

South African Higher Education

Sustainable Development Goals Mapping Exercise

Identification of the strengths, possible collaborators, and funding opportunities for Historically Disadvantaged Universities, Universities of Technology, and Newly Established Universities in South Africa



Compiled by Ms Mariska Vermeulen and Prof Corli Witthuhn

Table of Contents

Table of Figures	3
List of Tables	3
Background and Introduction	5
Research Design and Methodology	5
Why SciVal?	5
SciVal Methodology	12
How SciVal was used in this study	13
Contributions Made by Historically Disadvantaged Universities (HDUs), Universities of Technology (UoTs), and Newly Established Universities to the Sustainable Development Goals (SDGs)	15
Strengths and Areas of Emerging Excellence	16
Current and Potential Collaborations per University	23
Cape Peninsula University of Technology	23
Central University of Technology	25
Durban University of Technology	27
University of Fort Hare	29
University of Limpopo	31
Mangosuthu University of Technology	33
Sefako Makgatho Health Sciences University	35
Tshwane University of Technology	37
University of Mpumalanga	39
University of Venda	41
University of Zululand	43
University of the Western Cape	45
Vaal University of Technology	47
Walter Sisulu University	49
Recommended Future Collaborations	54
Potential Funding Opportunities	62
Impact of Centres of Excellence and SARCHI Chairs at the HDUs, UoTs, and newly established institutions on SDGs	62
Conclusion	64
References	65
Addendum 1	66

Table of Figures

Figure 1 - University Homepage.....	13
Figure 2 - Publication Metrics.....	13
Figure 3 - Collaboration Metrics.	14
Figure 4 - Current Collaborators.....	14
Figure 5 - Funding Bodies Linked to Publications.	15
Figure 6 - Total contributions to the SDGs through total research outputs by HDUs, UoTs, and newly established institutions (2018 – 2022).	16
Figure 7 - Total contributions to the SDGs through total research outputs by HDUs, UoTs, and newly established institutions (2020 – 2024).	17

List of Tables

Table 1 - Data comparison (Web of Science vs SciVal).	7
Table 2 - Total research outputs per HDU, UoT, and newly established institution for each of the first 16 SDGs for the period 2020 to 2024.	18
Table 3 - Geographical layout of collaborations at the Cape Peninsula University of Technology.	23
Table 4 - Top ten National, African, and International Collaborators of the Cape Peninsula University of Technology.....	24
Table 5 - Top Ten Funders by Linked Publications at the Cape Peninsula University of Technology....	25
Table 6 - Geographical layout of collaborations at the Central University of Technology.	25
Table 7 - Top ten National, African, and International Collaborators of the Central University of Technology.....	26
Table 8 - Top Ten Funding Bodies by Linked Publications at the Central University of Technology.	27
Table 9 - Geographical layout of collaborations at the Durban University of Technology.	27
Table 10 - Top ten National, African, and International Collaborators of the Durban University of Technology.....	28
Table 11 - Top Ten Funding Bodies by Linked Publications at the Durban University of Technology...	29
Table 12 - Geographical layout of collaborations at the University of Fort Hare.	29
Table 13 - Top ten National, African, and International Collaborators of the University of Fort Hare.	30
Table 14 - Top Ten Funding Bodies by Linked Publications at the University of Fort Hare.....	31
Table 15 - Geographical layout of collaborations at the University of Limpopo.....	31
Table 16 - Top ten National, African, and International Collaborators of the University of Limpopo.	32
Table 17 - Top Ten Funding Bodies by Linked Publications at the University of Limpopo.....	33
Table 18 - Geographical layout of collaborations at the Mangosuthu University of Technology.	34
Table 19 - Top ten National, African, and International Collaborators of the Mangosuthu University of Technology.	34
Table 20 - Top Ten Funding Bodies by Linked Publications at the Mangosuthu University of Technology.....	35
Table 21 - Geographical layout of collaborations at the Sefako Makgatho Health Sciences University.....	35
Table 22 - Top ten National, African, and International Collaborators of the Sefako Makgatho Health Sciences University.	36

Table 23 - Top Ten Funding Bodies by Linked Publications at the Sefako Makgatho Health Sciences University.	37
Table 24 - Geographical layout of collaborations at the Tshwane University of Technology.	37
Table 25 - Top ten National, African, and International Collaborators of the Tshwane University of Technology.....	38
Table 26 - Top Ten Funding Bodies by Linked Publications at the Tshwane University of Technology.	39
Table 27 - Geographical layout of collaborations at the University of Mpumalanga.	40
Table 28 - Top ten National, African, and International Collaborators of the University of Mpumalanga.....	40
Table 29 - Top Ten Funding Bodies by Linked Publications at the University of Mpumalanga.	41
Table 30 - Geographical layout of collaborations at the University of Venda.	42
Table 31 - Top ten National, African, and International Collaborators of the University of Venda.	42
Table 32 - Top Ten Funding Bodies by Linked Publications at the University of Venda.	43
Table 33 - Geographical layout of collaborations at the University of Zululand.....	44
Table 34 - Top ten National, African, and International Collaborators of the University of Zululand.	44
Table 35 - Top Ten Funding Bodies by Linked Publications at the University of Zululand.....	45
Table 36 - Geographical layout of collaborations at the University of the Western Cape.	46
Table 37 - Top ten National, African, and International Collaborators of the University of the Western Cape.	46
Table 38 - Top Ten Funding Bodies by Linked Publications at the University of the Western Cape.	47
Table 39 - Geographical layout of collaborations at the Vaal University of Technology.....	47
Table 40 - Top ten National, African, and International Collaborators of the Vaal University of Technology.....	48
Table 41 - Top Ten Funding Bodies by Linked Publications at the Vaal University of Technology.	49
Table 42 - Geographical layout of collaborations at the Walter Sisulu University.	49
Table 43 - Top ten National, African, and International Collaborators of the Walter Sisulu University.....	50
Table 44 - Top Ten Funding Bodies by Linked Publications at the Walter Sisulu University.	51
Table 45 – The top ten national collaborators and the SDGs they were in the top 10 for contributing nationally to the attainment of the SDGs.	53
Table 46 - Potential future collaborators based on top performers and current collaborations.	54
Table 47 - NRF SARCHI Chairs hosted at HDUs, UoTs, and newly established universities.....	63

Background and Introduction

The Research and Innovation Strategic Group (RISG) of Universities South Africa (USAf) requested a follow-up study of the report on the Sustainable Development Goals (SDGs) Mapping Exercise that was presented to them in 2024. The RISG members are interested in mapping areas of common interest between universities, with a specific focus on Historically Disadvantaged Universities (HDUs), Universities of Technology (UoTs), and newly established Universities. The possible collaborators for these institutions, as well as potential funding opportunities, will also be investigated.

Research Design and Methodology

The primary research strategy followed was desktop research, and data drawn from SciVal using the Elsevier database was gathered and mapped against the SDGs. Findings from the mapping exercise were quantified, and dashboards were created to show the extent of overlap with the SDGs for each institution and highlight the strengths and opportunities within and across institutions. Through SciVal, we also accessed data regarding the existing collaborations at the institutions and the funding bodies linked to publications published by the institutions for the five-year period 2020 to 2024.

Why SciVal?

In the International research environment, institutions and researchers face increasing demands to demonstrate the quality, relevance, and impact of their research outputs. Therefore, the tools for assessing and planning research performance need to be reliable, data-driven, and in accordance with International standards. SciVal, created by Elsevier, offers several clear benefits that make it a better choice for analysing research outputs than other platforms ¹. Some of these benefits include:

1. Comprehensive Data Coverage via Scopus Integration

SciVal is powered by Scopus, the largest database of peer-reviewed literature, which includes over 87 million records from more than 27,000 journals, book series, and conference proceedings ².

2. Advanced and Customizable Research Analytics

SciVal features modular and customizable analysis tools that allow users to:

- Compare institutions, countries, and individual researchers.
- Evaluate research performance based on user-defined topics and themes.
- Explore collaborations and find strategic partners.
- Predict emerging research trends.

3. Strategic Benchmarking and Collaboration Insights

SciVal enables institutions to compare their performance against thousands of others worldwide. Its collaboration network maps and benchmarking tools provide insights that are not only descriptive but also actionable, which is essential for strategic planning, research funding applications, and internationalisation strategies ³.

4. Alignment with International Research Policy Metrics

SciVal gives access to indicators that match international frameworks like the United Nations (UN) Sustainable Development Goals (SDGs), research impact narratives for the Research Excellence Framework (REF), and other important policy metrics ⁴.

5. User-Friendly Interface and Export Capabilities

SciVal has an easy-to-use dashboard, visualisation tools, and straightforward export options (Excel, CSV, PDF), making the platform practical for researchers, administrators, and decision-makers.

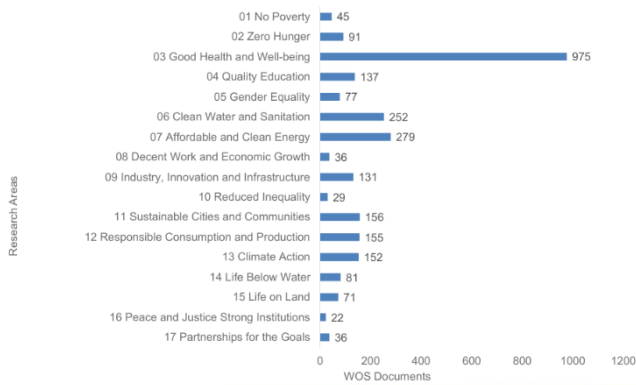
With its extensive data foundation, advanced analytics, alignment with policy frameworks, and user-friendly design, SciVal stands out as an excellent solution for institutions aiming to evaluate, showcase, and strategically develop their research outputs. Its ability to turn data into actionable insights makes it more than just a bibliometric tool, but a strategic asset for achieving research excellence.

There are numerous platforms available with similar data points, including InCites, which is built on data from the Web of Science ⁵. Mr Simon Lotz from the National Research Foundation (NRF) conducted a study in which he extracted data on research publication outputs from the Web of Science. With his consent, we have compared the data from this study with his. Below follows a table of comparison of findings from the two studies (Table 1). Table 1 shows that SDG 3 *Good Health and Well-being* is the SDG that is addressed the most nationally, indicated by both data from the Web of Science and Scival. However, there are clear differences in the data regarding the top addressed SDGs. According to the data from the Web of Science, SDG 13 *Climate Action* (2 396 total research outputs) and SDG 15 *Life on Land* (2 028 total research outputs) were the two SDGs most addressed by HDUs, UoTs, and newly established Universities following SDG 3. In contrast, according to the data from Scival, SDG 7 *Affordable and Clean Energy* (1 866 total research outputs) and SDG 6 *Clean Water and Sanitation* (1 800 total research outputs) were the two SDGs most addressed by HDUs, UoTs, and newly established Universities following SDG 3. More differences noted were that, according to data from the Web of Science, SDG 16 *Peace, Justice, and Strong Institutions* had a mere 246 total research outputs in comparison to the 1179 indicated from data from Scival. Additionally, according to data from the Web of Science, SDG 14 *Life Below Water* had 1634 total research outputs in comparison to the mere 379 indicated from data from Scival. When drawing a conclusion and comparing this data to the five critical dimensions at the heart of the 2030 Agenda (People, Planet, Prosperity, Partnerships, and Peace), it was clear that the Web of Science has robust coverage in SDGs related to the planet as their top 5 SDG, except for SDG 3 which falls under the dimension of people, all fall under the Planet dimension (SDG 6, SDG 13, SDG 14, SDG 15). In contrast, Scival has shown to be more inclusive and able to identify and link more publications towards a broader field of SDGs, as their top 5 SDGs fell under multiple dimensions, including prosperity (SDG 7, SDG 8, and SDG 9), planet (SDG 6), and people (SDG 3).

Table 1 - Data comparison (Web of Science vs SciVal).

Data from Web of Science (study done by Mr Simon Lotz)	Data from SciVal (current study)
Cape Peninsula University of Technology	
Web of Science Documents 2020-2024 Sustainable Development Goals: CPUT Research Areas WOS Documents Advancing knowledge. Transforming lives. Inspiring a nation. NRF National Research Foundation	SciVal Data 2020 - 2024 Sustainable Development Goals : CPUT SDG 1: No Poverty SDG 2: Zero Hunger SDG 3: Good Health and Well-being SDG 4: Quality Education SDG 5: Gender Equality SDG 6: Clean Water and Sanitation SDG 7: Affordable and Clean Energy SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation and Infrastructure SDG 10: Reduced Inequality SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action SDG 14: Life Below Water SDG 15: Life on Land SDG 16: Peace, Justice and Strong Institutions
Central University of Technology	
Web of Science Documents 2020-2024 Sustainable Development Goals: CUT Research Areas WOS Documents Advancing knowledge. Transforming lives. Inspiring a nation. NRF National Research Foundation	SciVal Data 2020 - 2024 Sustainable Development Goals : CUT SDG 1: No Poverty SDG 2: Zero Hunger SDG 3: Good Health and Well-being SDG 4: Quality Education SDG 5: Gender Equality SDG 6: Clean Water and Sanitation SDG 7: Affordable and Clean Energy SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation and Infrastructure SDG 10: Reduced Inequality SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action SDG 14: Life Below Water SDG 15: Life on Land SDG 16: Peace, Justice and Strong Institutions
Durban University of Technology	

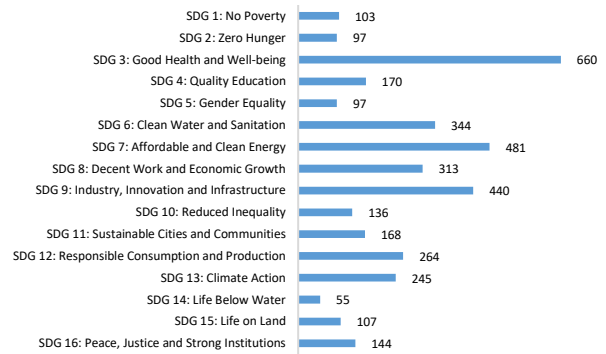
Web of Science Documents 2020-2024 Sustainable Development Goals: DUT



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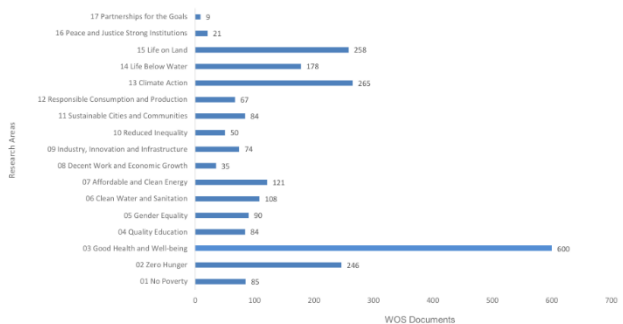


SciVal Data 2020 - 2024 Sustainable Development Goals : DUT



University of Fort Hare

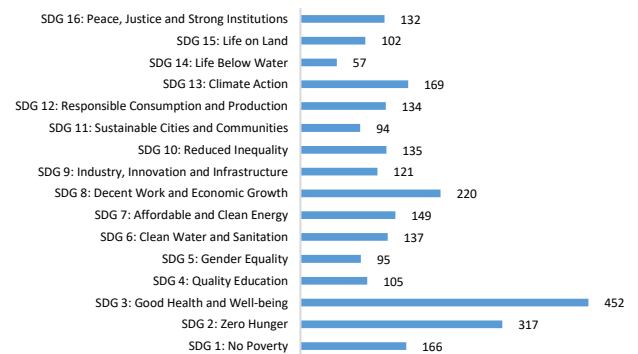
Web of Science Documents 2020-2024 Sustainable Development Goals: UFH



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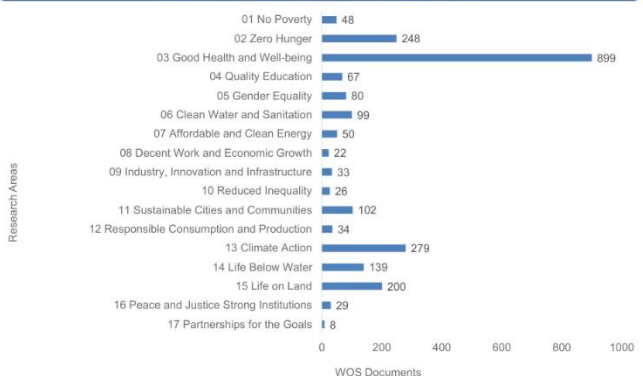


SciVal Data 2020 - 2024 Sustainable Development Goals : UFH



University of Limpopo

Web of Science Documents 2020-2024 Sustainable Development Goals: UL



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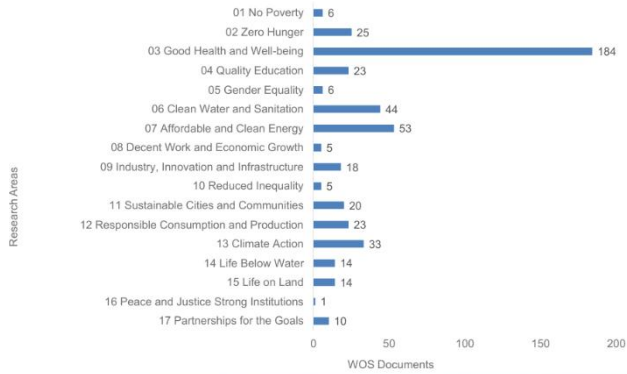


SciVal Data 2020 - 2024 Sustainable Development Goals : UL



Mangosuthu University of Technology

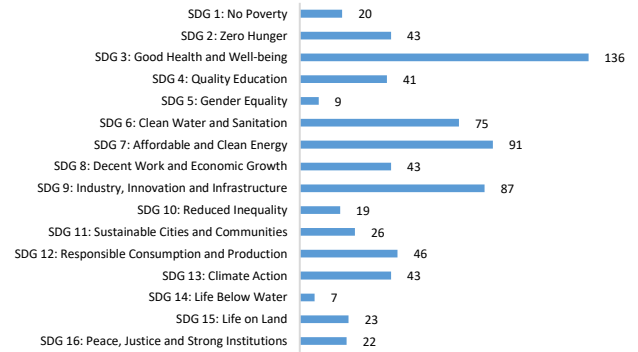
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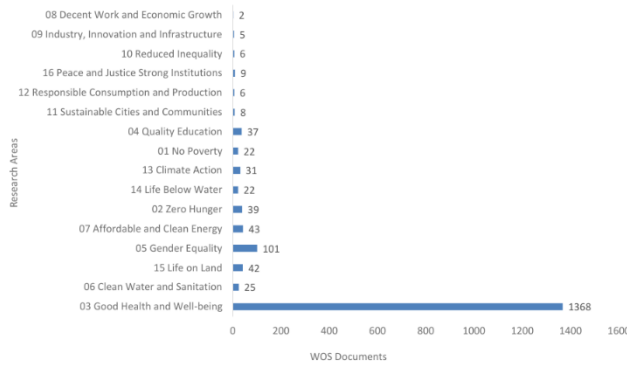


SciVal Data 2020 - 2024 Sustainable Development Goals : MUT



Sefako Makgatho Health Sciences University

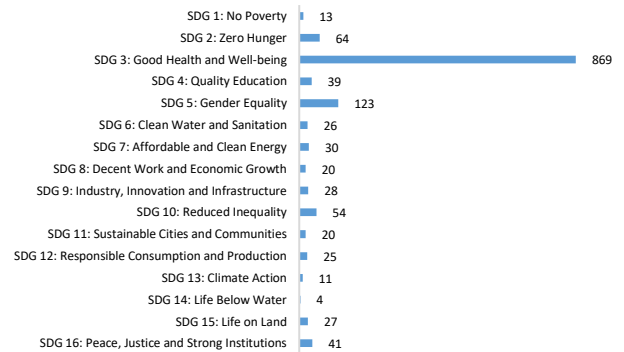
Web of Science Documents 2020-2024 Sustainable Development Goals: SMU



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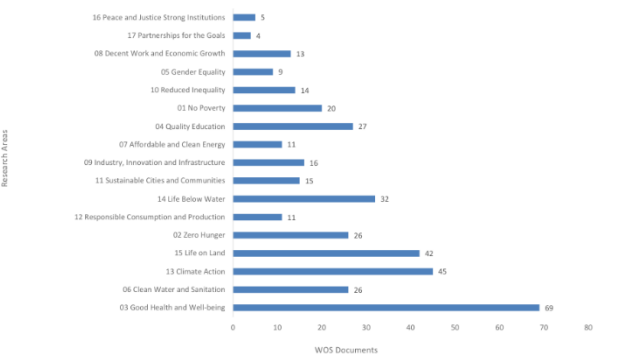


SciVal Data 2020 - 2024 Sustainable Development Goals : SMU



Sol Plaatjie University

Web of Science Documents 2020-2024 Sustainable Development Goals: SPU

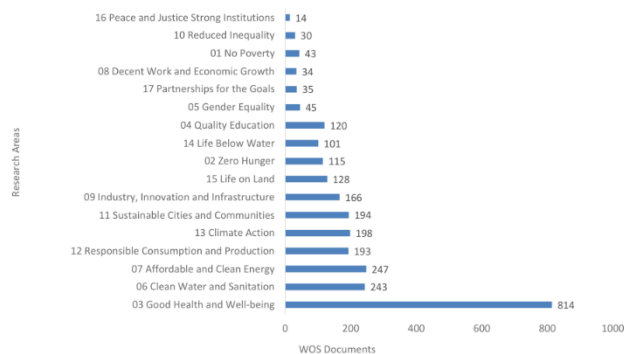


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Tshwane University of Technology

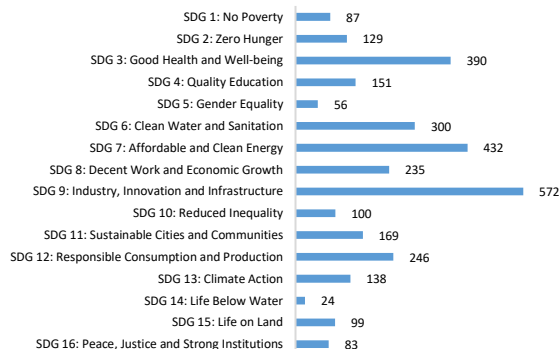
Web of Science Documents 2020-2024 Sustainable Development Goals: TUT



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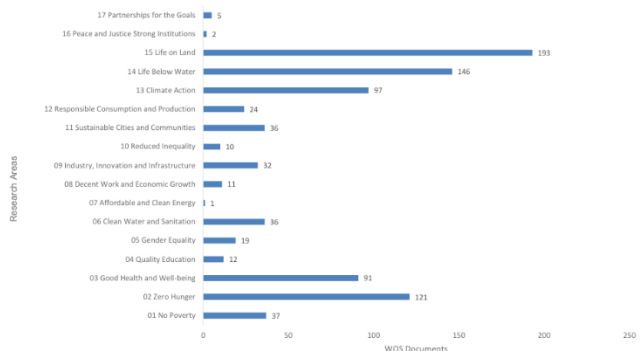


SciVal Data 2020 - 2024 Sustainable Development Goals : TUT



University of Mpumalanga

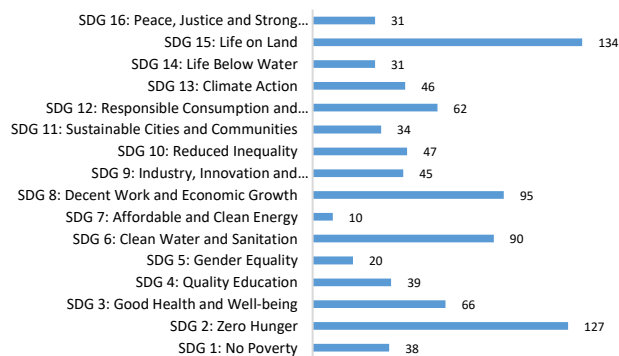
Web of Science Documents 2020-2024 Sustainable Development Goals: UMP



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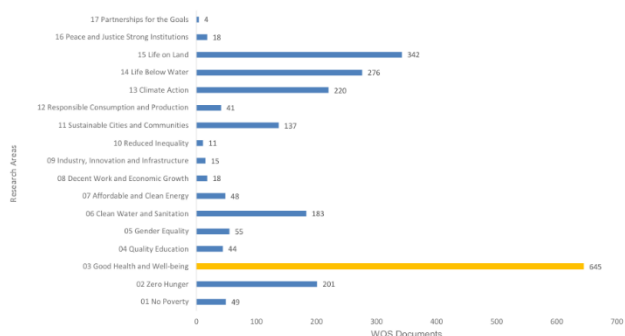


SciVal Data 2020 - 2024 Sustainable Development Goals : UMP



University of Venda

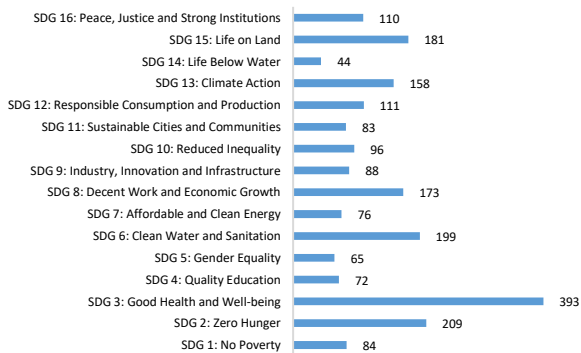
Web of Science Documents 2020-2024 Sustainable Development Goals: UNIVEN



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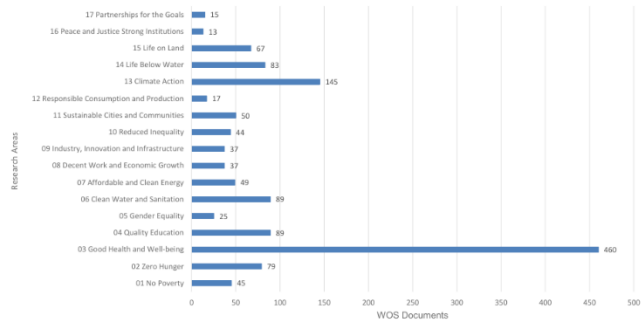


SciVal Data 2020 - 2024 Sustainable Development Goals : UNIVEN



University Of Zululand

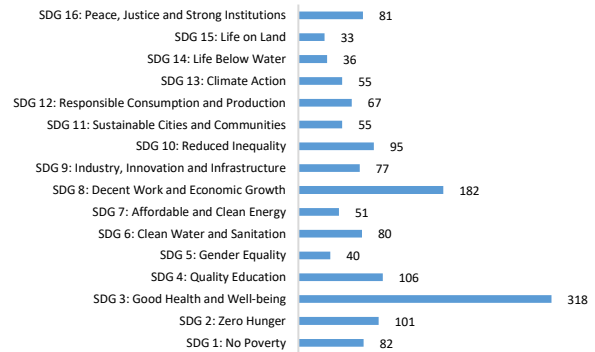
Web of Science Documents 2020-2024 Sustainable Development Goals: UNIZULU



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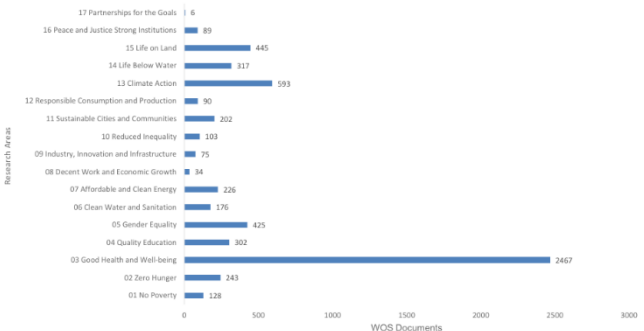


SciVal Data 2020 - 2024 Sustainable Development Goals : UNIZULU



University of the Western Cape

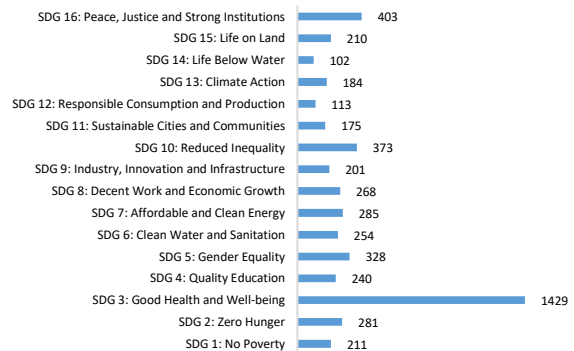
Web of Science Documents 2020-2024 Sustainable Development Goals: UWC



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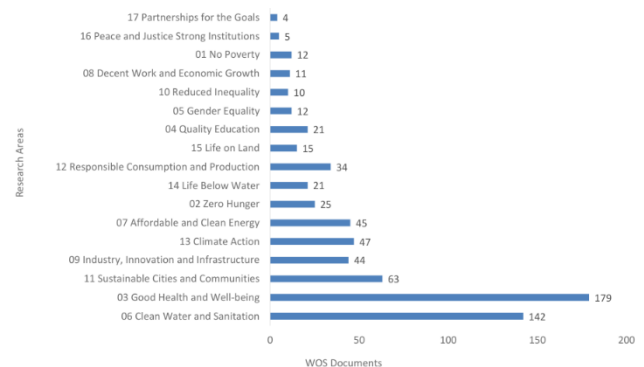


SciVal Data 2020 - 2024 Sustainable Development Goals : UWC



Vaal University of Technology

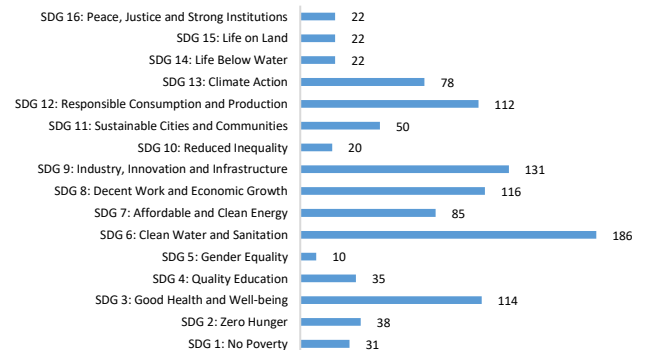
Web of Science Documents 2020-2024 Sustainable Development Goals: VUT



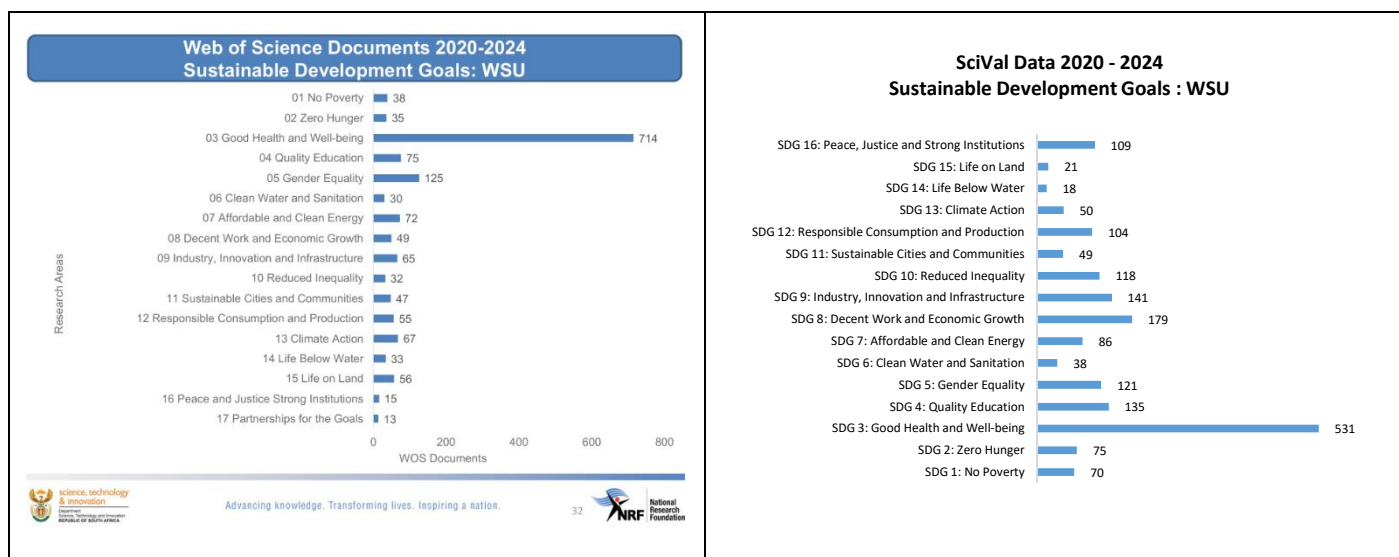
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SciVal Data 2020 - 2024 Sustainable Development Goals : VUT



Walter Sisulu University



SciVal Methodology

Scopus, through Elsevier, has created a systematic method for assigning SDGs to research publications. The process aims to match scholarly output with the UN global development framework. It combines keyword-based queries and machine learning. The foundation of the system lies in carefully constructed search queries, which consist of extensive keyword lists and phrases linked to the UN's SDG targets and indicators. These terms are compared against a publication's title, abstract, keywords, indexed subject terms, and disciplinary subject areas. Using multiple text fields increases the chances of capturing the complete thematic relevance of a publication ^{6,7}.

The keyword queries form the basis of the allocation process, and each query is tailored to a specific SDG and includes Boolean strings with inclusion and exclusion terms (refer to addendum 1). For instance, terms like "climate change" or "renewable energy" might be used for SDG 13 *Climate Action*, while exclusions help filter out unrelated meanings to minimise false positives. Elsevier's research teams regularly review and refine these queries. They test them against sets of publications, look at false positives and negatives, and update the lists as needed. The keyword method identifies almost all the publications linked to each SDG ⁶.

Understanding that keyword queries cannot capture all relevant research, Elsevier enhances this process with machine learning models. These models analyse features like term frequency-inverse document frequency (TF-IDF) representations of titles and abstracts, along with subject area classifications. Once trained, the models predict whether a publication relates to a specific SDG. To ensure precision, predictions are accepted only when they exceed strict confidence thresholds, sometimes set at 95% probability or more. This method allows the system to find relevant publications that do not have the exact keywords, improving recall without significantly affecting accuracy. Studies have shown that machine learning adds a smaller, yet important, number of extra documents beyond those identified by keywords ⁸.

The methodology also has important limitations. Only English-language text is considered in the keyword matching process, meaning non-English publications may be underrepresented unless they include English titles or abstracts. Additionally, keyword-based queries are sensitive to terminology. Publications that are relevant but use less common phrases may be missed, and

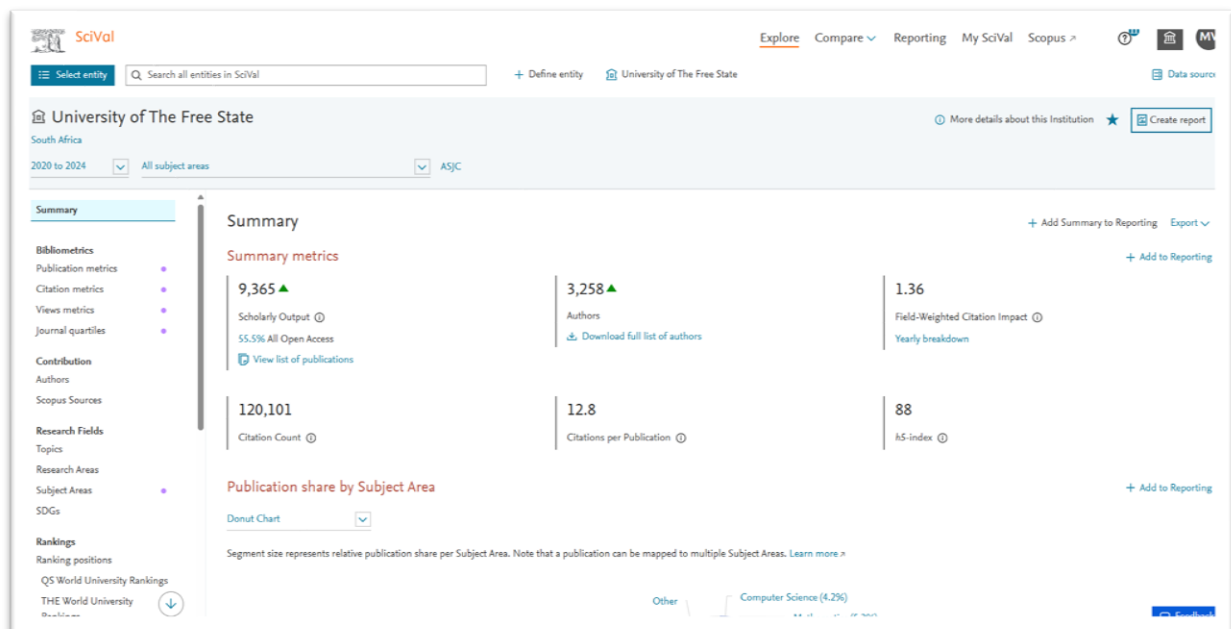
false positives can occur when terms are used in unrelated contexts. For this reason, Elsevier regularly updates its SDG mappings, with update releases in 2022, 2023, and 2025, reflecting changes to keyword lists and improvements in the underlying models ⁹.

The keyword and machine learning approaches work together in a two-stage system. First, the queries identify most SDG-relevant documents, and then the machine learning component broadens coverage by finding documents that do not have direct keyword matches but are still relevant. A publication can be assigned to multiple SDGs if it meets the criteria for more than one goal. This iterative and combined process ensures that Scopus provides a thorough mapping of research to the UN's SDG agenda ⁶⁻⁸.

How SciVal was used in this study

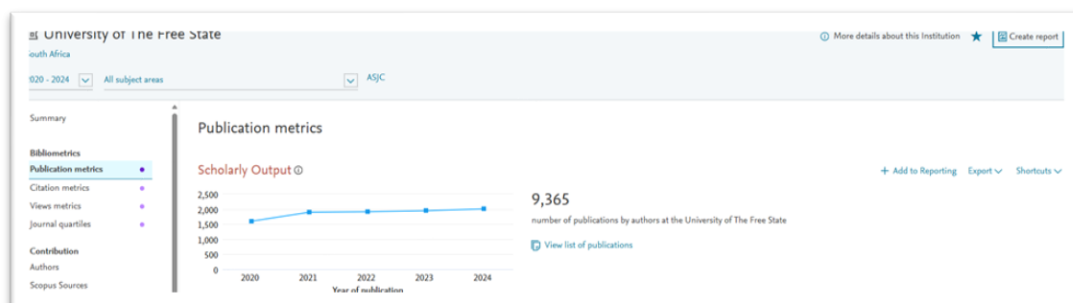
Every university on SciVal has a homepage where a summary of the data available is displayed (Figure 1).

Figure 1 - University Homepage.



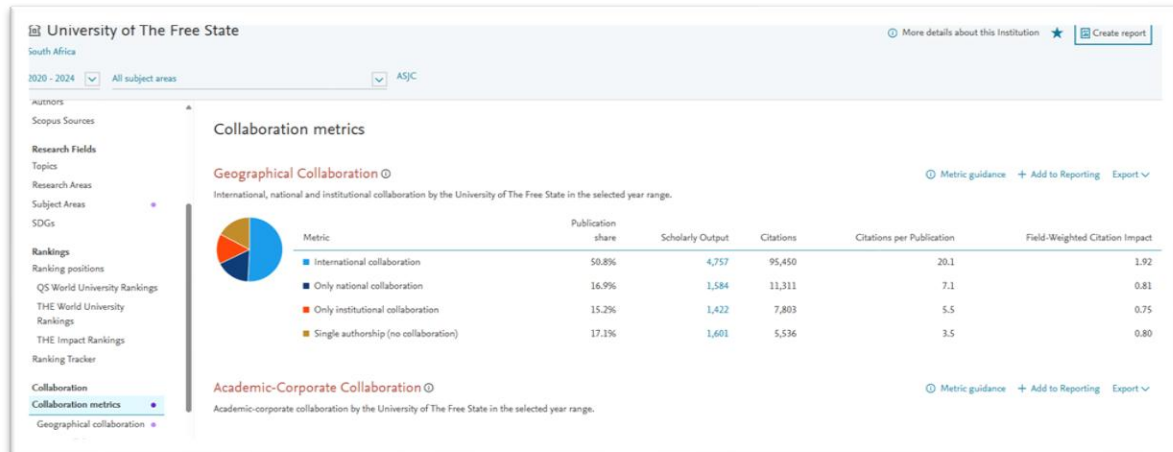
For the purpose of this study, we first assessed the publication metrics for each university. We looked at the Scholarly Outputs per university, which indicated the number of publications each university has indexed in Scopus. A list of these publications was extracted in an Excel document and quantified per SDG, as allocated to each publication according to the set of keywords used for each SDG. The publications that did not address any SDG were removed from the data sets used for this study. This data was used to identify strengths and areas of emerging excellence (Figure 2).

Figure 2 - Publication Metrics.



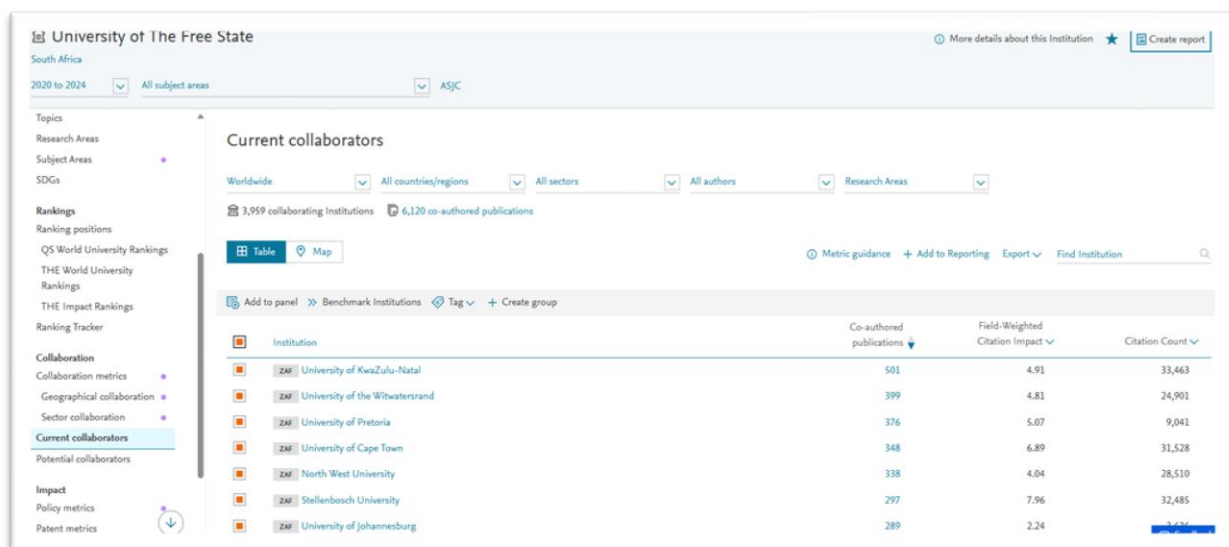
We looked at the extent to which each university has international, national, institutional co-authorship, and single-authorship publications (Figure 3), whereafter we extracted the list of publications for both the international and national collaborations. These publications were quantified per SDG, as allocated to each publication according to the set of keywords used for each SDG. Comparisons were made between international and national collaborations.

Figure 3 - Collaboration Metrics.



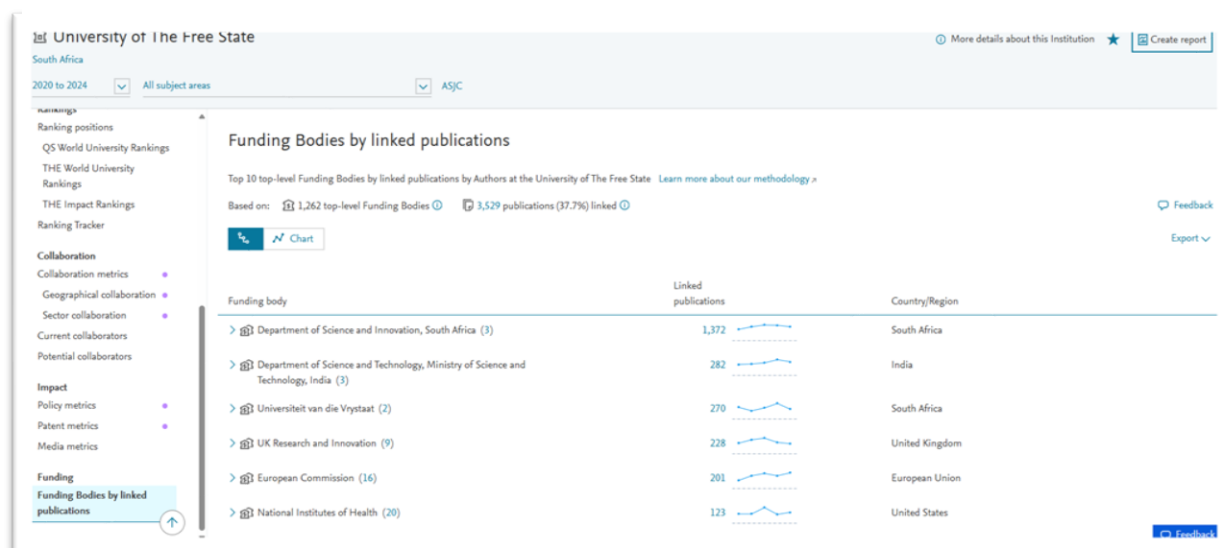
SciVal provides a list of current collaborators with the number of co-authored publications (Figure 4). These collaborators were reviewed and grouped into the top ten national, African, and international collaborators.

Figure 4 - Current Collaborators.



Lastly, we extracted a list of funders that could be linked to publications at each of the universities (Figure 5). SciVal establishes these links by in-text acknowledgements of funders and by collecting publications' identifiers directly from funders' sources.

Figure 5 - Funding Bodies Linked to Publications.



Contributions Made by Historically Disadvantaged Universities (HDUs), Universities of Technology (UoTs), and Newly Established Universities to the Sustainable Development Goals (SDGs)

It was evident from the data from our previous study (based on data from 2018 – 2022) that the HDUs, UoTs and the newly established universities have a significant impact on achieving the SDGs through their research outputs. When per capita calculations were made, many of these universities were in the top ten contributors of all South African (SA) Universities towards the attainment of the SDGs. For example, the University of the Western Cape were in the top 10 contributors for all SA universities for 7 of the 16 SDGs, and the University of Fort Hare were in the top 10 contributors for 6 of the first 16 SDGs. Additionally, Durban University of Technology, Tshwane University of Technology, and Central University of Technology are in the top ten contributors to five of the SDGs, and the newly established Mpumalanga University is also in the top ten contributors to five of the first 16 SDGs. It is important to note that Sol Plaatjie University has no publication output data available on SciVal.

Strong national partnerships can be formed or further developed between Historically Privileged Universities (HPUs) and the above-mentioned universities, where they both make impactful contributions to the same SDGs. Firstly, we will use the data from our previous study to identify areas of emerging excellence and strength in the HDUs, UoTs, and newly established universities. Secondly, we will identify possible national links between universities in SA that could be used to strengthen research outputs through sustained national partnerships. As a part of this study, the DVCs of the HDUs, UoTs, and newly established universities will be given an opportunity to evaluate the preliminary data and provide their input.

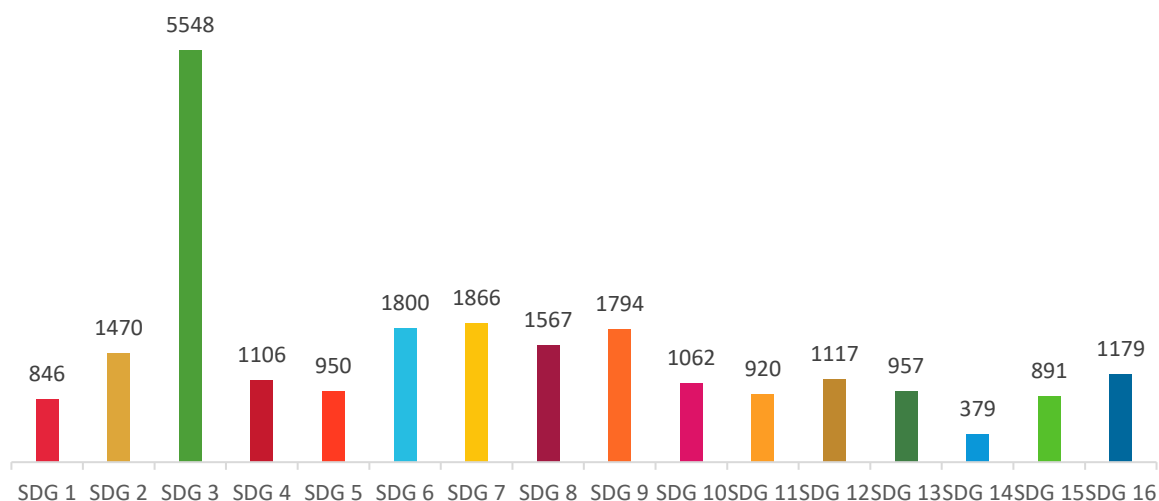
Strengths and Areas of Emerging Excellence

According to data available in SciVal for the five years from 2018 to 2022, there were 126 151 total research outputs that addressed the first 16 SDGs from public universities in South Africa. SDG 3 *Good Health and Well-being* is the SDG that is addressed the most in publications, with a significant 36 546 publications in total, followed by SDG 8 *Decent Work and Economic Growth* (7 661 publications in total), SDG 7 *Clean and Affordable Energy* (7 529 publications in total), SDG 9 *Industry, Innovation, and Infrastructure* (7 306 publications in total), and SDG 5 *Gender Equality* (7 119 publications in total). SDG 13 *Climate Action* (5 177 publications in total), SDG 12 *Responsible Consumption and Production* (5 118 publications in total), SDG 11 *Sustainable Cities and Communities* (4 930 publications in total), SDG 1 *No Poverty* (4 037 publications in total) and SDG 14 *Life Below Water* (2 466 publications in total) were the five SDGs least addressed by total research outputs from public universities in SA.

Figure 6 shows the total research outputs (23 452) by HDUs, UoTs, and newly established institutions in SA addressing the first 16 SDGs for the period 2018 to 2022. SDG 3 *Good Health and Well-being* is the SDG that is addressed the most in publications with 5 548 publications in total, followed by SDG 7 *Clean and Affordable Energy* (1 866 publications in total), SDG 6 *Clean water and sanitation* (1 800 publications in total), SDG 9 *Industry, Innovation, and Infrastructure* (1 794 publications in total), and SDG 8 *Decent Work and Economic Growth* (1 567 publications in total).

Interestingly, SDG 5 *Gender equality*, which was among the top five SDGs contributed to by public universities in SA, is among the five least addressed SDGs by HDUs, UoTs, and newly established institutions in South Africa, with a total of 950 publications. This was followed by SDG 11 *Sustainable Cities and Communities* (920 publications in total), SDG 15 *Life on Land* (891 publications in total), SDG 1 *No Poverty* (846 publications in total), and SDG 14 *Life Below Water* (379 publications in total).

Figure 6 - Total contributions to the SDGs through total research outputs by HDUs, UoTs, and newly established institutions (2018 – 2022).

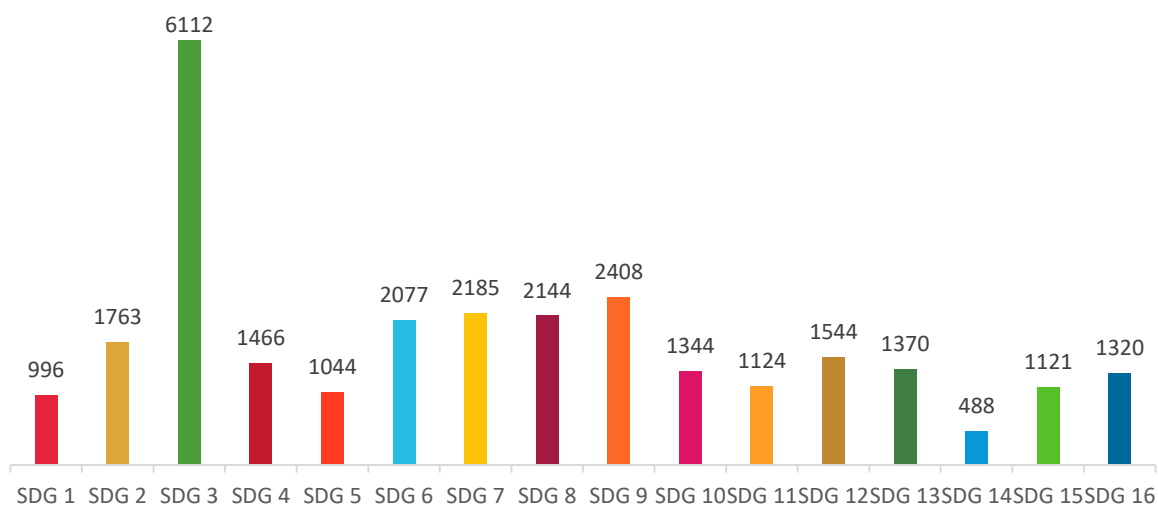


Considering the total contributions made, it is evident that SDG 3 *Good Health and Well-being*, SDG 7 *Clean and Affordable Energy*, SDG 9 *Industry, Innovation, and Infrastructure*, and SDG 8 *Decent Work and Economic Growth* are areas of emerging excellence and can be a foundation for future collaborations. Furthermore, the HDUs, UoTs, and newly established institutions in SA showed significant contributions towards the attainment of SDG 6 *Clean Water and Sanitation* and can take the lead in future research opportunities in this field.

For the purpose of the current study, we updated the five-year period from 2020 to 2024 so that we could report on the most recent collaborators and funders to make informed and up-to-date decisions regarding recommendations for future collaborations and funding opportunities.

Figure 7 shows the total research outputs (28,506) by HDUs, UoTs, and newly established institutions in SA addressing the first 16 SDGs for the five-year period from 2020 to 2024. SDG 3 *Good Health and Well-being* is again the SDG that is addressed the most in publications with 6 112 publications in total, followed by SDG 9 *Industry, Innovation, and Infrastructure* (2 408 publications in total), SDG 7 *Clean and Affordable Energy* (2 185 publications in total), SDG 8 *Decent Work and Economic Growth* (2 144 publications in total), and SDG 6 *Clean water and sanitation* (2 077 publications in total). The top five SDGs stayed the same, although their ranking order changed. SDG 11 *Sustainable Cities and Communities*, SDG 15 *Life on land*, SDG 5 *Gender Equality*, SDG 1 *No Poverty*, and SDG 14 *Life Below Water* were again in the SDGs that were addressed the least.

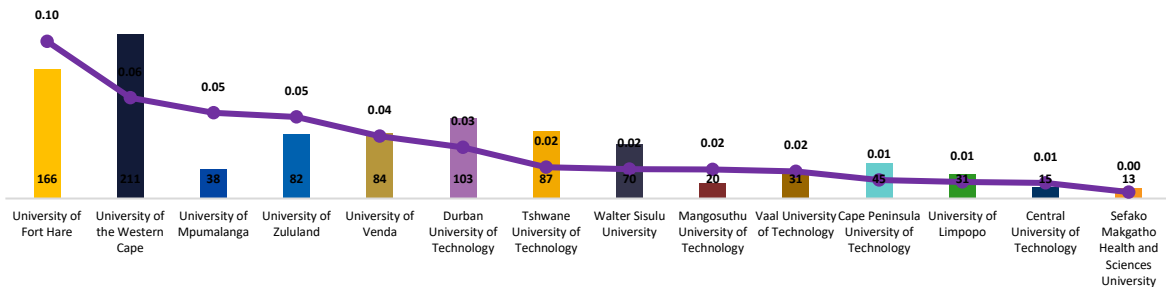
Figure 7 - Total contributions to the SDGs through total research outputs by HDUs, UoTs, and newly established institutions (2020 – 2024).



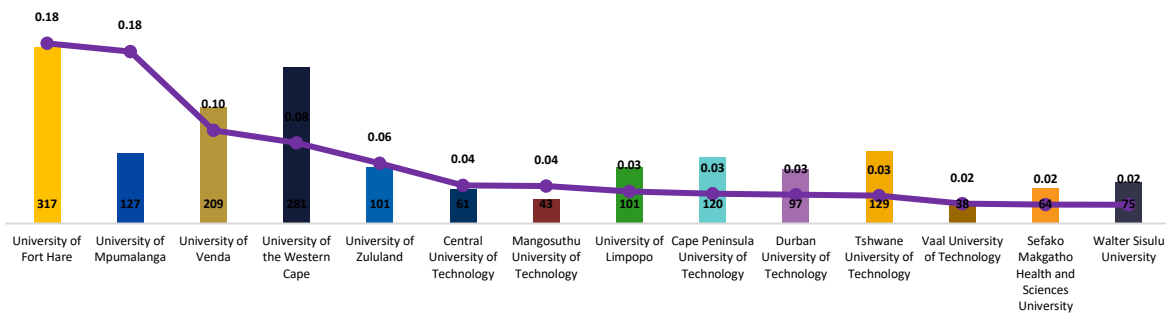
Based on the 2020 to 2024 data, we examined each of these universities individually (Table 2) to identify strengths and emerging opportunities within the HDUs, UoTs, and newly established institutions in SA. The University of Mpumalanga and the University of the Western Cape are the top contributors to the attainment of five of the first 16 SDGs through total research outputs. Additionally, the University of Mpumalanga were in the top three contributors for eight of the first 16 SDGs, and the University of the Western Cape was in the top three contributors for nine of the first 16 SDGs. These two universities were followed by the University of Fort Hare, which was the top contributor for four of the first 16 SDGs and in the top three contributors for 12 of the first 16 SDGs.

Table 2 - Total research outputs per HDU, UoT, and newly established institution for each of the first 16 SDGs for the period 2020 to 2024.

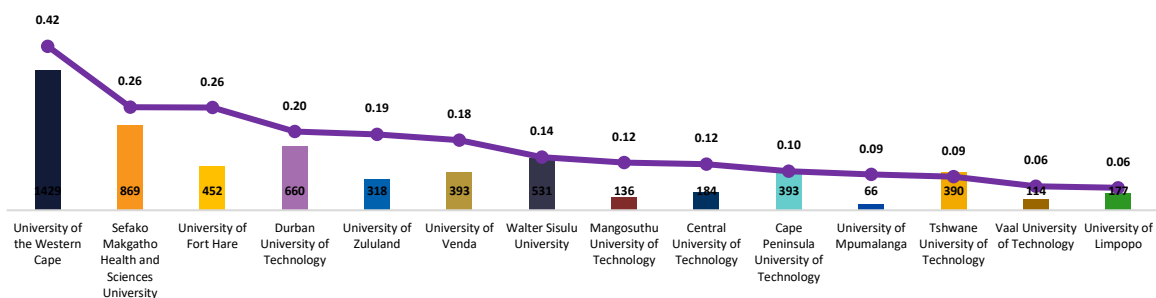
SDG 1: No poverty
Total number of publications | Publications per capita
2018 - 2022



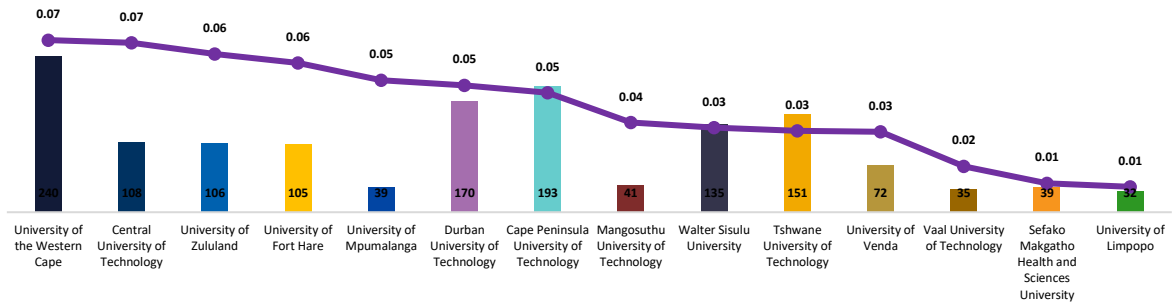
SDG 2: Zero Hunger
Total number of publications | Publications per capita
2018 - 2022



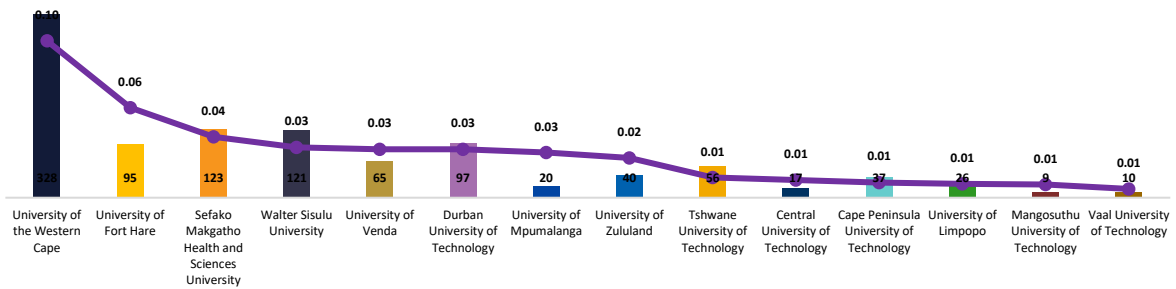
SDG 3: Good Health and Wellbeing
Total number of publications | Publications per capita
2020 - 2024



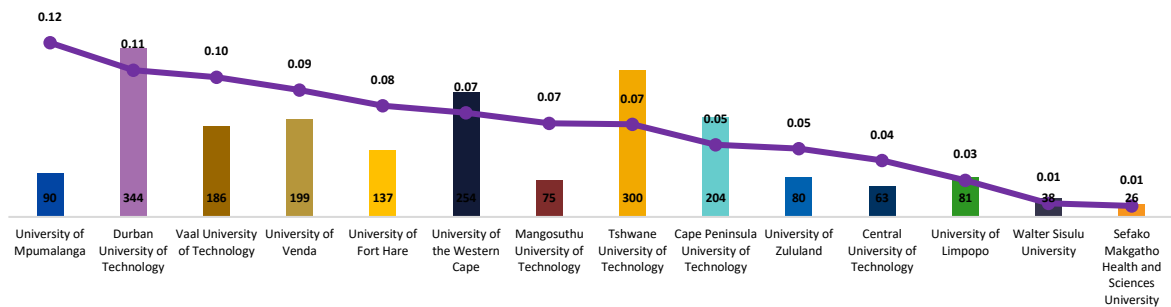
SDG 4: Quality Education
Total number of publications | Publications per capita
2020 - 2024



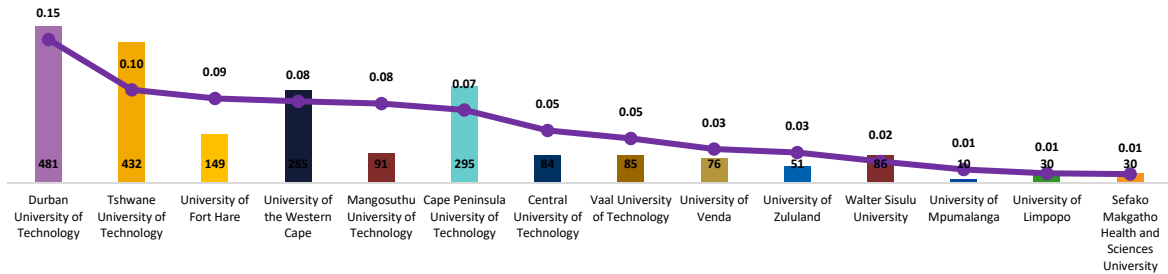
SDG 5: Gender Equality
Total number of publications | Publications per capita
2020 - 2024



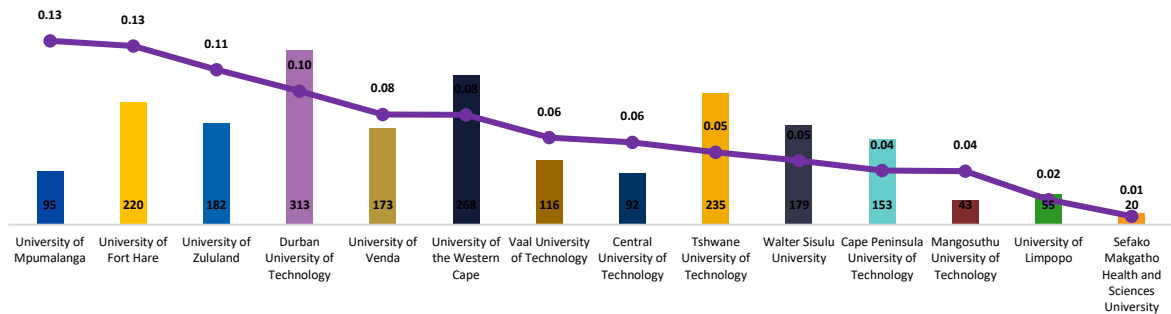
SDG 6: Clean Water and Sanitation
Total number of publications | Publications per capita
2020 - 2024



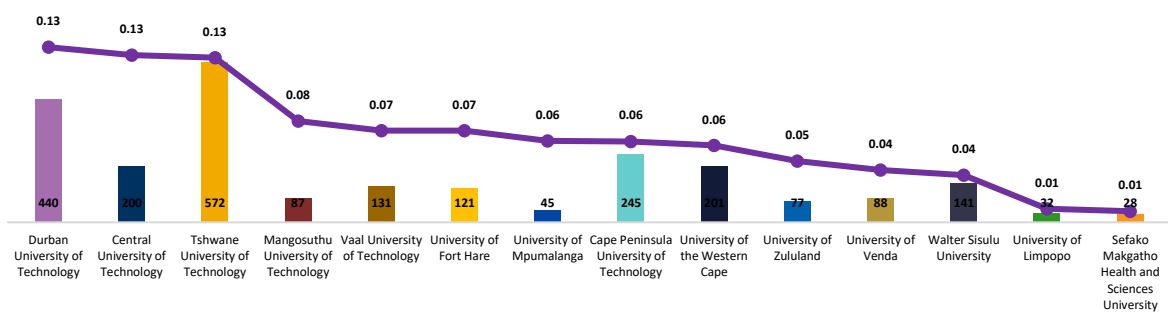
SDG 7: Affordable and Clean Energy
Total number of publications | Publications per capita
2020 - 2024



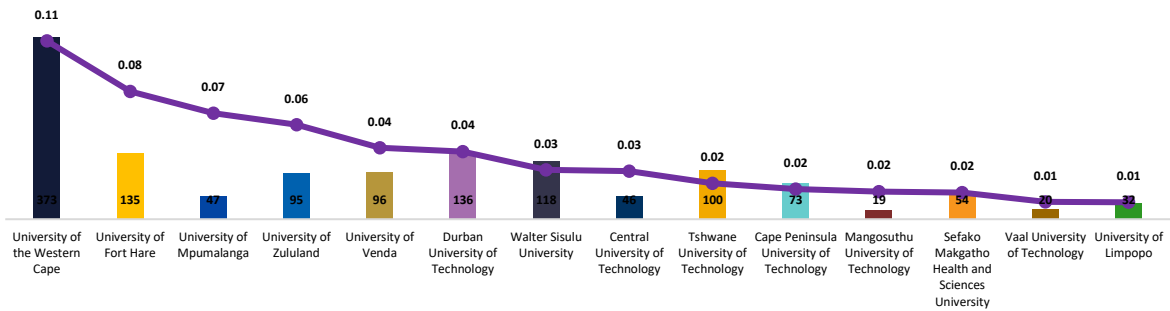
SDG 8: Decent Work and Economic Growth
Total number of publications | Publications per capita
2020 - 2024



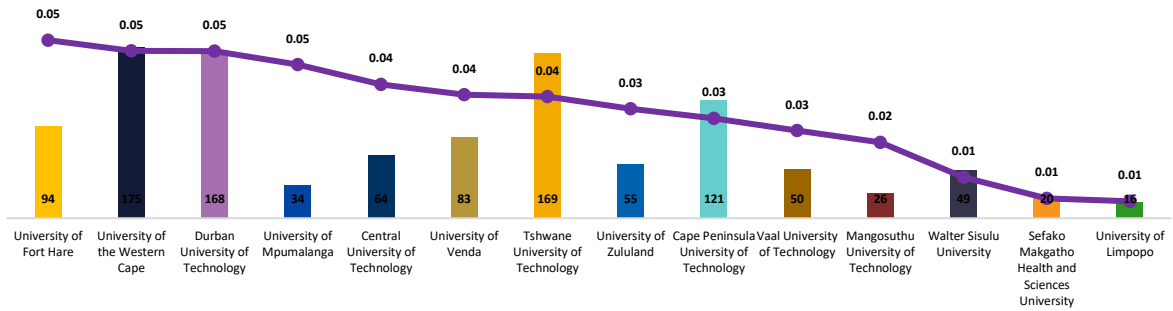
SDG 9: Industry, Innovation, and Infrastructure
Total number of publications | Publications per capita
2020 - 2024



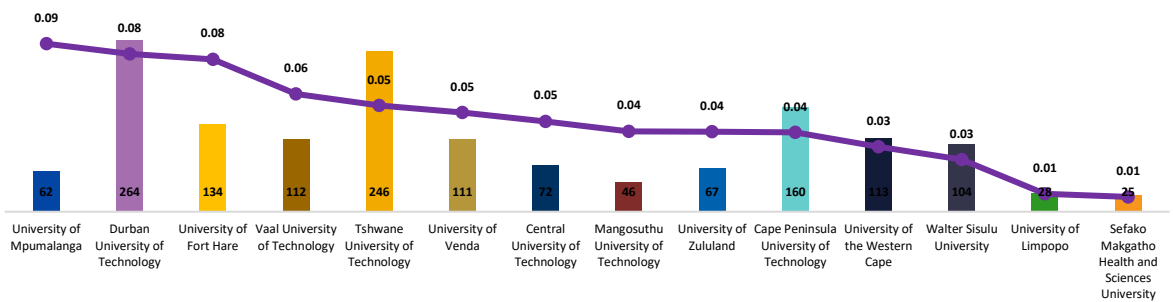
SDG 10: Reduced Inequalities
Total number of publications | Publications per capita
2020 - 2024



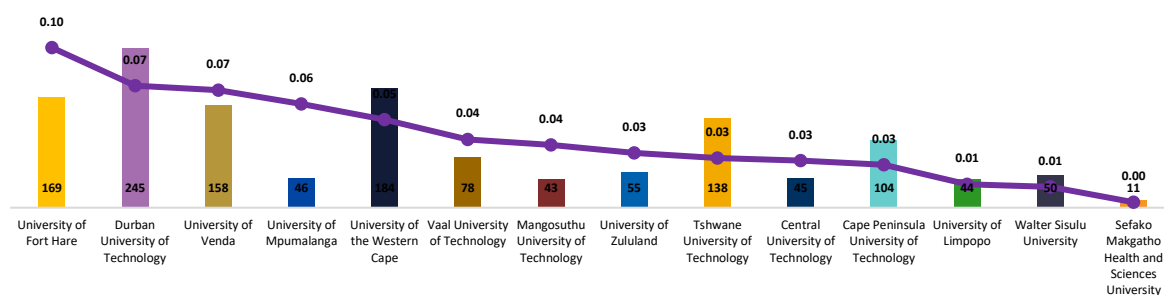
SDG 11: Sustainable Cities and Communities
Total number of publications | Publications per capita
2020 - 2024



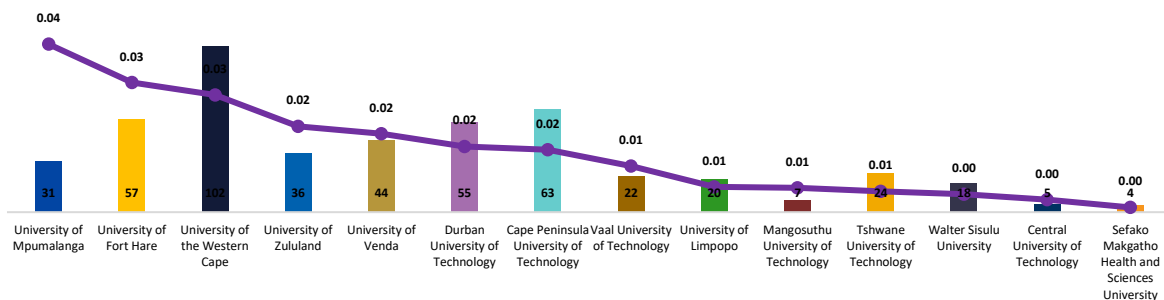
SDG 12: Responsible Consumption and Production
Total number of publications | Publications per capita
2020 - 2024



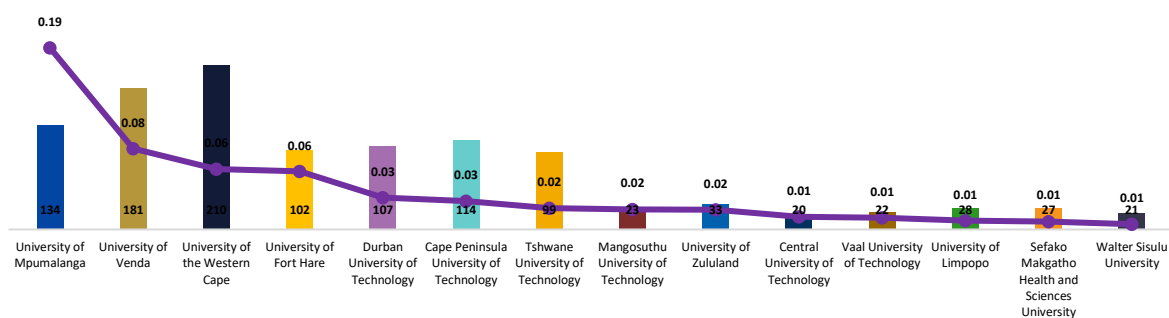
SDG 13: Climate Action
Total number of publications | Publications per capita
2020 - 2024



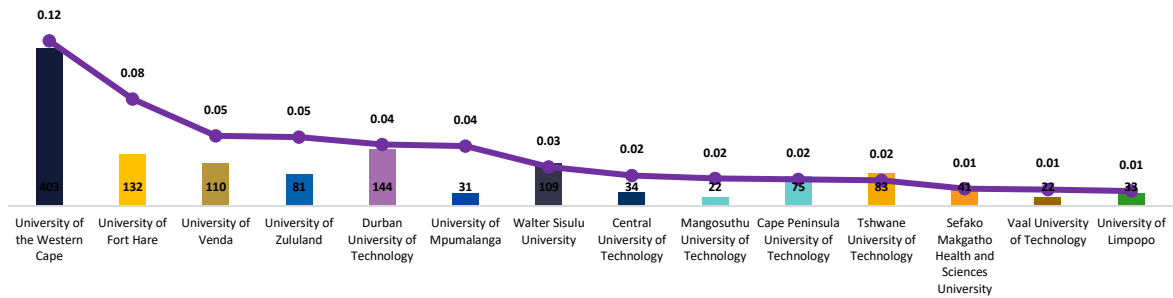
SDG 14: Life Below Water
Total number of publications | Publications per capita
2020 - 2024



SDG 15: Life on Land
Total number of publications | Publications per capita
2020 - 2024



SDG 16: Peace, Justice, and Strong Institutions
Total number of publications | Publications per capita
2020 - 2024



Current and Potential Collaborations per University

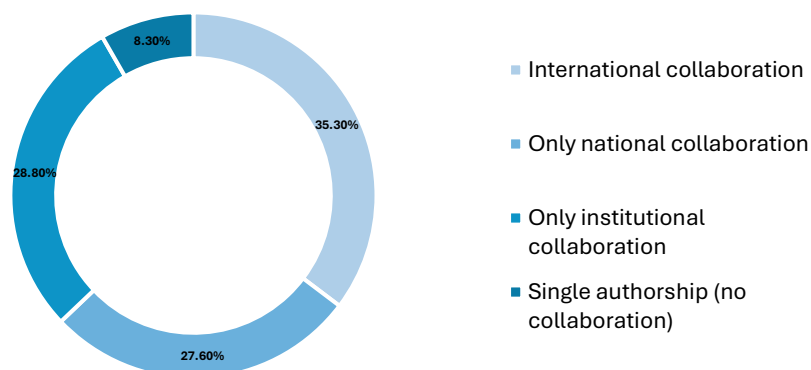
Cape Peninsula University of Technology

Collaborations at the Cape Peninsula University of Technology are predominantly international (35%), but strong institutional (29%) and national (28%) collaborations also exist. SDG 3 *Good Health and Well-being* is the SDG most addressed by both international and national collaborations. International collaborations made strong contributions in SDG 7 *Affordable and Clean Energy* and SDG 6 *Clean Water and Sanitation*. National collaborations strongly contributed to SDG 9 *Industry, Innovation, and Infrastructure*, SDG 6 *Clean Water and Sanitation*, and SDG 7 *Affordable and Clean Energy*. Although the majority of publications were international, national collaborations dominated in SDG 4 *Quality Education*, SDG 5 *Gender Equality*, SDG 9 *Industry, Innovation, and Infrastructure*, SDG 11 *Sustainable Cities and Communities*, and SDG 12 *Responsible Consumption and Production*.

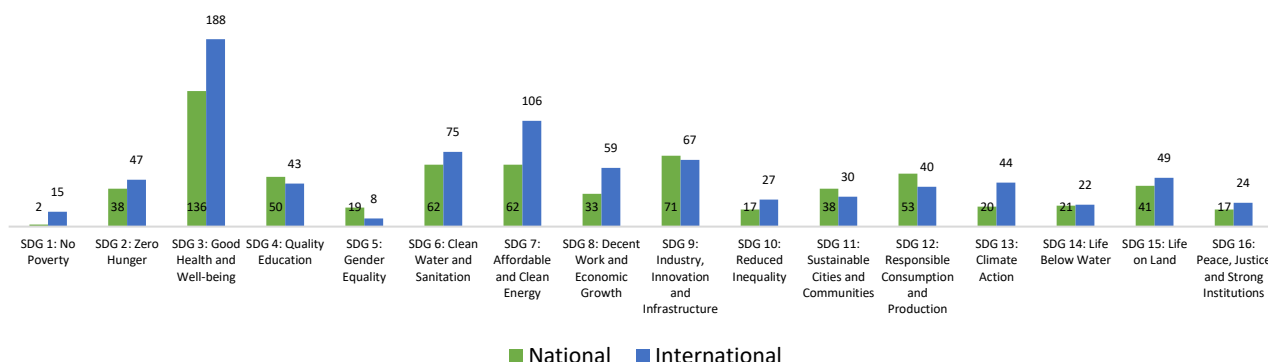
Table 3 - Geographical layout of collaborations at the Cape Peninsula University of Technology.

Cape Peninsula University of Technology

Geographical Collaborations of all Research Outputs at the Cape Peninsula University of Technology



Research outputs addressing the SDGs from national and international collaborations



Data from SciVal indicated that the Cape Peninsula University of Technology made the most contributions (total research outputs) towards SDG 3 *Good Health and Well-being* (393), SDG 7 *Affordable and Clean Energy* (295), and SDG 9 *Industry, Innovation, and Infrastructure* (245). These were all in the top three most addressed SDGs from either international or national collaborations. In contrast, SDG 14 *Life below water*, SDG 1 *No Poverty*, and SDG 5 *Gender Equality* were the three least addressed SDGs regarding total research outputs. However, most of the national universities with which the Cape Peninsula University of Technology are currently collaborating are strong contributors in these fields based on the data in the previous study. Their collaborators, which include Stellenbosch University, University of the Western Cape, and the University of Cape Town, are among the top ten contributors nationally for all three of these SDGs. Current collaborations can be utilised and strengthened to support contributions to attaining these SDGs.

Table 4 - Top ten National, African, and International Collaborators of the Cape Peninsula University of Technology.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
Stellenbosch University (208)	University of Ibadan (46), Nigeria	Texas Southern University (30), United States
University of the Western Cape (205)	Technical University of Kenya (34), Kenya	Paris-Est Sup (20), France
University of Cape Town (202)	Obafemi Awolowo University (30), Nigeria	Universitas Airlangga (18), Indonesia
Tshwane University of Technology (124)	Olabisi Onabanjo University (27), Nigeria	Université Paris-Est Créteil (18), France
University of Johannesburg (117)	University of Ilorin (25), Nigeria	University College London (17), United Kingdom
University of KwaZulu-Natal (93)	University of Nigeria (24), Nigeria	University of Sussex (17), United Kingdom
University of Pretoria (87)	University of Benin (23), Nigeria	Ural Federal University (17), Russian Federation
North-West University (79)	University of Namibia (23), Namibia	Amity University, Noida (16), India
University of South Africa (78)	Ladoke Akintola University of Technology (20), Nigeria	University of Huddersfield (12), United Kingdom

Durban University of Technology (65)	Namibia University of Science and Technology (20), Namibia	Khalifa University of Science and Technology (11), United Arab Emirates
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** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 31.0% of the Institution's Scholarly Output (568 of 1 833) could be linked to at least one funder, compared to 1 265 publications which could not be linked to any funders.

Table 5 - Top Ten Funders by Linked Publications at the Cape Peninsula University of Technology.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	496
Cape Peninsula University of Technology	South Africa	463
South African Medical Research Council	South Africa	65
University of Cape Town	South Africa	41
Universiteit Stellenbosch	South Africa	36
Council for Scientific and Industrial Research, South Africa	South Africa	35
UK Research and Innovation	United Kingdom	34
Tshwane University of Technology	South Africa	34
Water Research Commission	South Africa	31
European Commission	European Union	24

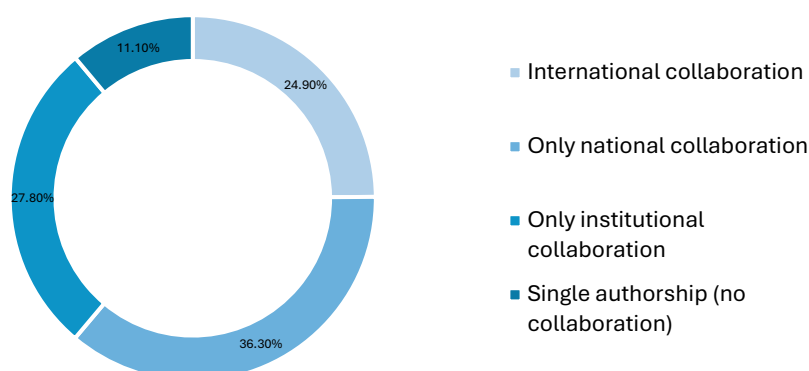
Central University of Technology

Collaborations at the Central University of Technology are predominantly national (36%), but strong institutional (28%) and international (25%) collaborations also exist. *SDG 3 Good Health and Well-being* is the SDG most addressed by both international and national collaborations. National collaborations strongly contributed to *SDG 9 Industry, Innovation, and Infrastructure* and *SDG 4 Quality Education*. International collaborations strongly contributed to *SDG 9 Industry, Innovation, and Infrastructure* and *SDG 8 Decent Work and Economic Growth* were addressed. The only SDG where international collaborations dominated was *SDG 8 Decent Work and Economic Growth*, as national collaborations made the majority of publications.

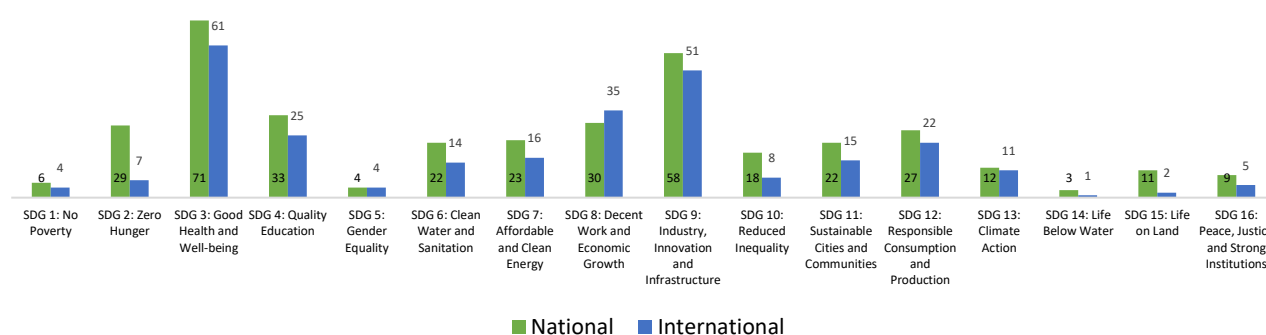
Table 6 - Geographical layout of collaborations at the Central University of Technology.

Central University of Technology

Geographical Collaborations - Central University of Technology



Research outputs addressing the SDGs from national and international collaborations



SciVal data indicated that the Central University of Technology made the most contributions in their total research outputs towards SDG 9 *Industry, Innovation, and Infrastructure* (200), SDG 3 *Good Health and Well-being* (184), and SDG 4 *Quality Education* (108). All of these were in the top three SDGs addressed by either international or national collaborations. In contrast, SDG 5 *Gender Equality*, SDG 1 *No Poverty*, and SDG 14 *Life Below Water* were the least contributed three SDGs regarding total research outputs. Most of the national universities with which the Central University of Technology are currently collaborating are strong contributors in these fields based on the data in the previous study, such as the University of KwaZulu-Natal, which is among the top ten contributors nationally for all three of these SDGs. Additionally, the Nelson Mandela University is in the top three universities nationally regarding contributions made towards SDG 14.

Table 7 - Top ten National, African, and International Collaborators of the Central University of Technology.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of The Free State (161)	Afe Babalola University (8), Nigeria	Leeds Beckett University (10), United Kingdom
University of KwaZulu-Natal (86)	University of Ibadan (8), Nigeria	University of Brescia (9), Italy

Nelson Mandela University (59)	University of Nigeria (8), Nigeria	University of Wolverhampton (8), United Kingdom
University of South Africa (50)	Great Zimbabwe University (7), Zimbabwe	Karlstad University (7), Sweden
University of Johannesburg (46)	Chinhoyi University of Technology (6), Zimbabwe	Széchenyi István University (6), Hungary
Tshwane University of Technology (40)	National University of Lesotho (6), Lesotho	University of Lincoln (6), United Kingdom
North West University (39)	University of Ilorin (6), Nigeria	Nagoya University (5), Japan
Durban University of Technology (35)	Ahmadu Bello University (5), Nigeria	National University of Singapore (5), Singapore
University of Pretoria (35)	Murang'a University of Technology (5), Kenya	Robert Gordon University (5), United Kingdom
Stellenbosch University (34)	University of Lagos (5), Nigeria	Saveetha Institute of Medical and Technical Sciences (Deemed to be University) (5), India

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 36.9% of the Institution's Scholarly Output (461 of 1249) could be linked to at least one funder, compared to 788 publications which could not be linked to any funders.

Table 8 - Top Ten Funding Bodies by Linked Publications at the Central University of Technology.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	245
Central University of Technology	South Africa	205
Department of Science and Technology, Ministry of Science and Technology, India	India	40
Council for Scientific and Industrial Research, South Africa	South Africa	25
Department of Science and Technology, Republic of South Africa	South Africa	18
Department of Higher Education and Training	South Africa	15
European Commission	European Union	13
Inyuvesi Yakwazulu-Natali	South Africa	11
South African Medical Research Council	South Africa	10
Water Research Commission	South Africa	10

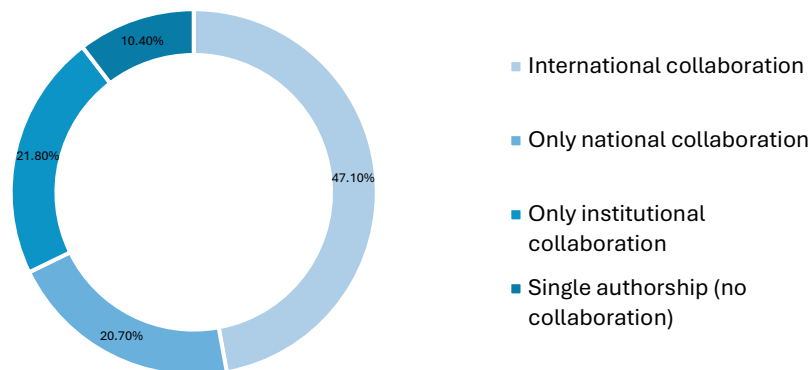
Durban University of Technology

Nearly half (47%) of the collaborations at the Durban University of Technology are international, but strong institutional (22%) and national (21%) collaborations also exist. SDG 3 *Good Health and Well-being* is the SDG most addressed by both international and national collaborations. Both international and national collaborations also made strong contributions to SDG 7 *Affordable and Clean Energy*, and SDG 9 *Industry, Innovation, and Infrastructure*. Although the majority of publications were international, national collaborations dominated in SDG 1 *No Poverty* and SDG 4 *Quality Education*.

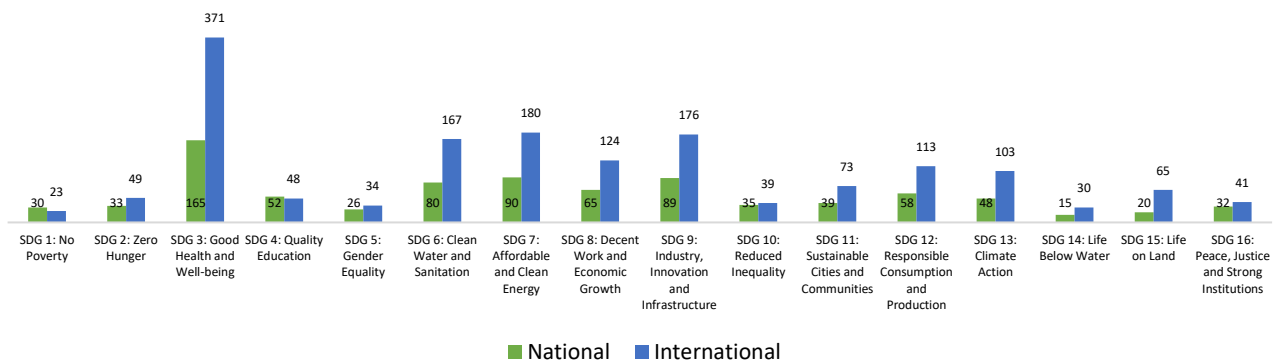
Table 9 - Geographical layout of collaborations at the Durban University of Technology.

Durban University of Technology
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Geographical Collaborations - Durban University of Technology



Research outputs addressing the SDGs from national and international collaborations



Durban University of Technology made the most contributions (total research outputs) towards SDG 3 *Good Health and Well-being* (660), SDG 7 *Affordable and Clean Energy* (481), and SDG 9 *Industry, Innovation, and Infrastructure* (440). All of these SDGs were in the top three SDGs addressed by both international and national collaborations. In contrast, SDG 2 *Zero Hunger*, SDG 5 *Gender Equality*, and SDG 14 *Life Below Water* were the three least addressed SDGs regarding total research outputs. Most of the national universities with which the Durban University of Technology are currently collaborating are strong contributors in these fields based on the data in the previous study, such as the University of KwaZulu-Natal, which is the top contributor nationally to SDG 2, and in the top ten contributors nationally for SDG 5 and SDG 14. Additionally, the University of Johannesburg is in the top ten national contributors to SDG 5 and SDG 14, and the University of Witwatersrand is the top contributor nationally for SDG 5.

Table 10 - Top ten National, African, and International Collaborators of the Durban University of Technology.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of KwaZulu-Natal (460)	Covenant University (56), Nigeria	King Faisal University (110), Saudi Arabia

University of the Witwatersrand (145)	Minia University (40), Egypt	Universidad Católica del Norte (62), Chile
University of Johannesburg (138)	University of Lagos (38), Nigeria	Philadelphia University (48), Jordan
Mangosuthu University of Technology (130)	Afe Babalola University (33), Nigeria	Jawaharlal Nehru Technological University Hyderabad (46), India
University of South Africa (107)	Federal University of Technology, Akure (33), Nigeria	Graphic Era (36), India
University of Pretoria (91)	Landmark University (33), Nigeria	Uttaranchal University (29), India
North West University (73)	University of Ibadan (29), Nigeria	Birjand University of Medical Sciences (28), Iran
University of Cape Town (68)	Federal University Oye-Ekiti (28), Nigeria	Nirma University (26), India
University of The Free State (67)	University of Eswatini (27), Swaziland	Universidad Austral de Chile (25), Chile
Cape Peninsula University of Technology (65)	Kafrelsheikh University (25), Egypt	Amity University, Noida (23), India

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 36.2% of the Institution's Scholarly Output (1,505 of 4,158) could be linked to at least one funder, compared to 2653 publications which could not be linked to any funders.

Table 11 - Top Ten Funding Bodies by Linked Publications at the Durban University of Technology.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	597
Durban University of Technology	South Africa	512
Department of Science and Technology, Ministry of Science and Technology, India	India	97
UK Research and Innovation	United Kingdom	88
Inyuvesi Yakwazulu-Natali	South Africa	81
South African Medical Research Council	South Africa	61
Water Research Commission	South Africa	60
Deanship of Scientific Research, King Faisal University	Saudi Arabia	58
European Commission	European Union	47
Comisión Nacional de Investigación Científica y Tecnológica	Chile	47

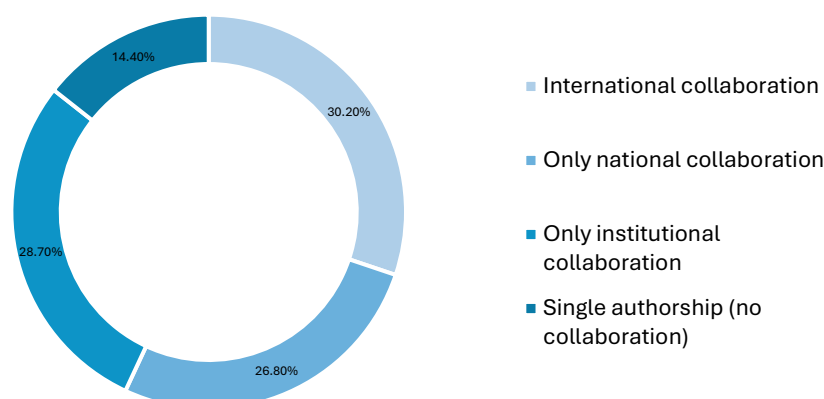
University of Fort Hare

The University of Fort Hare has strong international (30%), institutional (29%), and national (27%) collaborations. SDG 3 *Good Health and Well-being* is the SDG most addressed by both international and national collaborations, followed by SDG 2 *Zero Hunger*. International collaboration made strong contributions towards SDG 13 *Climate Action*, and national collaborations strongly contributed to SDG 8 *Decent Work and Economic Growth*. Although the majority of publications were international, national collaborations dominated in SDG 1 *No Poverty*, SDG 4 *Quality Education*, SDG 8 *Decent Work and Economic Growth*, SDG 10 *Reduced Inequalities*, and SDG 16 *Peace, Justice, and Strong Institutions*.

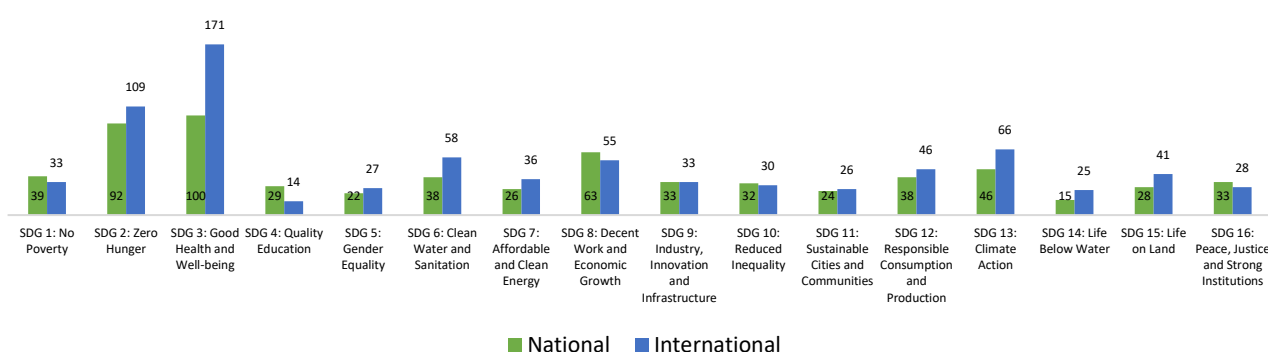
Table 12 - Geographical layout of collaborations at the University of Fort Hare.

University of Fort Hare

Geographical Collaborations - University of Fort hare



Research outputs addressing the SDGs from national and international collaborations



The University of Fort Hare made the most contributions as total research outputs towards SDG 3 *Good Health and Well-being* (452), SDG 2 *Zero Hunger* (317), and SDG 8 *Decent Work and Economic Growth* (220). SDG 3 and SDG 2 were the two most addressed SDGs in both international and national collaborations. SDG 8 *Decent Work and Economic Growth* was the third most addressed with total research outputs and the third most addressed by national collaborators. In contrast, SDG 5 *Gender Equality*, SDG 11 *Sustainable Cities and Communities*, and SDG 14 *Life Below Water* were the three least addressed SDGs regarding total research outputs. Most of the national universities with which the University of Fort Hare are currently collaborating are strong contributors in these fields based on the data in the previous study, such as the University of KwaZulu-Natal, University of the Free State, and University of Pretoria, which are all in the top ten national contributors for SDG 11. Additionally, the University of KwaZulu-Natal is in the top ten national contributors in SDG 5 and SDG 14, and the University of Pretoria is in the top ten contributors nationally for SDG 5.

Table 13 - Top ten National, African, and International Collaborators of the University of Fort Hare.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of KwaZulu-Natal (115)	University of Nigeria (48), Nigeria	University of Sharjah (64), United Arab Emirates

University of The Free State (114)	University of Namibia (28), Namibia	University of Birmingham (25), United Kingdom
University of Pretoria (93)	Adekunle Ajasin University, Akungba (26), Nigeria	University of Oxford (19), United Kingdom
University of the Witwatersrand (88)	Obafemi Awolowo University (22), Nigeria	Utrecht University (18), Netherlands
Walter Sisulu University (85)	University of Ibadan (20), Nigeria	Harvard University (15), United States
University of South Africa (84)	University of Botswana (18), Botswana	University of Edinburgh (15), United Kingdom
University of Johannesburg (74)	University of Benin (17), Nigeria	Université de Montpellier (15), France
Stellenbosch University (65)	Makerere University (15), Uganda	University of Porto (14), Portugal
North West University (62)	Great Zimbabwe University (14), Zimbabwe	Shahid Beheshti University of Medical Sciences (13), Iran
Nelson Mandela University (57)	National University of Lesotho (14), Lesotho	University of Queensland (13), Australia

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 43.4% of the Institution's Scholarly Output (991 of 2,284) could be linked to at least one funder, compared to 1293 publications which could not be linked to any funders.

Table 14 - Top Ten Funding Bodies by Linked Publications at the University of Fort Hare.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	428
University of Fort Hare	South Africa	397
South African Medical Research Council	South Africa	212
UK Research and Innovation	United Kingdom	68
The World Academy of Sciences	Italy	31
European Commission	European Union	26
Water Research Commission	South Africa	23
National Institute for the Humanities and Social Sciences	South Africa	21
Department of Science and Technology, Republic of South Africa	South Africa	19
Department of Science and Technology, Ministry of Science and Technology, India	India	17

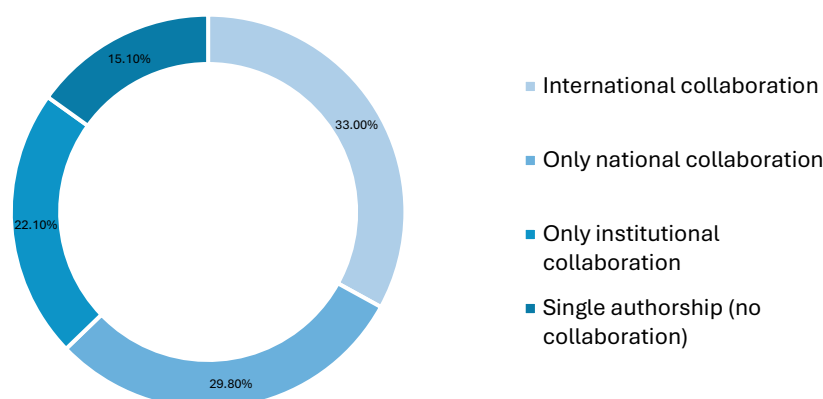
University of Limpopo

Collaborations at the University of Limpopo are predominantly international (33%) and national (30%), but strong institutional (20%) collaborations also exist. SDG 3 *Good Health and Well-being* is the SDG most addressed by both international and national collaborations, and it was followed by SDG 2 *Zero Hunger*. International collaborations strongly contributed to SDG 16 *Peace, Justice, and Strong Institutions*, while national collaborations made strong contributions towards SDG 6 *Clean Water and Sanitation*. National collaborations had more publications than international collaborations in 9 of the first 16 SDGs.

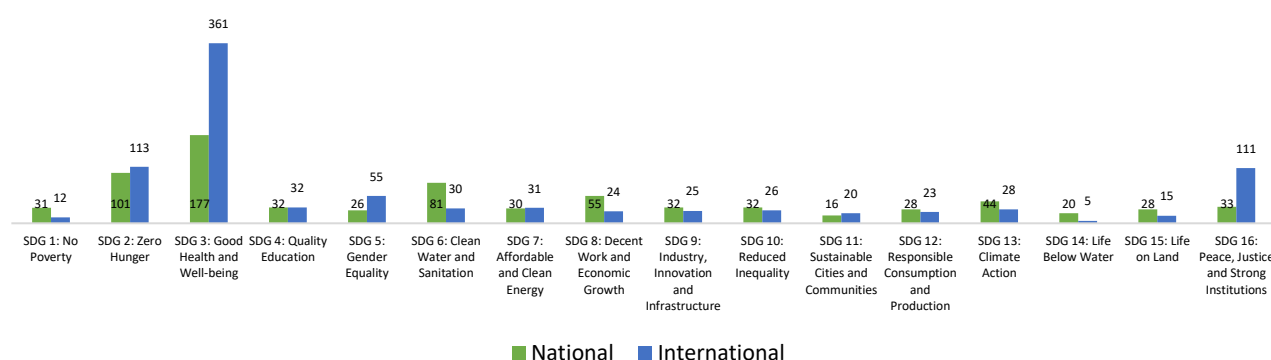
Table 15 - Geographical layout of collaborations at the University of Limpopo.

The University of Limpopo

Geographical Collaborations - University of Limpopo



Research outputs addressing the SDGs from national and international collaborations



The University of Limpopo made the most contributions in terms of total research outputs towards SDG 3 *Good Health and Well-being* (685), SDG 2 *Zero Hunger* (313), and SDG 16 *Peace, Justice and Strong Institutions* (220). SDG 3 and SDG 2 were the two most addressed SDGs in both international and national collaborations. SDG 16 *Peace, Justice, and Strong Institutions* was the third most addressed with total research outputs and the third most addressed by international collaborators. In contrast, SDG 11 *Sustainable Cities and Communities*, SDG 15 *Life on Land*, and SDG 14 *Life Below Water* were the three least addressed SDGs. Most of the national universities with which the University of Limpopo are currently collaborating are strong contributors in these fields, based on the data in the previous study, and include the University of KwaZulu-Natal, which is in the top ten National Contributors for SDG 11, SDG 14, and SDG 15. Additionally, the University of the Free State is in the top ten national contributors in SDG 11 and SDG 15.

Table 16 - Top ten National, African, and International Collaborators of the University of Limpopo.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of KwaZulu-Natal (183)	Midlands State University Zimbabwe (23), Zimbabwe	Mahidol University (255), Thailand

University of South Africa (163)	University for Development Studies Ghana (17), Ghana	Asia University Taiwan (95), Taiwan
University of The Free State (151)	Centre national de recherche scientifique et technologique, Burkina Faso (15), Burkina Faso	Ton Duc Thang University (38), Vietnam
University of Pretoria (131)	Kwame Nkrumah University of Science and Technology (14), Ghana	University of Antwerp (22), Belgium
University of the Witwatersrand (131)	University of Ghana (13), Ghana	Utrecht University (18), Netherlands
North West University (102)	University of Namibia (13), Namibia	University of Jaén (16), Spain
University of Johannesburg (90)	Makerere University (12), Uganda	University of Miami (16), United States
University of Venda (85)	Université de Dschang (11), Cameroon	University of Sydney (16), Australia
University of the Western Cape (82)	Botswana International University of Science and Technology (10), Botswana	Jilin Agricultural University (14), China
Tshwane University of Technology (77)	Universidade Eduardo Mondlane (10), Mozambique	University of New South Wales (13), Australia

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 8.0% of the Institution's Scholarly Output (1,104 of 2,903) could be linked to at least one funder, compared to 1799 publications which could not be linked to any funders.

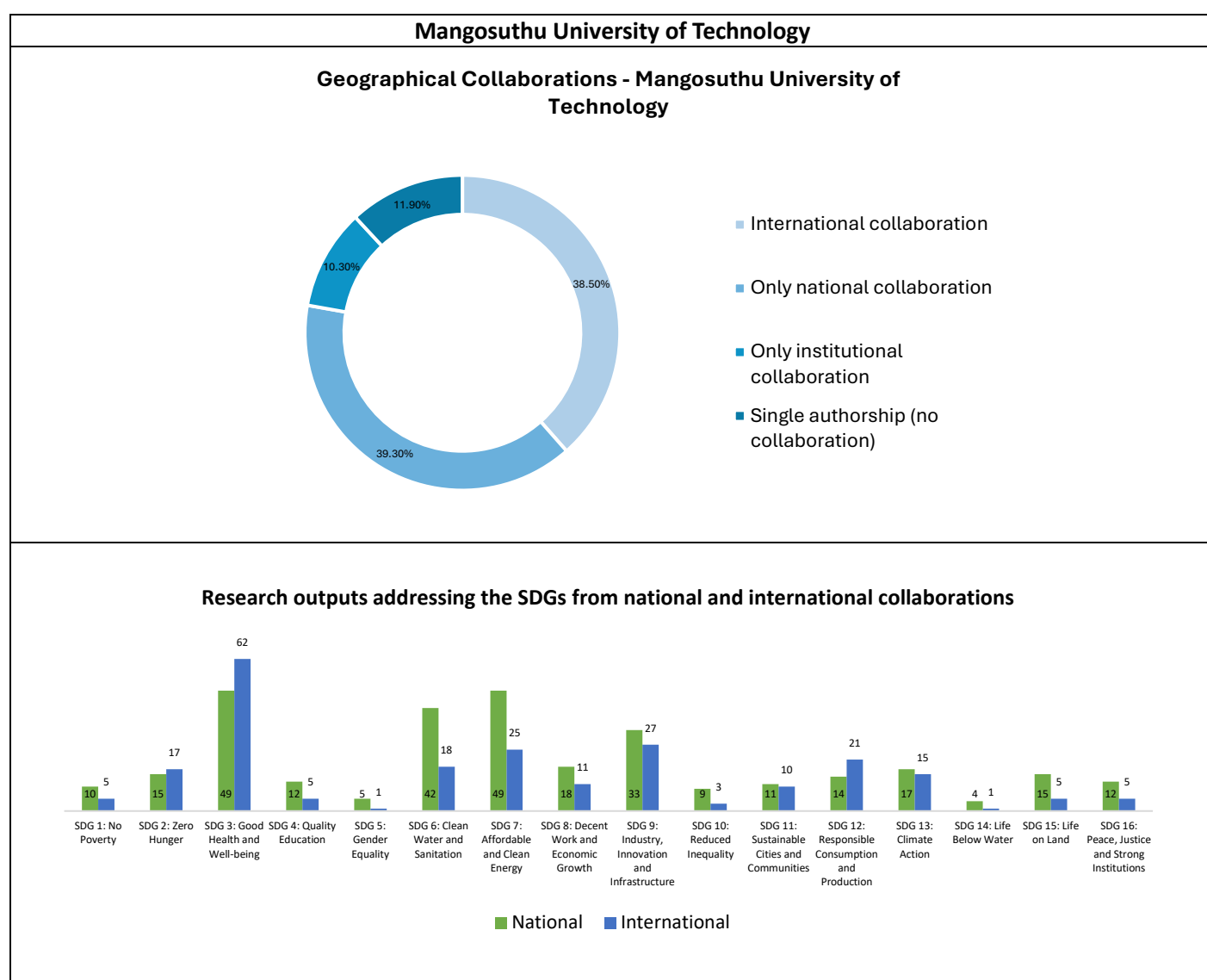
Table 17 - Top Ten Funding Bodies by Linked Publications at the University of Limpopo.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	517
National Institutes of Health	United States	96
World Health Organisation	Switzerland	58
South African Medical Research Council	South Africa	51
Department of Science and Technology, Ministry of Science and Technology, India	India	41
Council for Scientific and Industrial Research, South Africa	South Africa	40
European Commission	European Union	37
Water Research Commission	South Africa	37
UK Research and Innovation	United Kingdom	36
Ministry of Health and Family Welfare	India	36

Mangosuthu University of Technology

Collaborations at the Mangosuthu University of Technology are predominantly national (39%) and international (39%). Institutional collaborations (10%) do not seem to occur regularly. SDG 3 *Good Health and Well-being* is the SDG most addressed by international collaborations, and it was followed by SDG 9 *Industry, Innovation, and Infrastructure* and SDG 7 *Affordable and Clean Energy*. National collaborations also made strong contributions to SDG 6 *Clean Water and Sanitation*. National collaborations dominated in most of the SDGs, while international collaborations contributed to more publications in SDG 2 *Zero Hunger*, SDG 3 *Good Health and Well-being*, and SDG 12 *Responsible Consumption and Production*.

Table 18 - Geographical layout of collaborations at the Mangosuthu University of Technology.



The Mangosuthu University of Technology made the most contributions in total research outputs towards SDG 3 *Good Health and Well-being* (136), SDG 7 *Affordable and Clean Energy* (91), and SDG 9 *Industry, Innovation, and Infrastructure* (87). SDG 3, SDG 7, SDG 9, and SDG 6 were the SDGs most addressed by either international or national collaborations. In contrast, SDG 10 *Reduced Inequalities*, SDG 5 *Gender Equality*, and SDG 14 *Life Below Water* were the three least addressed SDGs. The University of KwaZulu-Natal, which is the Mangosuthu University of Technology's second strongest national collaborator, is in the top ten national contributors to all three of the least addressed SDGs, based on the data in the previous study.

Table 19 - Top ten National, African, and International Collaborators of the Mangosuthu University of Technology.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
Durban University of Technology (130)	Covenant University (19), Nigeria	United Arab Emirates University (13), United Arab Emirates
University of KwaZulu-Natal (104)	Landmark University (19), Nigeria	Lovely Professional University (12), India

Central University of Technology (33)	Obafemi Awolowo University (11), Nigeria	GLA University (10), India
University of Johannesburg (33)	Babcock University (10), Nigeria	Government Model Science College India (10), India
University of Zululand (24)	Osun State University (9), Nigeria	Guglielmo Marconi University (10), Italy
University of the Witwatersrand (20)	Federal University Oye-Ekiti (6), Nigeria	Netaji Subhas University of Technology (9), India
Cape Peninsula University of Technology (18)	Ladoke Akintola University of Technology (6), Nigeria	Istanbul University (8), Turkey
University of South Africa (17)	National University of Science and Technology Bulawayo (6), Zimbabwe	University of Delhi (8), India
University of The Free State (17)	Chinhoyi University of Technology (5), Zimbabwe	University of North Bengal (9), India
University of Pretoria (15)	University of Ibadan (5), Nigeria	Polytechnic University of Turin (6), Italy

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 35.8% of the Institution's Scholarly Output (250 of 699) could be linked to at least one funder, compared to 449 publications which could not be linked to any funders.

Table 20 - Top Ten Funding Bodies by Linked Publications at the Mangosuthu University of Technology.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	105
Durban University of Technology	South Africa	41
Mangosuthu University of Technology	South Africa	28
Inyuvesi Yakwazulu-Natali	South Africa	17
UK Research and Innovation	United Kingdom	16
South African Medical Research Council	South Africa	11
Central University of Technology	South Africa	11
National Treasury	South Africa	10
Department of Science and Technology, Ministry of Science and Technology, India	India	7
Universiti Teknologi Petronas	Malaysia	6

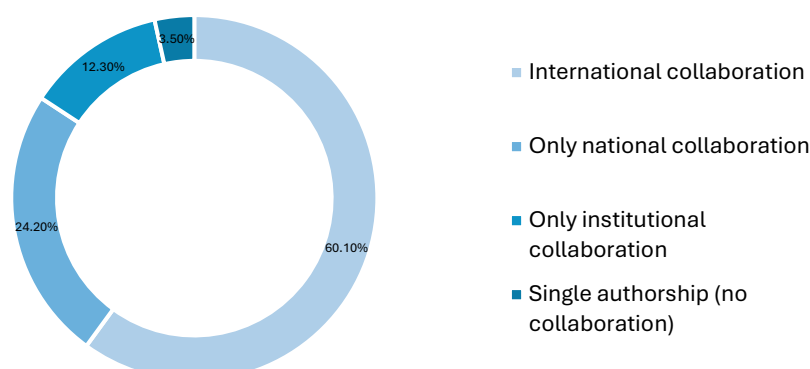
Sefako Makgatho Health Sciences University

Collaborations at the Sefako Makgatho Health Science University are predominantly International (60%), but strong national (24%) and institutional (12%) collaborations also exist. SDG 3 *Good Health and Well-being* is the SDG most addressed by both international and national collaborations, followed by SDG 5 *Gender Equality*. International collaborations made strong contributions towards SDG 10 *Reduced Inequalities*, while national collaborations strongly contributed to SDG 2 *Zero Hunger*. National collaborations dominated in 9 of the first 16 SDGs, but international collaborations still dominated overall due to high numbers of research outputs in SDG 3.

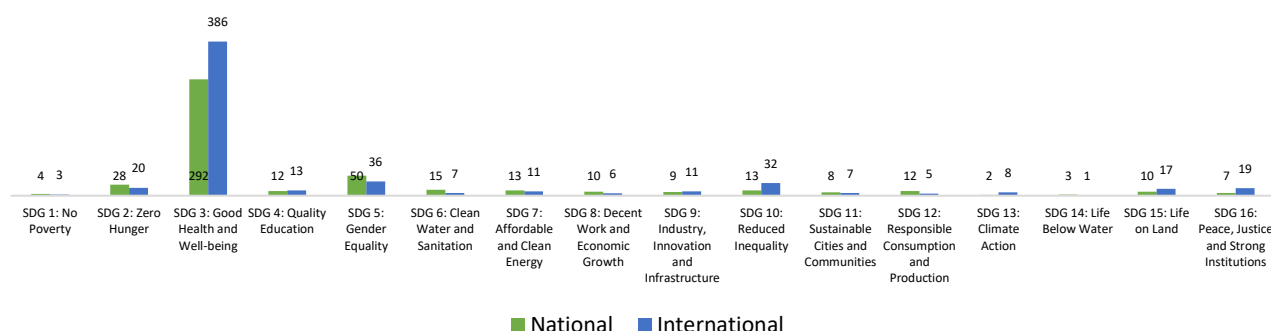
Table 21 - Geographical layout of collaborations at the Sefako Makgatho Health Sciences University.

Sefako Makgatho Health Sciences University

Geographical Collaborations - Sefako Makgatho Health Sciences University



Research outputs addressing the SDGs from national and international collaborations



Sefako Makgatho Health Science University made the most total research output contributions towards SDG 3 *Good Health and Well-being* (869), SDG 5 *Gender Equality* (123), and SDG 2 *Zero Hunger* (64). SDG 3 and SDG 5 were the two most addressed SDGs in both international and national collaborations. SDG 2 *Zero Hunger* was the third most addressed with total research outputs and the third most addressed by national collaborators. In contrast, SDG 1 *No Poverty*, SDG 13 *Climate Action*, and SDG 14 *Life Below Water* were the three least addressed SDGs. Most of the national universities with which the Sefako Makgatho Health Science University are currently collaborating are strong contributors in these fields based on the data in the previous study. The University of Pretoria, the University of the Witwatersrand, and the University of KwaZulu-Natal are in the top ten National Contributors for SDG 1 and SDG 13. Additionally, the University of KwaZulu-Natal is in the top ten national contributors in SDG 14.

Table 22 - Top ten National, African, and International Collaborators of the Sefako Makgatho Health Sciences University.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of Pretoria (231)	Zagazig University (58), Egypt	King Abdulaziz University (265), Saudi Arabia

University of the Witwatersrand (221)	Bayero University (45), Nigeria	Near East University (174), Turkey
University of KwaZulu-Natal (185)	University of Zambia (42), Zambia	Biruni Universitesi (162), Turkey
University of The Free State (176)	Usmanu Danfodiyo University (40), Nigeria	University of Strathclyde (147), United Kingdom
University of South Africa (125)	University of Nairobi (32), Kenya	Prince Sultan University (PSU) (90), Saudi Arabia
University of Cape Town (85)	Badji Mokhtar University (31), Algeria	Dunarea de Jos University of Galati (69), Romania
University of Limpopo (76)	Sohag University (29), Egypt	Hawler Medical University (66), Iraq
Stellenbosch University (73)	University of Namibia (28), Namibia	Asia University Taiwan (65), Taiwan
Tshwane University of Technology (70)	University of Health and Allied Sciences (27), Ghana	Mahidol University (62), Thailand
Walter Sisulu University (57)	Ekiti State University (26), Nigeria	Ajman University (61), United Arab Emirates

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 39.5% of the Institution's Scholarly Output (1,033 of 2,617) could be linked to at least one funder, compared to 1584 publications which could not be linked to any funders.

Table 23 - Top Ten Funding Bodies by Linked Publications at the Sefako Makgatho Health Sciences University.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	292
South African Medical Research Council	South Africa	127
Prince Sultan University	Saudi Arabia	91
Sefako Makgatho Health Sciences University	South Africa	68
UK Research and Innovation	United Kingdom	56
National Institutes of Health	United States	45
GlaxoSmithKline	United Kingdom	35
European Commission	European Union	34
King Saud University	Saudi Arabia	31
World Health Organisation	Switzerland	30

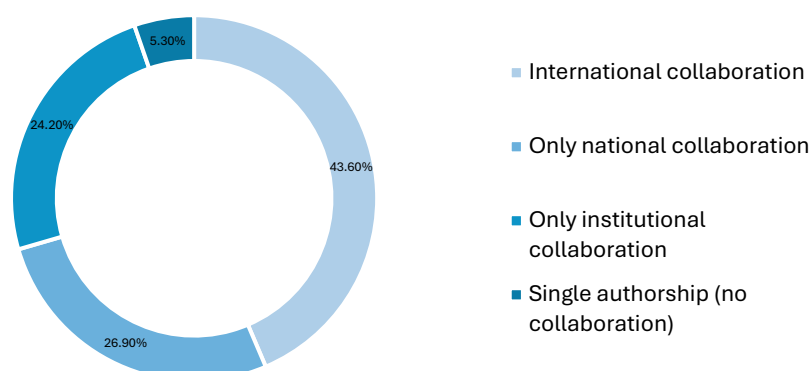
Tshwane University of Technology

Collaborations at the Tshwane University of Technology are predominantly international (44%), but strong national (27%) and institutional (24%) collaborations also exist. *SDG 9 Industry, Innovation, and Infrastructure* is the SDG most addressed by both international and national collaborations. International collaborations made strong contributions to *SDG 7 Affordable and Clean Energy* and *SDG 3 Good Health and Well-being*. National collaborations strongly contributed to *SDG 3 Good Health and Well-being* and *SDG 6 Clean Water and Sanitation*. Although the majority of collaborations were international, national collaborations dominated in *SDG 1 No Poverty*, *SDG 4 Quality Education*, *SDG 5 Gender Equality*, *SDG 10 Reduced Inequalities*, and *SDG 16 Peace, Justice, and Strong Institutions*.

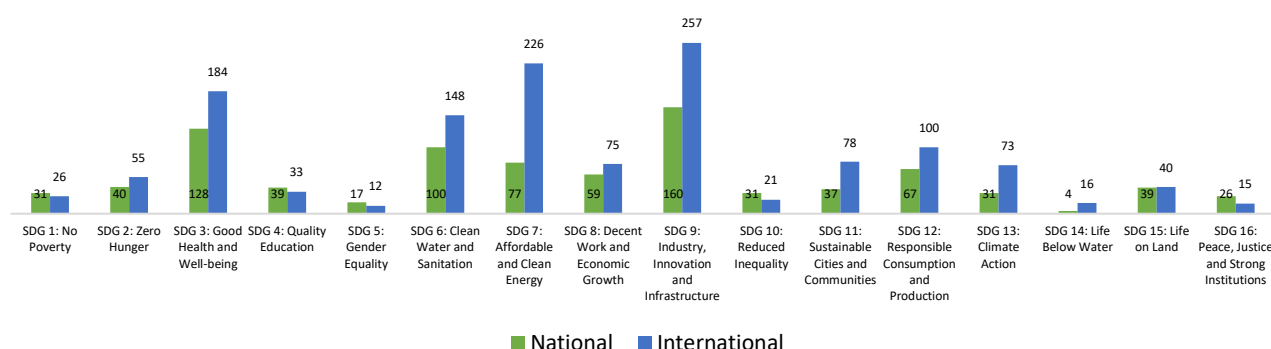
Table 24 - Geographical layout of collaborations at the Tshwane University of Technology.

Tshwane University of Technology

Geographical Collaborations - Tshwane University of Technology



Research outputs addressing the SDGs from national and international collaborations



Tshwane University of Technology made the most contributions towards *SDG 9 Industry, Innovation, and Infrastructure* (572), *SDG 7 Affordable and Clean Energy* (432), and *SDG 3 Good Health and Well-being* (390). These were all in the top three most addressed SDGs from international collaborations. In contrast, *SDG 16 Peace, Justice, and Strong Institutions*, *SDG 5 Gender Equality*, and *SDG 14 Life below water* were the three least addressed SDGs regarding total research outputs. Most of the national universities with which the Tshwane University of Technology are currently collaborating are strong contributors in these fields based on the data in the previous study, and include the University of Johannesburg and the University of Pretoria, which are in the top ten national contributors to SDG 5 and SDG 16. Additionally, the University of Johannesburg is in the top ten national contributors to SDG 14.

Table 25 - Top ten National, African, and International Collaborators of the Tshwane University of Technology.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of Johannesburg (310)	Covenant University (137), Nigeria	KU Leuven (80), Belgium
University of South Africa (275)	University of Ibadan (71), Nigeria	King Abdulaziz University (79), Saudi Arabia

University of Pretoria (217)	Federal University of Technology, Akure (66), Nigeria	Birjand University of Medical Sciences (52), Iran
University of the Witwatersrand (132)	University of Lagos (60), Nigeria	University of Queensland (51), Australia
Cape Peninsula University of Technology (124)	University of Nigeria (59), Nigeria	SRM Institute of Science and Technology (49), India
University of KwaZulu-Natal (85)	Afe Babalola University (56), Nigeria	Texas A&M University (46), United States
North West University (79)	Landmark University (52), Nigeria	University of Alabama in Huntsville (46), United States
University of Limpopo (77)	Botswana International University of Science and Technology (36), Botswana	JIS Group Educational Initiatives (32), India
Stellenbosch University (71)	Obafemi Awolowo University (32), Nigeria	Bozok University (31), Turkey
Sefako Makgatho Health Sciences University (70)	University of Calabar (32), Nigeria	Tianjin University of Technology (31), China

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 45.9% of the Institution's Scholarly Output (1,888 of 4,112) could be linked to at least one funder, compared to 2224 publications which could not be linked to any funders.

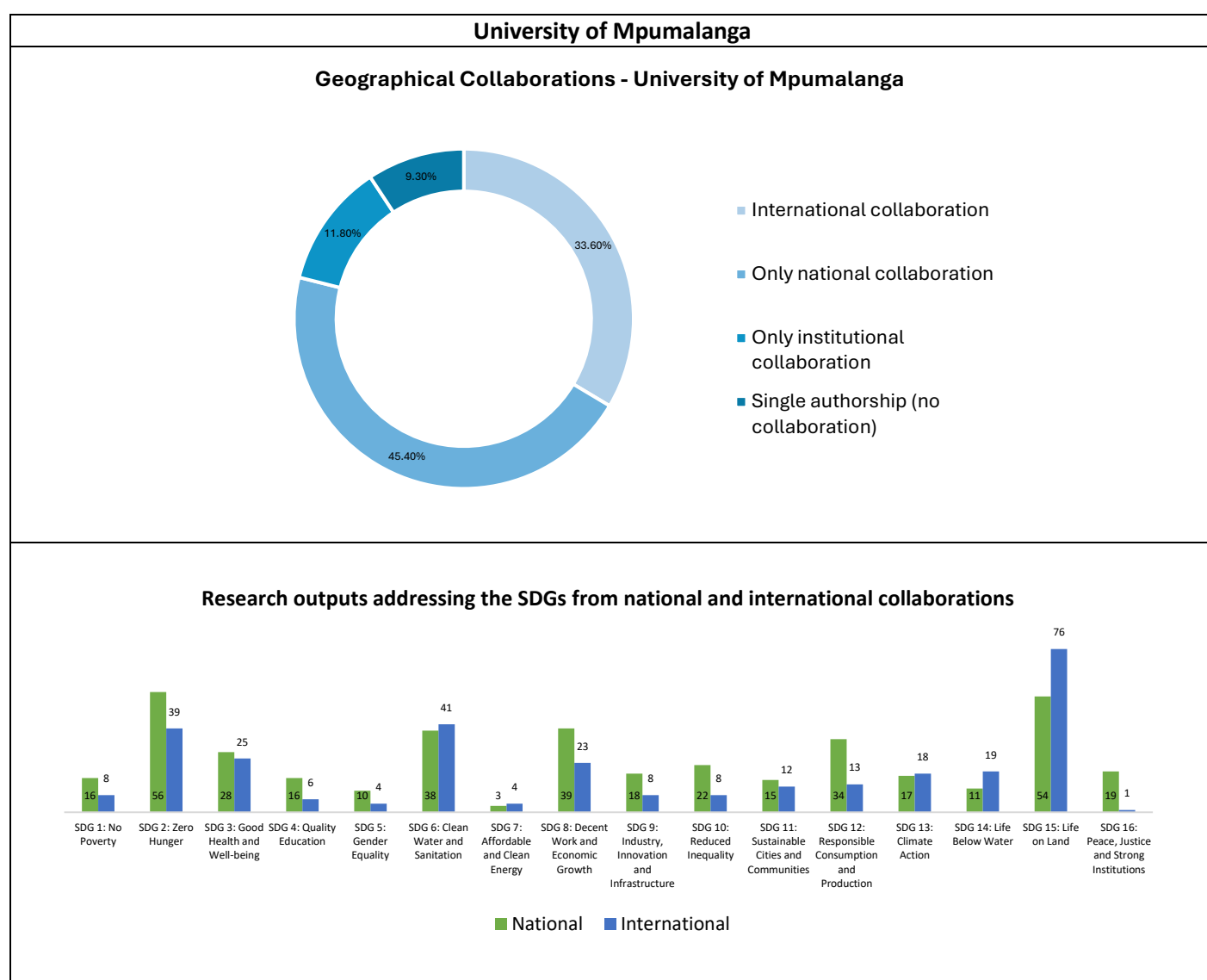
Table 26 - Top Ten Funding Bodies by Linked Publications at the Tshwane University of Technology.

Funder	Country/region	Linked Publications
Tshwane University of Technology	South Africa	832
Department of Science and Innovation, South Africa	South Africa	710
Council for Scientific and Industrial Research, South Africa	South Africa	157
National Natural Science Foundation of China	China	102
Department of Science and Technology, Ministry of Science and Technology, India	India	60
University of Johannesburg	South Africa	54
South African Medical Research Council	South Africa	54
University of Pretoria	South Africa	53
Covenant University	Nigeria	51
Agricultural Research Council	South Africa	49

University of Mpumalanga

Collaborations at the University of Mpumalanga are predominantly national (45%), but strong international (34%) collaborations also exist. National collaborations strongly contributed to SDG 2 *Zero Hunger*, SDG 15 *Life on Land* and SDG 8 *Decent Work and Economic Growth*. International collaborations made strong contributions towards SDG 15 *Life on Land*, SDG 6 *Clean Water and Sanitation*, and SDG 2 *Zero Hunger*. Although the majority of publications were made by national collaborations, international collaborations contributed to the most publications in SDG 6 *Clean Water and Sanitation*, SDG 7 *Affordable and Clean Energy*, SDG 13 *Climate Action*, SDG 14 *Life Below Water*, and SDG 15 *Life on Land*.

Table 27 - Geographical layout of collaborations at the University of Mpumalanga.



The University of Mpumalanga made the most contributions towards *SDG 15 Life on Land* (134), *SDG 2 Zero Hunger* (127), and *SDG 8 Decent Work and Economic Growth* (95). These were all in the top three most addressed SDGs from national collaborations. In contrast, *SDG 16 Peace, Justice, and Strong Institutions*, *SDG 5 Gender Equality*, and *SDG 7 Affordable and Clean Energy* were the three least addressed SDGs in terms of total research outputs. The national universities with which the University of Mpumalanga are currently collaborating are strong contributors in these fields based on the data in the previous study, such as the University of KwaZulu-Natal, which is in the top ten national contributors for all three of these SDGs. Additionally, Rhodes University is in the top ten national contributors for SDG 5 and SDG 16.

Table 28 - Top ten National, African, and International Collaborators of the University of Mpumalanga.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
North West University (122)	University of Eldoret (11), Kenya	Queen's University Belfast (25), United Kingdom

Rhodes University (93)	University of Nigeria (9), Nigeria	IHE Delft Institute for Water Education (11), Netherlands
University of KwaZulu-Natal (93)	University of Botswana (7), Botswana	Monash University Malaysia (10), Malaysia
University of Venda (72)	University of Zimbabwe (7), Zimbabwe	Durham University (6), United Kingdom
University of Pretoria (54)	Landmark University (6), Nigeria	University of Guelph (6), Canada
University of South Africa (32)	Midlands State University Zimbabwe (6), Zimbabwe	Charles Sturt University (5), Australia
Stellenbosch University (31)	Federal University of Technology, Minna (5), Nigeria	KU Leuven (5), Belgium
University of the Western Cape (30)	Botswana International University of Science and Technology (4), Botswana	Ningbo University (5), China
University of Johannesburg (29)	University of Ibadan (4), Nigeria	University of Leeds (5), United Kingdom
Tshwane University of Technology (25)	Chinhoyi University of Technology (3), Zimbabwe	University of Oxford (5), United Kingdom

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 48.7% of the Institution's Scholarly Output (352 of 723) could be linked to at least one funder, compared to 371 publications which could not be linked to any funders.

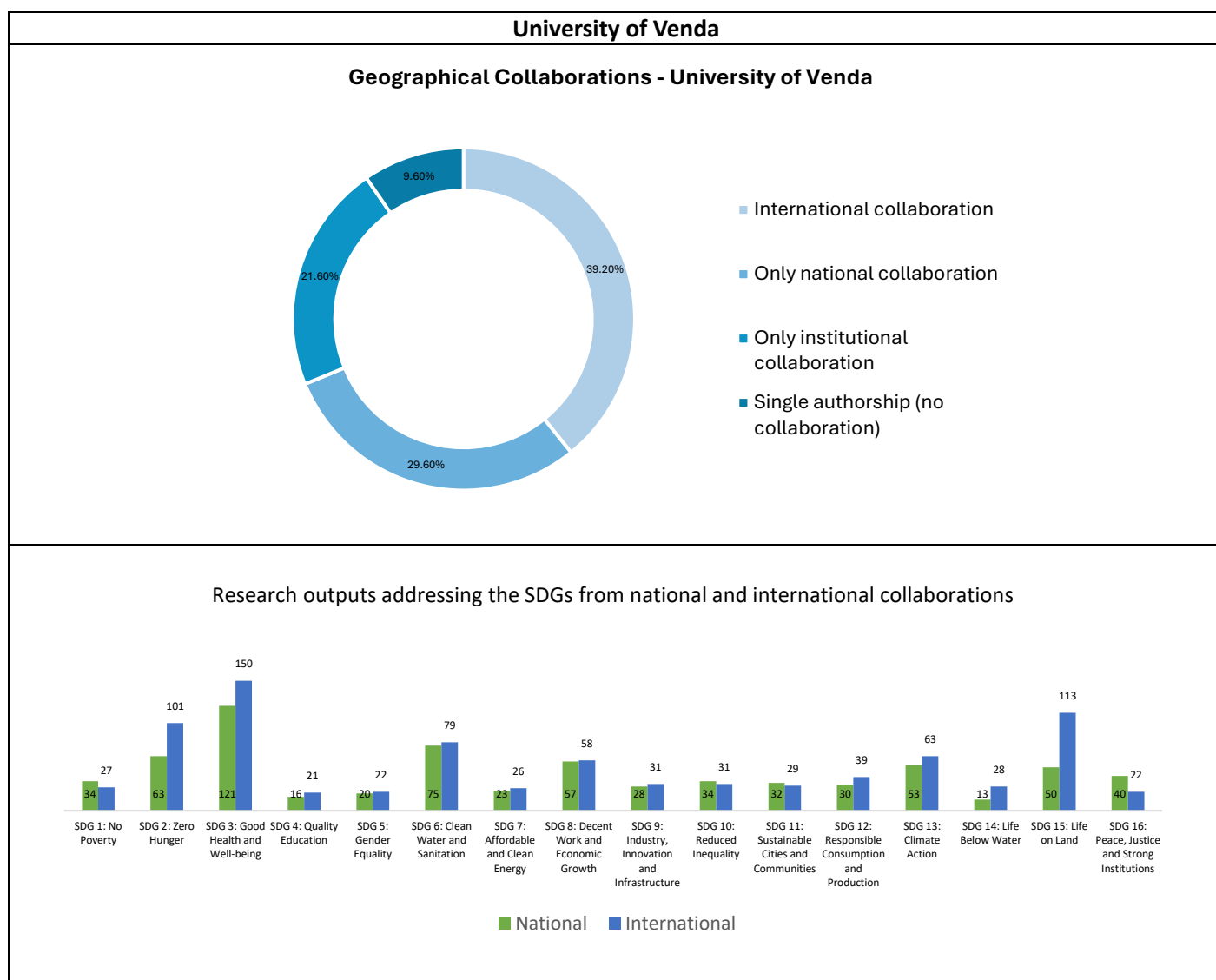
Table 29 - Top Ten Funding Bodies by Linked Publications at the University of Mpumalanga.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	203
University of Mpumalanga	South Africa	47
North-West University	South Africa	34
Inyuvesi Yakwazulu-Natali	South Africa	24
Alexander von Humboldt-Stiftung	Germany	22
Rhodes University	South Africa	20
Agricultural Research Council	South Africa	19
Leverhulme Trust	United Kingdom	15
Water Research Commission	South Africa	15
University of Venda	South Africa	13

University of Venda

Collaborations at the University of Venda are predominantly international (39%), but strong national (30%) and institutional (22%) collaborations also exist. SDG 3 *Good Health and Well-being* was the most addressed by both international and national collaborations. National collaborations made strong contributions towards SDG 6 *Clean Water and Sanitation* and SDG 2 *Zero Hunger*, while international collaborations strongly contributed to SDG 15 *Life on Land* and SDG 2 *Zero Hunger*. Although the majority of publications were made by international collaborations, national collaborations dominated in SDG 1 *No Poverty*, SDG 10 *Reduced Inequalities*, SDG 11 *Sustainable Cities and Communities*, and SDG 16 *Peace, Justice, and Strong Institutions*.

Table 30 - Geographical layout of collaborations at the University of Venda.



The University of Venda made the most research output contributions towards *SDG 3 Good Health and Well-being* (393), *SDG 2 Zero Hunger* (209), and *SDG 6 Clean Water and Sanitation* (199). These were all in the top three most addressed SDGs from national collaborations. In contrast, *SDG 4 Quality Education*, *SDG 5 Gender Equality*, and *SDG 14 Life Below Water* were the three least addressed SDGs regarding total research outputs. However, most of the national universities with which the University of Venda are currently collaborating are strong contributors in these fields based on the data in the previous study. The University of KwaZulu-Natal, the University of Pretoria, and the University of Johannesburg are in the top ten national contributors for SDG 4 and SDG 5, with the University of Johannesburg being the top contributor to SDG 4. Additionally, the University of KwaZulu-Natal and the University of Johannesburg are in the top ten national contributors for SDG 14.

Table 31 - Top ten National, African, and International Collaborators of the University of Venda.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
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University of KwaZulu-Natal (145)	Botswana International University of Science and Technology (21), Botswana	University of Virginia (56), United States
University of Pretoria (121)	University of Zimbabwe (19), Zimbabwe	Durham University (32), United Kingdom
University of Johannesburg (106)	National University of Science and Technology Bulawayo (17), Zimbabwe	Queen's University Belfast (31), United Kingdom
University of South Africa (105)	Technical University of Kenya (16), Kenya	Universidade Federal do Ceará (27), Brazil
North West University (102)	Obafemi Awolowo University (12), Nigeria	Aga Khan University (25), Pakistan
University of the Witwatersrand (87)	University of Botswana (10), Botswana	Christian Medical College (23), India
University of Limpopo (85)	Federal University of Technology, Akure (9), Nigeria	London School of Hygiene and Tropical Medicine (19), United Kingdom
Stellenbosch University (82)	University of Eswatini (9), Swaziland	University of Copenhagen (19), Denmark
University of The Free State (76)	University of Ibadan (9), Nigeria	Johns Hopkins University (18), United States
Rhodes University (74)	Ekiti State University (8), Nigeria	Nanjing Tech University (17), China

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 50.3% of the Institution's Scholarly Output (1,039 of 2,064) could be linked to at least one funder, compared to 1025 publications which could not be linked to any funders.

Table 32 - Top Ten Funding Bodies by Linked Publications at the University of Venda.

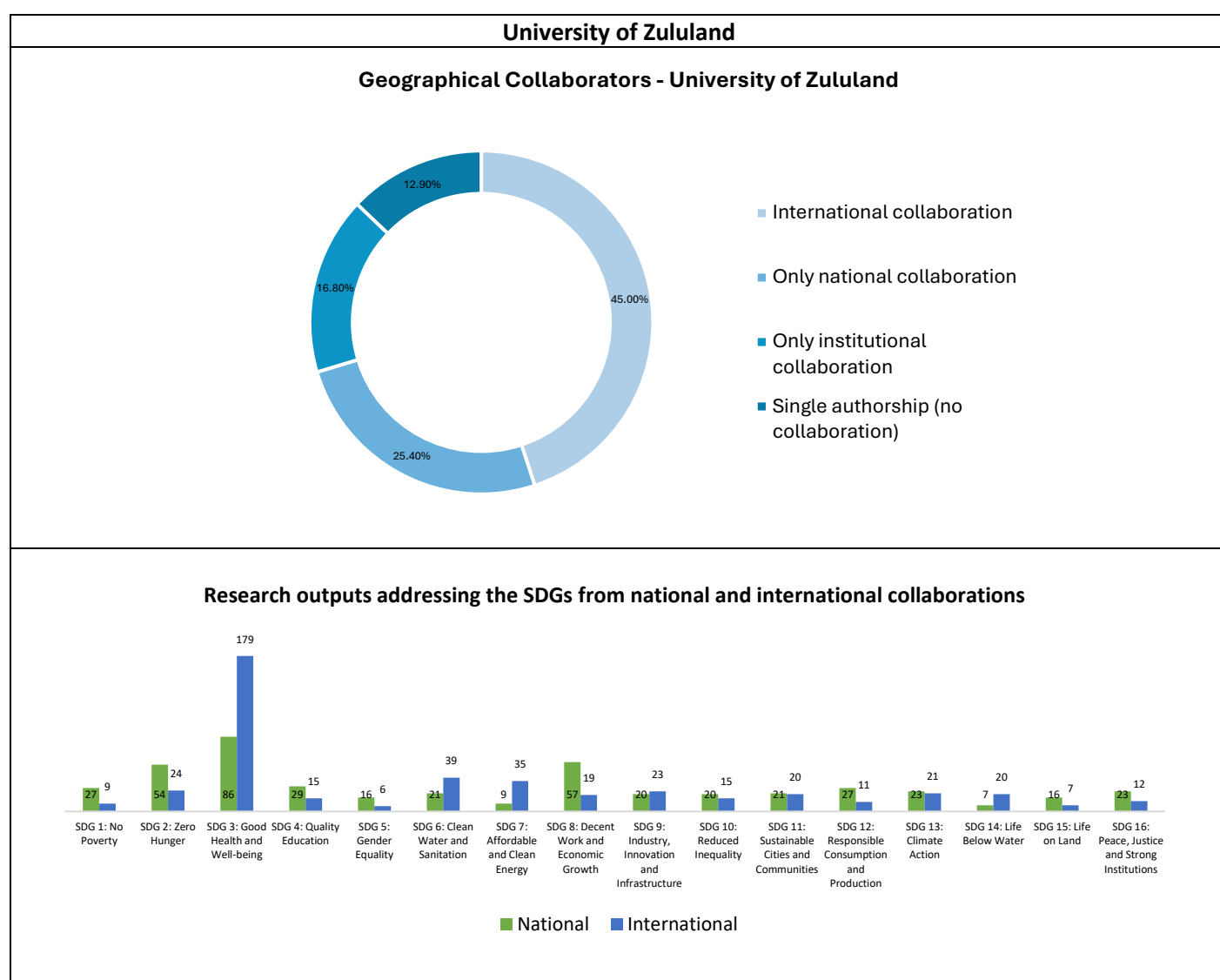
Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	429
University of Venda	South Africa	352
National Institutes of Health	United States	52
Water Research Commission	South Africa	51
South African Medical Research Council	South Africa	42
UK Research and Innovation	United Kingdom	39
Council for Scientific and Industrial Research, South Africa	South Africa	38
Department of Science and Technology, Ministry of Science and Technology, India	India	38
Bill and Melinda Gates Foundation	United States	37
Alexander von Humboldt-Stiftung	Germany	29

University of Zululand

Nearly half (45%) of the collaborations at the University of Zululand are international, but strong national (25%) and institutional (17%) collaborations also exist. SDG 3 *Good Health and Well-being* is the most addressed by both international and national collaborations. International collaborations strongly contributed to SDG 6 *Clean Water and Sanitation*, and SDG 7 *Affordable and Clean Energy*.

National collaborations made strong contributions towards SDG 8 *Decent Work and Economic Growth*, and SDG 2 *Zero Hunger*. National collaborations contributed to the most publications in 11 of the 16 SDGs.

Table 33 - Geographical layout of collaborations at the University of Zululand.



University of Zululand made the most contributions towards SDG 3 *Good Health and Well-being* (318), SDG 8 *Decent Work and Economic Growth* (182), and SDG 4 *Quality Education* (106). SDG 3 and SDG 8 were in the top three most addressed SDGs from national collaborations. In contrast, SDG 5 *Gender Equality*, SDG 14 *Life Below Water*, and SDG 15 *Life on Land* were represented by the least number of publications. University of Zululand currently collaborate with the University of KwaZulu-Natal, which is in the top ten national contributors for SDG 5, SDG 14, and SDG 15, and with the University of Johannesburg, which is the top contributor to SDG 5 and SDG 14, based on the data in the previous study.

Table 34 - Top ten National, African, and International Collaborators of the University of Zululand.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
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University of KwaZulu-Natal (245)	Afe Babalola University (70), Nigeria	GLA University (42), India
University of Johannesburg (121)	Federal University Oye-Ekiti (43), Nigeria	Marche Polytechnic University (39), Italy
North West University (105)	First Technical University (28), Nigeria	Polish Academy of Sciences (31), Poland
Stellenbosch University (99)	Landmark University (20), Nigeria	Stockholm University (23), Sweden
University of Pretoria (70)	University of Ilorin (20), Nigeria	University of Göttingen (22), Germany
University of South Africa (66)	Namibia University of Science and Technology (19), Namibia	University of Manchester (22), United Kingdom
University of the Witwatersrand (65)	Bowen University (18), Nigeria	Université Paris Cité (22), France
University of the Western Cape (61)	University of Dar Es Salaam (16), Tanzania	Université Paris-Saclay (22), France
University of The Free State (59)	University of Ibadan (15), Nigeria	KTH Royal Institute of Technology (21), Sweden
University of Cape Town (42)	Adekunle Ajasin University, Akungba (12), Nigeria	Chang'an University (20), China

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 32.0% of the Institution's Scholarly Output (601 of 1,881) could be linked to at least one funder, compared to 1280 publications which could not be linked to any funders.

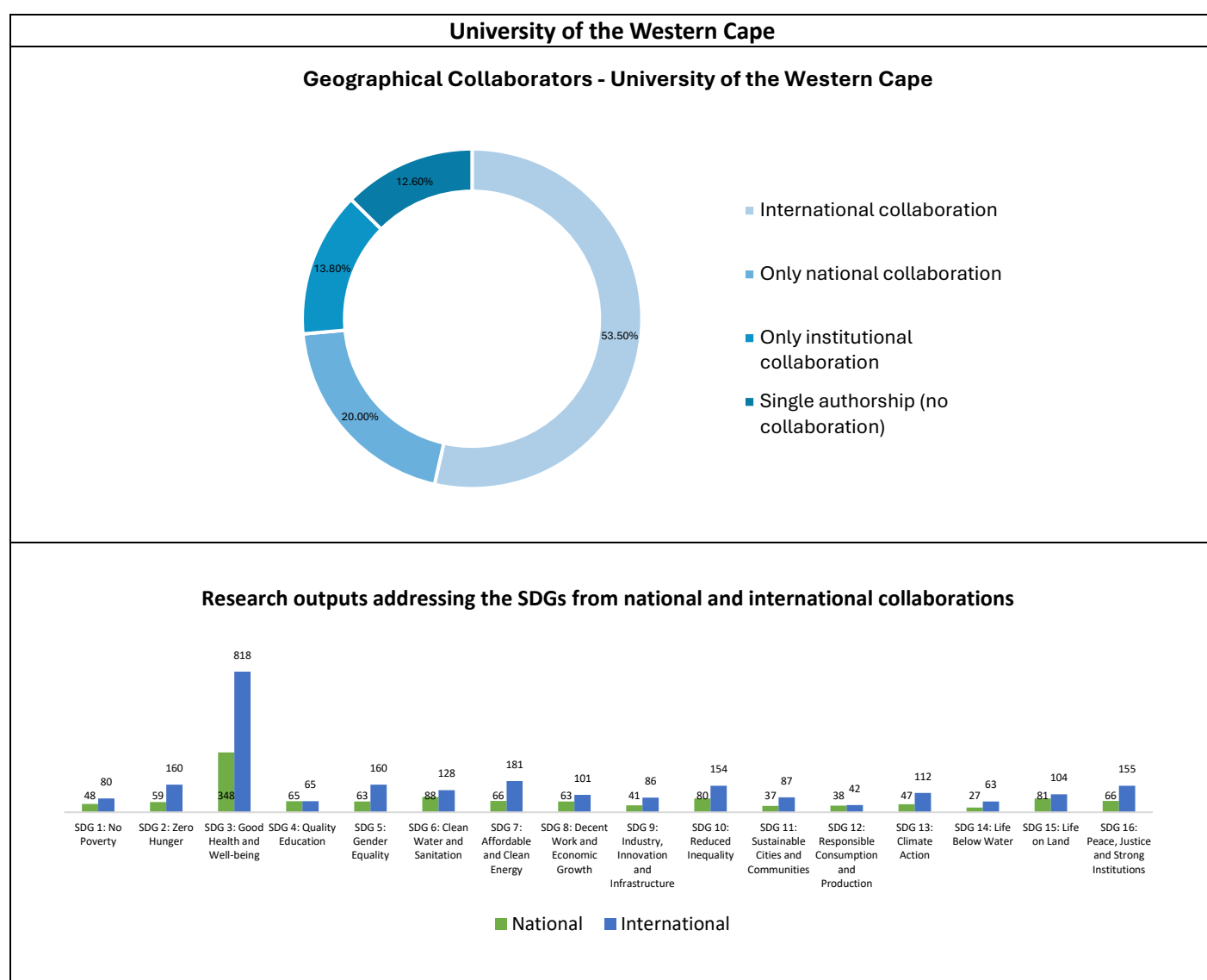
Table 35 - Top Ten Funding Bodies by Linked Publications at the University of Zululand.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	347
South African Medical Research Council	South Africa	85
UK Research and Innovation	United Kingdom	43
Inyuvesi Yakwazulu-Natali	South Africa	42
National Natural Science Foundation of China	China	39
Council for Scientific and Industrial Research, South Africa	South Africa	35
European Commission	European Union	31
National Treasury	South Africa	27
University of Zululand	South Africa	25
Ministry of Science and Technology of the People's Republic of China	China	21

University of the Western Cape

More than half of the collaborations at the University of the Western Cape are international (54%), but strong national (20%) and institutional (14%) collaborations also exist. SDG 3 *Good Health and Well-being* was the most addressed by both international and national collaborations. National collaborations strongly contributed to SDG 6 *Clean Water and Sanitation* and SDG 15 *Life on Land*. International collaborations made strong contributions to SDG 7 *Affordable and Clean Energy*, SDG 2 *Zero Hunger*, and SDG 5 *Gender Equality*. International collaborations contributed to the most publications in all 16 SDGs.

Table 36 - Geographical layout of collaborations at the University of the Western Cape.



The University of the Western Cape made the most contributions in terms of total research outputs towards *SDG 3 Good Health and Well-being* (1429), *SDG 16 Peace, Justice and Strong Institutions* (403), and *SDG 10 Reduced Inequalities* (373). In contrast, *SDG 11 Sustainable Cities and Communities*, *SDG 12 Responsible Consumption and Production*, and *SDG 14 Life Below Water* were the three least addressed SDGs. Most of the national universities with which the University of the Western Cape are currently collaborating are strong contributors to the attainment of the SDGs based on the data in the previous study, including the University of Cape Town, which is in the top ten national contributors for *SDG 11* and *SDG 14*, and the University of Pretoria, which is in the top ten national contributors for *SDG 11* and *SDG 12*.

Table 37 - Top ten National, African, and International Collaborators of the University of the Western Cape.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of Cape Town (713)	University of Ibadan (91), Nigeria	University of Oxford (227), United Kingdom

Stellenbosch University (538)	University of Zimbabwe (71), Zimbabwe	University of Manchester (178), United Kingdom
University of Pretoria (362)	Makerere University (68), Uganda	University of Edinburgh (172), United Kingdom
University of KwaZulu-Natal (344)	Cairo University (60), Egypt	Harvard University (151), United States
University of the Witwatersrand (331)	University of Nigeria (55), Nigeria	Université Paris-Saclay (145), France
Cape Peninsula University of Technology (205)	University of Lagos (51), Nigeria	Université Paris Cité (142), France
Rhodes University (185)	Addis Ababa University (48), Ethiopia	University of Western Australia (135), Australia
University of South Africa (146)	University of Namibia (46), Namibia	University of Cambridge (124), United Kingdom
University of Johannesburg (145)	Ahmadu Bello University (44), Nigeria	University of Groningen (123), Netherlands
North West University (144)	University of Ghana (43), Ghana	CSIC (121), Spain

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 47.7% of the Institution's Scholarly Output (3,291 of 6,899) could be linked to at least one funder, compared to 3608 publications which could not be linked to any funders.

Table 38 - Top Ten Funding Bodies by Linked Publications at the University of the Western Cape.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	1271
UK Research and Innovation	United Kingdom	519
European Commission	European Union	461
South African Medical Research Council	South Africa	298
University of the Western Cape	South Africa	259
National Science Foundation	United States	217
National Natural Science Foundation of China	China	211
National Aeronautics and Space Administration	United States	156
Department of Science and Technology, Ministry of Science and Technology, India	India	153
National Institutes of Health	United States	147

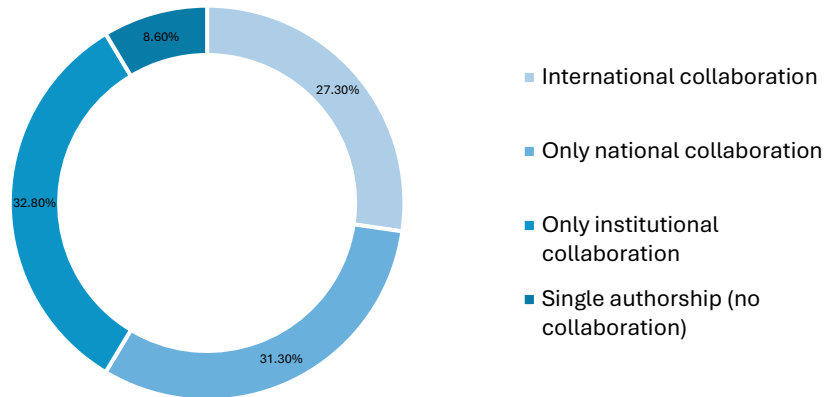
Vaal University of Technology

Most of the collaborations at the Vaal University of Technology were institutional (33%), with strong national (31%) and international (27%) collaborations. SDG 6 *Clean Water and Sanitation* was the SDG most addressed by international and national collaborations. International collaborations made strong contributions towards SDG 3 *Good Health and Wellbeing*, SDG 9 *Industry, Innovation, and Infrastructure* and SDG 12 *Responsible Consumption and Production*. National collaborations strongly contributed to SDG 9 *Industry, Innovation, and Infrastructure* and SDG 8 *Decent Work and Economic Growth*. National collaborations contributed to the most publications in 13 of the 16 SDGs.

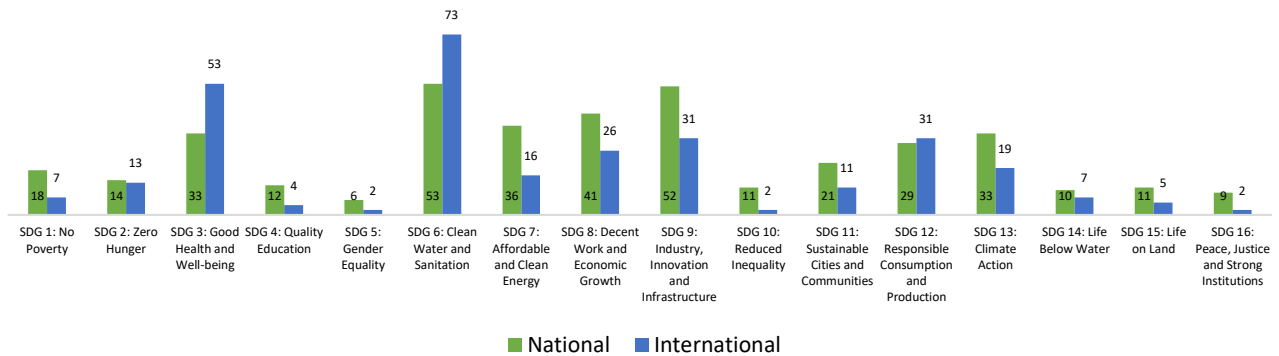
Table 39 - Geographical layout of collaborations at the Vaal University of Technology.

Vaal University of Technology

Geographical Collaborators - Vaal University of Technology



Research outputs addressing the SDGs from national and international collaborations



Data from SciVal indicated that the Vaal University of Technology made the most publication contributions towards SDG 6 *Clean Water and Sanitation* (186), SDG 9 *Industry, Innovation, and Infrastructure* (131), and SDG 8 *Decent Work and Economic Growth* (116). These were all in the top three most addressed SDGs from either international or national collaborations. In contrast, SDG 16 *Peace, Justice, and Strong Institutions*, SDG 10 *Reduced Inequalities*, and SDG 5 *Gender Equality* were the three least addressed SDGs. The Vaal University of Technology collaborate with the University of Johannesburg, which is in the top ten national contributors for SDG 5, SDG 10, and SDG 16 based on the data in the previous study. Additionally, the collaborator, the University of South Africa, is in the top ten national contributors for SDG 10 based on the data in the previous study.

Table 40 - Top ten National, African, and International Collaborators of the Vaal University of Technology.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of South Africa (130)	Botswana International University of Science and Technology (19), Botswana	Texas Tech University (10), United States
University of Johannesburg (85)	Redeemer's University (18), Nigeria	CCS Haryana Agricultural University (7), India

North West University (46)	University of Ibadan (18), Nigeria	Justus Liebig University Giessen (7), Germany
Tshwane University of Technology (42)	Federal University Oye-Ekiti (17), Nigeria	Chandigarh University (5), India
University of KwaZulu-Natal (34)	Bingham University (15), Nigeria	King Abdullah University of Science and Technology (5), Saudi Arabia
Durban University of Technology (33)	Ladoke Akintola University of Technology (11), Nigeria	University of Delhi (5), India
University of the Witwatersrand (33)	Midlands State University Zimbabwe (10), Zimbabwe	University of Kansas (5), United States
University of The Free State (23)	Adeleke University (8), Nigeria	Birjand University of Medical Sciences (4), Iran
University of Pretoria (18)	Obafemi Awolowo University (8), Nigeria	Burapha University (4), Thailand
Central University of Technology (17)	University of Ilorin (8), Nigeria	Hamdard University (4), India

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 38.6% of the Institution's Scholarly Output (433 of 1,123) could be linked to at least one funder, compared to 690 publications which could not be linked to any funders.

Table 41 - Top Ten Funding Bodies by Linked Publications at the Vaal University of Technology.

Funder	Country/region	Linked Publications
Vaal University of Technology	South Africa	246
Department of Science and Innovation, South Africa	South Africa	142
Council for Scientific and Industrial Research, South Africa	South Africa	17
Fonds National de la Recherche Luxembourg	Luxembourg	17
University of Johannesburg	South Africa	16
Water Research Commission	South Africa	14
Alexander von Humboldt-Stiftung	Germany	12
North-West University	South Africa	11
University of the Witwatersrand, Johannesburg	South Africa	10
Tshwane University of Technology	South Africa	10

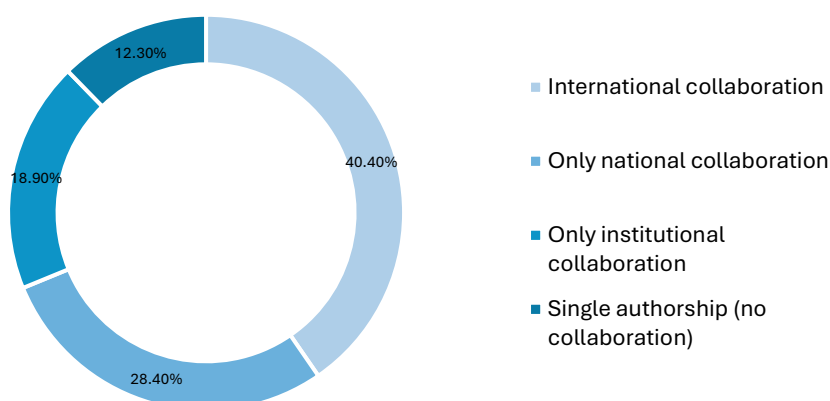
Walter Sisulu University

Collaborations at the Walter Sisulu University are predominantly international (40%), but strong national (28%) and institutional (19%) collaborations also exist. SDG 3 *Good Health and Well-being* is the SDG that was the most addressed by both international and national collaborations, and it was followed by SDG 9 *Industry, Innovation, and Infrastructure*. International collaborations made strong contributions towards SDG 5 *Gender Equality*, while national collaborations strongly contributed to SDG 8 *Decent Work and Economic Growth*. Although the majority of publications were international, national collaborations dominated in SDG 4 *Quality Education*, SDG 6 *Clean Water and Sanitation* and SDG 15 *Life on Land*.

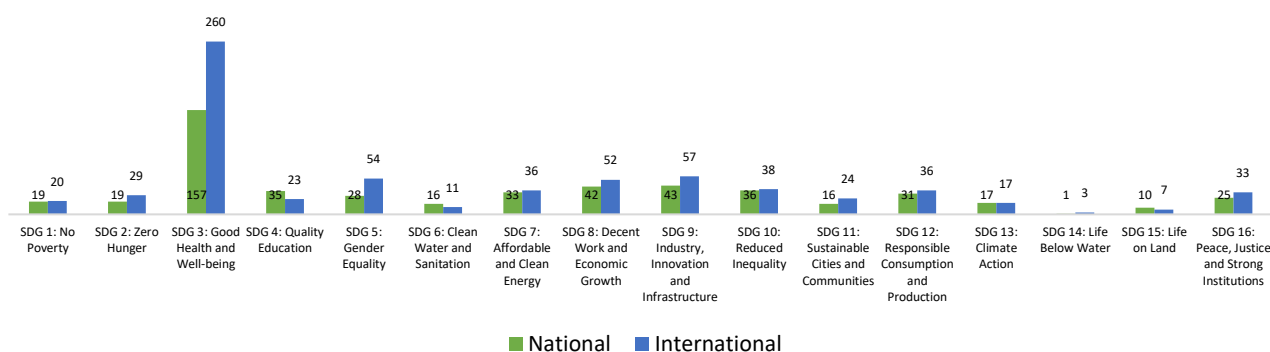
Table 42 - Geographical layout of collaborations at the Walter Sisulu University.

Walter Sisulu University

Geographical Collaborators - Walter Sisulu University



Research outputs addressing the SDGs from national and international collaborations



Walter Sisulu University made the most contributions towards SDG 3 *Good Health and Well-being* (531), SDG 8 *Decent Work and Economic Growth* (179), and SDG 9 *Industry, Innovation, and Infrastructure* (141). SDG 3 and SDG 9 were in the top three most addressed SDGs from both international and national collaborations, and SDG 8 was in the top three addressed SDGs by national collaborations. In contrast, SDG 6 *Clean Water and Sanitation*, SDG 15 *Life on Land*, and SDG 14 *Life Below Water* were the least addressed. Collaborations were with the University of Johannesburg, which is the top national contributor for SDG 6 and in the top ten national contributors for SDG 14. Additionally, the University of Cape Town is in the top ten national contributors for SDG 14 and SDG 15, and the University of KwaZulu-Natal is in the top ten national contributors for SDG 6, SDG 14, and SDG 15.

Table 43 - Top ten National, African, and International Collaborators of the Walter Sisulu University.

Top Ten South African Universities Collaborators	Top Ten African Universities Collaborators	Top Ten International Universities Collaborators
University of Cape Town (184)	University of Botswana (29), Botswana	University of Oxford (33), United Kingdom
University of Johannesburg (178)	Covenant University (26), Nigeria	University of New South Wales (31), Australia

University of KwaZulu-Natal (134)	University of Ilorin (25), Nigeria	Harvard University (28), United States
University of the Witwatersrand (134)	Namibia University of Science and Technology (23), Namibia	The George Institute for International Health (26), Australia
Stellenbosch University (121)	University of Ibadan (21), Nigeria	University of Washington (25), United States
University of The Free State (96)	University of Nigeria (19), Nigeria	Johns Hopkins University (21), United States
University of Fort Hare (85)	Afe Babalola University (17), Nigeria	Imperial College London (20), United Kingdom
University of Pretoria (76)	University of Nairobi (16), Kenya	University College London (18), United Kingdom
Nelson Mandela University (61)	Obafemi Awolowo University (15), Nigeria	University of Ottawa (18), Canada
North West University (58)	Addis Ababa University (14), Ethiopia	Medical University of Graz (17), Austria

** The number in () indicates the number of co-authored publications.

Based on acknowledgements indexed from publications and linked publications data from the funder, 31.0% of the Institution's Scholarly Output (568 of 1,833) could be linked to at least one funder, compared to 1265 publications which could not be linked to any funders.

Table 44 - Top Ten Funding Bodies by Linked Publications at the Walter Sisulu University.

Funder	Country/region	Linked Publications
Department of Science and Innovation, South Africa	South Africa	183
South African Medical Research Council	South Africa	108
National Institutes of Health	United States	58
Walter Sisulu University	South Africa	41
UK Research and Innovation	United Kingdom	38
Bill and Melinda Gates Foundation	United States	29
University of Johannesburg	South Africa	29
GlaxoSmithKline	United Kingdom	27
Council for Scientific and Industrial Research, South Africa	South Africa	19
European Commission	European Union	17

Table 45 below lists the 21 South African national universities that were in the top ten national collaborators to any of the HDUs, UoTs, and newly established institutions. Additionally, the table highlights the SDGs in which these listed universities have made a top ten national contribution towards the attainment of that specific SDG based on their total research outputs (previous study). Not only was the University of KwaZulu-Natal among the top ten national collaborators of all 14 HDUs, UoTs, and newly established institutions in South Africa mentioned in this study, but they were also in the top ten national contributors for all 16 SDGs as reported in the previous study. The University of Pretoria was also among the top ten national collaborators of all 14 HDUs, UoTs, and newly established institutions in South Africa, and they were in the top ten national contributors for 15 of the first 16 SDGs as reported in the previous study. Interestingly, the University of South Africa was among the top ten national collaborators for 13 of the HDUs, UoTs, and newly established institutions in South Africa, although they were only in the top ten national contributors for two of the first 16 SDGs.

Numerous public universities in South Africa that have been making strong contributions to the attainment of the SDGs have not featured in the top ten national collaborators of many of the HDUs, UoTs, and newly established institutions. Below is a list of universities with whom future collaborations are strongly recommended and should be further investigated:

- University of Cape Town (top ten national contributor to 14 of the first 16 SDGs)
- University of the Western Cape (top ten national contributor to 7 of the first 16 SDGs)
- Rhodes University (top ten national contributor in 14 of the first 16 SDGs)
- University of Fort Hare (top ten national contributor in 6 of the first 16 SDGs)
- University of Zululand (top ten national contributor in 6 of the first 16 SDGs)

Table 45 – The top ten national collaborators and the SDGs they were in the top 10 for contributing nationally to the attainment of the SDGs.

	SDG 1: No Poverty	SDG 2: Zero Hunger	SDG 3: Good Health and Well- being	SDG 4: Quality Education	SDG 5: Gender Equality	SDG 6: Clean Water and Sanitation	SDG 7: Affordable and Clean Energy	SDG 8: Decent Work and Economic Growth	SDG 9: Industry, Innovation and Infrastructure	SDG 10: Reduced Inequality	SDG 11: Sustainable Cities and Communities	SDG 12: Responsible Consumption and Production	SDG 13: Climate Action	SDG 14: Life Below Water	SDG 15: Life on Land	SDG 16: Peace, Justice and Strong Institutions
University of KwaZulu-Natal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University of Pretoria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
University of Johannesburg	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
University of South Africa				✓						✓						
North West University				✓				✓				✓				
University of the Witwatersrand	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Stellenbosch University	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓
University of the Free State		✓	✓	✓		✓				✓	✓		✓		✓	✓
University of Cape Town	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
Tshwane University of Technology						✓	✓		✓							
Durban University of Technology						✓	✓		✓			✓				
University of the Western Cape	✓		✓		✓		✓			✓				✓		✓
University of Limpopo		✓			✓											✓
Nelson Mandela University													✓	✓	✓	
Rhodes University	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓
Central University of Technology							✓		✓		✓					
University of Venda		✓				✓							✓		✓	
University of Fort Hare	✓	✓	✓		✓						✓			✓		
University of Zululand	✓							✓	✓	✓		✓		✓		
Mpumalanga University		✓						✓				✓		✓	✓	
Vaal University of Technology						✓										

Recommended Future Collaborations

Based on the data from the previous and the current study, Table 46 was constructed using the top three national contributors per SDG and mapping those HDUs, UoTs, and newly established institutions mentioned in this study that do not have existing collaborations with the top three national contributors and that are not themselves within the top ten national contributors for the specific SDG. This is used to identify potential future collaborations. We encourage universities to evaluate their existing collaborations to identify common areas of strength and emerging excellence that will result in increased contributions made towards attaining the SDGs. Alternative collaborations can also be strengthened based on the top ten collaborators for each institution.

The University of Cape Town, Stellenbosch University, University of the Witwatersrand, and University of Johannesburg are strong contributors to the attainment of most of the SDGs, but unfortunately, few HDUs, UoTs, and newly established institutions mentioned in this study are currently collaborating with them. Future collaborations between these universities could potentially increase the overall national contributions made towards the attainment of the SDGs.

Table 46 - Potential future collaborators based on top performers and current collaborations.

Sustainable Development Goal	The top three contributors nationally (based on data from the previous study)	Universities with emerging excellence	Potential future collaborators
1: No Poverty	1. University of Cape Town 2. University of Johannesburg 3. University of KwaZulu-Natal*	- Central University of Technology - Mangosuthu University of Technology - Tshwane University of Technology - University of Limpopo - University of Mpumalanga - University of Venda - Vaal University of Technology	University of Cape Town
		Sefako Makgatho Health and Sciences University	University of Johannesburg
2: Zero Hunger	1. University of KwaZulu-Natal* 2. Rhodes University 3. University of Pretoria*	- Cape Peninsula University of Technology - Central University of Technology - Durban University of Technology	Rhodes University

		• Mangosuthu University of Technology • Sefako Makgatho Health and Sciences University • Tshwane University of Technology • University of Zululand • Vaal University of Technology • Walter Sisulu University	
3: Good Health and Well-being	1. University of Cape Town 2. University of the Witwatersrand 3. University of KwaZulu-Natal*	• Central University of Technology • Mangosuthu University of Technology • Tshwane University of Technology • University of Limpopo • University of Mpumalanga • University of Venda • Vaal University of Technology	University of Cape Town
	•	• Cape Peninsula University of Technology • Central University of Technology • University of Mpumalanga	University of the Witwatersrand
4: Quality Education	1. University of Johannesburg 2. University of Cape Town 3. University of South Africa	• Sefako Makgatho Health and Sciences University • Central University of Technology • Mangosuthu University of Technology • Tshwane University of Technology • University of Fort Hare • University of Limpopo	University of Johannesburg University of Cape Town

		- University of Mpumalanga - University of Venda - Vaal University of Technology	
		Walter Sisulu University	University of South Africa
5: Gender equality	1. University of the Witwatersrand 2. University of Cape Town 3. University of KwaZulu-Natal*	- Cape Peninsula University of Technology - Central University of Technology - University of Mpumalanga	University of the Witwatersrand
		- Central University of Technology - Mangosuthu University of Technology - Tshwane University of Technology - University of Fort Hare - University of Limpopo - University of Mpumalanga - University of Venda - Vaal University of Technology	University of Cape Town
6: Clean Water and Sanitation	1. University of Johannesburg 2. University of KwaZulu-Natal* 3. Rhodes University	Sefako Makgatho Health and Sciences University	University of Johannesburg
		- Cape Peninsula University of Technology - Central University of Technology - Mangosuthu University of Technology - Sefako Makgatho Health and Sciences University - University of Fort Hare - University of Limpopo - University of Zululand	Rhodes University

		Walter Sisulu University	
7: Affordable and Clean Energy	1. University of Johannesburg 2. University of KwaZulu-Natal* 3. University of Pretoria*	Sefako Makgatho Health and Sciences University	University of Johannesburg
8: Decent Work and Economic Growth	1. University of Johannesburg 2. University of KwaZulu-Natal* 3. University of Cape Town	Sefako Makgatho Health and Sciences University	University of Johannesburg
		- Central University of Technology - Mangosuthu University of Technology - Tshwane University of Technology - University of Fort Hare - University of Limpopo - University of Venda - Vaal University of Technology	University of Cape Town
9: Industry, Innovation, and Infrastructure	1. University of Johannesburg 2. Central University of Technology 3. Stellenbosch University	Sefako Makgatho Health and Sciences University	University of Johannesburg
		- Cape Peninsula University of Technology - Central University of Technology - Sefako Makgatho Health and Sciences University - University of Fort Hare - University of Limpopo - University of Mpumalanga - University of the Western Cape - University of Venda - Walter Sisulu University	Central University of Technology
		Mangosuthu University of Technology	Stellenbosch University

		- University of Limpopo - Vaal University of Technology	
10: Reduced Inequalities	1. University of the Witwatersrand 2. University of Cape Town 3. University of KwaZulu-Natal*	- Cape Peninsula University of Technology - Central University of Technology - University of Mpumalanga	University of the Witwatersrand
		- Central University of Technology - Mangosuthu University of Technology - Tshwane University of Technology - University of Fort Hare - University of Limpopo - University of Mpumalanga - University of Venda - Vaal University of Technology	University of Cape Town
11: Sustainable Cities and Communities	1. University of Johannesburg 2. University of the Witwatersrand 3. University of Cape Town	Sefako Makgatho Health and Sciences University	University of Johannesburg
		- Cape Peninsula University of Technology - University of Mpumalanga	University of the Witwatersrand
		- Mangosuthu University of Technology - Tshwane University of Technology - University of Limpopo - University of Mpumalanga - University of Venda - Vaal University of Technology	University of Cape Town
12: Responsible Consumption and Production	1. University of Johannesburg	Sefako Makgatho Health and Sciences University	University of Johannesburg

	- University of KwaZulu-Natal* - Stellenbosch University	- Mangosuthu University of Technology - University of Limpopo - Vaal University of Technology	Stellenbosch University
13: Climate Action	- University of Cape Town - University of KwaZulu-Natal** - Rhodes University	- Central University of Technology - Mangosuthu University of Technology - Tshwane University of Technology - University of Fort Hare - University of Limpopo - University of Mpumalanga - Vaal University of Technology	University of Cape Town
		- Cape Peninsula University of Technology - Central University of Technology - Durban University of Technology - Mangosuthu University of Technology - Sefako Makgatho Health and Sciences University - Tshwane University of Technology - University of Fort Hare - University of Limpopo - University of Zululand - Vaal University of Technology - Walter Sisulu University	Rhodes University
14: Life Below Water	Rhodes University	Cape Peninsula University of Technology	Rhodes University

	2. Nelson Mandela University 3. University of Cape Town	• Central University of Technology • Durban University of Technology • Mangosuthu University of Technology • Sefako Makgatho Health and Sciences University • Tshwane University of Technology • University of Limpopo • Vaal University of Technology • Walter Sisulu University	
		• Cape Peninsula University of Technology • Durban University of Technology • Mangosuthu University of Technology • Sefako Makgatho Health and Sciences University • Tshwane University of Technology • University of Limpopo • University of Venda • Vaal University of Technology	Nelson Mandela University
		• Central University of Technology • Mangosuthu University of Technology • Tshwane University of Technology • University of Limpopo • University of Venda • Vaal University of Technology	University of Cape Town

15: Life on Land	1. Rhodes University 2. Stellenbosch University 3. University of Pretoria*	• Cape Peninsula University of Technology • Central University of Technology • Durban University of Technology • Mangosuthu University of Technology • Sefako Makgatho Health and Sciences University • Tshwane University of Technology • University of Fort Hare • University of Limpopo • University of Zululand • Vaal University of Technology • Walter Sisulu University	Rhodes University
		• Durban University of Technology • Mangosuthu University of Technology • University of Limpopo • Vaal University of Technology	Stellenbosch University
16: Peace, Justice, and Strong Institutions	1. University of Cape Town 2. University of the Witwatersrand 3. University of KwaZulu-Natal*	• Central University of Technology • Mangosuthu University of Technology • Tshwane University of Technology • University of Fort Hare • University of Limpopo • University of Mpumalanga • University of Venda • Vaal University of Technology	University of Cape Town

		• Cape Peninsula University of Technology • Central University of Technology • University of Mpumalanga	University of the Witwatersrand
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*The university is not added to potential future collaborators, as they already have current collaborations with all 14 universities mentioned in this study.

Potential Funding Opportunities

As with the collaborators, it is clear that there are existing funders that can be approached to fund national collaborations and projects. From the above data per university, it was evident that the Department of Science and Innovation in South Africa and specifically the National Research Foundation (NRF) is the top funder of research at the HDUs, UoTs, and newly established institutions evaluated in this study, as it was within the top ten funder for all the mentioned universities. Other major funders at a national level include the South African Medical Research Council (MRC), funding 12 of the 14 mentioned universities, and the South African Council for Scientific and Industrial Research (CSIR), funding eight of the 14 mentioned universities. UK Research and Innovation was the top international funder, funding 10 of the 14 mentioned universities. The European Commission funded nine of the 14 mentioned universities, followed by the Department of Science and Technology, Ministry of Science and Technology, India, which funded research at eight of the 14 mentioned universities. With reference to Table 46, the University of Cape Town, University of Johannesburg, Stellenbosch University, and University of the Witwatersrand have similar funders, which could enable easier collaboration and access to future funding between these universities. The National Institute for Health (NIH) is a top ten funder of research at the University of Cape Town, Stellenbosch University, and the University of the Witwatersrand. This could present an opportunity for the HDUs, UoTs, and newly established institutions in South Africa to potentially secure future research funding from them in collaboration with universities that have experience in securing funding from them.

Impact of Centres of Excellence and SARChI Chairs at the HDUs, UoTs, and newly established institutions on SDGs

Since its inception, there have been 293 National Research Foundation SARChI Chairs that were/are hosted at public universities in South Africa, of which 39 are co-funded. Co-funding is either with (i) the South African government departments and their respective implementing agencies or science councils, (ii) universities, (iii) private sector partners, and (iv) international partners. Regarding the status of these chairs, 200 are operating, three are not operating, one has phased out, 84 have phased out or reached the end of their cycle, and five have rescinded. A mere 40 of these SARChI Chairs are currently operating and hosted at ten of the HDUs, UoTs, and newly established institutions in South Africa. Nearly half of these SARChI Chairs are hosted at the University of the Western Cape (17), and the Tshwane University of Technology hosts seven. The University of Mpumalanga, Mangosuthu University of Technology, Sol Plaatje University, Walter Sisulu University, and Vaal University of Technology do not host any SARChI Chairs. From Table 47 below, it is clear that these SARChI chairs have a strong focus on SDG 9 *Industry, Innovation, and Infrastructure*, and SDG 3 *Good Health and Well-being*.

Table 47 - NRF SARChI Chairs hosted at HDUs, UoTs, and newly established universities.

Name of Research Chair	Host Institution	Tier Level	SDG Addressed
Cardiometabolic Health	CPUT	2	SDG 3
Governance and Economics for Water and Sanitation Institutions.	CPUT	2	SDG 6, 9
Teacher Education	CPUT	1	SDG 4
Work Integrated Learning	CPUT	2	SDG 4, 8, 9, 17
Medical Product Development	CUT	2	SDG 3, 9
Applying Mathematics to Natural and Human Systems	DUT	2	SDG 9
Development and optimisation of wastewater treatment technology for developing economics	DUT	1	SDG 6, 7
Substance Abuse and Population Mental Health	SMU	2	SDG 3
DSTI-NRF-TUT Co-Funded Research Chair in Applied Machine Learning & Artificial Intelligence	TUT	1	SDG 9
Future Transport Manufacturing Technologies	TUT	2	SDG 9
Spatial Transformation (Positive change in the Built Environment)	TUT	2	SDG 9, 11
Phytochemical Food Network to Improve Nutritional Quality For Consumers	TUT	1	SDG 2, 12
Acid Mine Drainage Treatment	TUT	1	SDG 9, 12
Phytomedicine	TUT	1	SDG 3, 9
Energy Solutions for Inclusive and Sustainable Societies	TUT	2	SDG 7, 11
Sexualities, Genders and Queer Studies	UFH	2	SDG 5, 10
Social Change	UFH	1	SDG 1, 2, 5, 8, 13, 17
Ecosystem Health: Monitoring and Managing the Health Resilience of the Limpopo River Basin	UL	2	SDG 12, 15
Schools as Enabling Environments	UL	2	SDG 4
Mental Health and Society	UL	2	SDG 3
Photoelectrocatalytic Hydrogen Production	UL	2	SDG 7, 9
Biodiversity Value and Change in the Vhembe Biosphere Reserve	UV	1	SDG 15
Health systems, complexity and social change	UWC	2	SDG 3, 5
Poverty, Land & Agrarian Studies	UWC	1	SDG 1
Visual History and Theory	UWC	1	SDG 1, 4, 10
NanoElectrochemistry and Sensor Technology	UWC	1	SDG 9
Mathematics Education	UWC	1	SDG 4
Astronomy & Astrophysics (SKA)	UWC	1	SDG 9, 17
SA-UK Bilateral Chair in Food Security	UWC	1	SDG 2, 17
Religion and Social Justice	UWC	1	SDG 10, 16
TVET Teaching and Learning	UWC	2	SDG 4, 10

Human Capabilities, Social Cohesion and the Family	UWC	2	SDG 3, 16
Cosmology with multiwavelength data: exploiting SALT and Meerkat	UWC	1	SDG 9
Waste and Society	UWC	2	SDG 12, 13
Health Systems Governance	UWC	1	SDG 3, 16
Multi-level Government, Law and Development	UWC	1	SDG 16
Digital Humanities - Culture and Technics	UWC	1	SDG 9, 10, 16
Microbial Genomics	UWC	2	SDG 3, 9
Analytical Systems and Processes for Priority and Emerging Contaminants (ASPPEC).	UWC	2	SDG 9
Hydrology	UZ	1	SDG 6

Additionally, 15 Centres of Excellence ¹⁰ are hosted at public South African Universities, two of which are co-hosted at two of the HDUs, UoTs, and newly established institutions in South Africa. These include the DSI-NRF Centre of Excellence in Food Security (FS), hosted by the University of the Western Cape and the University of Pretoria, which addresses SDG 1 *No Poverty* and SDG 2 *Zero Hunger*, and the DSI-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation (STI) Policy (SciSTIP), hosted by Stellenbosch University and the Tshwane University of Technology, which addresses SDG 9 *Industry, Innovation, and Infrastructure*

It is clear that there are opportunities for future development at the HDUs, UoTs, and newly established institutions in South Africa when it comes to SARChI Chairs and Centres of Excellence, as these universities have been making valuable contributions to the attainment of the SDGs.

Conclusion

This study shows that HDUs, UoTs, and newly established universities play a crucial role in helping South Africa move towards attaining the Sustainable Development Goals (SDGs). The mapping exercise found that these institutions contribute meaningfully to SDG 3 *Good Health and Well-being*, SDG 7 *Affordable and Clean Energy*, SDG 9 *Industry, Innovation and Infrastructure*, and SDG 8 *Decent Work and Economic Growth*. These areas of emerging excellence lay a solid foundation for future collaborations and increasing the national effort to achieve the SDGs. At the same time, the analysis revealed that subject areas represented by SDG 5 *Gender Equality*, SDG 11 *Sustainable Cities and Communities*, SDG 14 *Life Below Water*, and SDG 15 *Life on Land* may present opportunities for future research and increased outputs. Targeted interventions and partnerships could help address these gaps and increase our national contribution to these critical areas of development.

The analysis of collaboration and funding highlighted both the progress made and the opportunities that still exist. While HDUs, UoTs, and newly established universities have strong institutional, national, and international partnerships, the data showed they are often underrepresented in collaborations with the most active national contributors to the SDGs. This includes the University of Cape Town, Stellenbosch University, University of the Witwatersrand, and University of Johannesburg. Expanding partnerships with these leading universities within the Higher Education sector is essential for strengthening research efforts, building capacity, and ensuring fair participation in national and International knowledge production. Additionally, identifying key funders offers useful insights on how universities can align their research priorities with the focus of funders, helping to unlock resources for long-term sustainability.

This study emphasises the importance of inclusive collaboration, targeted investments, and ongoing capacity-building. These factors can help leverage the strengths of all universities to achieve the SDGs. By strengthening existing partnerships, addressing areas where they are underrepresented, and actively engaging with national and international funders, HDUs, UoTs, and newly established institutions can significantly boost their impact. Strengthening these institutions not only aids South Africa's progress on attaining the SDGs but also furthers the broader goals of social change, equality, and sustainable development.

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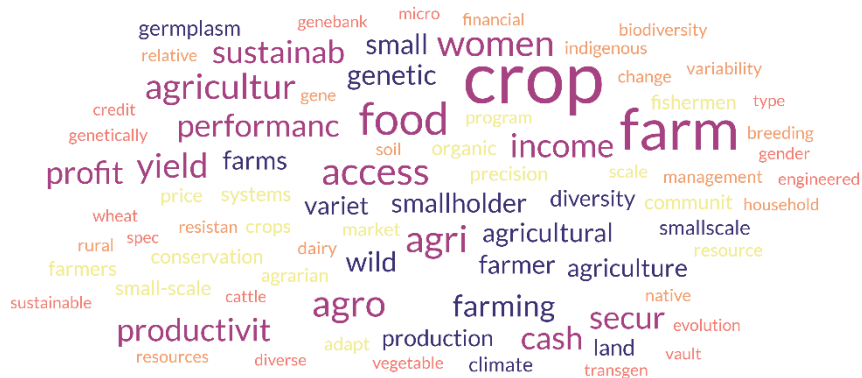
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Addendum 1

SDG 1: No Poverty



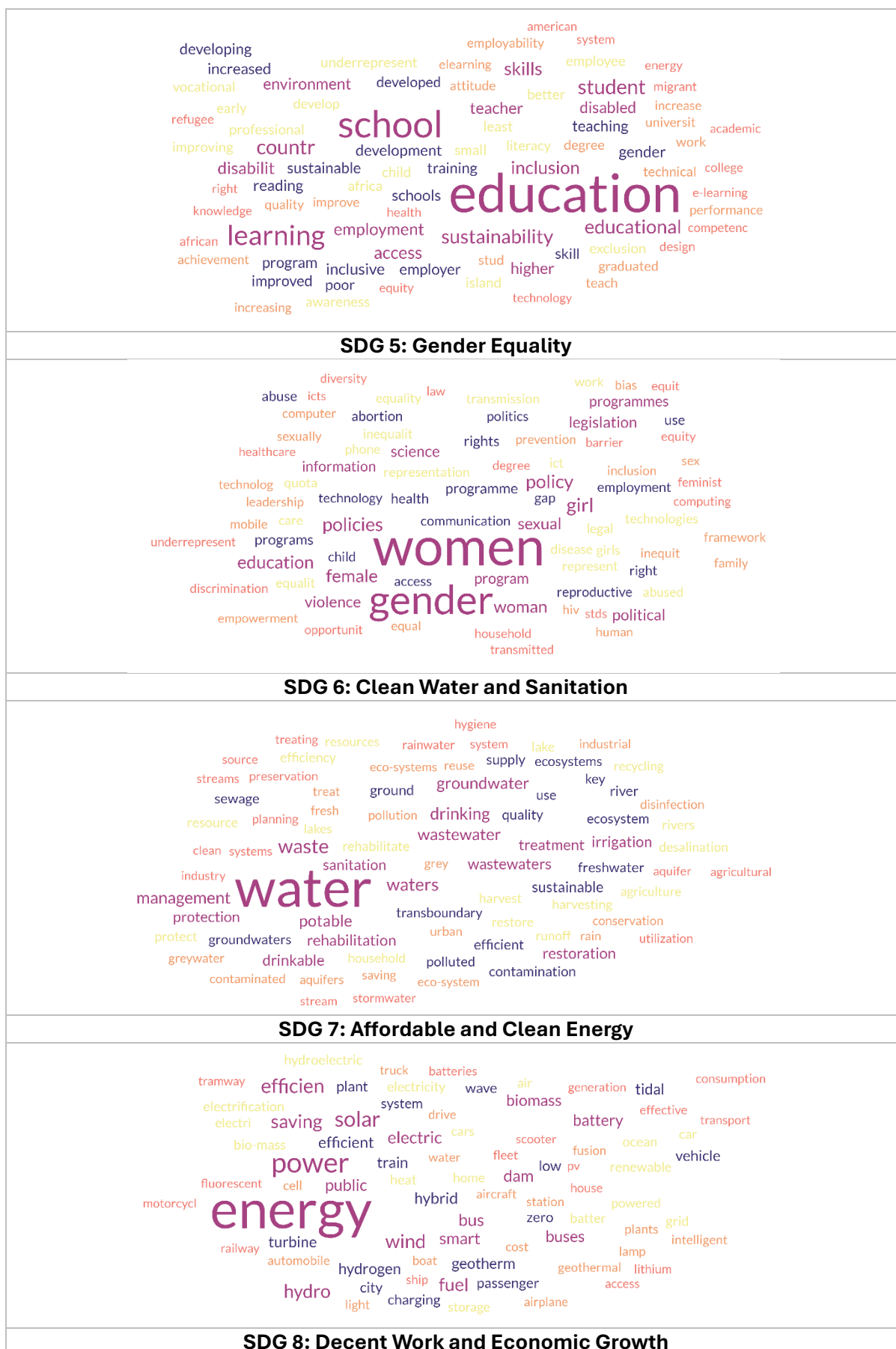
SDG 2: Zero Hunger

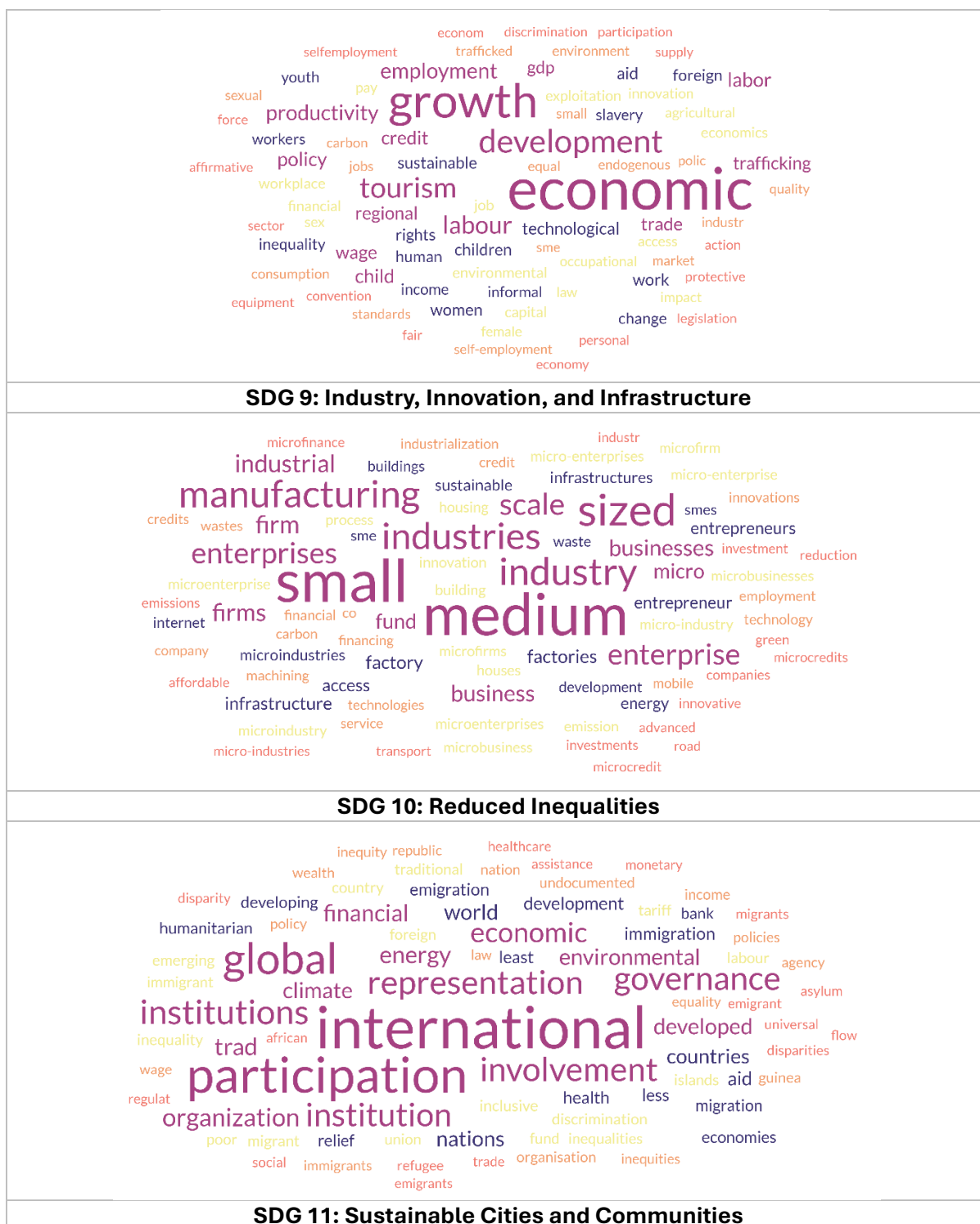


SDG 3: Good Health and Well-being



SDG 4: Quality Education



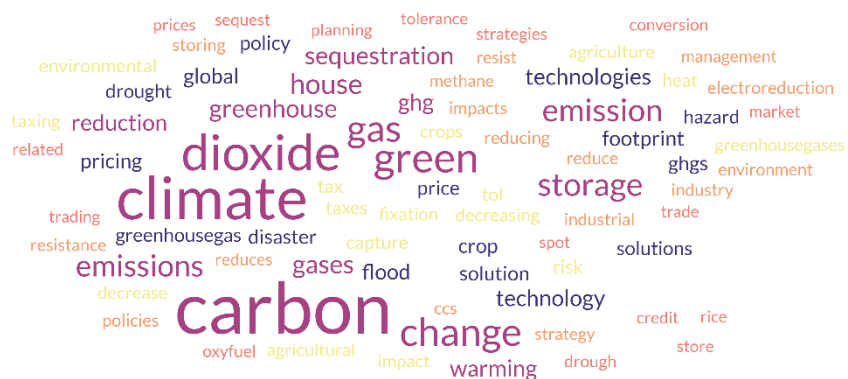




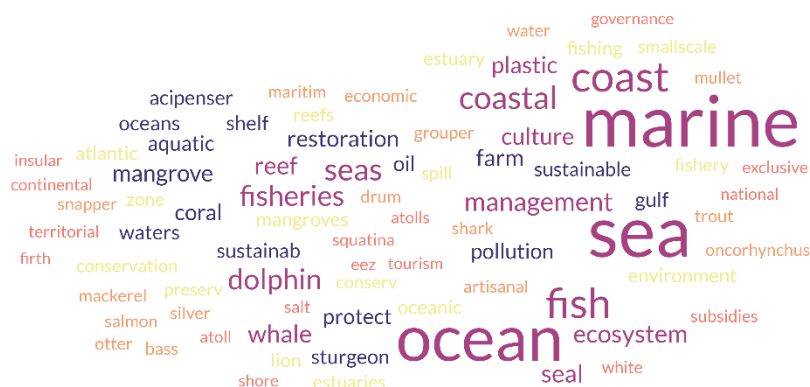
SDG 12: Responsible Consumption and Production



SDG 13: Climate Action



SDG 14: Life Below Water



SDG 15: Life on Land

