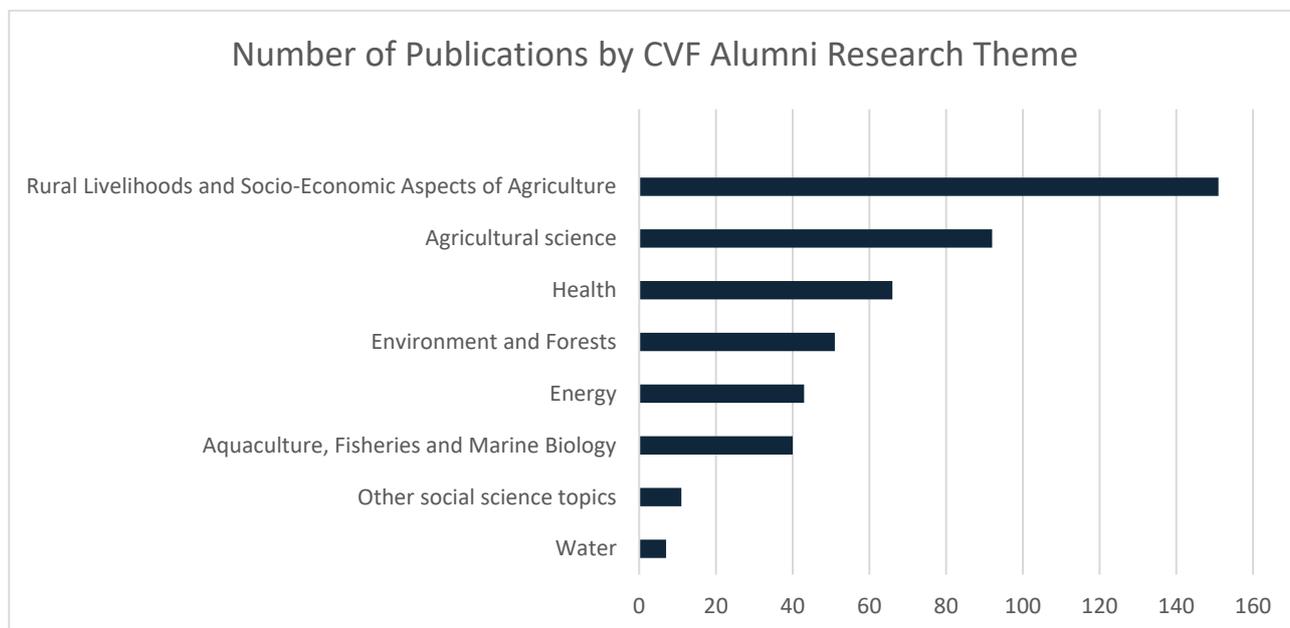


Figure 12. Number of publications produced by CVF Alumni research theme

Barriers to publishing scientific papers

Through the CVF Follow-up Reporting conducted on a biannual basis, CIRCLE has collected data from respondents on the barriers they have faced when returning to their home institution. A number of these barriers relate to publishing scientific papers. Throughout the reporting, there have been three main barriers for CVF Alumni; funding, time, and infrastructure. In particular, fellows highlight:

- A lack of funding to carry out research and communicate findings to a wider audience
- A lack of time to conduct research, analyse findings, and write manuscripts due to excessive teaching schedules and administrative workloads
- A lack of infrastructure such as lab equipment, weak and intermittent internet connection, and power outages

The reporting of these challenges has been consistent throughout the Programme, and across all our Fellowship alumni cohorts.

⁶ OECD/FAO (2016) [OECD-FAO Agricultural Outlook 2016-2025](#)

⁷ Ibid.

Scientific Communication

As well as academic publications, researchers can also produce scientific outputs via conferences and events such as conference proceedings and presentations. This section focuses on these outputs which we categorise as scientific communication.

80 fellows have delivered presentations on their research findings since the beginning of CIRCLE, while 26 fellows have published conference proceedings. In total this represents 87% of our fellows. CIRCLE has supported fellows to attend conferences and present their work. Through a designated fund, CIRCLE awarded approximately \$160,000 to 73 fellows to attend and present CIRCLE research at international conferences and events. On average, financial support to attend a conference cost around \$1,500.

Data on presentations delivered by 80 fellows is analysed in this report. Through biannual follow-up reporting, we have acquired data on 320 of the presentations that fellows have delivered since the beginning of the CIRCLE programme. 42 of the fellows are female, while 38 are male. The proportion of these in relation to overall alumni are displayed in Figure 13, highlighting that female fellows are more likely to deliver presentations. In addition, 182/320 (57%) presentations were delivered by female fellows, and 138 (43%) by male fellows. The average number of presentations delivered by female alumni is 3.7 while it is 2.9 for male alumni. Therefore, female alumni are not only more likely to present their research findings, but also present more often.

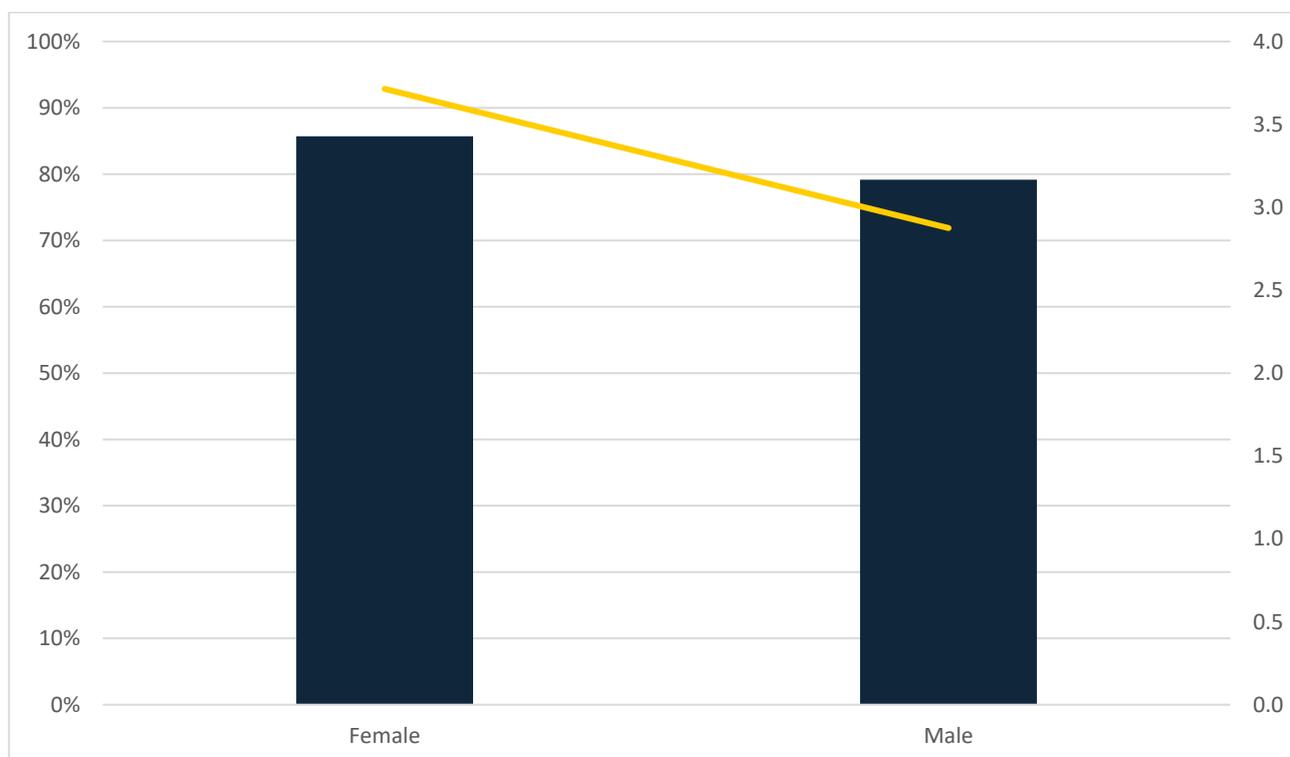


Figure 13. Gender comparison of the proportion of CVF Alumni presenting and the average number of presentations per fellow

As mentioned above, alumni of the programme are based in 9 sub-Saharan African countries. Alumni from all 9 countries have presented since the start of the programme. As can be seen in Figure 14, 50% or more alumni in each country have presented at conferences and events, indicating the programme has been able to support an increase in scientific outputs across different regions of sub-Saharan Africa. However, there are substantial differences in the proportion of fellows from each country who have presented. 100% of fellows from both Kenya and Tanzania have presented at conferences or events, while 50% and 54% of fellows from Sudan and Ethiopia respectively have presented. This suggests that benefit has not been consistent across the region. As with scientific publications, it is interesting to see that Ethiopia and Sudan are the lowest reporters, where the language of instruction in universities is not English or French. The majority of global scientific publishing and presenting is conducted in English and French, and this may prove a barrier to academics conducting research and teaching in universities whose language of instruction is not principally English or French.

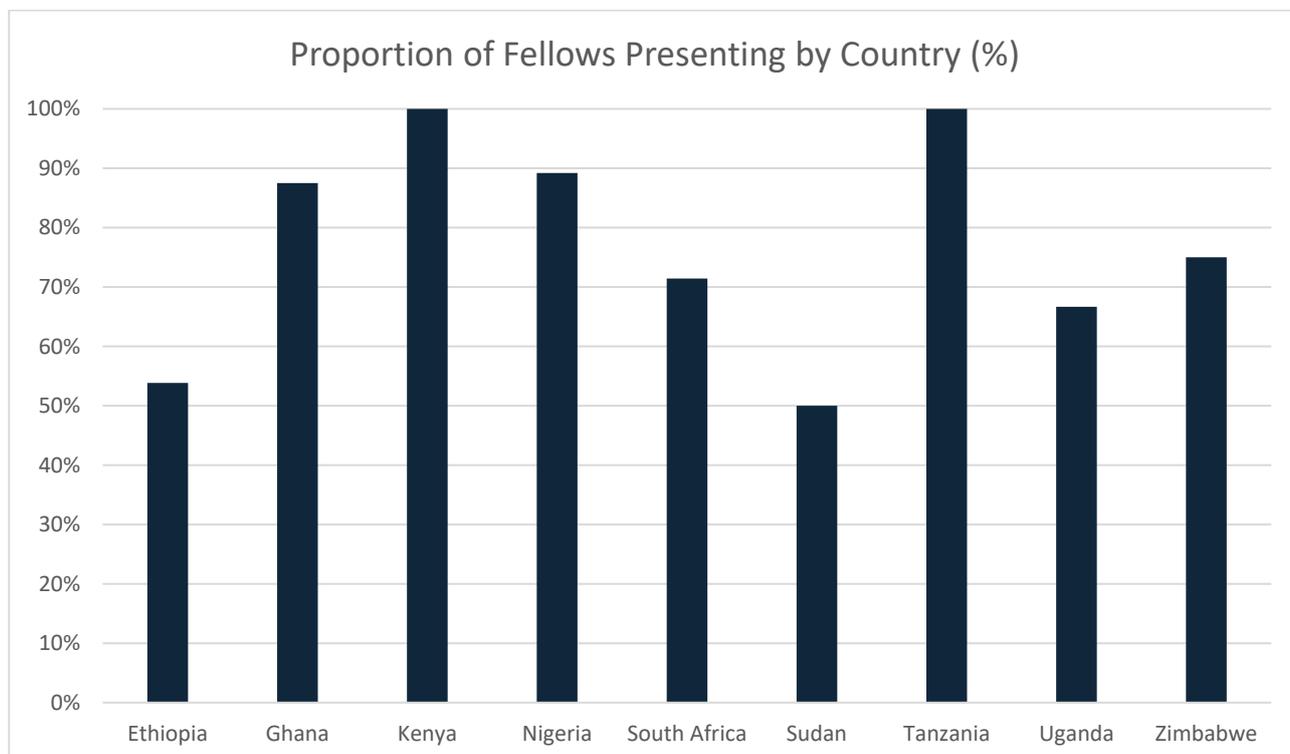


Figure 14. Country comparison of the proportion of fellows presenting

Alumni of the CIRCLE programme have presented in 36 countries across 6 continents (see Table 4). The majority of presentations (71%) have been delivered in countries home to institutions involved in the CIRCLE programme (see bold in Table 4). Nevertheless, approximately half (49%) of all presentations were delivered outside of the presenter's home country, evidencing that CIRCLE has supported an internationally mobile group of researchers. Interestingly, there is very little difference between the genders in the proportion of presentations delivered outside of their home country, with 49% of presentations delivered by both female and male respondents being delivered outside of their home country. A slightly higher proportion of presentations delivered by PhD fellows had been presented outside their home country, with 50% compared with 46% for master's fellows. Although this is minimal, this may reflect the ability of post-PhD academics to be more mobile.

| | | | |
|-----------------|-----------|---------------------|-----------|
| AUSTRALIA | 4 | MOZAMBIQUE | 1 |
| BELGIUM | 1 | NETHERLANDS | 1 |
| BENIN | 1 | NIGER | 1 |
| BRAZIL | 1 | NIGERIA | 73 |
| BURUNDI | 1 | NORWAY | 1 |
| CAMEROON | 2 | RWANDA | 1 |
| CANADA | 3 | SINGAPORE | 2 |
| CHINA | 1 | SOUTH AFRICA | 39 |
| COLOMBIA | 1 | SOUTH SUDAN | 1 |
| COTE D'IVOIRE | 2 | SUDAN | 1 |
| EGYPT | 1 | SWEDEN | 2 |
| ETHIOPIA | 20 | TANZANIA | 7 |
| GERMANY | 7 | UAE | 2 |
| GHANA | 40 | UGANDA | 15 |
| IRELAND | 1 | UK | 8 |
| ITALY | 1 | USA | 18 |
| JAPAN | 3 | ZIMBABWE | 12 |
| KENYA | 25 | NOT PROVIDED | 18 |
| MALAYSIA | 1 | | |

Table 4. Number of presentations delivered by country (CIRCLE Countries in bold)

We do see some difference in the international mobility of researchers when analysed by their home country (see Figure 15). Tanzanian researchers have been proportionally the most mobile, while Ethiopian and South African researchers are been proportionally the least mobile. Sudanese and Ugandan researchers are more likely to present in their home country. Ghanaian, Kenyan, Nigerian, and Zimbabwean researchers are more likely to present outside of their home country.

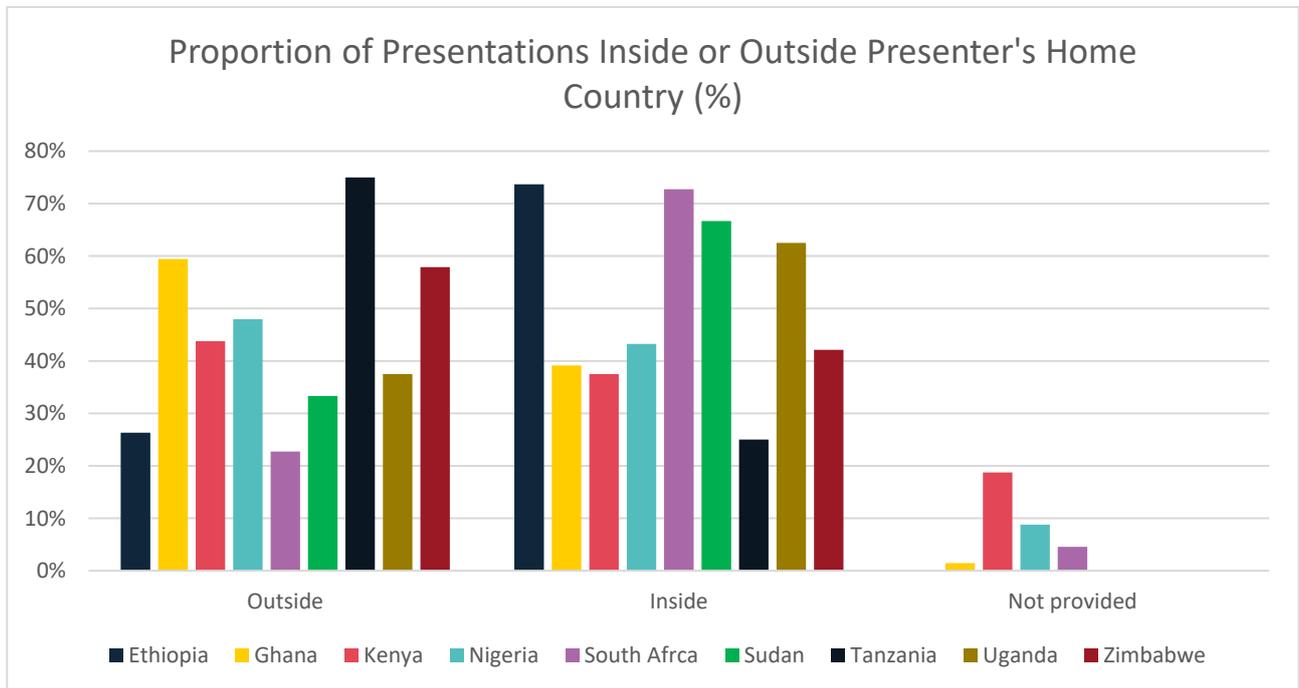


Figure 15. Country comparison of the proportion of presentations delivered inside or outside a fellow's home country

The proportion of fellows presenting at conferences and events when analysed by their highest degree held at the start of the programme does not differ substantially. In this sense, a high proportion of both post-PhD and post-master's fellows are presenting, and they have similar average numbers of presentations per fellow (see Figure 16). However, as would be expected, those at post-PhD level are slightly more likely to present. Nevertheless, this data does suggest that investing in both post-master's and post-PhD researchers is worthwhile from a scientific outputs perspective, particularly given the lower proportion of researchers holding PhDs in sub-Saharan Africa (as mentioned earlier).

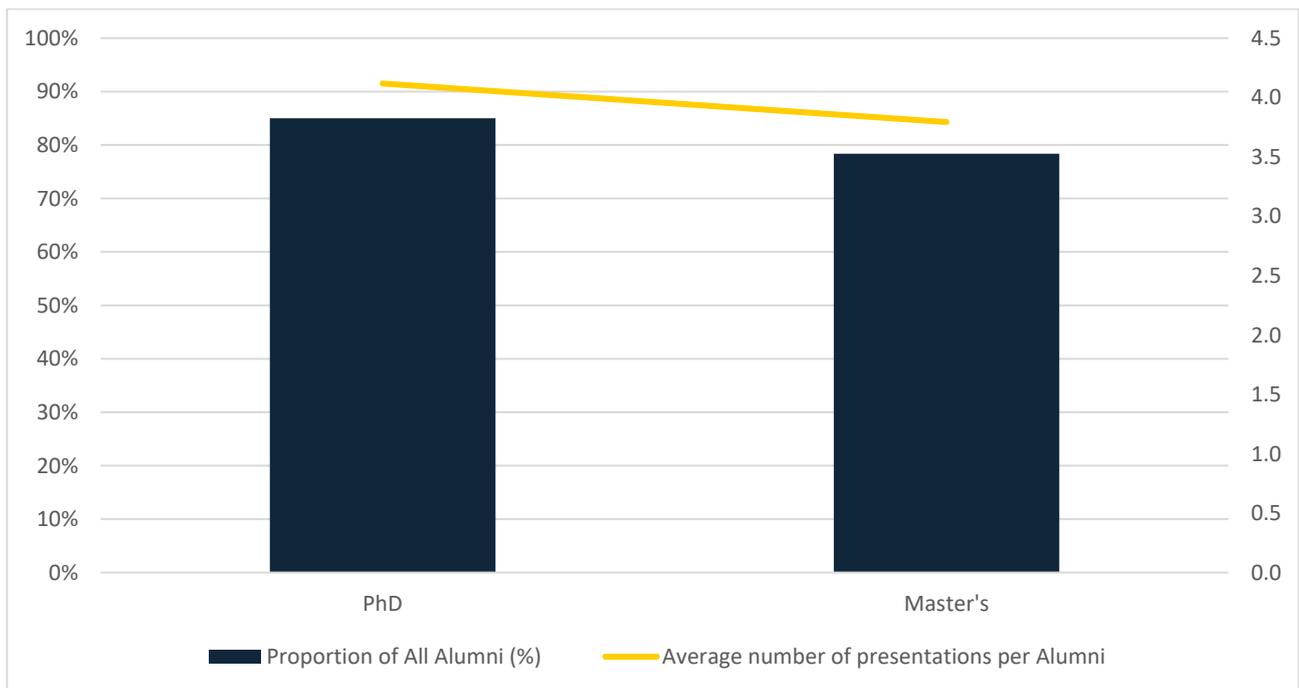


Figure 16. Degree level comparison of the proportion of CVF Alumni presenting and the average number of presentations per fellow

When the presentations took place in relation to the completion of the fellowship is displayed in Figure 17. As can be seen, the majority of presentations took place 0-1 years following the completion of fellowships. Similar to the publications discussed above, this significantly higher number of presentations 0-1 year post-fellowship could reflect that the year-long fellowship gave researchers the time the focus on solely on producing research findings to present.

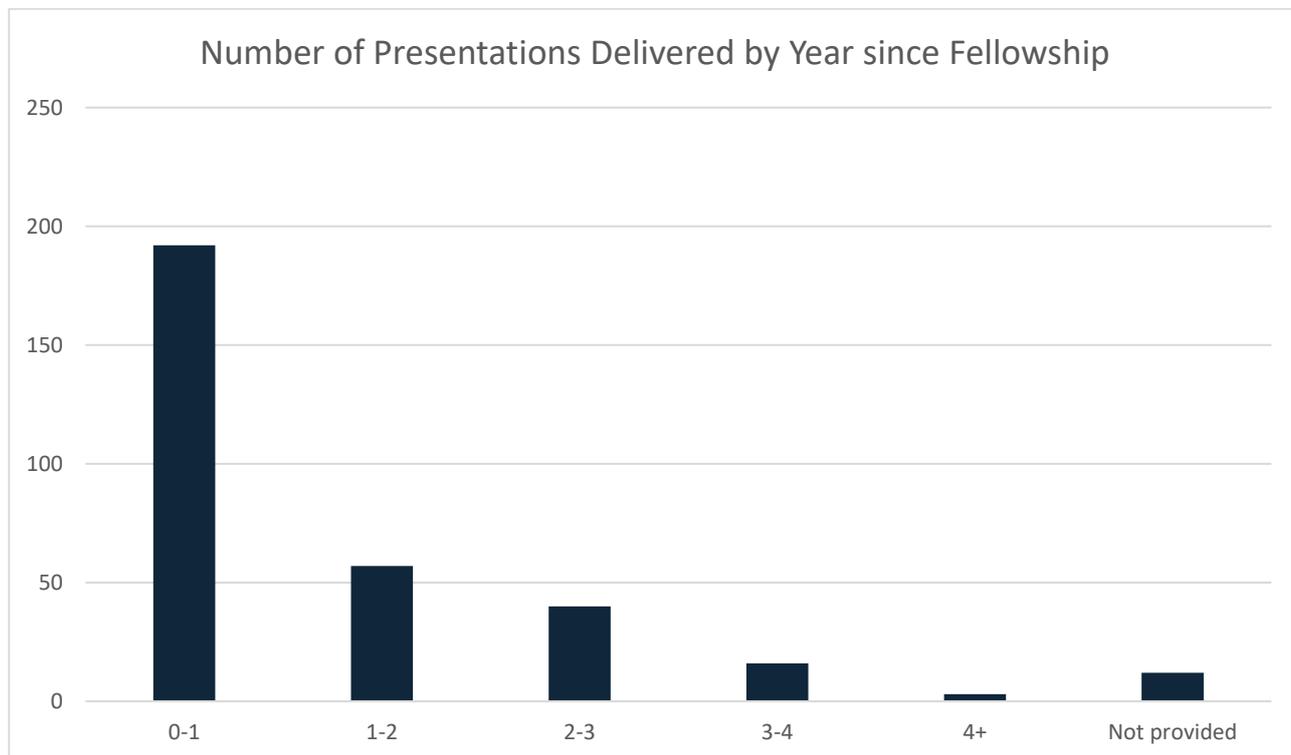


Figure 17. Number of presentations delivered by year since fellowship completion

As with scientific publications, the CIRCLE network has been central to supporting fellows in delivering presentations (see Figure 18). However, it should be noted that a significant number of events were also organised by groups external to CIRCLE programme, suggesting that the scientific outputs of CIRCLE fellow are of a high standard.

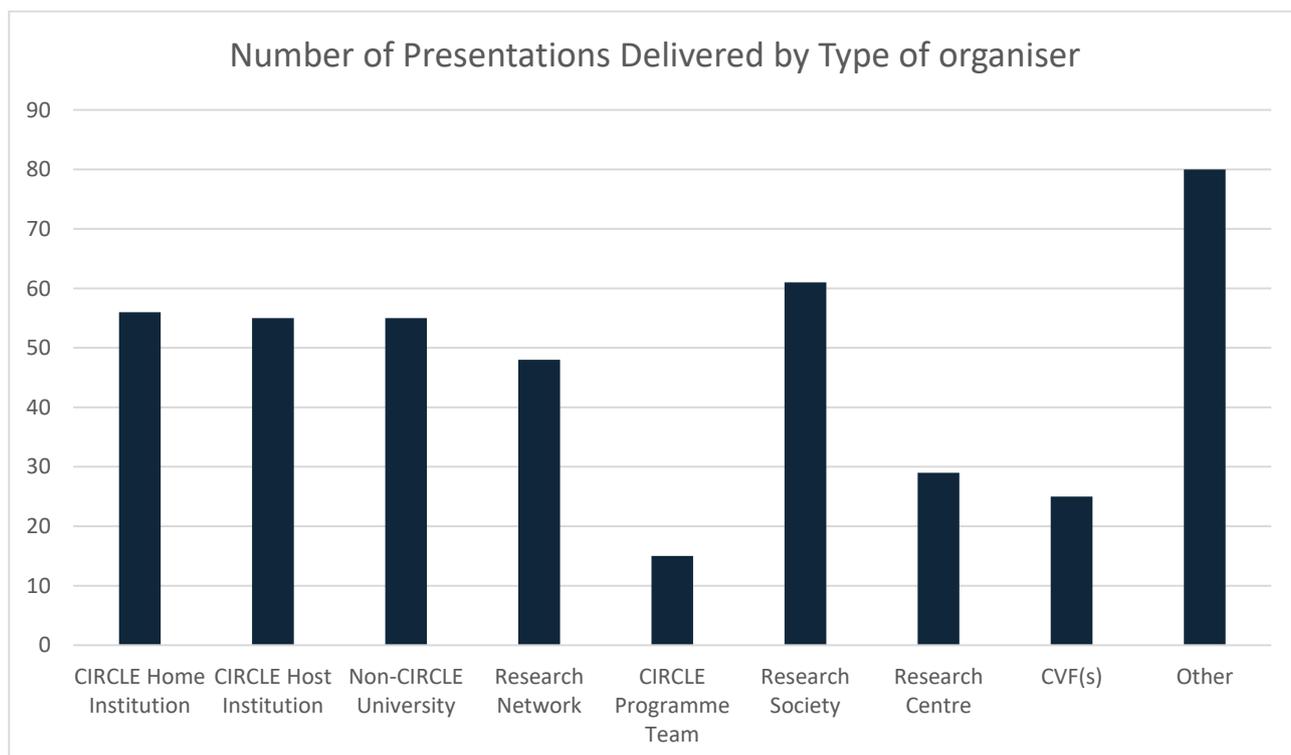


Figure 18. Number of presentations delivered by type of event organiser

Interestingly, when we analyse when the presentation was delivered in relation to who organised the event, CIRCLE Host Institutions drop dramatically after 1 year. This could represent connections not being sustained, although this is not likely given the continued support found elsewhere (see Scientific Publications and Communicating with non-academic audiences). Rather, this could be due to the international nature of the visiting fellowships which may result in accessibility issues for alumni.

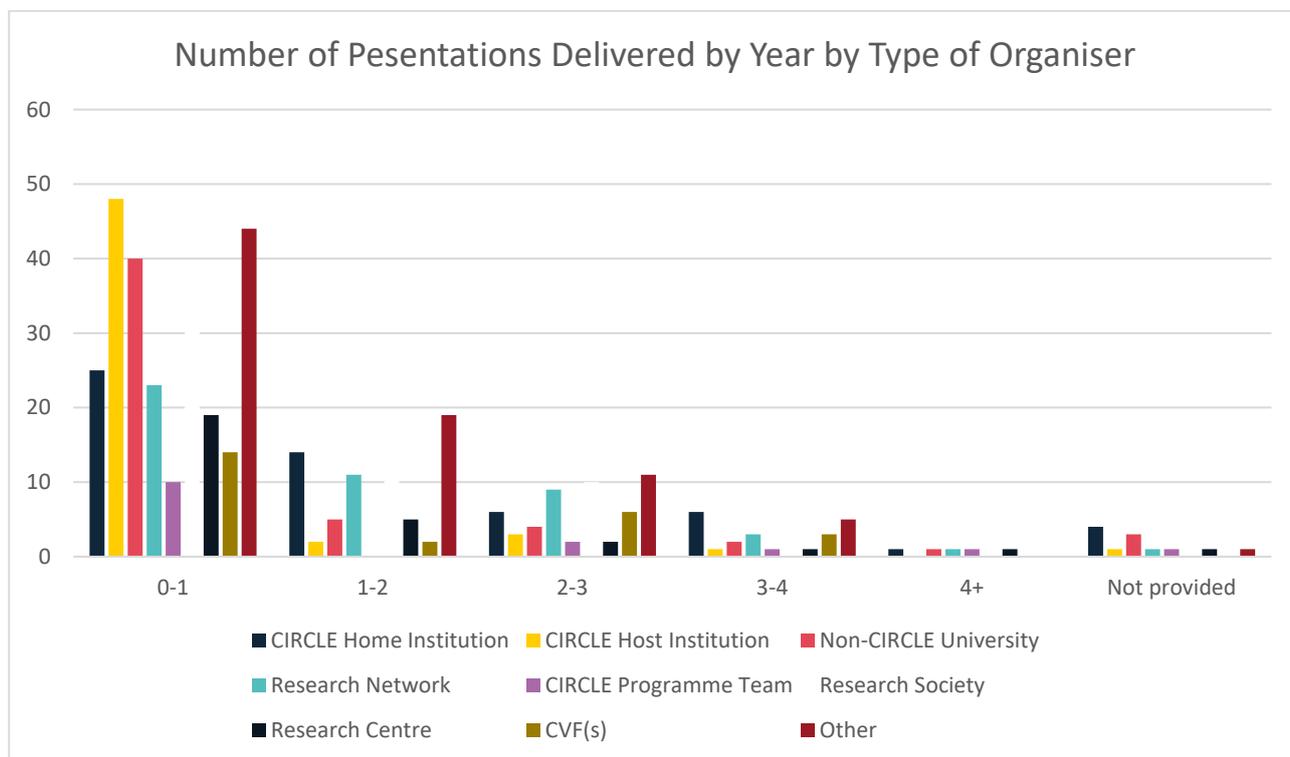


Figure 19. Event organiser comparison of the number of presentations delivered by CVF Alumni since the year of fellowship completion

Barriers to presenting research to academic audiences

Although the vast majority of CIRCLE fellows have presented their work to non-academic audiences, those who have not were asked to provide details of any barriers they have faced in doing so. To-date, 3 fellows have responded. 2/3 (66%) indicated that poor health has prevented them travelling to events during the reporting period, while 1 indicated event postponement as an uncontrollable barrier. 1 fellow indicated a lack time to produce a manuscript to present amid high administrative workloads. Moreover, this particular fellow indicated that being a female leader has hindered her ability to have the time to write-up research findings and present them. The following response was provided:

'Female leadership is very challenging especially with regard to junior staff like myself, it's so hard to publish... Being a female and a mother is another issue. You have to effectively play as an administrator, academician, and a mother. Publishing requires ample time, commitment and a settled mind of which for a female is sometimes challenging... A male colleague can stay in offices longer... some up to 6hrs after normal working hours to write a proposal or a manuscript, for females it's impossible. I need to rush home immediately after working hours to attend to the family.'

While this may be an individual case, it shows that there can be specific challenges for female academics, particularly those in leadership positions, that may prevent them from being able to produce a manuscript and present it at events, whether at home or internationally. However, it should be noted that the respondent's institution is working to address the situation:

'[T]he university has noted with concern our administrative loads and the challenges we face as women in leadership and mothers at the same time and that's why it has set aside some funds to assist women in leadership at this university to be out of office for at least 7 days to concentrate on their manuscripts. It's my hope this will assist in a way'

Communicating with non-academic audiences

Scientific outputs could also be designed to communicate with non-academic audiences such as business & industry, policy makers, and local communities. This could be for the purposes of getting research evidence into use for impact in wider society. Pursuing research impact, defined here as the benefit of research in the 'real world' (Bayley 2019), has become increasingly important for researchers, research institutions, and research funders. In the context of CIRCLE, a programme designed to fund research looking into the impacts of climate change in sub-Saharan Africa, taking those research findings back to the communities potentially affected to help mitigate and adapt to climate change is essential.

In total, 80 alumni have engaged with stakeholders of their research outside of the academic community and conducted activities designed to increase the potential of achieving impact from their research findings. The types of activities include producing policy briefs, producing and patenting new technologies, contributing to national and international policy documents, producing informative materials such as leaflets and training manuals, conducting workshops or field demonstrations, and conducting media interviews. All these are designed to translate their research findings into a product or tool that can have impact in society.

There is little difference in the proportion of alumni who have participated in these activities when analysed by gender (see Figure 21), however it is more likely that post-PhD alumni will have conducted activities (see Figure 20).

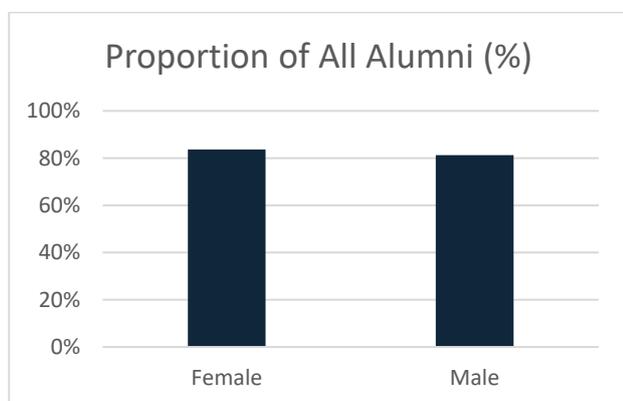


Figure 21. Gender comparison of the proportion of CVF Alumni communicating with non-academic audiences

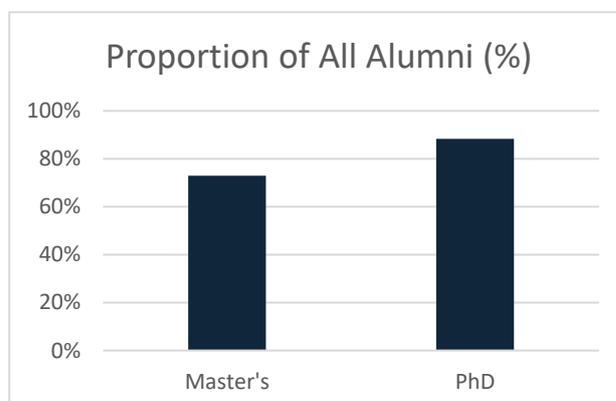


Figure 20. Degree level comparison of the proportion of CVF Alumni communicating with non-academic audiences

We do see some differences when analysing by country (see Figure 22). As with previous sections, Ethiopia and Sudan are proportionally low, as are Tanzania and South Africa. However, we still see the majority of respondents (other than in Sudan and Tanzania) in each country conducting activities related to communicating with non-academic audiences. 100% of alumni in Kenya, Uganda, and Zimbabwe have conducted activities, and significant proportions of alumni in Ghana and Nigeria have.

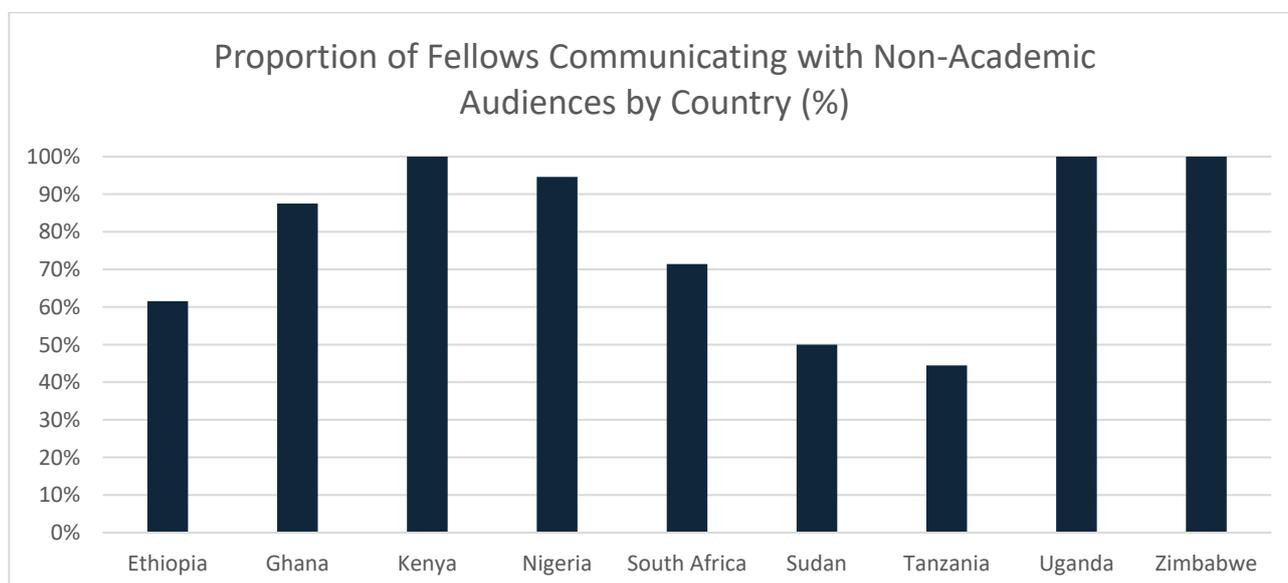


Figure 22. Country comparison of the proportion of fellows communicating with non-academic audiences

Reflecting the importance of this aspect of the programme, CIRCLE launched the CIRCLE Research Uptake Fund in 2016 which awarded funding to fellows via competitive calls in order to support activities in this area. To date, the fund has supported 60 fellows. 20 fellows have conducted activities without direct financial support from CIRCLE. Therefore, of those that have conducted activities to communicate with non-academic audience, 75% have solely relied on CIRCLE funding, indicating that external support in this area has been crucial in sub-Saharan Africa to-date.

The CIRCLE Research Uptake Fund has distributed approximately \$200,000 to 60 fellows through 4 competitive funding calls. Awardees are required to submit a report of their funded activities once they have completed. Here we analyse the data collected via these reports to give an indication of the types of activities that are being conducted and with what type of stakeholders.

In total, 144 activities have been conducted, a breakdown of which is provided in Figure 23 below. As can be seen, the majority of activities focus on workshops, training sessions, field demonstrations, meetings, and the development of informative materials. Informative materials could be policy briefs, flyers, training manuals, and reports.

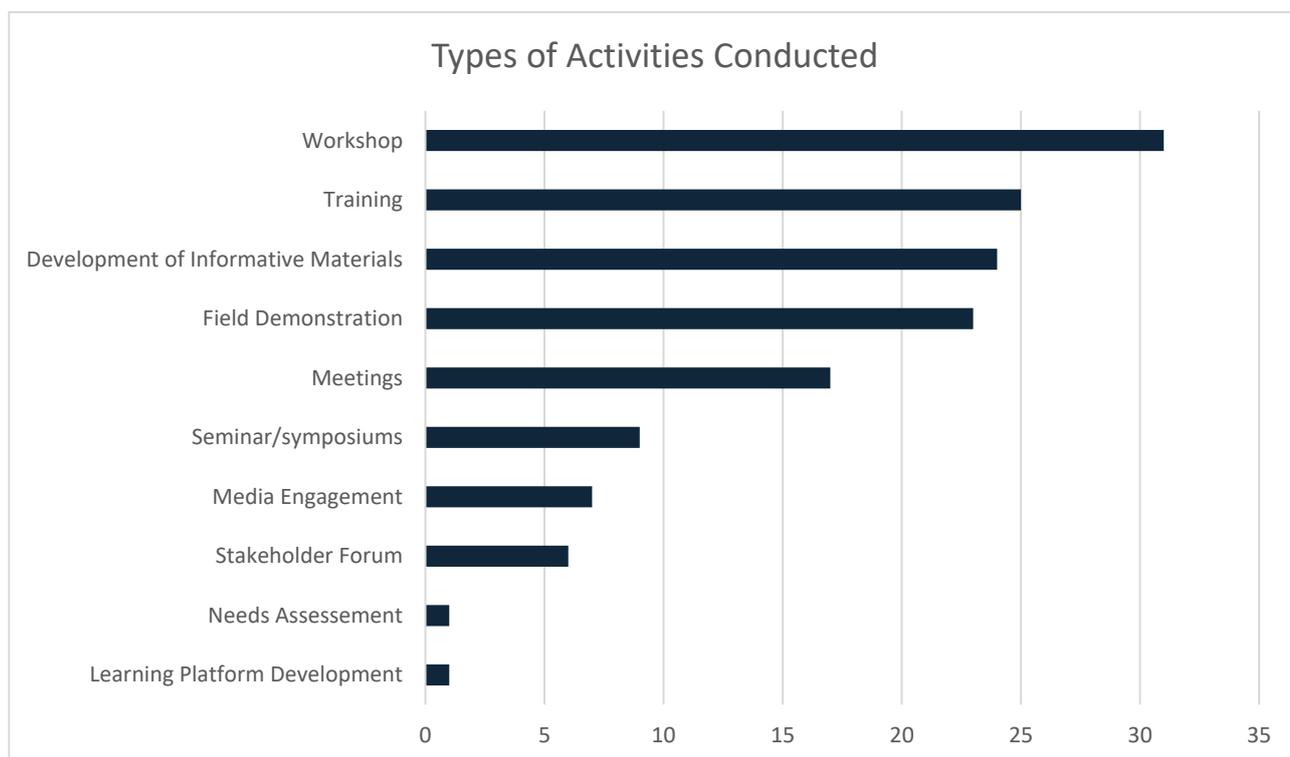


Figure 23. The types of activities conducted when communicating with non-academic audiences

The total number of stakeholders that have been engaged through these activities is approximately 3,400. The types of stakeholders engaged cover a wide variety of groups, including local community members and leaders, students, local government, researchers, NGOs, media, and policy makers (see Figure 24). Notably, the majority of stakeholders engaged have been farmers. Farmers have been singled out here a specific group due to the nature of the programme. CIRCLE focuses on the local impacts of climate change in sub-Saharan Africa. As such, a large proportion of research focuses on impacts on agriculture and how to mitigate against and adapt to a changing climate and therefore it is crucial to engage farmers in this work. For instance, one project established 10 Climate-Smart Farming Communities (CSFC) in Mwea and Embu regions of Kenya which included approximately 850 farmers.

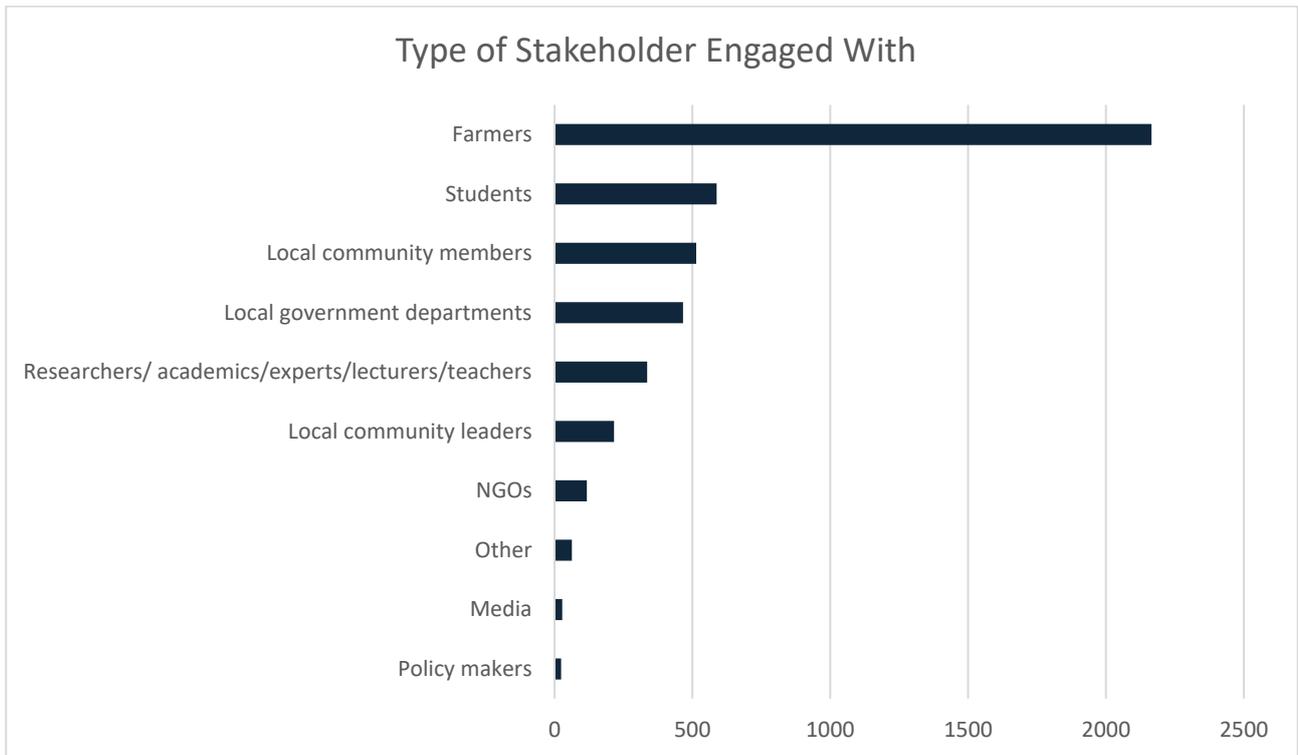


Figure 24. The types of stakeholder's fellows are engaging with when communicating with non-academic audiences

The outputs generated from these activities have the potential to have impactful outcomes for the stakeholders involved. The nature of these outputs also has the potential to sustain this impact in the long term. The types of outputs are presented in Figure 25. For example, the most common type of output has been manuals, factsheets, and infographics which hold information that can be actioned by stakeholders for their benefit.

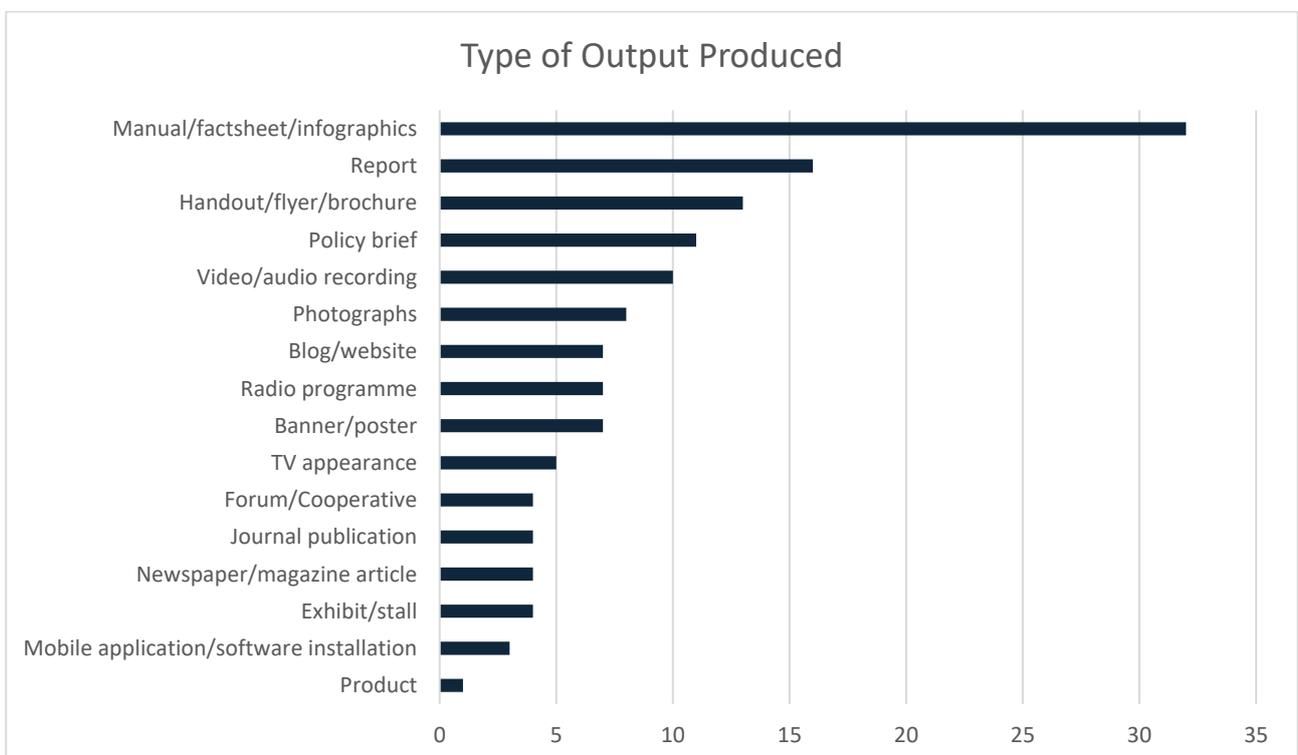


Figure 25. The types of outputs produced from activities designed for communicating with non-academic audiences

The CIRCLE network has once again played an important role in supporting the production of these scientific outputs. As displayed by Figure 26, a significant number of activities involved the fellows' home institution mentor. A large number also included other CVFs. Host institution supervisors and specialist advisors have also been involved in some activities.

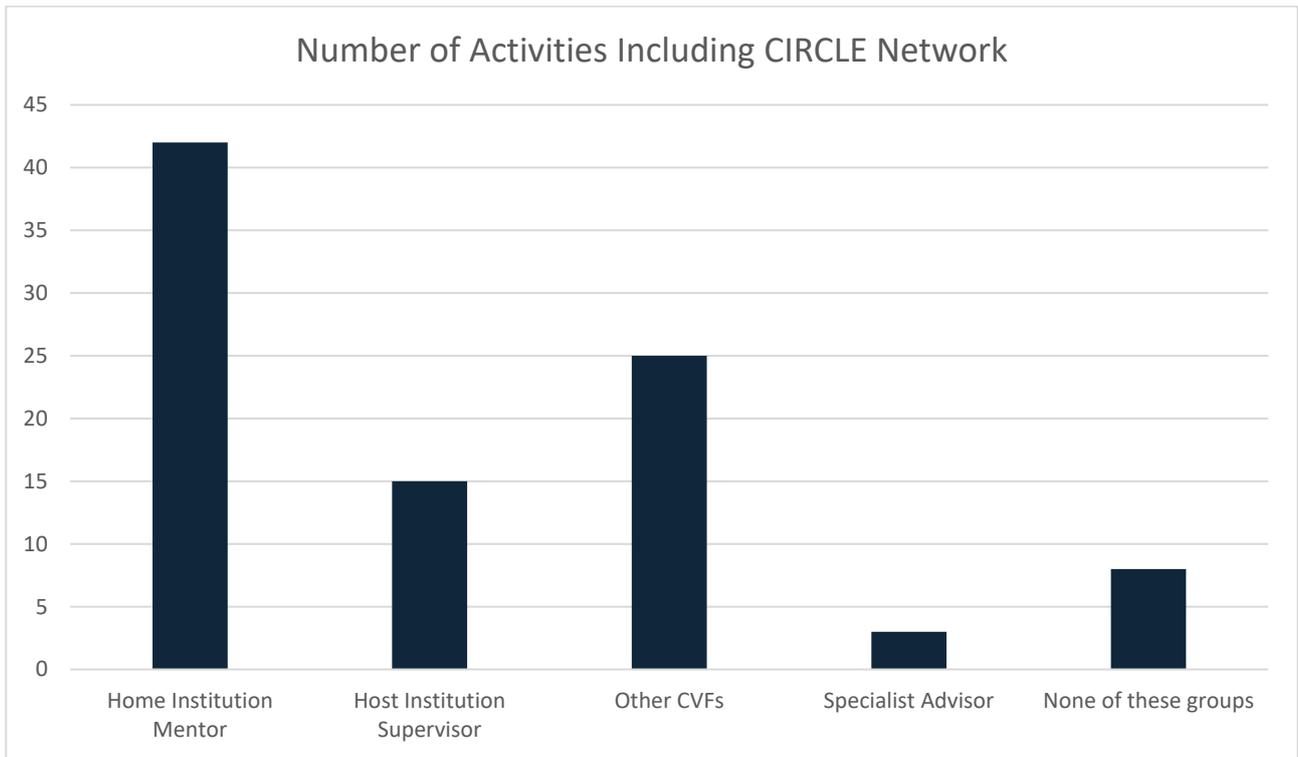


Figure 26. The number of activities that have included members of a fellows CIRCLE network

Barriers to communicating with non-academic audiences

Those who had not completed activities related to communicating with non-academic audiences, or had not done activities in a given reporting period, were asked to report what challenges they had faced in doing so. Figure 27 displays the challenges reported by alumni. As can be seen, the most commonly reported challenge is lack of funding. More often than not, sub-Saharan African researchers require external funding to support them in such activities as they are not deemed essential aspects of their role at their institutions, particularly in relation to promotion criteria. More important are scientific publications and presentations, as well as teaching. This relates to the other main challenge in conducting these activities – lack of time. Issues with time relate to other responsibilities, participating in further education, excess workloads, and a heavy teaching schedule. This again suggests that CIRCLE institutions are not prioritising these activities.

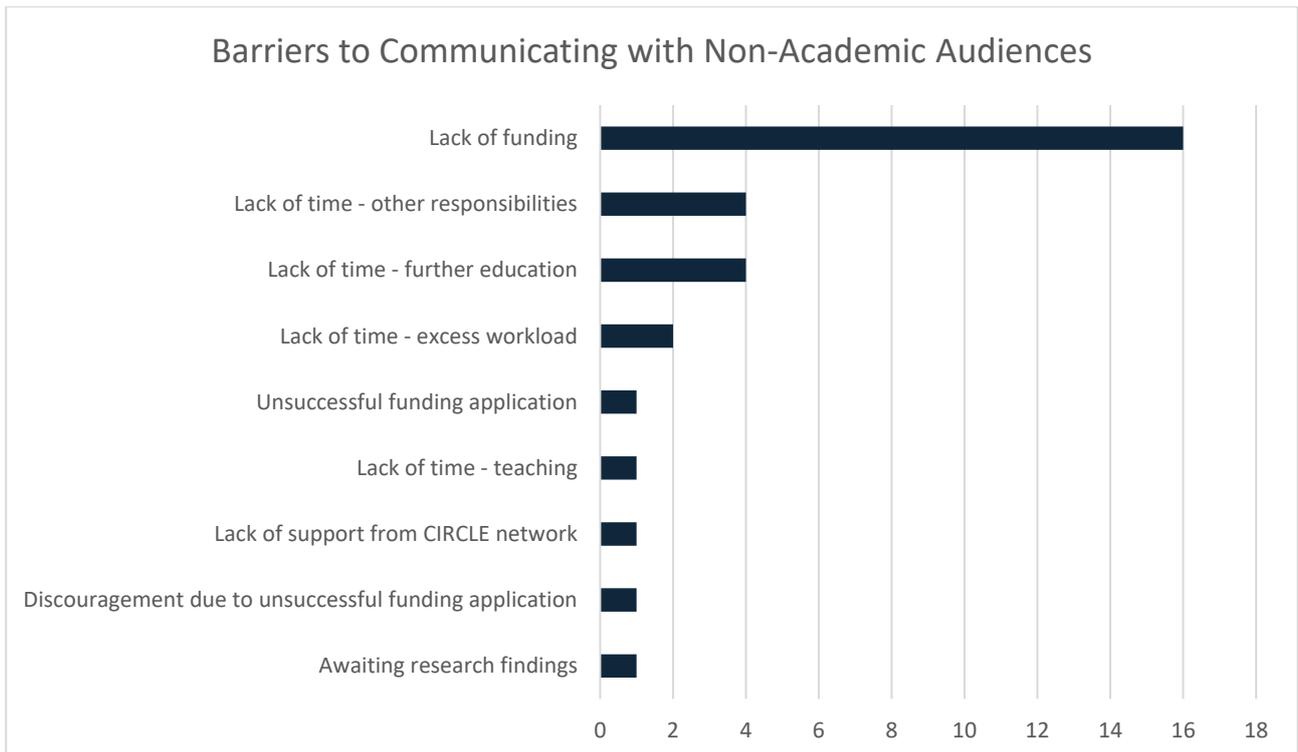


Figure 27. The barriers fellows have reported when trying to communicate with non-academic audiences

Recommendations for CLARE

The CIRCLE programme has had numerous aspects that have supported the strengthening of the capacity of researchers in sub-Saharan Africa to produce scientific outputs. This report has drawn some of these aspects out. From this, CIRCLE can provide recommendations for the research capacity strengthening arm of DFID's new CLARE framework.

Recommendation 1. Achieve a gender balanced pool of fellows

This report has shown that female academics can match or outperform their male peers in relation to scientific outputs. Therefore, research capacity strengthening programmes that have a specific aim of achieving a gender balanced pool of fellows are worthwhile and can be successful. Nevertheless, distinctive challenges for female academics do remain, such as family commitments, which may need to be factored in.

Recommendation 2. Create international networks of support

The CIRCLE programme created a network of support for fellows, which included a home institution mentor, a host institution supervisor, a third-party institution specialist advisor, and other alumni of the programme. This report has shown that these networks have supported fellows in producing scientific outputs. It is therefore recommended that similar networks of support be created within the CLARE programme. However, more work needs to be done to ensure networks are sustained over time as support and collaboration reduces progressively.

Recommendation 3. Include specific support funds for participants

Funding earmarked to support researchers in producing scientific outputs in the three areas discussed in this report are beneficial. However, projects should work with researchers to ensure they can diversify their income streams to ensure they are not reliant on project-specific support funds. This can ensure capacity strengthening is sustained beyond the life of a project. This report indicates that this is particularly important for those activities that fall outside of institutional priorities, such as communicating with non-academic audiences.

Support funds are beneficial. However, work should be done to ensure fellows can diversify their funding streams to ensure they are not reliant on funding and as such capacity can be sustained beyond the life of a project.

Recommendation 4. Conduct research capacity strengthening training

One way to ensure research capacity strengthening is sustainable is by having successful bespoke trainings throughout the programme, focusing on research and grant funding proposal writing, manuscript writing, and the soft skills researchers need to communicate within and beyond academia. Thought should be given to training delivery, with a mixture of online and face-to-face training on offer that is accessible to all project participants. Training resources should be available to participants beyond the life of the programme to ensure sustainability. Resources could include handbooks, videos, recorded lectures.

Recommendation 5. Fund year-long research fellowships

Other than funding, the main challenge facing researchers in producing scientific outputs is pressures on their time, including administrative and teaching workloads meaning they have no time to conduct research, analyse data, and write-up findings. A year-long fellowship gives researchers the time to focus on just research and writing.

Recommendation 6. Improve data collection processes for evidencing capacity strengthening

The monitoring and evaluation of research capacity strengthening needs to be scientifically robust and built-in from the beginning of the programme. A mix of quantitative and qualitative data is essential, while resources (time & Budget) must be given to ensure data collection, analysis, and write-up can be done to the required level. Processes such as counterfactual studies must be planned, built-in to the project, and adequately resourced from the outset.



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