

ACADEMY OF SCIENCE OF
SOUTH AFRICA INSTITUTIONAL
REVIEW REPORT

2022

Acknowledgments

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1. Executive summary

The retrospective review of the Academy of Science of South Africa (ASSAf) was a labour of love. This report is built from a diverse range of opinions of interviewees whose knowledge of ASSAf ranges from thorough to passing. There are various themes that emerged from the review, but one consistent one is that ASSAf, as an academy, is valued. The idea of an independent institution devoted to the pursuit of knowledge in the service of society has an enduring appeal. The question is how does ASSAf maintain that appeal and justify its continued existence?

The main issues that emerged from the current review concern funding; the agility or lack of in the face of national public emergencies; matters of membership; leadership; independence; and transformation.

The Act that founded ASSAf insisted on its independence. Although the Act (Act 67 of 2001) has been modified a number of times since, the issue of the independence of ASSAf has remained intact. It is the view of many that ASSAf must cherish its independence. The Academy should however carefully consider whether that independence is insured or assured. The reality is that it is up to ASSAf itself to safeguard its independence in the face of shifting attitudes. One recurring theme related to the independence is the issue of membership. It seems that ASSAf continues to be perceived as elitist. This originates from the fact that the membership of ASSAf, demographically, is not necessarily representative of the general South African population. ASSAf is called upon to pay serious attention to equity in membership criteria. Indeed, maintaining quality and making the membership more diverse are not conflicting aims and need not be viewed as such. The view is that the Academy ought to study how it can tap into a larger pool of prospective candidates in order to make its membership more diverse.

Strong and committed leadership is required to steer ASSAf into the next five-year period. The leadership of ASSAf is called upon to respect the ethos of an academy, be aware of its relationship to government and other interested parties but not feel constrained in its action. It is up to the leadership to see to it that the honorific aspect to membership is balanced by emphasis on service to society. It is pleasing to note that ASSAf was highly commended as a member of the InterAcademy Partnership (IAP) and that it has distinguished itself through leadership on many regional and international initiatives.

An elephant that kills a rat is not a hero, so goes the saying. The last two years challenged the *status quo* in ways many of us had never experienced in our lifetime. With this still fresh in minds, our respondents wondered about the agility of ASSAf to public health emergencies. Its perceived silence and absence during COVID-19 called into question its relevance. While some acknowledged that ASSAf's *modus operandi* of thoroughness and completeness conflicts with demands of response with speed, others wondered whether 'this elephant' should sometimes choose to be nimble and quick for the good and benefit of society. This would be relevant at times where it is necessary to curtail misinformation and educate the public on issues such as climate change.

The report that we now hand over is wide-ranging, far-reaching and offers much for ASSAf to work on. ASSAf is valued and hopefully, will be even more so, when the recommendations are taken to heart.

2. Context for this report

To appreciate the Institutional Review Panel's recommendations that follow, it is important to understand the complexity of the sphere in which the Academy is functioning. Interviewed stakeholders each provided valuable information but often from a singular perspective, which did not take into account what would be required to follow through on the stakeholder's suggestion and the potential long-lasting ripple effects from initiating major structural changes as encouraged by individual interviewees.

It was the job of the Panel to explore potential risks and benefits associated with each suggestion, and to synthesise all the input through a holistic lens as it considered how different stakeholder suggestions (see Appendix A) might be combined into a list of formal Panel recommendations (see Section 4). Aspects the Panel reflected upon during its deliberations included how a restructuring of the current membership application process might be viewed by current and future members; would changing the Academy's image from one of elitist to one of inclusivity alter Members' enthusiasm for the Academy or would a wider membership be embraced by its Members? As the primary financial backer of the Academy, would the Ministry of Higher Education, Science and Innovation welcome diversification of ASSAf's portfolio? If ASSAf diversified its portfolio, would funders pay for the products, particularly if they required a long lag time to ensure a thorough review of the topic? If new, shorter, rapid forms of advising were put in place, would funders support them? Would ASSAf have the staff to produce them along with other convening and consensus activities? Does ASSAf leadership have the bandwidth to be more proactive in transforming the Academy into a more diverse, socially relevant, rapid response, trusted voice of the nation and the continent?

Deliberation of these questions led to the following recommendations to the different stakeholder groups as how to interpret the recommendations.

ASSAf Members should work with Academy leadership to understand the complexity of the environment in which the Academy functions, then with this understanding, assist the leaders in expanding its sponsorship and transforming the Academy into a dynamic, 21st Century advisor.

ASSAf leadership should work with the Academy Members in:

- Expanding its membership to reflect a more diverse base of experts;
- Working with members to broaden the Academy's sponsorship base for taking on contemporary societal issues, particularly contentious issues requiring a neutral convener for illuminating the evidence; and
- Exploring the pros and cons of different types of convening and consensus products that can be produced over short to longer-term timeframes comparing speed with depth.

Sponsors of ASSAf should work with the academy staff and leaders to evaluate different academy products so ASSAf leadership can focus energy on those items that have the greatest return on investment for sponsors; and in this way, become more responsive to the needs of the funding agency or organisation.

With this background, the following key recommendations are proposed by the independent Review Panel:

Recommendation 1 Membership: ASSAf leadership should work with its Members in establishing a recruiting strategy that maintains rigour while enhancing the diversity of the membership in terms of age, race, gender, and expertise to increase representation of social scientists, women, and Black subject matter experts, and young Members.

Recommendation 2 Funding: ASSAf leadership should engage Members to promote proactively the value of its independence for providing non-partisan advice to agencies and sponsors seeking a neutral platform for contemplating contentious, societal issues. In this way, ASSAf leaders should work with Members in identifying and securing a wide array of government and non-government sponsors to support the Academy's work. Additionally, the Academy leadership should work with sponsors to test new products and evaluate the return on investment for both the Academy and the sponsor.

Recommendation 3 Transformation: ASSAf leadership should test a model of integrating the work of different standing committees—such as when addressing country-level health and socio-economic issues—and in so doing, promote a holistic response to societal challenges using a more cost-effective model of convening. To effectively address concerns of underserved and marginalised communities, the Academy leadership and Members should reflect on the current make-up of its membership to ensure representatives of relevant communities are represented and available for service in providing up-to-date evidence to convince sponsors about the necessity for undertaking work that serves the needs of all South Africans.

Recommendation 4 Relevance: ASSAf must work relentlessly to find the balance between government and its membership to bring these two stakeholders together to address South Africa's national development challenges. The Academy remains relevant, but must be more proactive in asserting itself. ASSAf must continue to find new ways to engage more regularly with government, decision makers and policy makers to build and enhance trust between the politician, policy maker, the media, the public, and the science community. ASSAf must address the perception lingers that is an elitist organisation in all activities and reports.

Recommendation 5 Agility: ASSAf should review and refine their products to ensure agility is built into responses whenever feasible. The Academy should explore new and additional mechanisms for rapid responses. The Academy could, for example, consider creating a conversation with society and state clearly that the information is not definitive, that the Academy will follow up and engage further once the science is done. The Academy could provide short-term advice to government if properly resourced—government needs to buy into the concept to make it work.

3. Background

The Academy of Science of South Africa (ASSAf) is the officially recognised national science academy of South Africa established through the ASSAf Act (No 67 of 2001).

The dual mandate of the Academy is to:

- Promote and inspire outstanding achievements in all fields of scientific enquiry and to grant recognition for excellence
- Proactively or upon request undertake studies on matters of public interest to provide evidence-based scientific advice to government and other stakeholders

The mandate of the Academy encompasses all fields of scientific enquiry, and it includes the full diversity of South Africa's distinguished scientists.

Vision

ASSAf aspires to be the apex organisation for science and scholarship in South Africa, recognised and connected both nationally and internationally. Through its Membership which represents the collective voice of the most active scholars in all fields of scholarly enquiry, the Academy aims to generate evidence-based solutions to national problems.

Strategic goals

ASSAf aims to provide evidence-based scientific advice on issues of public interest to government and other stakeholders.

The strategic goals of the Academy are as follows:

- Recognition and reward of excellence
- Promotion of innovation and scholarly activity
- Promotion of effective, evidence-based scientific advice
- Promotion of public interest in and awareness of science and science education
- Promotion of national, regional and international linkages

The strategic intent of the Academy is to be acknowledged, both nationally and internationally, as a credible, professional and respected collective voice representing the national interests of the full spectrum of scientific fields, to policy and decision-makers, the private sector, science community and the public – thereby helping to produce an ever-more successful South African nation.

4. Introduction

ASSAf was inaugurated in May 1996 by the former President of South Africa and patron of the Academy, Nelson Mandela. It was formed in response to the need for an academy of science congruent with the dawn of democracy in South Africa - activist in its mission of using science for the benefit of society.

The mandate of the Academy encompasses all fields of scientific enquiry, and its membership includes the full diversity of South Africa's distinguished scientists. The Parliament of South Africa passed the Academy of Science of South Africa Act (Act 67 of 2001), as amended, which came into operation in May 2002.

ASSAf is the official national Academy of Science of South Africa and represents the country in the international community of science academies.

Objectives

The key objective of the Academy is to promote and apply scientific thinking in the service of society. To this end, the Academy shall:

- Use the common ground of scientific knowledge and activity to remove barriers between people and obstacles to full development of their intellectual capacity;
- Endeavour in every possible way to inspire, promote and recognise excellence in scientific and technical practice;
- Investigate and publicly report on various matters, at its own discretion or at the request of government or organisations in civil society, to promote and apply scientific thinking in the service of society;
- Promote science education and a culture of science in the population at large;
- Maintain strict independence while consulting other organisations and individuals in the widest manner possible;
- Endeavour to establish and develop close relations with scientific organisations in South Africa and with similar academies in other countries; and
- Take any other action that it may consider necessary towards the attainment of its key objectives.

Relevance

The strategic priorities of the Academy are closely matched to those of the nation. The priorities focus particularly on the need for the enhanced availability of high-level human capital and an increased use of the country's best intellectual expertise in generating evidence-based science advice in support of policy development.

The Academy is aligned to national policy as dictated in the White Paper on Science and Technology and the National Research and Development Strategy. It also seeks, through its studies and convening activities, to address the triple challenges of the reduction of poverty, unemployment and inequality, as enunciated in the National Development Plan (NDP).

Membership

The core function of any national science academy is to honour and recognise the country's most outstanding and celebrated scholars by electing them to Membership of the Academy. ASSAf Members are drawn from the full discipline spectrum. The key intellectual resources of the Academy reside in its Membership, which at the conclusion of the review period (2020) comprised 541 Members. Members,

who volunteer their service, are supported in their science-advisory role by the fulltime staff of the secretariat, which currently numbers 39. Part-time staff includes the editors of the Academy's periodical publications.

ASSAf is a self-perpetuating organisation in which new Members are elected every year by the full existing Membership to achieve the goals of the Academy. After nomination by four existing Members (at least two of whom do so from personal knowledge of the candidate), new Members of the Academy are elected in a secret ballot. The normal criterion for election is significant achievement in the advancement and application of science/scholarship, both nationally and internationally.

(As of 2021/2022, ASSAf has 633 Members drawn from a wide variety of disciplines.)

Council

ASSAf is governed by a Council, comprising 12 elected Members and a 13th Member appointed by the Minister as representative of the National Advisory Council on Innovation (NACI). The Academy has five office-bearers: the President, two Vice-Presidents, General Secretary and Treasurer.

The Council has constituted an Executive Committee comprising the office-bearers. The purpose of the Executive Committee is to streamline Council operations and to allow for decision-making on important matters in the intervals between Council meetings. In addition, the Council has a Human Resources Committee and an Audit and Risk Committee.

4.1 Purpose and scope of the IR

The Minister of Higher Education, Science and Innovation has legal responsibility for the governance and resourcing of a set of national public entities including the Academy. Institutional Reviews are conducted as an additional oversight to evaluate if organisations are meeting their mandate and objectives. They are not a statutory requirement. Their aim instead is to reflect on the operations of an organisation to independently assess its strengths and weaknesses, to benchmark, and to determine if organisational structures, policies and programmes are fit for purpose.

During 2015, the Council of ASSAf appointed an Institutional Review Panel to provide a retrospective view on the performance of the Academy, focusing specifically on activities during the period 1 April 2010 to 31 March 2015 and reflecting briefly on the evolution of the organisation during its twenty-year existence. The first Institutional Review made a number of recommendations.

This second Institutional Review builds on the work of the first Review and the Panel was tasked with reflecting on ASSAf's achievements and making recommendations to improve the organisation in a continuous quality improvement paradigm. This Review Report additionally provides critical views on possible gaps not addressed by the Academy in terms of the ASSAf Act within the National System of Innovation (NSI) and it makes recommendations regarding the future strategic direction and operational execution of the ASSAf mandate.

This Institutional Review interrogates the period 1 April 2016 to 31 March 2020 and covers the strategic goals of the Academy namely:

- Recognition and reward of excellence
- Promotion of innovation and scholarly activity
- Promotion of effective, evidence-based scientific advice
- Promotion of public interest in and awareness of science and science education
- Promotion of national, regional and international linkages.

The Review Panel was provided with Terms of Reference, as well as relevant planning and reporting documents (Annexure B). Historical information was provided as background and to introduce the broader context in which ASSAf operates.

4.2 Review Panel members

The members of the Institutional Review Panel comprised Prof Makaiko Chithambo (Chair) of the Department of Physics and Electronics at Rhodes University; Patricia Cuff of the United States National Academy of Sciences; Prof Michelle Esau, Economic and Management Sciences, University of the Western Cape; Prof Rajaâ Cherkaoui El Moursli of the Hassan II Academy of Sciences and Technology, Morocco; and Prof Philani Moyo of the Fort Hare Institute for Social and Economic Research. Their biosketches are available below (Annexure C).

The Review Panel was appointed by the ASSAf Council who endeavoured to constitute a panel of local and international experts from a range of disciplines. The Panel met with a representative of the Review Reference Group to identify stakeholders to be interviewed, finalise the line of questioning that would be pursued, and to discuss its approach and methodology. The group compiled a questionnaire that was subsequently sent to all interviewees in advance. The structure of the questionnaire interrogated the stakeholder's views on:

- ASSAf's strategic objectives and their alignment to the Act,
- The structure and governance of ASSAf,
- The performance of the Academy against targets,
- The relevance of the Academy, and
- Anticipated challenges going forward.

The Panel met virtually over a period of several days during March to July 2022 to conduct in-depth, semi-structured interviews with stakeholders from government, higher education and other sectors, as well as role players in the South African and regional science and innovation system, and staff members. They also subsequently convened via video conference to finalise this Review Report.

Where stakeholders were unavailable for virtual, in-person interviews, the questionnaire was sent via email to the stakeholders to be answered in writing. These written responses were also considered and are captured in the body of the report.

The Review Panel interviewed a total of seventeen stakeholders.

4.3 The programmes of ASSAf

ASSAf's strength resides in the quality and diversity of its distinguished Membership; internationally renowned scholars elected by their peers, who give of their time voluntarily in the service of society. ASSAf can use its Membership as a collective resource for evidence-based solutions to national problems. The ASSAf Act provides the framework for identifying the Academy's overarching goals, within which its strategic priorities and focus are outlined.

ASSAf is led by a full-time Executive Officer who assumed this role in November 2018. ASSAf reports to the Department of Science and Innovation (DSI), formerly the Department of Science and Technology (DST), per the bilateral agreement between ASSAf and the then DST.

The Academy's operational activities are niched into four programmes:

- [Governance and Administration Programme](#);
- [Scholarly Publishing Programme](#);
- [Liaison Programme and Strategic Partnerships](#), and the
- [Science Advisory Programme](#).

ASSAf's activities are focused around six strategic outcomes: (1) Independent, authoritative and influential scientific advice, (2) Science Engagement, (3) Mobilising Knowledge, (4) Facilitating Partnerships, (5) Scholarship Support and (6) Supporting Transformation. Ongoing ASSAf activities are intended to be focused, collaborative, effective, and transdisciplinary, supported by staff with the most appropriate expertise and skills.

These activities are supported by the Governance and Administration Programme, which leads four sub-programmes: Governance, Finance and Risk, Human Resources, and Information Technology (IT); to ensure compliance with National Treasury requirements as outlined in the Public Finance Management Amendment Act (1999).

ASSAf is committed to the promotion of women in science and a gendered lens to issues in science and scholarship, and that of young scientists, amongst other ways by fostering better collaboration between the South African Young Academy of Science (SAYAS) and ASSAf. The multidisciplinary composition of ASSAf's Membership, coupled with the Academy's track record in producing impactful evidence-based studies, positions ASSAf to advance meaningful solutions for policy makers.

The White Paper, together with the Medium Term Strategic Framework 2019-2024 and other regional and global directives, has highlighted areas of focus which are required to improve the quality of lives of all the citizens of our country while preserving our environment. ASSAf takes cognisance of the national priorities set by the government. It will phase in evidence-based studies that promote diversity, of people and ideologies, to grow the knowledge economy which in turn will contribute to capacity development. ASSAf seeks to ensure a better future for the broader society and succeeding generations.

5. The observations and recommendations of the Review Panel

After meeting with and being briefed by the Review Reference Group, the Institutional Review Panel met to consider its approach, methodology, and line of questioning. After electing a chair, the panel finalised the list of stakeholders to be interviewed. The Review Panel met virtually during March to July 2022 to conduct the stakeholder interviews.

Methodology of the 2015-2020 Institutional Review

The observations and recommendations of the Review Panel are captured according to the line of questioning that was pursued in the interviews and used in the written questionnaire. Comments and observations are reported on anonymously, to allow the voice of the stakeholders to be recorded accurately. Where necessary, the Review Panel provides an interpretation of comments and makes recommendations based on the comments received. Where necessary the report lists sub-headings, so that observations are followed by relevant and related recommendations.

The review of the activities of ASSAf is reported on below according to five interrelated aspects namely:

1. Policy (mandate, aims, objectives)
2. Outputs (products and services resulting from activities and inputs)
3. Outcomes (intended effects on stakeholders)
4. Structure/process (governance, management)
5. Resources.

For each aspect, the Panel interrogated the quality or appropriateness and effectiveness thereof. They also requested each interviewee to identify possible improvements (if deemed necessary). All members were free to probe. The responses are delineated below and arranged according to the five interrelated aspects.

5.1 Policy: Mandate, aims, strategic objectives

This section explores whether the Academy's strategic objectives are aligned with its mandate as per the ASSAf Act. When examining this topic, the Institutional Review Panel interrogated stakeholders about the Academy's overall mandate, status within the country's NSI, engagement and synergies with the Department of Science and Innovation (DSI), government in the broader sense, other agencies in the science system and stakeholders in general.

The Panel also interrogated whether there is alignment with national and international imperatives such as the National Development Plan (NDP) and the Sustainable Development Goals (SDGs).

In the previous Institutional Review, the 2010-2015 Panel called for closer alignment of ASSAf policies with the NDP. This 2016-2020 Review Panel therefore interrogated this issue closely to evaluate whether or not there had been an improvement in this regard.

Alignment with mandate and national imperatives

Observations

ASSAf's 2020/21–2024/25 five-year Strategic Plan and its strategic direction more generally is aligned with the DSI's STI White Paper, Decadal Plan, the Medium-term Strategic Framework (MTSF), the NDP and the SDGs. The science engagement activities of ASSAf are consistent with the DSI Science Engagement Strategy (2015). There is also evidence that ASSAf is contributing significantly using evidence-based science in responding to the health and socio-economic challenges facing South Africa

due to the COVID-19 pandemic. ASSAf is also supporting the “Just Transition” in promoting a low carbon emission agenda and a climate resilient economy which leaves no one behind.

The Institutional Review Panel (the Panel) heard broad agreement among respondents that the Academy’s strategic objectives are aligned with its mandate as per the ASSAf Act, with a progressive refinement in such alignment over the 25 years of the Academy’s existence.

Policy is rarely determined by science alone, but policy can be informed by evidence. It is incumbent upon the scientific community to play a direct role in ensuring that the scientific perspective is present in policymaking across various areas, such as climate change, urbanisation, disasters, deadly viruses, or emergencies that confront society. Scientists have a huge responsibility to ensure that scientific debates are informed by solid scientific evidence, logical argument, reasoning and sound advice.

The Panel heard that national challenges are paramount in the actions that ASSAf takes and that ASSAf’s strategic objectives are broad supportive objectives, while the contributions come through the three programmes—Scholarly Publishing, Science Advisory Programme, and Liaison Programme—and through publications and their accompanying events.

The Strategic Plan embraces the directions of a number of national strategies including the NDP, continuing all the way to the Medium Term Strategic Framework.

One stakeholder noted though that article 3(a) in the Act, which states “promote common ground in scientific thinking ...” is not explicitly addressed in the strategic objectives. Nevertheless the objective of promoting multidisciplinary thinking and approaches pervades the work of the Academy.

“I find it curious that the Act is silent on recognising excellence (though see Act 5(3) on criteria for election).”

One stakeholder felt the Academy could better express its strategy with loftier goals.

Most agreed that ASSAf’s science advisory role in support of policy development is informed by key national challenges, particularly those outlined in the NDP, and is executed in both a responsive and proactive manner. In fact some stakeholders stated that they are aware of very few South African organisations that are making such a meaningful transdisciplinary, evidence-based contribution in their deliverables.

ASSAf is independent and must have the latitude to do what the Members require of it. The Panel noted that the way the Act is written is very accommodating, allowing for latitude to make the objectives fit. This gives the Academy flexibility and adaptability to manoeuvre in ways that might be unforeseen at this time.

“I notice that the objectives published in the Act and on the website are different. It is difficult to update the Act each time the objectives are updated. I suggest the Act should carry a statement that ‘these objectives of the Academy may be updated from time to time after extensive consultations with the membership for approval by the Minister’.”

The previous Institutional Review Panel urged ASSAf to do more to align its strategic objectives with the government's triple national priorities of addressing poverty, unemployment and inequality. The reality is that ASSAf's mandate is huge, so it must choose issues carefully.

These cross-cutting priorities are also of highest importance to the rest of Africa. The current Review Panel was informed that ASSAf has value to society and that the work of ASSAf is now in alignment with the strategic goals and mandate, as well as national development plans. The wide range of research themes covered indicates demonstrated relevance. Themes such as water and sanitation; women empowerment; agricultural diversity; sustainability; poverty and inequality; a range of reports on a range of health-related challenges (including Covid-19), etc. demonstrate relevance in terms of addressing national development challenges.

Issues that could be added include innovations that South Africa needs to pursue in the next ten years. ASSAf should work closer with NACI on innovation.

“Every ASSAf event I have attended is directly related to the NDP. The Academy displays acute awareness of national, continental and global difficulties.”

In its five-year strategic plan 2015-2019, ASSAf used evidence-based science in service of society. The Panel was informed that since ASSAf is membership-based, it endeavours to use the diversity and skillset of Members to draw them in to deliver on this mandate, to serve society and help address the challenges we face as a nation and globally in the current times.

“The intensive planning that leads to the preparation and adoption of the five-year strategic plans, together with the year-on-year operationalisation of these plans, have ensured in my view that strategies are well aligned with the mandate, and have furthermore shown flexibility in adapting and responding to unanticipated opportunities, threats and challenges (e.g. the Covid-19 pandemic).”

A stakeholder commented that ASSAf does address the NDP challenges but added that those challenges are formulated by government and questioned whether this would “unwittingly affect ASSAf”.

Recommendations

ASSAf must redouble its efforts at adopting an integrated model that is more outcome-driven and that its consensus studies are more apparent to the relevant government departments, Government Clusters and the Parliamentary Committees.

There is alignment between the strategic objectives of the academy and the ASSAf Act.

Consider conducting a review of the Act to explore any enhancement.

The interconnectedness of research, innovation and internationalisation or global engagement could be more pronounced between the ASSAf Act and strategic goals.

The ASSAf Act speaks to “all people” in an explicit manner. Because of South Africa’s context, the aspect of “diversity and inclusion” could be deepened in the strategic goals.

The Act clearly advocates for integration between disciplines, developing the intellectual capacity of all South Africans and ensuring that science serves all citizens, particular the previously marginalised members of South African Society. Therefore ASSAf should serve the needs of all South Africans, especially those who are marginalised and vulnerable—rural communities, the poor, unemployed youth, illiterate people and those who are not digitally connected.

The intertwined nature of society and technology has become more relevant than in the past. While the Act is broad enough—there may be a need to examine this intertwined relationship in a more careful and caring manner—a result here could be transdisciplinary and disciplinary thought paradigms.

“The Act does not exclude this thinking. It is, however, my observation (a perception) that implementers are biased towards the disciplinary paradigm (our comfort space) and more needs to be done, for transformative impact, to bring about a combined approach (not one or the other, but both).”

One respondent felt that Item 4(1) in the Act seems to suggest that the Academy has been set up at the behest of the government. The objectives can be set by the government, but thereafter the Academy must be able to conduct its affairs independent of the government. The Act needs to emphasise this more clearly.

The Act leaves considerable room for interpretation, which is a good thing. It could be amended to reflect in more detail the range and scope of activities (e.g. in the publishing arena, policy for science (which is not there, in contrast to science for policy)).

“The intentions of the Act are captured, but I’d like to suggest that the objectives of the Act are quoted at the next strategy session to check ongoing alignment.”

Another stakeholder commented that ASSAf should not only respond to issues raised by government but should raise concerns at least as much as government does.

The current structural and operational model of the Academy is much better designed to help address NDP challenges than observed by the previous panel. The Panel noted that the Academy had moved the Science Advisory and Strategic Partnerships functions under one Director. This would help in opening doors in the policy landscape and how strategies are implemented. However it is suggested that the Academy focus more on understanding **Impact of Science**, and there is further work to be done to break down silos within the organisational structure.

When measuring impact, ASSAf must also attempt to measure the difference it makes to the lives of ordinary South Africans.

Some NDP targets may be overly ambitious and ASSAf cannot be blamed if they are not met. To put that on the shoulders of ASSAf would set it up for failure because the target itself was not reasonable.

The Academy straddles a mosaic of activities of national importance and should **more actively pursue greater engagement with other Ministries beyond the DSI**. Instead of accepting the current top-down policy approach, ASSAf should be offering the expertise of its Membership, in the different disciplines, to co-create the South African policy landscape. There is no reason the Academy should not be actively reaching out to all government departments, from the Department of Sports and Culture to Treasury and other agencies in the science system.

This will allow it to use its strengths to influence NDP and Decadal Plan outcomes, as well as Agenda 2063 (Africa's development blueprint to achieve inclusive and sustainable socio-economic development over a 50-year period) and the global SDGs.

South Africa desperately needs innovation and a fortified business infrastructure. The engine for that is within science. ASSAf should ensure it plays a role in these aspects of development.

The Academy must explore its relationship with NACI to define and distinguish itself very differently from NACI, and other organisations too, such as the South African Council for Natural Scientific Professions (SACNASP). This will allow ASSAf to be recognised as a body that delivers the advice needed.

Alignment with international imperatives

Observations

ASSAf's strategic objectives fall within the scope of the wide range of national development and continental developmental challenges.

The Panel heard that the Academy should do more work on climate change. The work of the Network of African Science Academies (NASAC), for example, indicates clearly that climate change is not a threat of the future. Migration, food insecurity, malnutrition, and more destructive storms all related to climate change are existential, challenging decision makers across the continent right now.

One stakeholder stated that climate change and its consequences would be one of the main challenges facing ASSAf in future.

COVID-19 has highlighted complex, interconnected risks to humanity. The pandemic represented an intertwined health, social and economic disaster that devastated the physical and mental well-being, education, employment, and income of many. It transcended boundaries, demonstrating that risk is systemic in a connected, globalised world. The initial health disaster quickly became a socio-economic crisis. These issues highlight the urgent need for an approach to prevention and risk-informed recovery and development if sustainable development goals (SDGs) are to be achieved.

A vital lesson from the pandemic is that countries with multi-hazard disaster risk management strategies in place found themselves better prepared to respond to COVID-19. The pandemic reinforced the premise that major system transformations were needed to address global emergencies and their threats to humanity.

The state of water and sanitation was another global issue that arose during the interviews with stakeholders. It was noted that the water problem is significant across Africa. ASSAf has already held a series of discussions on this theme, including an Africa-wide, ministerial level engagement. ASSAf's approach is to discuss challenges and transform problems into solutions.

Although outside the time period of this review, ASSAf has raised the issues of a just transition as another global issue for discussion and during 2022 arranged an interactive workshop entitled *Academic community engagement on a just transition framework for South Africa*. The issue is noted for future reviews.

Recommendations

ASSAf must play a role in preparing society for change. This includes helping address the causes of inequality and poverty. The Social sciences and humanities will be key in this regard. Boosting food security and food sovereignty—producing crops at smaller scales and locally—reduces energy and coordination. The Academy should promote solutions to solve food security including smart (technology-based) solutions.

There is a much deeper role that ASSAf can play in society, in helping the poor and the marginalised who are always hit hardest. The Academy must find ways to convince the public. There are direct ways, but it can also speak to intermediaries that engage the public e.g. NGOs, civil society, and organised labour. Use existing networks and platforms that are dealing with these issues. Organise a series of dialogues with those intermediaries. Their leadership is often respected. So the Academy needs ongoing dialogues with leaderships in local communities.

The Academy should do more work on climate change, as well as on disaster preparedness and recovery. If the Academy is up to speed on such issues it can advise government timeously on climate change by providing information as concise points that someone who is very busy can quickly read and process. Keep the reports small. This way ASSAf can assist the country by informing climate adaptation actions to help communities cope with climate change and other livelihood stresses and shocks.

In the SADC region, the COVID-19 pandemic graphically demonstrated the interdependence between people and socio-ecological systems on which humanity depends. A complex system-informed approach to responses and solutions is required as per the UN's Sendai Framework for Disaster Risk Reduction 2015-2030. An academy of science—such as ASSAf—is ideally placed to inform this required high level response.

The effects of climate change are most apparent at municipal level as well. This intensifies when two disasters collide, as demonstrated when major storms in KwaZulu-Natal in 2021 occurred during the COVID-19 pandemic. Therefore ASSAf needs to work more closely with policy makers and decision makers in local government. The Academy could provide useful information about climate change scenarios and include documents in easy to read booklet format that can guide their responses to climate change risks.

Key challenges will be societal and human behaviour based. Therefore ASSAf needs to ask itself how it will create conversations in communities on adaptive responses to prepare for the world that we are facing.

The Academy should continue to engage the Presidential Climate Commission's Just Transition Framework as the first building block towards reaching South Africa's vision for a just and equitable transition towards climate resilience and zero-emissions development.

5.2 Outputs: products and services resulting from activities and inputs

Scholarly publishing

The strategic goal of the Scholarly Publishing Programme (SPP) is to enhance the national capacity to produce and publish research and to increase the quality and visibility of South African research publications. The Publications Programme is responsible for the production and dissemination of the Academy's flagship journal, the South African Journal of Science (SAJS), and the science magazine, Quest: Science for South Africa.

Observations

The work of ASSAf on the peer review of South African scholarly journals, the implementation of the SciELO open access platform for scholarly journals, the hosting of a National Scholarly Editors' Forum and the improvement of scientific writing skills is highly appreciated by the Department of Higher Education and Training (DHET) and is useful to the country as a whole.

The DHET provides subsidy to institutions for journal publishing i.e. the publications of ASSAf and the publications of the university sector and that is where the country benefits. ASSAf does a good job in this regard but must bear in mind that South Africa is a diverse country in terms of culture and levels of education. It is therefore important that ASSAf makes knowledge accessible to all—not just through publications, but on radio and television, in different mediums and in different languages.

The Panel heard that the current DHET Funding Framework may have resulted in an emphasis on quantity rather than on quality of publication output. Recent studies have shown that consequently, the system has witnessed the unfortunate emergence of different forms of unethical and questionable publication practices (such as in journals predatory publication).

Against this background the DHET has, in consultation with key stakeholders, developed a Research Quality Framework, together with a National Collaborative Programme, to ensure that the publications funded under the Funding Policy adhere to good practice in research integrity.

Regular reviews of the DHET/ASSAf work on scholarly publishing in particular areas e.g. the human sciences one year, or the agricultural sciences the next year are valuable and lend themselves to evaluation of ASSAf's work, especially regarding interacting with people in a particular discipline.

The Panel heard that there is appreciation for the work of ASSAf such as SCOPUS, Web of Science, the Directory of Open Access Publishing, and SciELO.

The research subsidy that DHET gives to universities is significant. So South Africa must make sure it gets value for money from that budget.

ASSAf can play an important role in conducting checks and balances in terms of predatory journals, plagiarism and unethical research practise. This can be extremely beneficial for the country, providing value for all South Africans.

The SAJS plays an important role in promoting the visibility and impact of South African and African research by publishing high-quality original research on relevant issues. The journals of academies in other countries are seen as prestigious.

“There is an opportunity to enhance the quality and relevance of the work that comes into the SAJS if you place

it as a more multidisciplinary Journal that looks at the translation of the science rather than the hard science. This would ensure greater opportunities for researchers to publish especially the multi- and transdisciplinary research in the national sense.”

The Panel noted calls for ASSAf to grow the SAJS to become a premier scientific journal and an authoritative source of high-impact, original research.

Recommendations

ASSAf should promote ethical publication practises.

The Academy should discourage unethical practises and work with the DHET to ensure that there are no subsidies for publications in predatory journals.

Improve the impact factor of the SAJS by providing good article summaries for quick scanning; developing new article types to attract a diverse range of authors and content; expanding the scope of the journal; and allowing authors to submit their manuscripts in a variety of formats to attract more submissions. Consider directed calls for review papers.

Having high impact factor scores could help you attract more university funding, better papers, researchers, editors, which lead to better metrics in terms of publications and citations.

ASSAf should invest time and effort into a marketing mechanism to promote articles from the SAJS to increase awareness, attract citations, and improve usage.

ASSAf must ensure it makes knowledge accessible to all—not just through publications, but on radio and television, in different mediums and in different languages. It is important to recognise that knowledge is often communicated orally and visually on the continent. If the Academy has sufficient resources, it could investigate verbal dissemination of knowledge.

Study reports

Key universal elements of science academy advice are that it is authoritative, independent, objective, free of vested interests, trusted, based on volunteerism, based on rigorous analysis of evidence and peer review, transparent, locally-based, and multi-disciplinary to address complex issues that transcend disciplinary boundaries.

Observations

The Panel heard that the reports of the Academy, across a range of topics and disciplines, are excellent. However, stakeholders questioned if the reports gain traction, e.g. “When an academy does excellent work, is it being read?”

The Consensus Study reports are useful and can be used by organisations for planning and decision making.

The Academy does a very good job of being scholarly but loses out when trying to present their material so that the average person can understand the value of the information they are presenting.

There is some concern that there is insufficient uptake of the recommendations from the ASSAf studies.

Recommendations

The Science Advisory Programme should be taken much more seriously in the science advisory landscape. ASSAf needs to improve its branding and reach all stakeholders in the NSI.

Explore options for making ASSAf studies more apparent to the relevant government departments, Government Clusters and the Parliamentary Committees.

While acknowledging staffing and budgetary limitations, the Academy should consider writing concise, five-page summary reports to accompany each study report produced. The electronic version of this “brief report” should provide links to chapters in the full report. That way, when ASSAf sends a study report to a decision maker or policy maker, the recipient can read the high-level summary first and where they want more information, they can simply click on the link to read further.

The statements can be short and sharp to reach the right people.

This could assist in making the Academy more nimble, addressing the related issue of a lack of agility (see 5.3 Observations: Agility).

Events

Observations

The Panel heard that the public debates, round tables, seminars, etc., especially on topical matters of the day are extremely valuable.

ASSAf webinars are considered an effective and relevant communication tool. They are useful for addressing controversies, such as the webinar on the Copyright Bill. They are a great way to get issues out in the open and articulated. The only concern is that they are often during office hours, and this might make it difficult for some to attend.

The Presidential Roundtables are effective and draw big names.

University lectures by Members are of a high quality, well attended and of great value.

Recommendations

The Academy may want to survey Members and other stakeholders about the most suitable times for webinars to ensure maximum attendance.

The university lectures by Members are generally held at the Member’s university. These lectures could travel to other institutions where there may be few or no Members.

Science engagement, communication and branding

Observations

Most (if not all) of ASSAf forums, webinars, publications, reports etc are open and available to all academics. In this regard, ASSAf plays an important role in building, sharing and expanding scientific knowledge to wider audiences.

The Panel heard that ASSAf’s study reports and communication materials are highly regarded and appreciated but there are concerns about the materials reaching target audiences and the uptake of the work.

“ASSAf should be commended for its efforts in bringing science closer to communities and making science accessible to the average South African.”

The Academy faces a hurdle in terms of branding. In this age of social media and 24-hour news, the scientific voice can be drowned out.

There are lingering perceptions that ASSAf is an elitist organisation.

Recommendations

The Panel heard that the Academy successfully promotes public interest and awareness of science but that there is room for more campaigns.

There is universal acknowledgement that the Academy needs to improve its branding. The Panel heard that the Academy therefore should be publicising itself more prominently about the role of a national science academy, about its work and about its impact on society.

The Academy could consider additional communication products and channels to enhance the reach and uptake of its work.

The lingering perception of elitism should be countered at every opportunity and addressed in all activities and reports.

There needs to be more emphasis on science communication, promotion and marketing (strategic dissemination) of published material, particularly study reports.

“ASSAf should continue to improve public participation to enhance public (i.e. not academic) appreciation of its reports and advice. The best mechanism to address doubts over contentious issues e.g. anti-vaccination, is to create a scientifically-informed and literate society. ASSAf can play a valuable role in this regard.”

In addition to Statements, Consensus Study Reports, Proceedings Reports, Commentaries and Policy makers’ Booklets, ASSAf should consider issuing Bulletins. When an important issue arises, ASSAf should consider broadcasting an alert by sending a Bulletin to their stakeholders. These Bulletins could also be used for alerting stakeholders when something has changed.

ASSAf should review their products regularly to ensure agility is built into their responses.

Like academies around the world, there is a perception that ASSAf can be too much of an ivory tower. The Academy should present their material so that the average person can understand the value of the information they are presenting. They could consider making short videos about their work to further promote and market published material. The Academy could make more use of social media to share such outputs.

Branding itself can advance science—the sharing of information, and the promotion of science as a public good. ASSAf should make visible the difference it makes, and the changes it has brought about for the better. This needs to be done at the level of the public at large.

In these efforts, the Academy should focus on inclusivity, building trust and trustworthiness.

Communication is a two-way process, and the Academy must ensure it listens to the voices of the people as well. Three models of expert-public interaction in science and technology communication are central: **the dissemination model (often called the deficit model), the dialogue model, and the participation model**. In these times, it is important for science academies to practice a combination of these models and to ensure that the participation model appears in at least some of their work.

ASSAf needs to ensure that it does not put out mixed messages—as occurred for many science institutions during COVID-19. The Academy’s communication efforts must include targeted efforts to deal with misinformation and disinformation.

The Academy should consider profiling Members as role models for future generations. ASSAf could work with SAYAS to profile their Members to inspire the youth to follow careers in science and to build trust in scientists and science. There should be a focus on profiling young women scientists and young Black scientists, as well as scientists from lesser known disciplines, where skills are in short supply.

5.3 Outcomes: Intended effects on stakeholders

Impact and intended effects on stakeholders

Observations

The Academy is doing a splendid job. It is commended for its pursuit of excellence. It requires some subtle changes.

The Academy is a relevant and important component of the NSI. However its impact is very limited and only visible to the academic sector. There needs to be clear and visible impact of the work of ASSAf to justify its existence.

The meetings with the Parliamentary Portfolio Committee are highly productive and relevant, but too few and far between.

The national layer of government, especially the science-related departments and agencies, are aware of the role the Academy can play in assisting it to meet the NDP challenges. However provincial government may not be as aware of the potential of the Academy to assist in addressing developmental and societal challenges. At a local level, underperforming metros could benefit from ASSAf assistance in addressing service delivery issues.

Do we need to redefine merit? Or change the requirements to be a Member e.g. increase the component of community engagement and empowerment of civil society organisations or women or youth empowerment? Consider other elements to considerations for membership. The Academy need not compromise on standards but h-index is not the only metric of merit.

Academies by their nature are elitist. That is the case with ASSAf too. It is an interesting question as to if ASSAf could have greater impact if the road to membership was made broader and more representative.

Some stakeholders believe that broadening membership would make ASSAf more relevant to the society it serves and have greater impact.

“There is an issue with the make-up of the Academy, but the Academy was formed specifically to address the issues of the other Academy i.e. the Royal Society of South Africa. Will alteration in membership address the acceptance of ASSAf? Yes, I think it will.”

Another stakeholder commented that ASSAf needs to be more proactive, instead of reactive, and it needs to move with greater urgency and speed to produce advice. The Panel heard that the Academy must find a balance between excellence and speed.

Recommendations

ASSAf needs direct access to the people that make the big decisions on behalf of the public. The new governance and coordinating architecture in South Africa’s Decadal Plan outlines an STI Plenary once or twice a year with the Minister. This will help but the interaction between the Ministry and ASSAf needs to be instrumentalised. The current mechanistic engagements that are already there must be expanded to include something that is more like a Forum to discuss the emerging fault lines in society.

To enhance impact and visibility, the Academy should re-position itself to play a much broader role in the NSI cutting across academia, science councils industry and society. It must make it clear to such institutions how they can direct the Academy towards areas of research that interest them.

ASSAf needs to foster stronger collaboration with the likes of NACI, science councils, research institutes and industry to gain access to additional capacity and ensure that its outputs are relevant and impactful. Consider a fellow’s programme—where organisations can second senior experienced researchers for short periods of time to the Academy to undertake focused desktop research.

For greater impact adopt an integrated approach when addressing health and socio-economic issues in the country, through collaborations among the different Standing Committee Members as well as the disciplinary experts. This transdisciplinary approach will move away from the previous methodology that meant that each of the ASSAf committees work on their own within each of their particular disciplines, thereby ensuring a more comprehensive and holistic response to offering advice on identified challenges.

The pursuit of excellence in science, and development of science, on a global scale must go hand-in-hand. ASSAf must focus on excellence in science, and not compromise on international quality in the developing world.

“There isn’t a second class standard for science in the developing world, and the Academy needs to be a strong advocate for this.”

The ideas of ‘Development of Science’ versus ‘Science for Development’ need to be better articulated.

The question is whether the developing world should focus on fundamental basic science or only applied science with practical applications. Clearly it is not a case of one or the other. We need both.

“The idea of fundamental research driving innovations, and innovations driving fundamental research in an upstream effect should become an important way in which we should think about growing science globally. I would like to see the Academy giving this thought.”

The value proposition of ASSAf could be visualised in a strategic map that shows how it delivers to its goals. This would help understand how internal resources, competencies and capacities deliver against the goals and expectations of various stakeholders.

Dynamic partnerships will be critical to achieving the outcomes and impacts envisaged.

There should be more regular engagement with the Parliamentary Portfolio Committee. ASSAf should not wait to be invited to address them but should approach them if an issue needs attention.

Occasional meetings could be scheduled with relevant government representatives to update them on the issues ASSAf is addressing. This does not have to wait for a final study report but could be a discussion. This will help begin to address the need for greater science traction.

The Academy should consider engaging with provincial government to increase awareness of the cohort of scientists in its ranks who are available to serve the provincial layer of government. The Academy should meet with provincial government to make them aware that they have scientists who would be despatched to the provinces to help with the issues they may be struggling with.

The Academy could contribute at Municipal level too, but this would have to be done in a very targeted manner to assist with issues such as urban planning, water supply, and energy.

The Academy could bring civil society organisations to the table to hear from them. “It’s risky, but if we don’t do it, we don’t try, we won’t hear them,” said one stakeholder. Non-governmental and civil society organisations, including community-based organisations, have a local presence, partnerships, and existing networks of trusted relationships with vulnerable groups. They would be a good partner to engage to reach the people of South Africa.

ASSAf is little known, especially beyond the scientific community and needs to better market itself and its work.

Aims, independence, and relevance

Science does not stand apart from society. Scientists cannot separate science, policy and society. With each of these changing rapidly, the interactions between them change as well. Science is clearly being

seen as a tool of both national and international development. This is causing many governments to realise that science does have a useful role to play in policymaking.

ASSAf provides the platform for informed, evidence-based debate on wicked and difficult problems, and therefore it plays a fundamental role in the community of practice of science in South Africa.

Observations

Without doubt there is a historical and ongoing imperative for an academy of science to help South Africa grapple with the nature, role and impact of science and technology, as well as the impact on contemporary and future society along multiple axes. That resonates with the needs of a society striving for inclusion and equality.

It is crucial that there is a platform outside of government to ask the fundamental scientific questions as they relate to policies. An academy of science must consider the impact of new technologies. It is important for ASSAf to be there because policy makers are too close to making policy and the technologies that they harness.

ASSAf is still relevant and uses its limited resources well. However, the Academy needs more funding to marshal the resources necessary to address important issues of public interest, social cohesion, the functioning of government, inequality and poverty, housing and more.

“We do have a committee looking at poverty and inequality, but sometimes I feel some of it is driven more by science interests than what’s on the mind of the public and agility.”

As with many academies around the world, the Review Panel noted that ASSAf’s independence is constrained. There is a tension for ASSAf between government’s influence versus independence. For example, some respondents mentioned that ASSAf found it hard to express its opinion on the ongoing political crisis in Ukraine. The panel heard that there are strong views among Members, but that opinions were divided.

Independence is directly linked to funding. If the Academy is funded by government, it is very difficult to say anything out of line with its sponsor.

“Providing non-partisan advice is ASSAf’s strength. It needs to stand up to that and address sensitive political and societal issues.”

What came up time and again is that ASSAf is created as an independent organisation in the Act and as an academy it ought to value that independence. Certain stakeholders expressed a strong commitment to ensure ASSAf’s independence endures. The academic space is a space of contestation of ideas. Scholars revel in that.

One stakeholder stated that the Academy is more relevant today than when it was founded.

Another commented that ASSAf never shies away from potentially painful or difficult debate, but has, remarkably, made an environment in which debate can be carried out in a collegial manner on potentially polarising subjects. “This is absolutely critical in building a robust science community in which

there is an opportunity, or even an obligation, to speak out—in a well-informed and rational manner. The principles of freedom and responsibility in science have a caretaker in ASSAf. A small example is the production of the Code of Conduct in connection with POPIA.”

“ASSAf is making a major contribution to making transdisciplinary science the norm, in an era in which we are confronted by urgent global problems. This is clear in the ethos at my university, which has a number of active ASSAf Members. I cannot judge whether the influence extends to those universities with very few Members. I know that science councils and the private sector are under different pressures from academia and may not be able to participate in important debates.”

The Panel heard as well that parastatals—that are somewhat independent, as well as truly independent institutions—like ASSAf, may struggle somewhat to be heard in government circles.

“My experience is that government tends to look for its advice from affiliated individuals and institutions, rather than approaching a body like ASSAf and seeing the Academy as an independent think tank of particular value.”

There is uncertainty about government policy with respect to accepting and deploying scientific advice.

The Panel heard that the Academy must play a greater role in policymaking. One stakeholder stated that in South Africa, a lot of the policymaking is not as greatly evidence-based as what it should be. The Academy does produce authoritative reports from time to time, but these do not necessarily lead to policy.

It is absolutely important to have independent bodies advise government. COVID-19 was a case in point. Stakeholders felt that the Academy was not used enough in this instance. Members may have been part of science advisory bodies on COVID, but not the Academy formally. One stakeholder commented that this type of role is critical, and that society cannot allow politicians to drive public science-related discourse, because countries suffer when that happens. The stakeholder added that this is not necessarily something the Academy can fix, it is just the environment that we operate in, and it happens all around the world.

The Academy should not ask permission from government to do things. It is an independent body. It is not just another institution of government. The current leadership seems to

look to government and discuss things with the DDG before the Academy acts. That is not correct.

ASSAf is held in high regard in many quarters, including by other member academies of the NASAC. Many of the 28 merit-based academies of science on the continent are under government's wing and struggle for independence.

Recommendations

The Academy must work relentlessly to find the balance between government and its membership to bring these two stakeholders together to address South Africa's national development challenges.

The Academy remains relevant and must continue to support excellence in science across all disciplines. An awful lot of good flows from that for society. The Academy could spend a greater effort articulating this good. What is it and why is it important. Unfortunately, history shows us that we all have a short-term memory and stating the above once is not sufficient. The Academy needs to use every effort, at every opportunity emphasising the importance of the benefit of science to society. It must become a refrain.

The ASSAf Act states clearly that the Academy is independent, therefore it needs to be more proactive in asserting itself.

One of the critical principles when providing science advice is trust. ASSAf must continue to find new ways to engage more regularly with government, decision makers and policy makers to build enhance trust between the politician, policy maker, the media, the public, and the science community.

The Academy is currently too distant from its Members (See also item 5.4 Membership). To make ASSAf a stronger, more independent body, it needs to solicit Member feedback and understand their motivations to guide decisions and responses. ASSAf needs to up its member engagement activities in the shorter-term, so that in the longer-term, when a controversial issue arises, such as the Ukraine issue, the Members—and not government— are equipped and ready to influence the agenda and formulate the response.

The Panel heard that ASSAf must promote its legitimacy and importance in a more connected society. The Academy is a voice of authority with a social licence to operate. The world is moving from a shareholder model to a stakeholder model. The Act of Parliament is positive but ASSAf also must have legitimacy in South African society. The rise of the amateur makes the job of ASSAf more difficult as it is one of a thousand voices that someone can Google. Not enough people know about ASSAf, it needs to take a position within the conversation space.

A perception lingers that ASSAf is an elitist organisation—it is recommended that this be addressed in all activities and reports.

Broaden and increase public participation—not simply academics, to enhance appreciation of the reports and advice from ASSAf.

Instead of convening their own teams to develop policy, government departments should consult ASSAf as the go-to institution for policy advice and policymaking.

There are a number of credible individuals who would span the science and policy spectrum and the Academy needs to think through how it can collaborate with these individuals to better influence policy. The Academy could convene a workshop to get the ball rolling.

The members of ASSAf represent a wide spectrum of science disciplines. They must ensure that collectively they approach challenges by speaking in one voice to ensure continued independence and impact. This can be achieved by continuing to pursue excellence relentlessly and by continuing to connect with other academies to build capacity and skills.

ASSAf should elevate efforts to draw younger Members and a more diverse membership in general without affecting its ability to execute its mission and without distorting the primary goal of the Academy, which is to keep independent of political pressure.

“A membership that better reflects the society it serves will inevitably enjoy a voice that’s respected, as well as improved independence and sustainability.”

ASSAf should build a fundraising arm in the Academy to raise money from donors, foundations and other sources to empower it to speak any time and without fear.

Additional funding will benefit the Academy. It may even consider finding ways to compete for additional funding from government or source funding for specific projects. Alternatively, ASSAf could explore new conduits of communication with government to influence policy.

ASSAf should consider working closer with civil society, this collaboration is too limited now.

Agility

Observations

The Panel heard that ASSAf is well suited to undertake longer-term Consensus Studies and has done so successfully. The consensus report titled [South Africa’s Technical Readiness to Support the Shale Gas Industry](#) produced in collaboration with the South African Academy of Engineering (SAAE) is a case in point and was produced during the review period.

Some questioned whether ASSAf has sufficient agility to respond to issues timeously—especially in uncertain times. Some stakeholders criticised the Academy for being too slow in responding to issues, notably the COVID-19 pandemic.

Some expressed their opinion that the Academy could be more pragmatic.

“It’s easier for me to call a meeting with those scientists and ask them for answers than to approach ASSAf and do it through them.”

The Academy is of view that it needs more time.

“Yes, the Academy is a bit slow to respond. Some things are beyond its control, but others are within its control.”

Another stakeholder commented that providing scientific advice rapidly is not something ASSAf is suited to and if it is going to consider doing so, it is something that would have to be very carefully looked at.

“Post-COVID, we need to relook ASSAf’s role in a disaster or emergency. ASSAf did try and approach this issue with government, but government did not bite at the time. During COVID, ASSAf was in a very difficult situation—as were academies and scientific institutions around the world. All the people on the SA National COVID Advisory Committee were in fact ASSAf Members, but they were advising in other capacities.”

Some felt ASSAf should not be doing rapid responses at all, especially with its small secretariat—although it would depend on the nature of the crisis and the number of scientists available to work on a report.

One stakeholder commented that the only way around could have been for ASSAf to put together a committee first. During the pandemic, it was ASSAf Members who led the way in terms of the science-based response, yet the Academy got no credit at all.

They could’ve provided a parallel committee to translate the information suggested another respondent who was interviewed.

The Panel heard that the Academy does well on consensus reports but could improve its rapid responses.

“Members are not fast enough to respond. The age of the membership may play a role in the lack of agility. Most Academy Members are older, and when mobilised to respond to emergency issues, their response rate becomes an issue, and that affects the Academy’s reputation as an institution.”

Another respondent with operational knowledge explained that there is a “seashore” of issues that ASSAf could consider and hence it has devised a system of responses that range from [Statements](#) that can be issues within a matter of days, including the May 2020 [Statement on Academic freedom and the values of science](#), through to [Consensus Study Reports](#) that may take several years to generate, as they are peer reviewed and submitted to ASSAf Council before being released. Additional report types include [Proceedings Reports](#), [Commentaries](#) (on topical and relevant government policy documents and White Papers), and [Policy makers Booklets](#), such as the brief entitled *Neonicotinoid Insecticides: Use and Effects in African Agriculture*, published by: Academy of Science of South Africa, in partnership with the InterAcademy Partnership (IAP) and the NASAC in 2019.

Recommendations

ASSAf should review and refine their products to ensure agility is built into responses when feasible. At the same time, it should be acknowledged that committees need time. Thinking takes time to evolve and a committee cannot publish until the real creativity emerges. There may be diminishing returns when a committee is pushed too hard.

The Academy should explore new and additional mechanisms for rapid responses.

Refine ASSAf’s existing publication outlets and use them. Explore using other outlets such as *The Conversation Africa* for shorter term commentary by Members, while working on longer-term study reports.

The Academy should consider the approaches of other academies of e.g. releasing preliminary reports and quicker responses more readily. It is not changing the value proposition; it is expanding the value proposition.

This would require an enabling environment where the academic community can identify information to provide to the public quickly—even if without academic rigour—if you are creating a conversation with society and state clearly that the information is not definitive, that the Academy will follow up and engage further once the science is done.

This suggestion comes with a caveat, because ASSAf must not lose their scientific rigour and become a science engagement organisation, but there is an opportunity there. We are reminded that most people do not get their scientific information from reading journal papers. They read it, hear it and watch it via the media and social media.

In an emergency, rather than issuing premature advice, ASSAf could instead convene a panel of experts to provide guidance, bearing in mind there are always risks in such a scenario. However, unsolicited advice may be a greater risk than taking too long to react to solicited advice.

Certain stakeholders that were interviewed expressed the opinion that government does not recognise the full potential of ASSAf. The Academy could provide short-term advice to government if it were properly resourced. However, government needs to buy into the concept to make it work. This would be more of a convening activity than a consensus activity.

International impact

Strengthening and enhancing international scientific linkages with relevant scientific organisations is a responsibility of the Liaison Programme. This includes strategic partnerships; African collaboration; and overseas collaboration.

Observations

Another important objective of the Academy is to link South Africa with scientific communities, in particular within the Southern African Development Community, the rest of Africa and internationally. The Panel heard that this is an area in which ASSAf consistently excels.

“Through the exchange of scientific ideas and the sharing of support, the pandemic offers a strategic opportunity for bolstering regional cooperation in dealing with some of the common health and socio-economic challenges that are experienced in the various countries. ASSAf, through its valuable and productive partnerships with African scientists affiliated with Network of African Science Academies (NASAC), African Academy of Science (AAS), The World Academy of Science - Sub-Saharan Africa Regional Partner (TWAS-SAREP) and International Science Council Regional Office Africa (ISC ROA), continues to play a leading role in

connecting scientists from across the African region to fortify a continental response to the pandemic in line with the vision of the African Union.”

ASSAf is a member of the InterAcademy Partnership (IAP) and has distinguished itself through leadership on many regional and international initiatives, often being called upon to play a leading role among African academies. During the review period this included hosting *the IAP Conference on Science Advice* in Hermanus in early 2016.

ASSAf seeks to develop and maintain productive partnerships with international partners that include other academies and their networks. The South African Academy serves and contributes to international strategic partnerships that include the IAP and its regional networks. ASSAf has signed memoranda of understanding (MoUs) with several other national science academies and has held joint workshops and conferences with international academies.

ASSAf is not a member of the International Science Council (ISC), but has nevertheless cooperated closely with the organisation, until recently hosting its Regional Office for Africa. It is regarded by the ISC as a valuable partner, with ASSAf members regularly participating in ISC-sponsored studies, workshops, and other activities. ASSAf ought to apply for membership of the ISC.

The World Academy of Sciences for the advancement of science in developing countries, known worldwide by its acronym, TWAS, praised ASSAf very highly. UNESCO-TWAS and ASSAf have been working together for several years now in support of building scientific capacity in the developing world with special focus on sub-Saharan Africa.

Presently there are 35 ASSAf Members among the TWAS fellows.

ASSAf hosts the TWAS Regional Partner for Sub-Saharan Africa. In this context, the work of key staff at ASSAf has been critical in running the major activities of the TWAS Regional Partner: i) Regional Conference for Young Scientists (RCYS), ii) selection of Young Affiliates, iii) TWAS Regional Prize/Award.

“The work of ASSAf deserves great praise because of the efforts they made in reaching out to early-career researchers in LDCs many of which are within the African continent. Africa has the largest number of Scientifically and Technologically Lagging Countries: ASSAf greatly contributed, in different ways, to TWAS capacity building in those countries. In addition, ASSAf colleagues liaised with the TWAS Regional Partner in India and collaborated on RCYS events.”

ASSAf hosts the Organization for Women in Science for the Developing World (OWSD) South Africa chapter, which currently has 447 members (women with postgraduate degrees in science, resident in and /or nationals of South Africa). Many of these members are OWSD visiting PhD fellows (48) and a further 53 are graduates from OWSD PhD programme. The Panel heard that ASSAf staff have always

been attentive to the needs of OWSD PhD fellows in providing them a warm welcome and ensuring that their needs are being met at the different universities where they are enrolled. The current OWSD President was Chair of the OWSD SA, and this experience made it possible for her to be nominated as President.

ASSAf has also hosted GenderInSITE's regional Africa office and, this was especially fruitful. When the previous executive officer of ASSAf retired, she was elected as the international director of GenderInSITE. OWSD SA applied for a grant from IAP to produce a report on women's participation in science academies and this resulted in the [seminal 2016 IAP/ASSAf report](#) which made recommendations to all academies. In addition, as a TWAS Fellow, Dr Diab was also Chair of the TWAS Gender Advisory Panel and in this role (with support from the OWSD Secretariat) she produced an annual report for the TWAS Secretary General on the number of women in TWAS governance, programmes and activities. This report had to be read out each year by the Secretary General and subsequently numbers of women in TWAS have improved rapidly.

“ASSAf has been a long-term member of IAP, participating in common initiatives, supporting statements and hosting governance and other meetings. ASSAf regularly nominates participants to our committees and programmes, provides experts for review committees and evaluation panels and acts as a lead in the capacity building mission of IAP with regard to other less substantial academies.”

Some stakeholders feel that ASSAf's international prominence is waning, and this is going to be a challenge. During the era of the African Science Academy Development Initiative (ASADI)—from 2004 to 2014—ASSAf was heavily involved in the effort and enjoyed prominence that resulted in it being well connected. ASADI, launched by the U.S. National Academies and funded by the Bill & Melinda Gates Foundation, was a ten-year effort to strengthen the capability of African science academies to provide independent, evidence-supported advice to inform African government policymaking and public discourse. Since it concluded the enthusiasm has worn off.

ASSAf needs to find ways to revitalise and maintain the interest in such activities and possibly the return to in-person events is a good opportunity to make sure ASSAf representatives attend international meetings.

The Panel heard that ASSAf plays a considerable role in and is a stalwart of NASAC, and it thinks in African terms.

The Academy also has good relations with many individual academies on the continent and is a highly regarded partner.

There is potential for overlap with our professional societies and possibility also for unnecessary competition.

Recommendations

Scientists can use science to build bridges across divides, between individuals, and between

organisations, across national boundaries to create fora for greater insight, analysis and action. The Academy should nurture current partnerships and leverage these for greater collaboration and impact.

To avoid unnecessary competition, Assaf should outline more clearly the international links they wish to nurture and the nature of the partnerships and collaborations they desire with other scientific organisations. Forging partnerships with common goals is an important way to address this issue.

ASSAf ought to apply for membership of the International Science Council (ISC).

ASSAf should explore opportunities for staff development and growth as the influence of COVID-19 wanes. This is an opportunity to attend international conferences again, and to visit other academies and spend time learning how they do things.

As an African Academy, ASSAf must build on its reputation and engage more broadly across the continent.

Within global disciplines, ASSAf, through its Members in those disciplines, should explore opportunities for formalising international linkages. This could also open opportunities for capacity development and leadership development within the Academy. These cross-cutting opportunities could help close the gap left by the conclusion of the ASADI capacity development initiative, to ensure that the momentum is not lost.

5.4 Structure: Governance, management, and membership

Structure: Governance and operational model

Observations

The structure and operational model, including the Council and Standing Committees, together with procedures for involvement of Members and the broader scientific community; and representation on international bodies, are lean and fit for purpose. In this regard, since its establishment ASSAf has drawn on and learned from more established academies, adapting as appropriate to its needs and resource base.

Following the policy intents of the STI White Paper, the Decadal Plan and the NDP, ASSAf continues to: (i) underscore the importance of a whole-of-society approach to STI by focusing on system-wide coordination, greater policy coherence, and partnerships with government, business and civil society, (ii) recognise the importance of science diplomacy, Open Science and Open Data, and (iii) view STI as a key driver of change in society.

Overall, it is appropriate that the Act is as high-level as it is, with the Council being entrusted with accountability for alignment and compliance. The model supports effective execution of ASSAf's mandate. The Strategic Plan aspires to advance three core national thematic priority areas:

- a) Advancing the objectives of the White Paper on STI and the MTSF in support of the DSI mandate;
- b) Promoting the advancement of evidence-based research related to national priorities, including the deliverables of the SDGs; and
- c) Science engagement and science communication.

These strategic objectives and their operationalisation are sensitive to national priorities and the shifting landscape of scientific activity and challenges, drawing on experience from the past. There is strong alignment through the dual mandate of excellence and service.

Areas in the NDP that ASSAf has addressed through its policy work, assessment studies, and various cooperative activities, include energy, climate change, food security, regional and international cooperation, research and innovation, and health.

“ASSAf operates in a country without a critical mass of scientists to have a major impact on how it delivers to the NDP. By its nature ASSAf becomes a smaller set of scientists relative to the population of scientists operating in the country, simply because it is about outstanding scientists and not the broader scientific community in South Africa. This affects its impact.”

The Review Panel heard that, for the most part, the Academy’s structure and operational model are suitable, that the different programmes integrate well, and are led by appropriately qualified and competent staff. Staff work well with Members on relevant issues ranging from health communication to education, to environmental communication and others.

The Panel heard that ASSAf is considered by many to be the top performing Academy on the continent, able to respond to the needs of the nation. It has been considered more of a hard science academy, with very few reports emerging from the human and social sciences.

The Panel heard that ASSAf needs to be seen as a body that is actively contributing to using science to improve people’s lives. To achieve this it would need to consider relooking its structure to e.g. address major societal challenges such as the SDGs.

Recommendations

By ASSAf’s own admission, its evidence-based studies “have not consistently been taken up as policy”. The question then arises, what will ASSAf do differently to ensure uptake of its science advice? How will ASSAf ensure that government departments and Parliament take up the findings of ASSAf’s consensus studies? What mechanisms and processes will ASSAf put in place to use science advice to shape policy and legislation? These matters need to be urgently addressed for ASSAf to become the go-to body to assist government and other stakeholders in evidence-based approaches when addressing societal issues.

ASSAf should investigate the possibility of restructuring itself to address societal issues. For example, within the SDGs there are clear areas in which we could do research and translate it into socio economic impact. ASSAf could group itself to address specific SDGs. The Standing Committees could be structured for areas linked to the SDGs and continue working and producing reports, even if not commissioned to do so. This aids the impact of science.

The structure and operational model could benefit from the inclusion of Research, Development and Innovation (RDI) spaces from the private sector. There may be a need to find an appropriate way (such as associate or industry/institutional memberships) to bring about closeness with this group.

Continue to collapse silos within ASSAf beyond what has already been achieved.

Diversify the Academy to begin to address the need for more reports from the social sciences and humanities. There is concern that even though ASSAf has hired a staff member who deals with the social sciences and humanities specifically, issues such as unemployment, drug and alcohol abuse among the youth, and xenophobia are not being sufficiently addressed.

Organisational performance and management

The Panel interrogated whether systems are in place to monitor organisational performance against targets.

Observations

The Academy has in place a good online monitoring and evaluation (M&E) system that tracks outputs and outcomes as set in the strategic plan and APP. The quarterly bilateral meetings with government and the semi-annual parliamentary discussions ensure that the Academy remains on track and ensures return on investment for government.

The Academy is good at reporting and sends regular updates to all stakeholders and circulates regular newsletters. A dedicated person tracks activities and ensures that governance issues are addressed.

The Panel heard that from a management point of view, ASSAf has the right structure and metrics in place to measure performance, however respondents were unsure if the Academy evaluates individual staff performance. “There is an HR committee, but I have not seen the ratings of staff. I assume it is in place.”

Recommendations

ASSAf needs to be very outcomes-based and where possible (taking into consideration limited resources), address some of the ill-informed conversations taking place in society.

ASSAf should seek more regular interactions with government than what is prescribed within formal governance procedures.

Membership

ASSAf is a self-perpetuating organisation in which new Members are elected every year by the full existing Membership to achieve the goals of the Academy. New Members are added by nomination and election, not selection

The Academy is not tapping enough in a wider pool of expertise. After nomination by four existing Members (at least two of whom do so from personal knowledge of the candidate), new Members of the Academy are elected in a secret ballot. The normal criterion for election is significant achievement in the advancement and application of science/scholarship, both nationally and internationally.

Observations

There is currently a strong emphasis on the honorific aspect to membership. This is indeed balanced by emphasis on service to society, however ASSAf must pay serious attention to equity in membership criteria.

The Panel heard that the system works, but that there are prospective Members being missed and ASSAf needs to draw more Members, but still on merit.

“The academic process ideally is based on independent, critical thinking, on evidence-based research, on

reproducibility of results, on pursuing the facts, on unearthing the truth, on not seeking favours, on interrogating ideas rather than from which office or hierarchical structure these come from, and so on. We need more courageous people elected to the Academy who are prepared to stand for these principles no matter the consequences.”

The ability of ASSAf to carry out its mandate effectively depends in the first place on the quality of its membership, and on having a critical mass of outstanding scholars as Members. This critical mass has not yet been reached, though the increase in Members year on year, following stringent election procedures, is encouraging. To a large extent growth depends on the size of the South African scientific community, and also the diversity of this community. The challenge is to continue with growth in membership, while adhering strongly to the criteria of excellence and service.

For some, having colleagues who are Members of the Academy brings prestige to their organisation.

The Academy needs more young Members.

Universities with a number of ASSAf Members experience a lot of permeation of thinking around the kinds of issues that ASSAf is engaging—and this is good as it means that the country’s academic institutions are on the same page. However, it is of concern that certain universities have only one Member of the Academy. These universities might be working on key issues and their voices are needed at the Academy, but if they have only one Member, their contribution might be restricted.

Open science is coming and is likely to make the current membership criteria outdated.

The Panel heard from a good number of Members interviewed that ASSAf’s member engagement activities need improvement.

As a Member, I find it very difficult to engage with ASSAf. This may be due in part to COVID. We do get invited to webinars, but there is insufficient opportunity for flow of engagement from the membership to the Secretariat. There is a limit to the number of webinars I can attend, and I like to give input in other ways too.

It should be added that the Panel also heard from the Academy itself that it was struggling to get Members to participate in activities, as they are more focused on academic citizenship and their many responsibilities. The reality is that ASSAf work is voluntary, Members do not get paid for it.

Another stakeholder mentioned that ASSAf may face a challenge in future of maintaining a membership cohort that meets the requirements/expectations of high academic/research excellence with international recognition. Institutions without membership might tend to ignore ASSAf altogether.

Recommendations

The Academy must challenge itself to increase and diversify membership, but still on merit. The membership process needs to be modernised, streamlined and transformed to reach a larger pool of candidates.

ASSAf must pay serious attention to equity in membership criteria. A good discussion dedicated to membership in an Academy in the context of high inequality would be extremely useful and may provide some innovative answers.

“Membership must be expanded but changing standards is not helpful here. Academies are about excellence. The Academy could instead look at ensuring standards are relevant to different disciplines. Career trajectories differ and are not necessarily linear. We need a longer conversation about this.”

Meaningful inclusion of historically disadvantaged institutions (HDIs) and equity among membership is critical. The Academy must reach out to Members and universities located in the more rural provinces, to try and increase their representation in the membership ranks. The Academy could consider roadshows to these institutions to improve knowledge and awareness of its work, as well as to improve the number of Members located at some HDIs.

One stakeholder commented that their university actively promotes ASSAf membership and engagement (active participation at events and committee structure(s)). It also tracked ASSAf membership as part of the university’s strategic plan. Other universities and science institutions should be encouraged to do the same.

HDIs dominate, not just the membership of ASSAf, but also Standing Committees and project teams. It is related to state of higher education and the historical position of those universities in the country. The Academy could play a role in enhancing the role of HEIs in their activities.

ASSAf must find ways to help empower young scientists, so that they can eventually become Members. SAYAS as a group needs to be empowered and brought closer to ASSAf to become a place where greater numbers of new Members are sourced.

There may be a need to create different platforms and further diversify SAYAS membership (simultaneously progress transformation and inclusion).

Improve member engagement by facilitating more active participation by Members.

Ensure ongoing and regular interaction with the Members to create awareness, inspire commitment and encourage participation. Create meaningful content, connect with them emotionally, to make them feel positive towards the Academy and invite their participation. Find creative ways to get their attention and remind them of the ways in which the Academy adds meaningful value to their lives and careers. Build relationships with Members to keep them happy.

In the post-COVID period when in-person events are revitalised, ASSAf should find ways to ensure two-way engagement at these events. Structure them to ensure involvement and give Members a choice of a number of different ways to make their inputs.

Give young researchers opportunities, draw them into the Academy, encourage Members to mentor the younger scientists into the Academy as their paradigm is very different.

At the tail end of serious COVID, there is an opportunity to have a post covid strategy for ASSAf with an emphasis on how to better engage the membership. It cannot be more of the same. ASSAf should consider regional convening activities. These can be driven by Council. They are in all regions and all HEIs. They can reinvigorate and draw in the Members as part of a post-COVID reset. These efforts should not be top down only however but should follow a bottom-up process as well.

Transformation

Observations

The Panel heard that the gender balance has improved significantly within ASSAf but that there are still concerns about the race and age profile of the Academy with there being too few Black members and an ageing membership, with too few young members joining the ranks.

“The DSI recommends that ASSAf pursue more robust engagements with the scientific community for the submission of nominations with respect to race, gender, discipline and institutional affiliation.”

Scientists must take responsibility for identifying colleagues of value and encouraging them to join. The Academy does what it can to encourage nominations, but the researchers across disciplines must make the effort to encourage top scholars to be available to put their hands up for membership. The Academy assured the Panel that it does its best to facilitate the process and encourage transformation e.g. encouraging nominations of Black women.

“I am conscious of the responsibilities we all must fix the inequalities of the past. We have been there, and we want to fix that. Equality issues on race and gender seem to trump science and society.”

The founders of ASSAf insisted on its independence and inclusivity and the Act has been modified a number of times since. There appear to be calls from government and parliament for the Academy to amend the Act again to meet transformation efforts in terms of race, gender and institutional affiliation. Some respondents felt that this was an unfair expectation, since ASSAf is dealing with what is a reality in academia in the country and a broken pipeline that feeds academic excellence.

The Academy’s transformation achievements are in fact ahead of the national statistics for women and Black professors. However, it is a reality that models indicate that that it will be almost a half a century before parity is reached. Black Members of the ASSAf Council remain adamant that membership has to be based on excellence.

ASSAf has considered having a weighting when considering Member criteria. Due to South Africa's history, many scholars responded to mentorship and societal issues at the expense of producing research papers. The Review Panel heard that two committees are taking this forward currently and the Academy is challenging itself outside of the normal parameters of looking at excellence.

A new transformation strategy was in the final stages of approval at the time of the Institutional Review. The strategy is an attempt to be more inclusive while trying to figure out the whole recipe, because what works in the health sciences, does not necessarily work in the social sciences. It is a shifting goalpost but the Panel was assured that ASSAf is trying.

The Panel heard that there are concerns about the age-profile of the membership as well, and that the Academy may over time lose funding based on that shortcoming. Older people are not talking about the needs of young people to government.

Recommendations

The Academy might consider self-nomination, as a potential example of expanding membership as recommended previously.

Make a **wider call** when calling for nominations of new members, but make it clear what the requirements are. The Academy should find ways to tap into a broader range of Members to make the organisation more inclusive. Addressing this issue will also counter the claim that ASSAf is elitist.

Send out calls for nominations and connect to all higher education institutions and other relevant institutions and set specific criteria for those nominations—without undermining the issue of scholarly merit.

One stakeholder added that it is one thing to establish ASSAf, but another to make it a force to be heard.

“Science has the answers to the energy crisis, but the Academy and scientists in South Africa have to get government to take science seriously. I do not know how we do this, because they do not know how to listen to anybody except their own folks. But it does not mean we must be quiet.”

ASSAf needs to build on its transformation strategic plan and do more to allow its membership to engage with one another and encourage senior scholars to work with junior scholars. This could be done by accelerating the Standing Committees.

“ASSAf struggles with the stigma of being an ‘old boys club’, you nominate people who look and think like you. We have to break the cycle and get the dominant institutions to reach out to academics at other institutions, so that we can transform the membership.”

Expanding its membership criteria could boost ASSAf's relevance, stability and sustainability.

The DSI does not want to be prescriptive but encourages ASSAf to work closely with the DSI in finding ways of increasing the number of Black people, females, as well as HDI representation in the ASSAf membership. ASSAf needs to reflect on how to uplift the HDIs. ASSAf needs to look closely at the indicators and be more creative. What resources are needed, for example from the National Skills Fund to support skills development? Is there a possibility for a Ministerial project to support ASSAf in changing the demographics? ASSAf should be closer to the Sibusiso Bhengu HDI programme to strengthen the HDIs.

ASSAf must work closely with DSI to discuss how to transform knowledge production in South Africa.

The Academy should be more proactive when they send out calls for nominations. Members of Council and all Members must follow up and proactively nominate colleagues, especially those who are women, black and young. To empower women, ASSAf could mobilise women in science, even at university level and link it to work at SADC and Africa level on role of women.

Promote the presence of women in science in general and this will draw more women into the Academy eventually.

“ASSAf needs to challenge itself outside of the normal parameters of looking at excellence.”

ASSAf needs to work hard to become more inclusive. This could involve refining the membership criteria to ensure that they work for all disciplines. What works in the health sciences, does not necessarily work in the social sciences. The Academy could change the Membership criteria to include, for example, a greater weighting for scientists who are more involved in society. The Academy could learn from the National Research Foundation's rating system, which provides clear criteria, they spell it out, but it does not compromise on excellence.

Meritorious appointments that facilitate transformation of the Academy must focus on Black people and on young people, otherwise they cannot become Members. We should avoid defining merit in a particular way, but have a range of ways of defining merit. Or change the requirements to be a Member e.g. increase the component of community engagement and empowerment of civil society organisations, or women or youth. There should be other elements added to the considerations for membership. Many scholars spend time on these activities, which takes them away from writing research papers. This does not mean they are not deserving of membership.

Many historically disadvantaged universities are located outside the city limits. Make a special effort to bring them into the fold and make them part of this academic advisory.

The Moroccan Academy took a roadshow to the HEIs around the country. Shared the criteria, prizes etc. Even at school level.

ASSAf should look to the Academies in Africa—where membership is a matter of immense pride—for examples and inspiration. The Benin National Academy of Sciences, Arts and Letters was mentioned, where Members are highly regarded in society and where researchers actively campaign to become Members.

“The research funding model pushes people to be individuals rather than to partner with junior scientists. Why? Because then the funding comes to my institution alone. There is a lot of push to be a solo. One way to make membership more sought after would be to ensure that scholars get credit **at their institutions** for the work, they do on ASSAf reports and monographs.”

ASSAf needs to find ways to retain its societal relevance in a changing world and to South African society. One way would be to consider creating an emeritus status for the older Members, which in turn makes space for others.

Lessons from the world demonstrate that those countries that develop young scientists end up with a much greater critical mass of scientists who contribute to science and impact society. The Academy should make better use of SAYAS as a pipeline into the senior academy.

ASSAf must continue to address the membership imbalance in terms of a heavy emphasis on the natural sciences and not enough representation from the social sciences and humanities.

5.5 Resources, stability and sustainability

The Panel asked respondents how effectively ASSAf is managing resource allocation in support of its strategic objectives. They asked if the respondents believe resources are adequate to ensure the stability and independence of ASSAf, and if not, what would be the possible solutions or other sources of funding that it could tap into and build capacity.

Financial resources

Observations

Deteriorating financial circumstances in South Africa are affecting not just ASSAf but science in South Africa in general.

Although resourcing is an ongoing huge challenge, ASSAf has done well to achieve much with limited resources. It could do so much more with better resourcing. The DSI grant is presumably constrained by a range of economic and other factors, but the case for an increase in this grant is compelling and consistent with the importance to the country’s development of a vibrant, well-resourced Academy. The additional resource needs are modest, in comparison say with those of the major funding and research bodies in the NSI.

The Panel heard that the Academy would have to work hard to source additional government funding, since budgets are severely constrained. In fact, there is a possibility that ASSAf’s budget could be cut.

“Countries set up structures and then do not look after them well. I think that could be what ASSAf may be facing. It is not being looked after well by us in government. To ensure sustainability, it is going to require very careful planning by

ASSAf to be versatile and adaptable, using COVID's lessons to survive into the future."

Past efforts to source private sector funding have not been very successful and the Academy needs to look at other sources of funding.

Staff skills development and capacity development remain priorities that require ongoing attention.

Recommendations

ASSAf needs to leverage other sources of funding. Reducing their dependence on government funding would increase their independence.

Sourcing additional funding is a major responsibility of the ASSAf Executive Officer and management. This team should focus their efforts on nurturing and advancing international linkages and partnerships, which may result in additional funding.

Foundations should be prioritised as potential additional funding sources.

The Academy should consider elevating, and bolstering its international networking activities. This would allow it to source funding from international donors and thereby retain its medium to long-term sustainability and independence.

ASSAf should consider building a fundraising arm, within the institution, to raise money from donors and other sources locally, such as the private sector, to help the Academy to speak out any time and without any fear.

Human resources

The individuals who hold office are crucial to attaining the ideals of the Academy. It is important to pay close attention to ensuring that ASSAf has the right people in place, who have demonstrated their commitments to the ideals of the Academy.

Observations

With the resources available, financial and people, the Academy is doing enough providing evidence-based policy advice. But it is uncertain if this is having the impact needed. There is a lot of work to be done and this is often done by volunteers, and therefore Standing Committees operate slowly.

"We need to accelerate the Standing Committees. However, if you want me to stop everything I am doing, you are going to have to have money to buy me out of what I am already doing e.g. my research, teaching, mentoring and writing journal articles."

In addition, there have been challenges, especially those around the social sciences and humanities. ASSAf needs to respond quickly but this is entirely dependent upon the resources you can pull together.

The Academy is well organised and structured. In some respects they are thinly spread due to limited funding but to a greater extent they achieve their objectives. For the small pool of people involved they are efficient, dedicated and effective. This may be linked to the specific people involved.

To deliver on its mandate, its Strategic Plan and address the NDP challenges, certain stakeholders felt that ASSAf could do with a bigger staff complement.

The Panel heard that certain members of staff perform beyond their positions/posts and are an invaluable asset to the Academy and the country.

Some expressed concern over high turnover of senior staff members and that these skills were lost.

Recommendations

Valuable staff members who perform beyond their positions need to be nurtured and retained. ASSAf should implement staff retention programmes to retain certain sought-after skills.

The Panel heard that the Academy must find ways to become leaner and more effective in responding to dynamic issues. It needs to marshal the academics, but they are already burdened with too much work as people perceive it. Some of those reports take time, we put them through peer review process. But we need to mobilise the membership to respond with haste.

The Academy must simultaneously cultivate its relationship with active Council Members and Members in general to support the leadership, management and staff with the goal of enhancing the work of the Academy.

Foster stronger collaboration with science councils and agencies, research institutes and industry, to gain access to additional capacity and to ensure relevance and impact.

Consider a fellows programme where organisations can second senior experienced researchers for short periods of time to the Academy to undertake focused desktop research.

Simultaneously cultivate relationships with active Council Members and Members in general to support the leadership, management and staff.

Stability and sustainability

Observations

ASSAf provides the platform for informed, evidence-based debate on wicked and difficult problems, and therefore it plays a fundamental role in the community of practice of science in South Africa. ASSAf never shies away from potentially painful or difficult debate, but has, remarkably, made an environment in which debate can be carried out in a collegial manner on potentially polarising subjects. This is critical in building a robust science community in which there is an opportunity, or even an obligation, to speak out – in a well-informed and rational manner. The principles of freedom and responsibility in science have a caretaker in ASSAf.

Society is changing rapidly, and the nature of science has meant it has moved from linear and reductionist approaches to accepting complexity; to dealing with systems-based approaches. Science has entered an era where it needs to act fast and attempt to translate into action. COVID-19 and the increasing presence of open science have made this apparent.

These issues affect the relevance and sustainability of ASSAf. Climate change for example presents a major challenge to ASSAf. But climate change is going to be slightly different from COVID. It needs

engineers who interact at conferences. That engineering approach needs to be embraced in climate science and by ASSAf.

The Review Panel was informed that for each year of the review period (1 April 2016 to 31 March 2020), ASSAf produced a range of good policy documents, policy statements and consensus studies. The science minister during this period was a technocrat who understood the role of an academy of science and the two institutions cooperated well. The new minister however is a socialist with different priorities. ASSAf cannot rely on the goodwill of the minister for posterity and the Academy must address these issues to survive.

There is a possibility of increased government interference in future.

The Panel heard that one of the challenges that ASSAf could face in future is diminished trust in the advisories from the Academy due to societal challenges in general, where the population no longer believes in organisations linked with the government.

Recommendations

COVID-19 changed the world with more of an emphasis on virtual engagement than ever before. Modalities, such as for networking, evolves in this virtualising world. In a post-COVID-19 period there is a “rebound”. The move to hybrid engagements seems appropriate—it does look like the emerging model at ASSAf. This could be a short-term opportunity for ASSAf to capitalise on—for example to foster stronger collaborations in the SADC area.

The network-of-networks approach could be furthered (mutual recognition of ‘status’ among peer national academies, particularly within the continent).

Post-normal science is complex, the facts are uncertain or incomplete, and there is much which is unknown. The stakes are often high, decision-making is urgent, and there is a high values component, and the values are often in dispute. This science is at the heart of where governments rely on science in policymaking. This ranges from environmental issues, policy issues, urbanisation, to migration and xenophobia.

Review partnerships and mandate to ensure this is sufficiently diverse to instil trust and belief in the work of ASSAf. Explore a mechanism to build trust in the long term, particularly through effective and consistent implementation. ASSAf needs to examine and define what it envisages as the future scenario/s. Once this is done, select the pathway and mechanism to achieve the desired future.

There are instances where post-normal science will clash with cognitive biases and core beliefs, and unless scientific evidence engages with disputed societal values, it will not be effective. Therefore it is the responsibility of ASSAf to locate itself in these paradigms and use the collective power of its multidisciplinary membership to offer evidence-based solutions to complex challenges.

ASSAf must think carefully how best to execute its work to maximise benefits and outcomes of what it does. The Academy should do some futures thinking and horizon scanning to see how society is going to consume knowledge and information on its decisions over the next five to ten years. They could do so internally, or they could engage places like the Futures Institute at Stellenbosch University to assist.

There is increasing pressure on researchers to produce more multi-, inter- and transdisciplinary research. This is something that ASSAf could drive. If successful there could be a spill over into academia, thereby getting academics out of their silos to work more in transdisciplinary teams. That remains a challenge even for experienced scientists.

The Academy could look at engaging curricula renewal beyond traditional areas e.g. the political studies incorporated workplace learning into its curriculum. ASSAf could drive such new developments, reinforcing its value to academia and society.

There is acknowledgement that ASSAf cannot necessarily rely on the goodwill of successive government administrations over time. The Academy needs to anticipate and navigate change. The Panel believes that a more inclusive membership with greater numbers of younger Members will have the support of broader South African society and help improve its sustainability.

Strong and committed leadership would be required to steer ASSAf into the next five-year period. The pool of funders should be broadened to rely less on government and membership funding. The scientific independence should remain a top priority. Strategies to continue to involve a broader pool of especially younger members in the organisation are crucial for its future survival.

6. Vote of thanks

The Institutional Review Panel would like to thank the ASSAf leadership and staff (past and present) for their enthusiasm and participation. Appreciation is extended to all participants – from the senior government officials and science council leadership to Members and external stakeholders. The team in the Governance and Administration Programme is thanked for the flawless organisation and coordination. A special vote of thanks is once again extended to Renate Venier for going the extra mile to ensure everything ran smoothly.

7. Advice for future reviews

This is the first time that the Institutional Review interviews were held entirely virtually. There was some difficulty in getting all the panellists together for the interviews. This was partially since certain panel members were located in different time zones and the options for meeting times were therefore limited. There were some challenges securing a spot in the diaries of some of the stakeholders as well. In future, the Academy may want to consider bringing the panel together in-person for a full week and scheduling interviews throughout the day for each day of that week. Bringing the panel together in one physical space would mean flying in international panel members, but this would be beneficial in that everyone would be in the same time-zone for the duration of most of the interviews.

Locally-based stakeholders could be interviewed in person, allowing for a more conversational engagement, while those based elsewhere could be interviewed via teleconference or video conference. Follow up interviews with those not able to make it during the week could then be arranged virtually.

Acronyms

AAS	African Academy of Science
ASADI	African Science Academy Development Initiative
ASSAf	Academy of Science of South Africa
DHET	the Department of Higher Education and Training
DSI	Department of Science and Innovation
DST	Department of Science and Technology
HEIs	Higher education institutions
IAP	InterAcademy Partnership
ISC	International Science Council
ISC ROA	International Science Council Regional Office Africa
MSTF	Medium-term Strategic Framework
NACI	National Advisory Council on Innovation
NASAC	Network of African Science Academies
NDP	National Development Plan
NRF	National Research Foundation
NSI	National System of Innovation
OWSD	Organization for Women in Science for the Developing World
RDI	Research, Development and Innovation
SAAE	South African Academy of Engineering
SACNASP	South African Council for Natural Scientific Professions
SAJS	South African Journal of Science
SAYAS	South African Young Academy of Science
SDGs	Sustainable Development Goals
SPP	Scholarly Publishing Programme
TWAS-SAREP	The World Academy of Science - Sub-Saharan Africa Regional Partner

Annexure A: Recommendations summary

1. Policy: Mandate, aims, strategic objectives

1.1 Mandate, aims and strategic objectives

- Redouble efforts to adopt an integrated model that is more outcomes-driven and the value proposition (and the ensuing buy-in and support) of Consensus Studies must be more apparent to the relevant government departments, Government Clusters and the Parliamentary Committees.
- Pursue greater engagement with Ministries beyond DSI
- Strategic objectives should embrace the whole of South African society
- Ensure ongoing relevance to society by continually revisiting the mandate
- Consider conducting a review of the Act to explore any possible enhancement
- Increase collaboration with departments across government
- The interconnectedness of research, innovation and internationalisation or global engagement could be more pronounced between the ASSAf Act and strategic goals
- The Act speaks to “all people” in an explicit manner. Because of South Africa’s context, the aspect of “diversity and inclusion” could be deepened in the strategic goals.
- Encourage integration of disciplines and develop the intellectual capacity of all South Africans to ensure that science serves all citizens, particularly the previously marginalised members of South African society
- Define and distinguish ASSAf from NACI, SACNASP and others
- Work with credible individuals who span the science and policy spectrum to better influence policy development and uptake

1.2 Addressing the National Development Plan challenges

- Adopt an integrated approach when addressing health and socio-economic issues in the country, through collaborations among the different Standing Committee Members as well as the disciplinary experts.
- A transdisciplinary approach will result in a move away from the methodology that previously meant that each of the ASSAf committees work on their own within each of their particular disciplines and ensures a more comprehensive and holistic response to offering advice on identified challenges.
- The National Plan provides excellent guidance to the Academy but the issue of implementation needs investigation
- The Academy should serve the needs of all South Africans, especially those who are marginalised and vulnerable
- ASSAf must close the loop between evidence and its utilisation for policy formulation and societal benefit
- Consider working closer with civil society, this collaboration is too limited now
- A post-project process to draw in government and civil society is vital. Otherwise there is the risk that the process is ended when the report is produced and launched.
- Ensure more emphasis on the social sciences and humanities

1.3 Alignment with international imperatives

- Investigate the possibility of restructuring to better address societal issues and complex challenges

- Standing Committees could be structured for areas linked to the SDGs and continue working and producing reports, even if not commissioned to do so. This aids the impact of the science.
- An academy of science is ideally placed to inform required high level responses and help prepare society for change
- Promote solutions that are smart (technology-based) and widely applicable
- Do more work on climate change and resilience, as well as on disaster preparedness and recovery to advise government timeously and help communities with adaptation

2. Outcomes: intended effects on stakeholders

2.1 Outcomes

- ASSAf needs direct access to the people that make the big decisions on behalf of the public.
- Develop a more formalised and regular two-way exchange between decision-makers in government and ASSAf
- Current mechanistic engagements with government must be expanded to include something like a Forum to discuss emerging fault lines in society
- Better articulate the ideas of ‘Development of Science’ versus ‘Science for Development’—to balance the need for fundamental basic science and applied science activities
- The Academy should re-position itself to play a much broader role in the NSI cutting across academia, science councils, industry and society
- It is one thing to establish ASSAf, it is another to make it a force, a force to be heard. The Academy needs to work harder to get government to promote a science-based approach to policy as a vital part of achieving the NDP goals
- Speak to the big issues—emancipation from human misery and making the biosphere healthier—as they can only be addressed by science as a spectrum of knowledge
- Pay attention to (national, provincial and local) government and professional civil servants who seek to implement policy on e.g. energy, climate change and technological disruption
- Translate science to assist the public and civil society understand and deal with issues in society such as pandemics
- Pay attention to the economic and industrial elites who have vast resources to harness technology—help them understand the nature of AI, machine learning, blockchain and the 4IR
- Pay attention to the scientific community itself—advise it on issues of ethics; the integrity elasticity and resilience of the science system; and on where to raise the investment in science
- Convening and dialogue is important and must be supported

2.2 Independence

- Non-partisan advice is ASSAf’s strength, the Academy should cherish its independence and not shy away from addressing sensitive societal issues
- Political interference should be countered in the strongest of terms
- The Academy needs to be steadfast in aligning with academic principles
- ASSAf should investigate and publicly report on various matters, at its own discretion or at the request of government or organisations in civil society, to promote and apply scientific thinking in the service of society.
- ASSAf must be more innovative and proactive by pulling together task teams and initiating studies (e.g. to address the energy crisis). Studies should also be initiated on request by Members

- Champion the environment that is necessary for free intellectual discourse to take place, without political interference

2.3 Relevance

- Consider additional mechanisms to promote the uptake of ASSAf's reports and studies by relevant stakeholders in the policy space
- The Academy should consider capturing the value proposition of ASSAf, such as a strategic map that shows how it delivers to its goals—this would help understand how internal resources, competencies and capacities deliver against the goals and expectations of various stakeholders
- ASSAf Members from their wide range of disciplines must approach challenges collectively—by speaking in one voice they ensure independence and impact
- Like many other advisory bodies, increased traction is needed
- Counter the stigma of elitism
- Find ways to collaborate more intensively with a range of government departments
- Find ways to collaborate with provincial and local government to assist in addressing developmental and societal challenges
- ASSAf should build a fundraising arm in the Academy to raise money from donors, foundations and other sources to empower it to speak any time and without fear
- Additional funding would benefit the Academy. ASSAf may even consider finding ways to compete for additional funding from government or source funding for specific projects. Alternatively, ASSAf could explore new conduits of communication with government to influence policy

2.4 Agility

- The Academy should explore new and additional mechanisms for rapid responses
- Set up a mechanism to respond with speed (could be a parallel structure) and review and refine products to ensure agility is built into responses **when feasible**
- Refine ASSAf's existing publication outlets and use them
- Explore outlets such as *The Conversation Africa* for publishing shorter term commentary by Members, while working on longer-term study reports
- Consider the approaches of other academies of e.g. releasing preliminary reports and quicker responses more readily. It does not change but expands the value proposition
- Warning: Unsolicited advice may be a greater risk than taking too long to react to solicited advice
- Consider creating a conversation with society and state clearly that the information is not definitive, that the Academy will follow up and engage further once the science is done
- Do not lose scientific rigour and become a science engagement organisation
- The Academy could provide short-term advice to government if properly resourced—government needs to buy into the concept to make it work (more a convening activity than a consensus activity)

2.5 International impact

- Nurture current partnerships and leverage these for greater collaboration and impact
- As an African Academy, ASSAf must build on its reputation and engage more broadly across the continent
- Further the network-of-networks approach particularly within the continent—mutual recognition of 'status' among peer national academies

- Increase and strengthen global links
- Forge partnerships with common goals to avoid unnecessary competition and potential overlap with other professional societies
- Apply for membership of the International Science Council (ISC)
- When necessary, include international experts in teams
- Spell out more clearly the relationships that ASSAf wishes to have with other scientific organisations and then pursue them
- The development of science in the world is neither hierarchical nor one dimensional. ASSAf is working in a highly inter-connected environment and must use every opportunity to promote science or the generation of knowledge for the good of society—and to respond to the SDGs
- Partnerships and collaboration in this context are extremely important
- The Academy must see itself as a part of this interconnectedness, should connect seamlessly to other national and global efforts

3. Outputs: products and services resulting from activities and inputs

3.1 Scholarly Publishing

- Maximise return on investment to South Africa from the significant research subsidy that DHET gives to universities
- Improve the impact factor of the SAJS by providing good article summaries for quick scanning; developing new article types; expanding the scope of the journal; and allowing authors to submit their manuscripts in a variety of formats, such as commentaries, book reviews and letters, to attract more submissions
- Invest in a marketing mechanism to promote articles from the SAJS to increase awareness, attract citations, and improve usage

3.2 Study reports

- Explore options for making ASSAf studies more apparent to the relevant government departments, Government Clusters and the Parliamentary Committees
- Develop new capabilities in science communication (with government, from decision makers to policy makers to Members of Parliament, with public)
- Write concise, summary reports to accompany each study report produced with links to chapters in the full report
- The statements can be short and sharp to reach the right people

3.3 Events

- Survey Members and other stakeholders about the most suitable times for webinars to maximise attendance
- The university lectures by Members are generally held at the Member's university. These lectures could travel to other institutions where there may be few or no Members

3.4 Science engagement, communication and branding

- Consider additional communication products and channels to enhance the reach and uptake of the work of the Academy
- Make knowledge accessible—not just through publications, but on radio and television, in different mediums and in different languages
- Include targeted efforts to deal with misinformation and disinformation
- Counter the lingering perception of elitism in all activities and reports

- Continue improving public participation to enhance appreciation of reports and advice—to create a scientifically-informed and literate society
- Review products regularly to ensure agility is built into responses
- Consider making short videos about the work to further promote and market published material and make more use of social media to share outputs
- Focus on inclusivity, building trust and trustworthiness
- Practice a combination of three models of expert-public interaction in science and technology communication: the dissemination model, the dialogue model, and the participation model
- Profile ASSAf and SAYAS Members as role models for future generations—focus on profiling young women scientists and young Black scientists, as well as scientists from lesser known disciplines

4. Structure: Governance, management, and membership

4.1 Structure and operational model

- The model could benefit from the inclusion of research, development and innovation or RDI spaces from the private sector
- There may be a need to find an appropriate way (such as associate or industry/institutional memberships) to bring about closeness with this group
- Investigate restructuring to address societal issues—e.g. ASSAf could group itself to address specific SDGs
- The Standing Committees could be structured for areas linked to the SDGs and continue working and producing reports, even if not commissioned to do so
- Diversify the Academy to begin to address the need for more reports from the social sciences and humanities

4.2 Organisational performance

- ASSAf needs to be very outcomes-based and where possible (taking into consideration limited resources), address ill-informed conversations in society
- Seek more regular interactions with government than what is prescribed within formal governance procedures

4.3 Membership

- Pay serious attention to equity in membership criteria
- Maintaining quality and increasing membership are not conflicting aims
- The Academy must challenge itself to increase and diversify membership, but still on merit
- Do not be conservative or rehash arguments about membership
- ASSAf needs more Black Members and more women Members
- The membership system needs to be made much more open and transparent
- An in-depth discussion dedicated to membership in an Academy in the context of high inequality would be extremely useful and may provide some innovative answers
- The Academy is currently too distant from its Members and needs a strong, focused member engagement strategy
- Solicit Member feedback and understand their motivations to draw them closer, so that they can guide decisions and responses
- An energised and motivated membership will be equipped and ready to influence the agenda and formulate responses to crises
- Consider appointing a director responsible for membership

- The membership process needs to be modernised, diversified and transformed to reach a larger pool
- Enhance the role of HEIs in Academy activities
- Universities and science institutions should be encouraged to actively promote ASSAf membership and engagement, and track ASSAf membership as part of their strategic plan
- Improve member engagement by facilitating more active participation by Members
- Ensure ongoing and regular interaction with the Members to create awareness, inspire commitment and encourage participation.
- Create meaningful content, connect with them emotionally, to make them feel positive towards the Academy and invite their participation.
- Find creative ways to get their attention and remind them of the ways in which the Academy adds meaningful value to their lives and careers.
- Build relationships with Members to keep them happy and structure events to ensure involvement
- Give Members a choice of a number of different ways to make their inputs
- Consider regional convening activities driven by Council
- Efforts should not be top down only however, but should follow a bottom-up process as well

4.4 Transformation

- Transformation of the Academy's membership is essential to ensure legitimacy, to enable full participation by all potential candidates and to avoid perpetuating past historical imbalances
- Consider creative ways to address the election process to ensure that Black and female representation is more reflective of our current society
- Black Members of the ASSAf Council remain adamant that membership must be based on excellence
- ASSAf needs to challenge itself outside of the normal parameters of looking at excellence 'in one way e.g. h index'
- Use of the South African Young Academy of Sciences (SAYAS) as a pipeline into the ASSAf membership is a possible way in which to increase young, Black and female scientists
- Find ways to help empower young scientists, so that they can eventually become Members
- Give young researchers opportunities, draw them into the Academy, encourage Members to mentor the younger scientists into the Academy
- Consider creating an emeritus status for the older Members, which in turn makes space for others
- Continue to address the membership imbalance to increase representation from the social sciences and humanities.

5. Resources, stability and sustainability

5.1 Resources

- Leverage other sources of funding to reduce dependence on government to ensure independence
- Build a fundraising arm to raise money from donors, foundations, the private sector
- Consider finding ways to compete for additional funding from government or source funding for specific projects
- Dynamic partnerships will be critical to achieving the outcomes and impacts envisaged

- Foster stronger collaboration with science councils and agencies, research institutes and industry, to gain access to additional capacity and to ensure relevance and impact
- Consider a Fellows' programme where organisations can second senior experienced researchers for short periods of time to the Academy to undertake focused desktop research
- Simultaneously cultivate relationships with active Council Members and Members in general to support the leadership, management and staff
- Continue to connect with other academies to build capacity and skills
- The ASSAf Executive Officer and management must focus their efforts on nurturing and advancing international linkages and partnerships, which may result in additional funding.
- Foundations should be prioritised as potential additional funding sources
- Consider elevating and bolstering international networking activities as these are opportunities to source funding from international donors
- Implement staff retention programmes to retain certain sought-after skills

5.2 Sustainability

- Strong and committed leadership is required to steer ASSAf into the next five-year period
- Promote and foster multi-, inter- and trans-disciplinarity
- Scientific independence should remain a top priority
- Embrace versatility, adaptability, and agility—technology requires this of us
- Use technology to assist risk assessments and to draw up a risk mitigation plan
- Explore a possible new sustainable resource model that considers the challenges outlined in this report
- The honorific aspect to membership must be balanced by emphasis on service to society
- Elevate efforts to draw younger Members and a more diverse membership in general without distorting the primary goal of the Academy—a membership that better reflects the society it serves will inevitably have a voice that is heard, improved independence and sustainability
- Strategies to continue to involve a broader pool of especially younger members in the organisation is crucial for its future survival
- Capitalise on the current focus on hybrid engagements as a short-term opportunity to foster stronger collaborations in the SADC area and beyond
- Review partnerships and mandate to ensure this is sufficiently diverse to instil trust and belief in the work of ASSAf.
- Examine and define future scenario/s, then select the pathway and mechanism to achieve the desired future
- Use the collective power of its multidisciplinary membership to offer evidence-based solutions to complex challenges
- Do some futures thinking and horizon scanning to see how society is going to consume knowledge and information on Academy decisions over the next five to ten years (internally or engage places like the Futures Institute at Stellenbosch University)
- Drive multi-, inter- and transdisciplinary work and help get academics to work more in transdisciplinary teams
- Drive new developments, e.g. curricula development, to reinforce ASSAf's value to academia and society
- A more inclusive membership with greater numbers of younger Members will have the support of broader South African society and help improve sustainability

Annexure B: List of supporting documents

- ASSAf Act Amendments, ASSAf Regulations
- ASSAf Annual Reports (2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020)
- ASSAf Institutional Review 2010-2015 Synthesis Report
- ASSAf Strategic Plan 2015-2019
- ASSAf Annual Performance Plans (2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020)
- Higher Education, Science, Technology and Innovation Institutional Landscape Review Report
- National Development Plan 2030: Our future - make it work
- Terms of Reference for ASSAf Institutional Review 2015-2020

Annexure C: Short biosketches of Review Panel members

Professor Makaiko Chithambo

Prof Chithambo is Professor of Physics and Head of the Physics Department and formerly, Deputy Dean of Science at Rhodes University. He is an NRF B2-rated research physicist. Prof Chithambo obtained his PhD from The University of Edinburgh and his Masters, from The University of Sussex, UK. His research interests span areas concerned with study of point-defects in materials using luminescence methods particularly using with the time-resolved optical stimulation. He is the author of An Introduction to Time-resolved Optically Stimulated Luminescence published by Morgan & Claypool Publishers. He has organised a number of national and international conferences and symposia. Prof Chithambo has served as an expert reviewer for several publishing Houses and research agencies worldwide and is a recipient of the Vice Chancellors Distinguished Research award at Rhodes University. He is the current President of the South African Institute of Physics.

Patricia A. Cuff, M.S., M.P.H.

Patricia Cuff is a Senior Program Officer at the US National Academies where she directs the Global Forum on Innovation in Health Professional Education. Patricia is also leading dissemination of the FDA-funded study looking at mutual recognition agreements in the regulation of medicines, and a special COVID-related project with select academies in Africa. Patricia worked for 11 years on the African Science Academy Development Initiative where she was the Country Liaison to the Uganda National Academy of Sciences. She has directed and co-directed multiple studies at the National Academies including Clinical Trials During the 2014-2015 Ebola Outbreak, Options for Overseas Placement of U.S. Health Professionals, and Enhancing the Behavioral and Social Science Content of Medical School Curricula. Patricia joined the Academies staff to work on the report, Emerging Microbial Threats to Health in the 21st Century. Before coming to Washington, D.C., Patricia worked at St. Luke's-Roosevelt Hospital Center in New York City in the field of HIV-nutrition as a counselor, researcher, and lecturer on topics of adult and pediatric HIV. She received a M.S. in Nutrition and a M.P.H. in Population and Family Health from Columbia University and performed her undergraduate studies at the University of Connecticut.

Professor Michelle V. Esau

Prof Esau is the Dean of the Economic and Management Sciences Faculty at the University of the Western Cape (UWC). She has been with the UWC for the past 26 years. Before her appointment as Dean of the Economic and Management Sciences Faculty on 1 February 2018, Michelle was a member of the School of Government and taught in the areas of Human Resources Management, Public Sector Ethics and Bureaucracy and Democracy. Michelle has supervised students at the Masters' and Phd levels and has published in the areas of citizen participation and leadership. She has participated in both national and international research collaborations over the years. As Dean of the faculty, Michelle is responsible for a number of strategic areas that include student success, the people framework, research & innovation, and fostering partnerships with industry and government stakeholders. It is her aspiration that students in the faculty can pursue their further development and ultimately contribute in a meaningful way to the political, social, economic and technological spheres of society.

Professor Rajaâ Cherkaoui El Moursli

Prof Cherkaoui El Moursli received her PhD in Nuclear Physics at the University Joseph Fourier, France. Early 1982, she joined the Faculty of Sciences, University Mohammed V, Rabat as a research-professor. Later in 1996 she was serving as a head of the Laboratory of Nuclear Physics. She had implemented several master's degree programs the First Master's Program in Medical Physics in Morocco. She became Vice-President for Research of UM5 (2013-2017). She was part of the official Morocco's forerunners participants in the ATLAS collaboration at CERN in Geneva in 1996. In 2015, she received L'Oréal-UNESCO award for "Women in Science". Besides that, she also assigned as resident member at the Hassan II Academy of Sciences and Technology and a Fellow of the African Academy of Sciences. In 2016, she was appointed a member of the Management Board of the Moroccan Agency for Nuclear and Radiological Safety and Security and a member of the Scientific Committee of the Spanish Foundation "Women in Africa". She was honoured in 2017 by the Organization of Islamic Cooperation. In 2018, she was assigned as a member of the International Awards Jury in the Physical Sciences for the L'Oréal-UNESCO Awards for Women in Science. The same year, she was appointed a member of the World Academy of Sciences for the advancement of science in developing countries and a Member of the Management Board of the Moroccan Center for Nuclear Energy, Science and Technology. In 2019, she was elected Vice-President for Policy Review and Administration of the board of the Network of African Science Academies. In 2022, she was nominated a member of the European Academy of Science and Art and a Member of the Management Board of the National Center for Scientific and Technical Research.

Professor Philani Moyo

Prof Moyo is a Professor of Sociology at the University of Fort Hare and Director of the Fort Hare Institute for Social and Economic Research. He holds a DPhil in Politics and International Studies from the University of Leeds, United Kingdom; an MA in Human and Sustainable Development from the University of Leeds, United Kingdom; another MA in Social Policy and Development Studies from the University of Fort Hare and a BA Honours from the University of Zimbabwe. He is a former Co-Chair of the South African Young Academy of Science (SAYAS) and previous Secretary of the South African Sociological Association (SASA). He has published extensively on climate change impacts and adaptation, food security, rural/urban livelihoods and migration. His two recent books are 'Revisiting Environmental and Natural Resource Questions in Sub-Saharan Africa' (2017) co-edited, and 'Urban Food Insecurity, Coping Strategies and Resistance in Bulawayo, Zimbabwe' (2010). Philani sits on the Editorial Boards of a number of international journals, including the Review of African Political Economy.