

DEPARTMENT OF SCIENCE AND INNOVATION RESPONSE TO THE NRF EVALUATION REPORT OF THE PALAEOSCIENCES STRATEGY FOR THE PERIOD FROM 01/04/2014 TO 31/03/2020

1. Introduction

The Department of Science and innovation Executive Committee approved the terms of reference for the review of the Palaeosciences Strategy in 2020 and requested the National Research Foundation (NRF) to undertake the review. The NRF appointed a diverse panel of experts to evaluate the implementation of the Palaeosciences Strategy (PS) for the period 1 April 2014 to 31 March 2020. The review was conducted in the first quarter of 2022.

The Panel members were as follows:

Professor Shadreck Chirukure, convener, University of Cape Town

Professor Jennifer Botha, university of Free State

professor Anusuya Chinsamy-Turan, University of Cape town

Professor John Compton, Stellenbosch University

Professor Innocent Pikirayi, University of Pretoria

The DSI registers its thanks to the NRF for driving the review process to its final conclusion and also extends its gratitude to the members of the review panel for the quality of the evaluation report and for providing a clear set of forward-looking and recommendations. The report will assist greatly in advancing the policy leadership role of the DSI as detailed in the 2019 White Paper on Science, Technology, and Innovation.

2. Overall Response

The DSI welcomes the Evaluation Report of the Palaeosciences Strategy for the period from 1 April 2014 to 31 March 2020. It is a timely intervention that would support current efforts to align the Geographical Advantage Area Science Mission Priorities to the policy intents of the 2019 White Paper and to articulate priority actions that will be advanced as

part of the process of finalising and implementing the STI Decadal Plan. It is the intention of the DSI to carefully consider the analysis and recommendations and provide space for their integration in the shaping of the Palaeosciences Strategy.

The DSI takes note of the overall assessment that reflects that the success of the Palaeosciences Strategy and African Origins Platform is mixed: on the one hand, the DSI through the African Origins Platform (AOP) and Centre of Excellence in Palaeosciences (CoE-PAL) have made vital contributions towards supporting Palaeosciences Strategy (PS) research at universities and museums and has enabled high quality PS research with global impact and have also led to a significant improvement in the training of postgraduates. On the other hand, the non-participation and inaction by DSAC and NDT resulted in museum-focused and tourism-dedicated goals (i.e., goals 3-5) not being fully implemented. The observation made by the panel regarding the non-participation and inaction of government partner institutions and the recommended way forward in ensuring the success of any future endeavour to harness the potential of PS in South Africa through an appropriate high level (inter-ministerial) commitment by all government stakeholders is noted. The DSI shares the optimism that “there is no doubt that continuing and enhancing the Palaeosciences Strategy through lessons learnt will ensure that South African researchers use their geographical advantage to become leaders in Palaeosciences, which will lead to job creation, and will feed into the wider heritage and national economy”.

The DSI takes notes of limitations that were experienced in undertaking the evaluation process. This includes limited access to data, students, and high level officials from key government departments that impacted on the evidence base that the panel was able to use in order to have a more comprehensive understanding of the challenges facing the sector. The failure to secure interactions with high level policy makers in the Department of Arts Culture and Sports (DACS) and Department of National Tourism and probably the Department of Forestry, Fisheries and Environment represents a key risk in advancing the palaeosciences noting the important roles that have been assigned to these departments in the approved palaeosciences strategy. Additional limitations included a

few stakeholders withdrawing from the process for personal reasons and the low levels of responses from students who benefited from the strategy. The NRF, as the entity managing the platform, would need to put in place measures that will prevent similar challenges in future as part of broader measures to strengthen the evidence base for policy and action. On a positive note, the panel indicated that they transcended these limitations by combining information from complementary sources and techniques and by keeping to independently verifiable facts.

A standard and traditional methodology was utilised in the evaluation of the Palaeosciences Strategy. This consisted of complementary approaches including (i) document review and analysis, (ii) interviews with stakeholders and (iii) analysis of written submissions. It should be noted that the panel did not include site visit to verify the data collected from documents. In the section on document analysis and review a total of sixteen documents are listed. It would appear that annual reports, annual performance plans and policy documents from DACS, Department of Tourism and Department of Forestry, Fisheries and Environment and their institutions were not sourced. If this was indeed the case, it represents a gap as the annual performance plans of departments now represent a key instrument for directing resources and actions to priorities.

3. Key Findings of the Evaluation

The evaluation sets out six areas in which it provides findings in the implementation of the Palaeosciences Strategy and Implementation Plan. These are discussed below with the DSI assessment of each finding.

KEY FINDINGS AND DSI RESPONSE

No.	Kind of Assessment	Finding	Recommended Action	DSI Response
1.	Assessment of the extent to which the Palaeosciences Strategy interpretation, as expressed in the Implementation Plan of the DSI was appropriate	The interpretation of the strategy by the DSI was appropriate as it developed a broad-based agenda for research and capacity building in museums and universities to open up opportunities for awareness, palaeotourism and conservation.	Ensuring management of government stakeholder responsibility for the implementation of the strategy according to the allocated responsibilities aligned to their specialization	Valuable Observation and will requires a multi-pronged approach. This includes a high-level compact of key Ministers, inclusion of action and resources into Annual Performance Plans, improving current structures at the level of officials and regular reporting on progress against commitments made in the APP.
2.	Determination of whether the DSI instituted appropriate interventions to achieve the goals of the strategy	The DSI crafted interventions to achieve each of the five goals of the Palaeosciences Strategy and customized them to align with strengths of different government partners	There was no alternative or mitigation plan for dealing with partners in case on non-performance or poor delivery.	The DSI made use of measures such as DG to DG correspondence and also Ministerial communication. However, these did not always have the desired impact. Moving forward, the DSI will pilot the more strategic use of the Annual Performance Plan and IMC processes.
3.	Assessment of the various interventions in achieving the desired outcomes as expressed in PS Implementation Plan			
3.1	Goal 1: Transform South African Minds	The interventions were considered successful	With limited data, it was difficult for the panel to assess to what extent the minds of South	To address the challenge of limited data, the planned Science Engagement Survey could be utilized to assess to what extent the minds of South Africans had been transformed.

			Africans had been transformed	
3.2	Goal 2; To support South African Universities	This goal was hugely successful as seen through the Centre of Excellence in Palaeosciences and the African Origins Platform	High quality research of international standing and continued support for human capacity development.	The DSI remains committed to investing in high quality research and human capacity development. The level and extent will be informed by the policy requirements detailed in the White Paper on STI and the transformation agenda of the department.
3.3	Goal3: Capacity building in museums; Goal 4: Effective management of Palaeosciences and Goal 5: Promotion of Palaeotourism	Required other government departs to deliver on this but did not engage and deliver on these goals	Not sufficient data provided on the interactions with the DACS and National Department of Tourism (NDT).	The DSI through the Self-Assessment Report provided efforts made to work with the DACS and NDT. The DSI intervention through infrastructure funding through the NRF NEP had been provided but not fully utilized by the sector in the period of the review. However, going forward the DSI has made a new intervention, namely: the South African Research Infrastructure Roadmap through which the Natural Scientific Collections Facility will facilitate the protection and development of natural sciences museums.
4.	Evaluation of whether the resources invested into the development of the Palaeosciences was adequate to achieve the goals and desired outcome.	Goals 1 and 2 were adequately resourced. Goal 3 was resourced but stakeholders failed to utilize the funds. Goal 5 seem not to have been funded by the NDT. An imbalance in the funding Palaeosciences was noted with concentration of resources	(i)The imbalance in the resource allocation with the concentration of SARCHi and CoE in Miocene-Pleistocene needs to be addressed. The shift to recent period of the terminal Pleistocene-holocene to focus on iconic sites such as Mapungubwe,	(i) An important finding that is noted and accepted. The finding will be used to inform the future allocation of resources. (ii) The changes in the funding strategy from grant-holder linked bursaries and its negative to centrally administered systems impact on student recruitment should be revisited. It is the view of the DSI that this change should not apply to

		in palaeontology and deep history (Miocene-Pleistocene) than in more recent periods.	Thulamela. The shift will facilitate the transformation of minds, building social cohesion and promoting national pride and promoting heritage tourism. (ii) Changes In the funding strategy from grant-holder linked bursaries to centrally administered systems negatively affecting student recruitment.	the DSI contract based and strategic priorities projects which should continue to be based to grant-holder linked bursaries. Research funding and capacity development initiatives through the AOP are made available through open peer reviewed research calls. The new funding contract will enable directed interventions initiatives aimed at addressing national priority targets.
5.	Assessment of the performance of the departments, agencies and entities in fulfilling their assigned role in implementing the Palaeosciences Strategy	The NRF, SAASTA, PAST, COE-PAL and SARChI Chairs did extremely well. However, DSAC, NDT, and DHET did not participate in this vital programme, and simply did not deliver on the PS.	There were no binding agreements, making it difficult to make underperforming units or entities within them accountable.	See response under finding 1.
6.	Assessment of whether the Strategy is achieving the following:			
6.1	Quality research of international impact.	One of the greatest successes of the Palaeosciences Strategy and the African Origins Platform was in supporting research in universities and museums and in	The impact of the research and publications is well documented.	Maintain current approach but include an additional focus on support to Historically Disadvantage Institutions where new programmes are envisaged to be planted.

		building capacity in high impact research with international impact.		
6.2	Curating the collections to the highest international standards.	Significant decline in curation of museum collections occurred due to the lack of capacity (trained staff and scientific leadership).	Museum collection curation (apart from Iziko Museums of South Africa) is now well below the minimum standards established by SAHRA	The SARIR intervention on Natural Scientific Collections is a partial response to finding and will be maintained. However, a strategic engagement with the DSAC (in the context of proposals detailed in response to finding 1) will be prioritised to ensure the commitment of DSAC to maintaining international standards on curation at museums.
6.3	Equity and Redress	Transformation remains a major challenge. There are very few emerging South African black researchers driving palaeosciences research. The research eco-system is dominated by more senior, and mostly white researchers.	There is a need to recruit and retain high quality black talent, e.g., through creating gainful and fulfilling employment. As a case in point, despite all its success, the COE-PAL struggles to find a replacement director with the appropriate equity profile and or academic experience and quality as advertised	The proposed NRF intervention called the Leading Researchers and Scholars Programme could be used as an appropriate instrument for succession planning for CoEs such as the CoE PAL. A coordinated approach between the DSI and DHET to the transformation of higher education institutions through the Sibusiso Bhengu Development Programme and the DSI Transformation agenda in relation diversity of Palaeosciences on offer in order to transform the landscape for Palaeosciences in SA. Future business plans and contracts will be required to define transformation actions that can be measured and monitored.
6.4	Science awareness and outreach	The work of PAST, SAASTA, CoE-PAL and AOP has been acknowledge	Different programme and approaches to public awareness have been lifted for mention.	Working within the DSI Science Engagement Programme the support for palaeosciences will develop a strong public engagement platform with measurable indicators.

6.5	Building capacity locally and in Africa through collaboration in research and training.	The success of collaborations between researchers based at historically disadvantaged institutions such University of Venda, University of Limpopo, and the more established institutions such as UCT and Wits could not be established. Even institutions within one town as in the case of the, partnerships between University of Johannesburg Palaeosciences Research - Institute (UJ-PR-I) and CoE-PAL did not happen, despite overlapping research interests.	The extent to which collaboration between researchers in museums and universities in the fields of palaeosciences exists but was not measured. Building palaeosciences research collaborations across the African continent is imperative is south Africa must become a world leader in Palaeosciences.	A function research network on Palaeosciences in South Africa,(such as ACCESS for Global Change) to manage collaborative activities such as conferences, joint research projects, public engagements etc will be established
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The key findings are also a mixed set of issues on the extent of the implementation of the Palaeosciences Strategy and Implementation Plan. As indicated earlier, the Palaeosciences Review Report could not have come at a better time for Science Missions where efforts are underway where the policy intents detailed in the 2019 White Paper on STI will be used to inform the implementation of the Geographic Advantage Areas science missions over the next decade.

The DSI should be able to stream the findings into the Palaeosciences Strategy 2.0.

4. Recommendations

The response to the recommendations must be undergirded by the policy intents of the 2019 White Paper on STI and the philosophy that informed the priorities that have been included in the Decadal Plan. Decadal Plan priorities are guided by the need to build on successes achieved within the NSI over the last 25 years. The NSI initially focused on setting up institutions and policies to serve the interest of all of South Africa. From 2006 to 2018, resources and actions were directed towards efforts in the NSI that respond to the demands of a democratic South Africa.

It is during this period that the Palaeosciences Strategy was developed to leverage South Africa's geographical advantage areas to advance science excellence in priority and strategic areas. One of the challenges picked up by the Palaeosciences Review Report is that although the Palaeosciences Strategy attempted to bridge the fragmentation in the management of the palaeosciences in government, this continues to remain fragmented across government and between business, academia and civil society. In addition, the continued and significant underdevelopment of key areas of Palaeosciences and the participation of black people and women at senior level (e.g. professors) remain as challenges to be addressed. The 2019 White Paper on Science, Technology and Innovation advocates a purposeful approach to increasing the impact of STI's priority socio-economic growth and development challenges, as detailed in the National

Development Plan and the Sustainable Development Goals. This has guided the responses in the table below.

DSI RESPONSES TO THE RECOMMENDATIONS

No.	Recommendation	Actions	DSI Response
1.	A new PS strategy should be envisioned for the future	The overall highly successful Palaeosciences strategy be revisited and improved.	<p>Recommendation accepted.</p> <p>Our understanding is that a palaeosciences strategy 2.0 should be strengthened in two directions. Firstly, to broaden the areas of scholarship and scientific enquiry including support for a broader range of scientific fields. Secondly, to provide directionality where the Palaeosciences can make a stronger contribution to nation building and heritage.</p> <p>The development of the palaeosciences strategy 2.0 will require the active involvement of key partner departments and clear commitments from these departments which needs to be fed back into their strategic plans and APP's.</p>
2.	Establish binding high-level contracts with stakeholders	<p>The establishment of binding inter-ministerial agreements to ensure delivery by key stakeholders, such as DSAC, NDT, DHET, and DFFE. It is critical that key administrators be appointed who are informed and driven by the PS at all partner departments.</p> <p>The strategic importance of Palaeosciences demands oversight at the Presidential level to ensure overall coordination and success of the strategy and the knowledge economy in contributing to the</p>	<p>Recommendation partially accepted.</p> <p>The principle of high-level buy-in is accepted. However, it may not be feasible to establish separate IMC's and presidential level support for a range of areas including the palaeosciences. It may be more feasible to include such requirements as part of the broader STI IMC and plenary.</p>

		national economy in line with the National Development Plan.	
3.	Develop under-resourced areas of PS	<p>The Palaeosciences Strategy must through allocation of resources correct for historical imbalances that resulted in some fields in Palaeosciences being dominant over others.</p> <p>The PS strategy investment (COE-PAL and SARChI Chairs) focus was on palaeontology and Pliocene/Early to Mid-Pleistocene archaeology, leaving the more recent periods under-resourced and under-researched. . For example, the field of micropalaeontology, historically has provided abundant job opportunities in the oil and gas industry as well as in environmental impact assessments, yet it is currently under supported.</p>	<p>Recommendation accepted</p> <p>The need to move away from investment in a limited focus on paleontology and Pliocene which left out new and recent periods under researched and under resourced. The recommendations speak to the need to pivot the investments to other fields such as micropalaeontology that could provide abundant jobs, opportunities in the oil and gas industry is noted.</p> <p>The rebalancing will be managed as part of the process to develop Palaeosciences strategy 2.0.</p>
4.	Increase PS research capacity at Museums	<p>The dire lack of research capacity and curation in museums needs immediate interventions to counter the loss of staff and scientific leadership. Improved funding of museums will create jobs and assist in the recruitment and retention of post-graduates in palaeosciences, and will enable the optimal maintenance of infrastructure and collections at international standards</p>	<p>Recommendation accepted</p> <p>The responsibility/mandate to create research capacities at museums rests with the Department of Arts, Culture and Sport. Over the next few months, a strategic engagement at the level of DG's will be requested by the DSI.</p>

5.	Create networks to bridge institutional silos	<p>To grow a strong and inclusive Palaeosciences ecosystem, collaboration between historically disadvantaged and historically privileged institutions, as well as between museums and universities must be promoted to create beneficial network effects to address historical imbalances and grow the field</p> <p>Individual universities must be encouraged to take up opportunities available through initiatives such as nap. Targeted funding for Palaeosciences positions through DHET (e.g. nGAP) would give the PS research a strong boost.</p>	<p>Recommendation accepted</p> <p>The DSI envisages an all-inclusive network of Palaeosciences community bridging the gap between historically advantaged institutions and historical disadvantaged institutions, between universities and museums, industry and civil society. Measures to give effect to greater coordination will be detailed in Palaeosciences Strategy 2.0</p>
6	Market SA as a palaeotourism destination	<p>More investment and marketing should be made into profiling Palaeosciences tourism to develop South Africa as a palaeotourism destination. We suggest a multi-pronged strategy. Students in Palaeosciences must be taught fundamentals of tourism development and management and palaeotourism must be taught in traditional disciplines to integrate this critical area into the wider economy.</p> <p>A multi-stakeholder and multi layered approach is proposed.</p>	<p>Recommendation noted</p> <p>The responsibility for advancing this recommendation rests with the National Department of Tourism. Building on successes that have been achieved with astronomy tourism, the DSI will work with the NDT to advance palaeotourism.</p>

7.	Grow Palaeosciences at historically disadvantaged and new institutions	To boost PS research at Historically Disadvantaged and newly established institutions, young recent PS graduates be employed to develop their research agenda.	<p>Recommendation accepted</p> <p>A compact between DSI and DHET on growing Palaeosciences in Historically Disadvantage Universities will be integrated into existing engagements on strengthening research capacity at HDI's.</p>
8.	Create jobs and retain staff in the palaeosciences	There is a need for investment, integrated thinking, and action to create and retain jobs in the palaeosciences. Through building cross-sectoral synergies, opportunities for economies of scale are developed through supporting job creation (better and more productive), retention and ensuring proper succession planning.	<p>Recommendation noted</p> <p>As part of the process of developing palaeosciences strategy 2.0, an assessment will be done to quantify and understand the labour market in palaeosciences and to use this understanding to identify what measures to include in the strategy.</p> <p>This is a cross sectoral imperative. that requires Social compacting by the stakeholders. mainstreaming of Palaeosciences and growing Palaeosciences sites and the promotion of Palaeotourism should create opportunities to grow the sector and improve levels of unemployment.</p> <p>All sectors should be involved in this task and requires High level stakeholders social compacts.</p>
9.	Increase PS communication to the wider public	Outreach activities should be increased, encouraged, and properly evaluated to measure the impact of the activities in changing perceptions held by the general public. There is a need to cover the range of palaeosciences fields from palaeontology and	<p>Recommendation accepted</p> <p>Building on the work commenced by SAASTA, CoE-PAL, PAST, arrangements will be made to position the Science Engagement Strategy as the engine for increased communication to the wider public.</p>

		palaeoanthropology to archaeology and related disciplines.	
10.	Establish a National Institute of PS	The establishment of a National Institute of Palaeosciences that embodies equity, redress, inclusivity, and transformation, as well as full participation of stakeholders from all institutions (including Historically Disadvantaged Institutions), and all fields of the palaeosciences across the disciplines and time periods, will have the ability to take PS research to the next level. One of the key advantages to a National Institute of Palaeosciences is that it could act as the central hub for all stakeholders, linking universities, museums, sites, national labs in the advancement of knowledge and the promotion of national pride.	<p>Recommendation noted.</p> <p>The criteria recommended for the National Institute of Palaeosciences should guide the process of establishing a new institute. Advancing this will be undertaken as part of a broader process of reforming the institutional architecture of the publicly financed portion of the National System of Innovation.</p>
11.	Increase capacity for site management and conservation	Adequate resources must be invested in managing and conserving palaeosites to sustainably conserve them and to ensure that tourism will not affect their integrity and long-term sustainability.	<p>Recommendation noted</p> <p>The management and conservation of the Palaeosites sits with the Department of Forestry, Fisheries and Environment, Arts, Culture and Sport and the National Department of Tourism.</p> <p>As part of proposed arrangements to secure alignment with key partner departments, this area will be included for engagement.</p>

5. Conclusion

All the recommendations add value to the work on Palaeosciences in the country. The nature of the mandates exercised by different government departments influence the type of the responses to the recommendations. Six of the recommendations sit squarely within the mandate of the DSI and these are as follows:

1. A new PS strategy should be envisioned for the future (1)
2. Establish binding high-level contracts with stakeholders (2)
3. Develop under-resourced areas of PS (3)
4. Create networks to bridge institutional silos (5)
5. Increase PS communication to the wider public (9)
6. Establish a National Institute of PS (10)

Five of the recommendations fall in the mandates of other departments and they are therefore shared mandates, namely;

1. Increase PS research capacity at Museums (4) DSAC
2. Market SA as a palaeotourism destination (6) NDT, DFFE & DHET for entrepreneurial training
3. Grow Palaeosciences at historically disadvantaged and new institutions (7) DHET and DSI.
4. Create jobs and retain staff in the Palaeosciences (8) DSAC in museums, DHET in universities; NDT on palaeotourism sites, DFFE on world heritage sites
5. Increase capacity for site management and conservation (11) NDT and DFFE

The management of the implementation of the Palaeosciences Strategy remains an interdepartmental matter which requires attention and the DSI to take the lead in formulating the action on these five recommendations. It is proposed that the framework of the Inter-Ministerial Committee be explored for the implementation of these cross-departmental mandates.