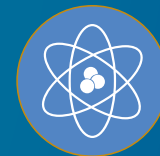




Highlights of the Public
Relationship with
Science 2022 Survey Results:
*Square Kilometre Array Area
in the Northern Cape Province*



science, technology
& innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA



HSRC
Human Sciences
Research Council

Produced by the Human Sciences Research Council (HSRC) on behalf of the Department of Science, Technology and Innovation (DSTI).

The DSTI has published two reports, prepared by the Human Sciences Research Council (HSRC) on the South African Public Relationship with Science 2022 Survey:

Department of Science and Innovation (2024) The South African Public Relationship with Science 2022 Survey Results. Prepared by the Human Sciences Research Council for the Department of Science, Technology and Innovation. Pretoria.

Available at www.hsrcpress.ac.za/saprs-2022 and <https://www.dsti.gov.za/index.php/documents/strategies-and-reports/203-saprs-2022-survey-results-web-12-03-2024>.

Department of Science and Innovation (2024) Highlights of the South African Public Relationship with Science 2022 Survey Results. Prepared by the Human Sciences Research Council for the Department of Science, Technology and Innovation. Pretoria.

Available at www.hsrcpress.ac.za/saprs-2022 and <https://www.dsti.gov.za/index.php/documents/strategies-and-reports/205-highlights-of-south-african-public-relationship-with-science-2022-survey-results>.

In addition to the national survey, we included two supplementary samples, to measure the public relationship with science and technology in specific areas in two provinces:

- Four main towns in the Square Kilometre Array (SKA) Telescope area in the Northern Cape (Carnarvon, Brandvlei, Vanwyksvlei and Williston),
- The town of Cofimvaba and environs in the Chris Hani Municipality District in the Eastern Cape, which houses the Albertina Nontsikelelo Sisulu Science Centre (ANSSC).

This report provides the results for the public relationship with science and technology for the Square Kilometre Array area.

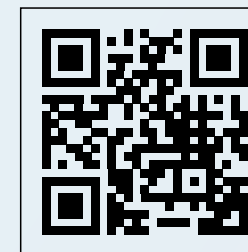
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1. Introduction

The Square Kilometre Array (SKA) radio telescope collects information from the sky and stars and will produce scientific knowledge to expand our understanding of the universe and the evolution of the galaxies. This is a major infrastructure project involving several countries in building the world's largest radio telescope. South Africa, with Australia, co-hosts the SKA telescope, which consists of a collection of parabolic dishes located in the legislated radio-controlled zone in the remote Karoo region in the Northern Cape (NC) province.

The NC is an ideal location as there are clear skies and minimal light pollution for most days of the year. The SKA telescope comprises 197 dishes, including 64 dishes of the MeerKAT telescope (SARAO, 2022; SKAO, 2022). The SKA telescope has the potential to drive scientific, technological, engineering and innovation advancement as well as creating business opportunities and jobs and enhancing skills development. In addition, it will foster science diplomacy and provide key research infrastructure that address big data and analytics (Adams et al., 2023).

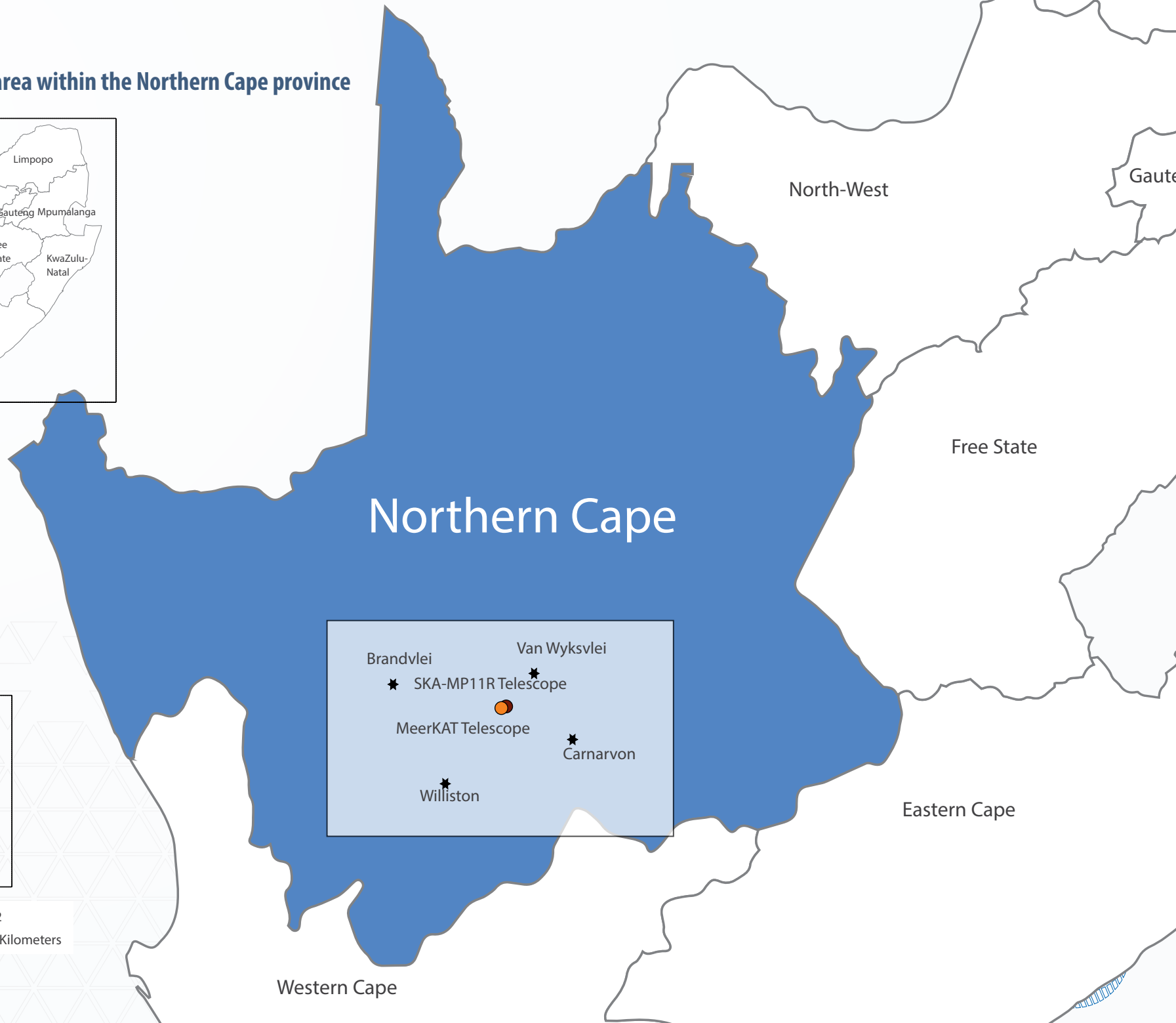
The South African Public Relationship with Science (SAPRS) sample included 373 interviews in the NC province. We extended the SAPRS survey by including an additional sample comprising 249 interviews with adults aged 16 years and over from the SKA area. The SKA area comprises the towns of Williston, Brandvlei, Van Wyksvlei and Carnarvon. The purpose of measuring the levels of science knowledge, attitudes and engagements for this special sample was to gain insights into how the high intensity SKA infrastructure development project influenced this public's relationship with science and technology (S&T) in this area.

This report presents the descriptive statistics for the 36 measures fielded in the survey, benchmarking the statistics for the SKA area against the NC province. These measures provide the baseline information for the levels of S&T knowledge, attitudes and engagements.

The map on the next page shows the location of the four towns which were included in the study, as well as the location of the MeerKAT and SKA-Multiple-point impulse response (MPIR) telescopes, which form part of the ongoing SKA project.

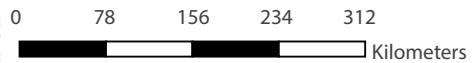


Map showing the SKA area within the Northern Cape province



Legend

- SKA-MP11R Telescope
- MeerKAT Telescope
- ★ Towns
- Northern Cape
- Provinces



2. Study methodology

Sample	Representative sample of the SKA area and Northern Cape province, aged 16 years and older which we refer to as adults in the SAPRS reports.
Sample size	We drew two independent samples: 373 respondents for the Northern Cape and a further 249 respondents from the SKA area.
Survey instrument and reporting framework	The Science Engagement Monitoring and Evaluation Impact Indicator Framework (SEMEIIF) informed the development of the survey instrument. We report on measures associated with the following indicators: S&T knowledge and interest, promise and reservation attitudes towards modern and traditional S&T, trust in science and science institutions, access to S&T information as well as science engagement outcomes relating to views, activities and behaviours (see SAPRS 2022 main report). In addition, we asked the SKA and NC public their views about the SKA telescope.
Survey interviews	Between November 2022 and January 2023, we conducted one-hour face-to-face interviews with adults 16 years and older. The interviews were conducted in one of the 11 official languages, based on respondents' preferences.
Capturing the interview information	Using a computer-assisted personal interviewing (CAPI) approach, the information was captured onto personal digital assistants (PDA) by trained administrators.
Weighting of data	All data was weighted to the SKA area and NC population aged 16 years and older.
The term 'science' refers to	Knowledge production in the academic disciplines: natural and life sciences, engineering, social sciences, and humanities.
The term 'public' is both singular and multiple	There are multiple 'publics' in South Africa based on the diverse nature of the society. The term 'public' encompasses both the singular (e.g. province) and multiple disaggregated publics (e.g. male and female, young and old).
Index creation	We computed an index score, for multiple item measures, by averaging the scores that make up each measure. For single item measures, we used the average score for that item. The scores for single and multiple item indices were converted to a 0-100 scale. Average scores are reported out of a total of 100.



3. Demographic characteristics of the public in the SKA area and the Northern Cape province

The Northern Cape (NC) is the largest province, by land area, in South Africa, but is the least populous with only 1.4 million people (i.e. 2.2% of the national population). The population density is 3.6 people per square kilometre. The population group composition in the province is 50% Black African, 42% Coloured, 7% White and 1% Indian/Asian. The most frequently spoken first languages are 55% Afrikaans, 36% Setswana, 4.5% IsiXhosa and 2.4% English (StatsSA, 2023).

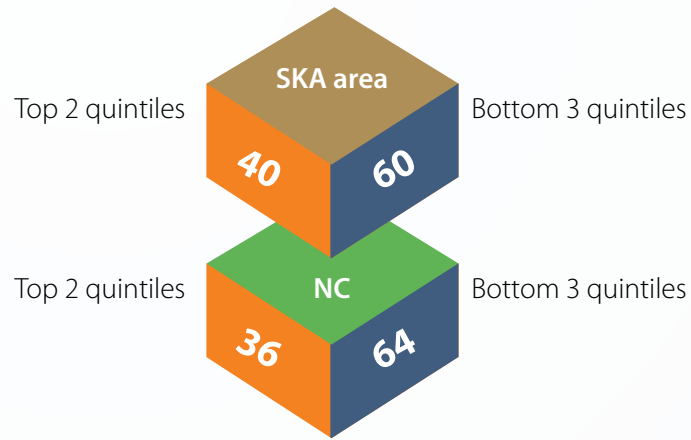
The NC faces a number of social and economic challenges. The major challenges encountered by communities in the NC are extreme levels of poverty, inequality and unemployment, lack of basic services like water and electricity, corruption, dilapidated infrastructure and healthcare facilities (Northern Cape Provincial Government, 2024). In addition, there are high levels of substance abuse (drugs and alcohol). Twelve percent of households reside in informal dwellings and 40% in government subsidised dwellings (StatsSA, 2023).

Science knowledge attitudes and engagements are shaped by demographic characteristics and the context in which people live. The infographic on the next page describes the social and demographic characteristics of the SKA area and NC population. Some of the key social and demographic characteristics include:

- Adults in the SKA area have lower levels of educational qualifications than in the NC: Seven in ten adults in the SKA area have qualifications lower than matric, compared to five in ten adults in the NC;
- Two thirds of adults in the SKA area and the NC are female;
- Less than three in ten adults in the SKA area and the NC are employed; and
- It is noteworthy that the SKA area population group is different from that of the NC – in the SKA area 94% are Coloured, 4% are White and 2% are Black African, while in the NC almost half the population are either Black African or Coloured and 4% are White.

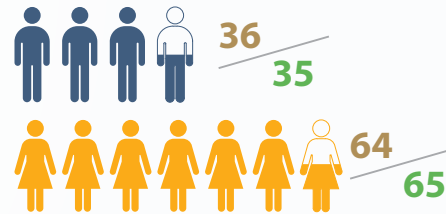
Social and demographic characteristics of the SKA area and the Northern Cape population (%)

Socio-economic status

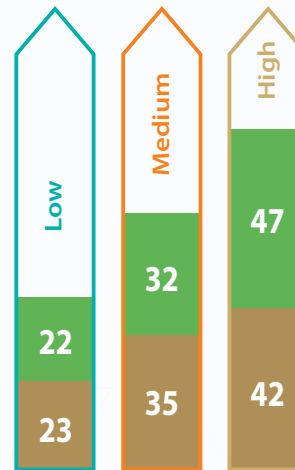


■ SKA area ■ NC

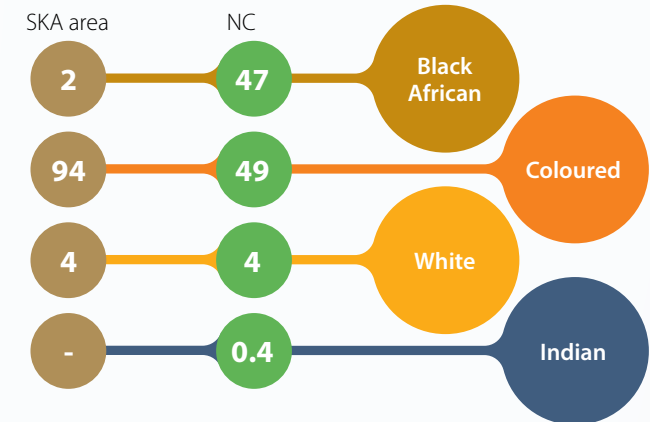
Sex



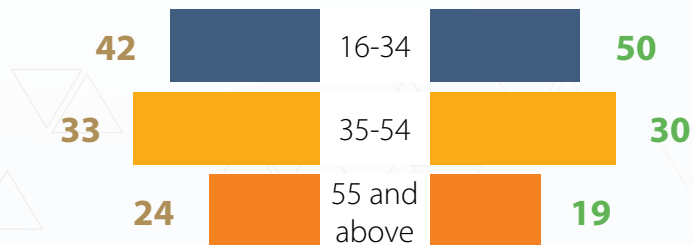
Religiosity



Population group



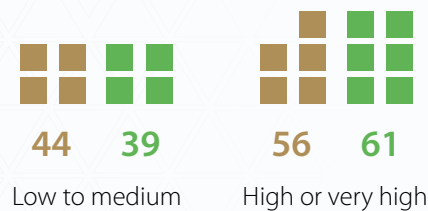
Age



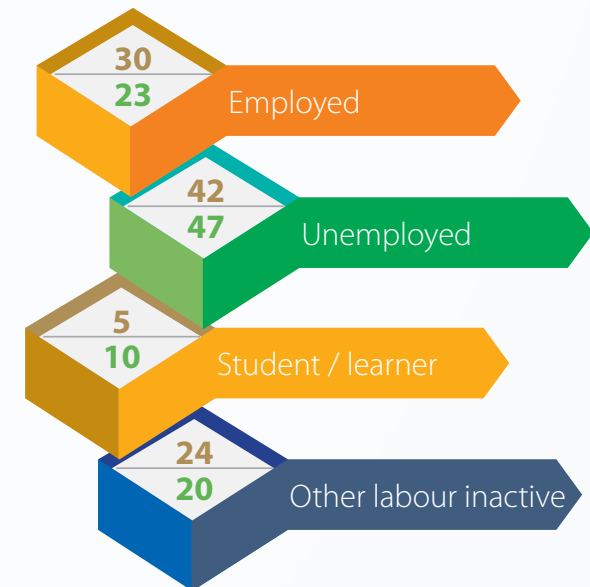
Educational attainment



Home educational support



Labour market status



4. When you hear the words science or technology, what comes to mind?

At the start of each survey interview we asked: (i) When you hear the word SCIENCE, what comes to mind? and (ii) When you hear the word TECHNOLOGY, what comes to mind? These questions were asked to ascertain the existing understanding of these terms, as expressed in the SKA respondents' own words.

The most common associations that respondents made with the word science were related to nature, plants, astronomy, the environment and technology. For technology, the most common associations were cell phones, computers, television and the internet. While fewer than two percent of the respondents mentioned the SKA specifically in their responses for science and technology, the word 'astronomy' was mentioned frequently.

The word clouds for both science and technology reveal the breadth of understanding of both terms among the SKA public, and this provides an important starting point for exploring the relationship between science and the public.

When you hear the word SCIENCE, what comes to mind?

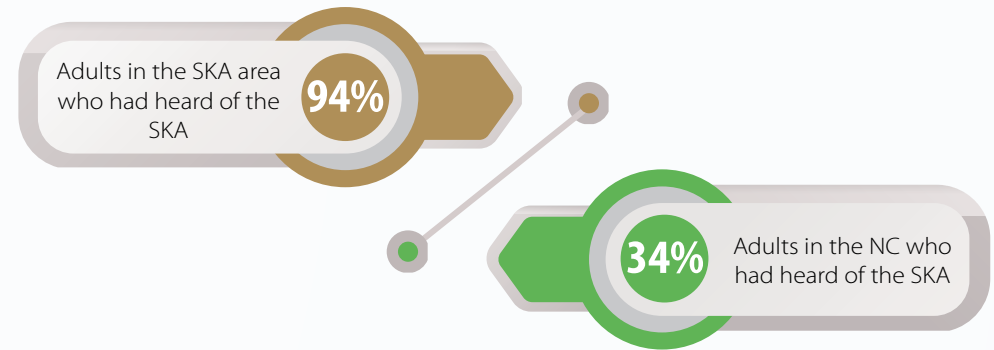


When you hear the word TECHNOLOGY, what comes to mind?

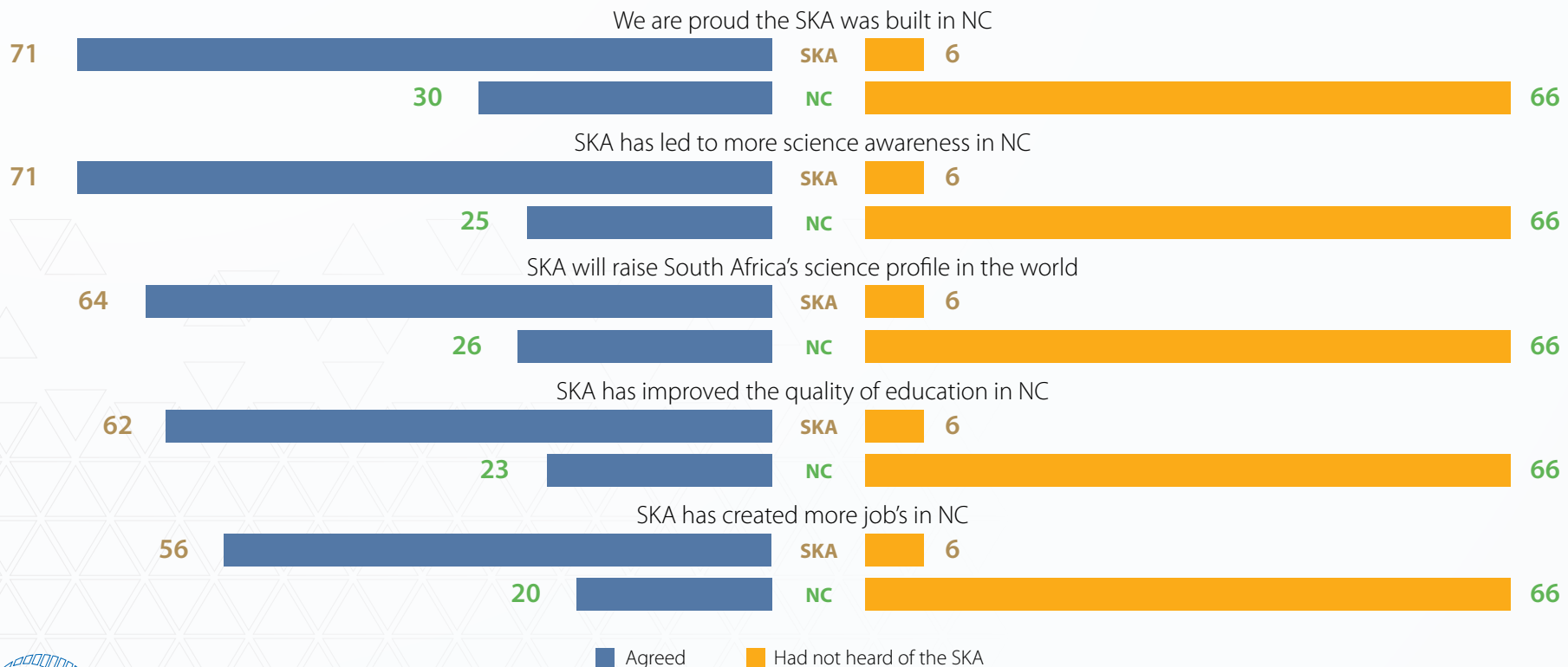


5. Awareness and attitudes about the Square Kilometre Array telescope

The NC survey also included a set of questions about the SKA telescope. Almost all adults living in the SKA area (94%) had heard of the project, compared to only a third (34%) of the adults in the NC province.



Promise of the SKA telescope for the SKA area and Northern Cape adults (% agreement)



Seven in 10 adults (71%) in the SKA area were proud that the SKA telescope was built in the NC and agreed that its presence has led to more science awareness. More than six in 10 adults felt that the SKA telescope raised the country's science profile in the world (64%) and its presence improved the quality of education in the NC (62%). Just over half of the SKA adults (56%) agreed that more jobs were created in the province as a result of the SKA project – this is especially concerning because part of the SKA project promise was to create more jobs in the area.

We computed the ***promise of the SKA for the community index*** as the average score for the set of five items described on the previous page.

Conversely, about two-thirds of the NC adults had not heard about the SKA telescope, and therefore they did not have the same views about the project. Thus, only between 20% and 30% of NC adults agreed that the SKA had created more jobs in the province (20%), improved the quality of education in the NC (23%), raised South Africa's science profile in the world (26%), led to more science awareness in the NC (25%) and were proud that the SKA was built in the NC (30%). Of those who had heard of the SKA telescope in the NC, their views of promise of the SKA were similar to those of the adults in the SKA area.

Promise of the SKA for the community index



65 for the SKA area

and a lower **25** for the NC

6. Awareness and knowledge about, and interest in, science and technology

Awareness and knowledge about, and interest in, S&T provide insights into the nature of the relationship between the public and science. We report on: (i) awareness of, and interest in, South African S&T, as well as creative arts achievements, (ii) formal science knowledge and (iii) interest in and knowledge of priority scientific areas.

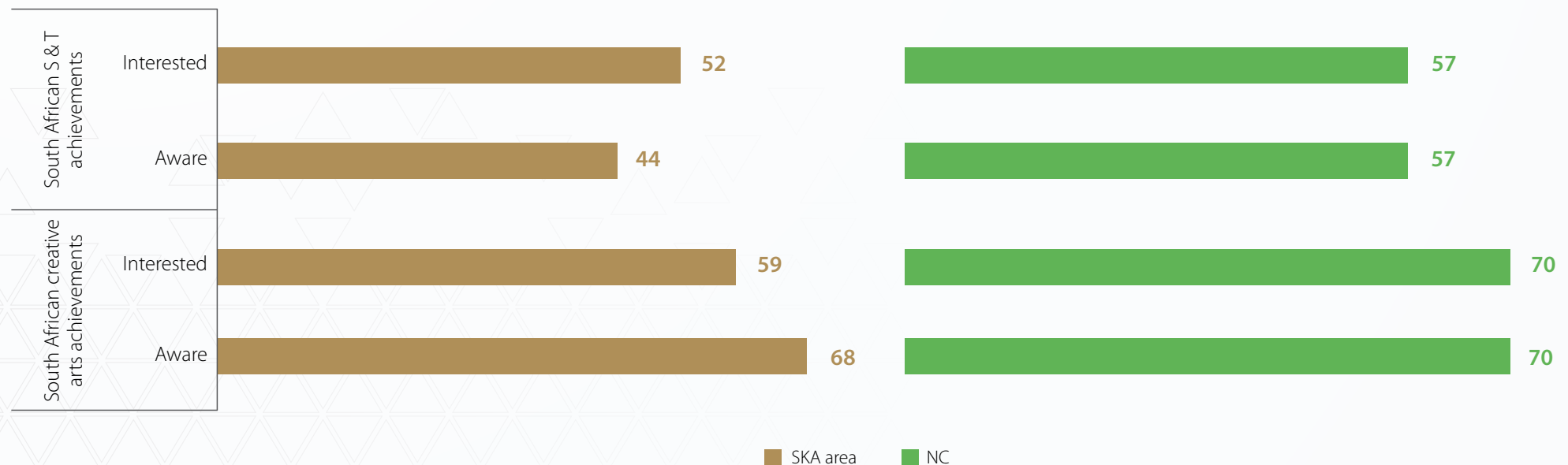
6.1 Awareness of, and interest in, South African S&T and creative arts achievements

The public responded separately about their levels of awareness of, and interest in, S&T, as well as creative arts achievements in South Africa.

There were lower levels of awareness (44%), and interest in (52%), South African S&T achievements in the SKA area, while the corresponding levels for the NC province were moderate at 57% for both awareness and interest.

On the other hand, 68% of adults were aware of, and 59% were interested in, South African creative arts achievements in the SKA area. Awareness of, and interest in, the creative arts achievements were higher for the province, at 70% for each.

Awareness of, and interest in, South African S&T and creative arts achievements (% 'very' or 'quite')



6.2 Formal science knowledge

The SKA and NC samples answered a science knowledge quiz consisting of nine statements. The average percent correct for the SKA public was 53%, compared with a slightly higher 57% for the NC. The five highest correct responses to the simpler and all 'true' correct responses, were similar for the SKA and NC public. However, there were more notable differences in responses between the SKA and NC adults, to the three more difficult lowest scoring items. For example, 36% of the SKA public and 48% of the NC correctly responded that the statement 'The earth's climate had not changed over millions of years' was false.

The most correctly answered question – 'The petrol price in South Africa is determined by the prices of world oil' – was the one that featured in news cycles and public discussions ahead of the survey. For this item 71% of the SKA adults and 72% of the NC adults answered correctly. There were fewer correct answers for the more cognitively demanding items, such as 'Antibiotics kill viruses and not bacteria'.

Percent correct responses to True (T) and False (F) science knowledge items

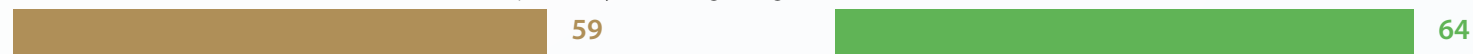
The petrol price in South Africa is determined by the price of world oil (T)



Countries in Europe have their winter season when South Africa has its summer season (T)



The Covid 19 Vaccine reduces illness, but won't prevent you from getting the virus (T)



The continents which we live on have been moving for millions of years and will continue to move (T)



The cutting down of trees leads to increased soil erosion (T)



Antibiotics kill viruses and not bacteria (F)



The Sun travels around the earth once a year (F)



The mother's genes determine if a baby is a boy or a girl (F)

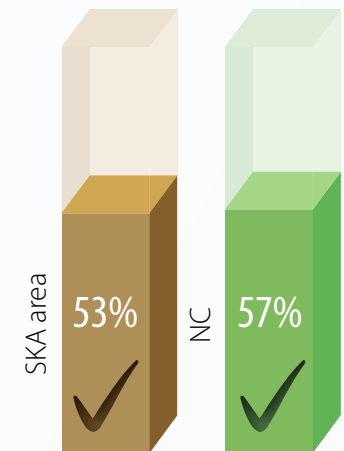


The earth's climate has not changed over millions of years (F)



SKA area NC

Science knowledge index



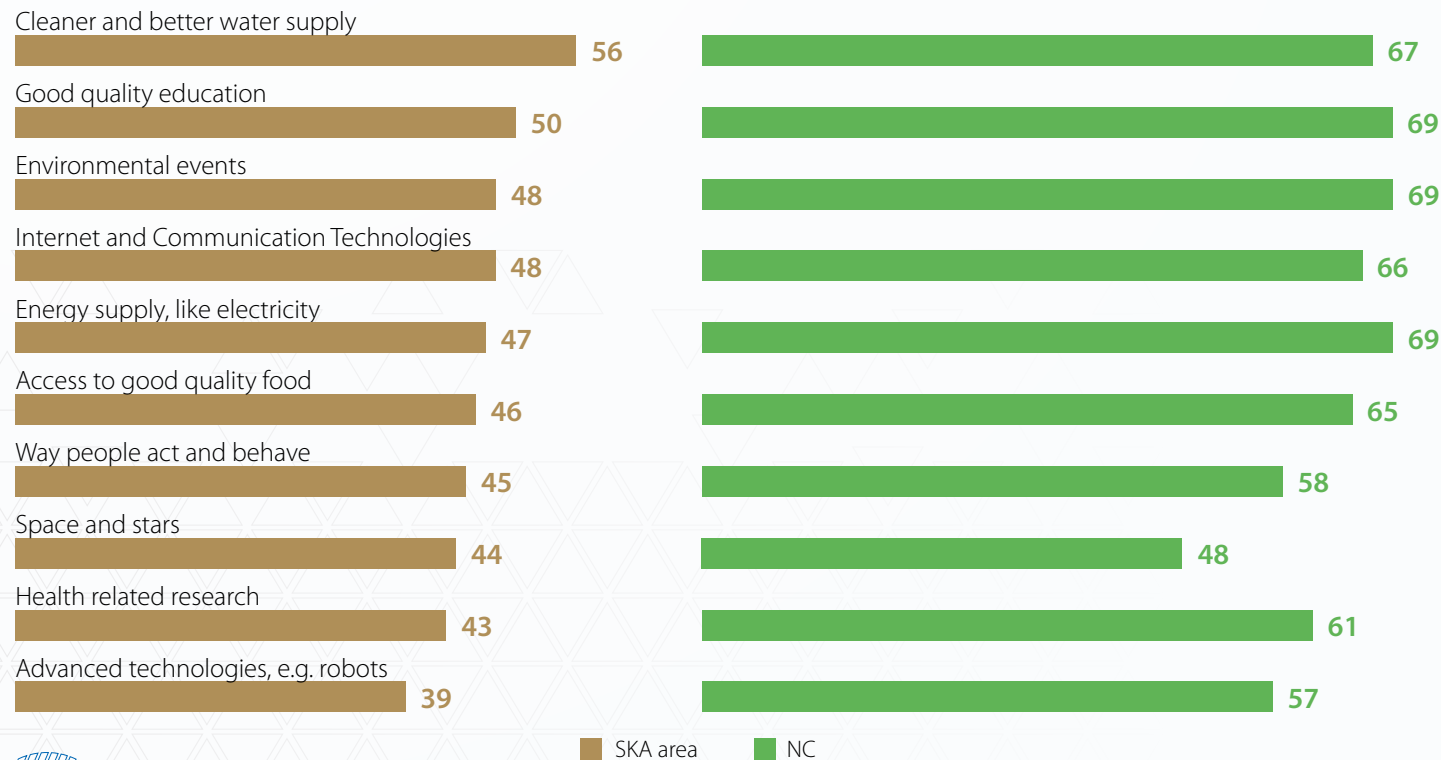
6.3 Knowledge about, and interest in, priority scientific areas

In addition to general awareness of, and interest in, S&T achievements, we explored the SKA and NC public's knowledge of, and interest in, several contemporary societal challenges that require a S&T response. The highest reported levels of both knowledge and interest in the SKA area and the NC, were for a cleaner and better water supply and good quality education.

On average across the 10 areas, 47% of SKA adults, compared to 63% of NC adults, were at least 'somewhat' knowledgeable about the priority S&T areas. On average, the levels of interest were higher than the knowledge levels, with an average of 55% of SKA adults, compared to 69% of NC adults, being at least 'somewhat' interested in the priority S&T areas. In summary, interest levels were higher than knowledge levels, and the NC had significantly higher levels of knowledge and interest than the SKA area.

It is noteworthy that only 44% of adults in the SKA area (and 48% in the NC) reported that they were at least 'somewhat' knowledgeable about space and the stars. The interest in this topic was also low, with 54% of SKA (and 61% of NC) adults being at least 'somewhat' interested. The SKA telescope, built in this area, studies the sky, stars and space, and we therefore expected higher levels of knowledge and interest.

Knowledge of priority S&T areas (% at least 'somewhat' knowledgeable) for SKA area and Northern Cape



Highest reported levels of knowledge and interest in both the SKA area and the NC

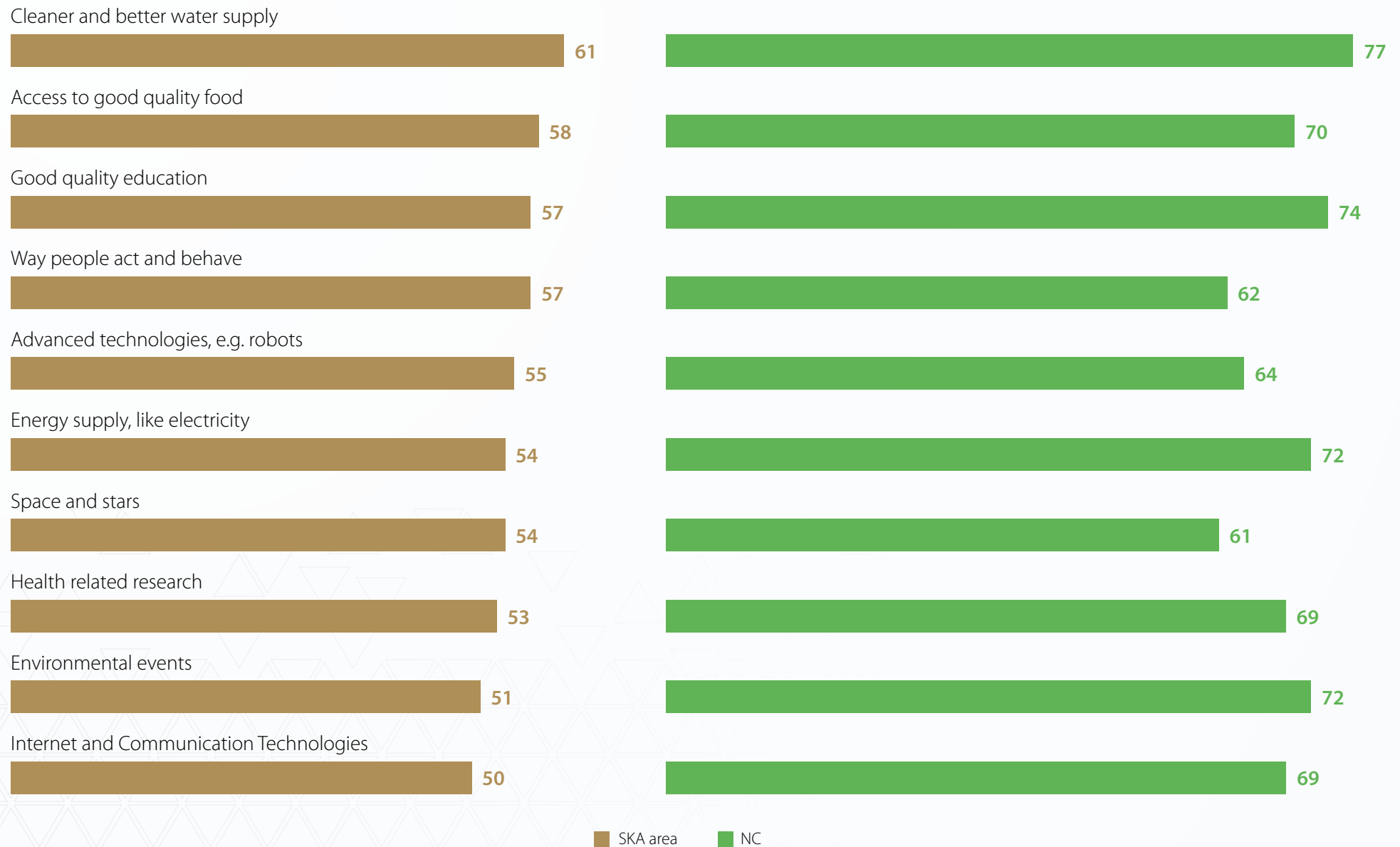


Cleaner and better water supply



Quality of education

Interest in priority S&T areas (% at least 'somewhat' interested) for SKA area and Northern Cape



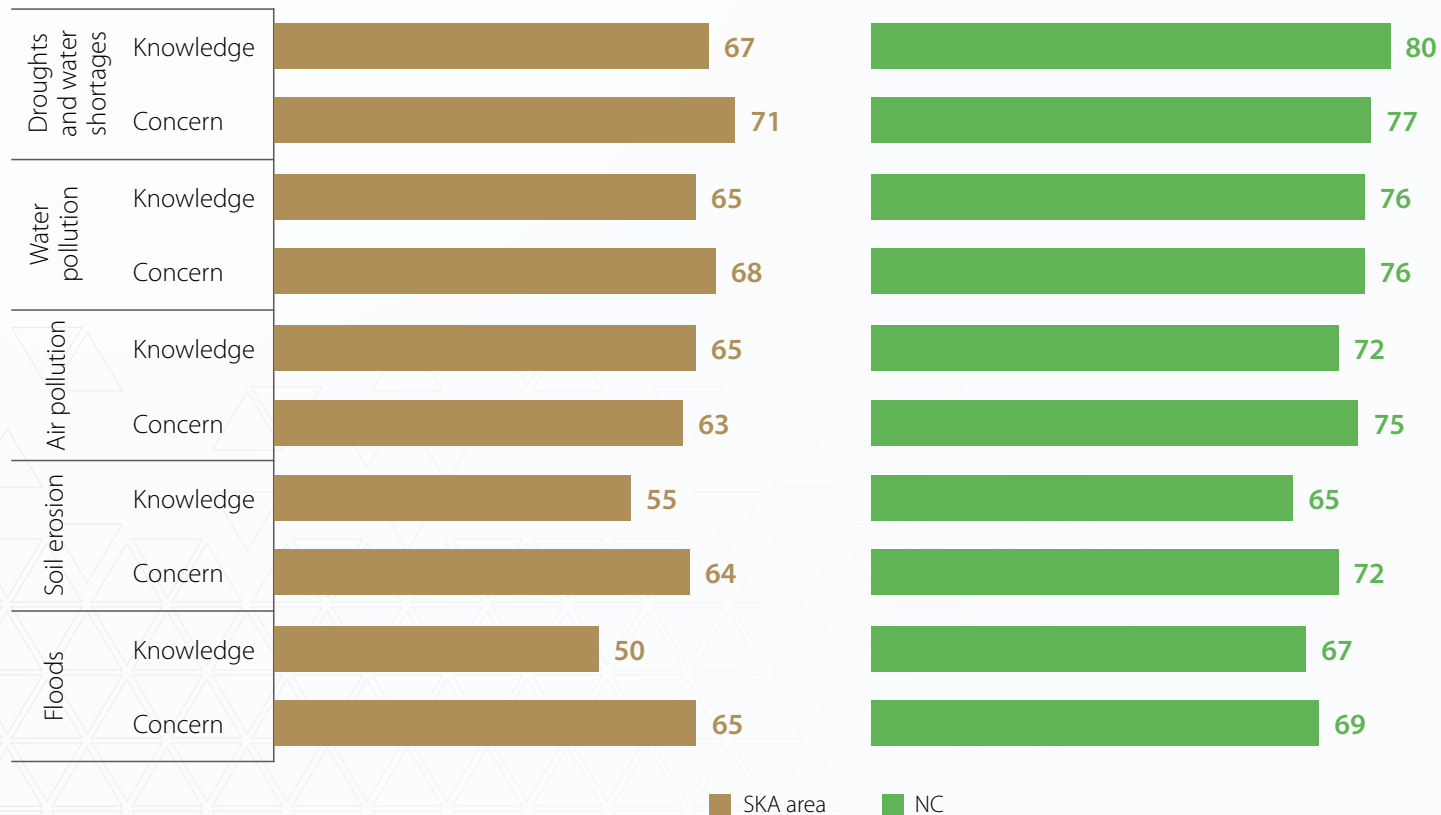
7. Knowledge of, and concern about, natural and environmental events

Apart from a narrow strip along the coast that receives winter rainfall, the NC is a semi-arid region with little rainfall in summer. The weather conditions are extreme, with hot summers and cool winters (Nkosi et al., 2022; South Africa Gateway, n.d.). The NC public are exposed to the effects of climate change and adverse environmental events. On average, 60% of adults from the SKA area, and 72% of adults from the NC reported at least some knowledge of environmental events. Concern about environmental events was generally higher than knowledge with,

on average, 66% of SKA area adults and 74% of NC adults, reporting at least some concern about environmental events.

In both the SKA area and the NC province, the highest levels of both knowledge and concern were, understandably, for droughts and water shortages, while the lowest levels were related to floods.

Knowledge and concern about environmental events (% at least 'somewhat' knowledgeable/concerned)



66% of SKA area adults and
74% of NC adults



Reported at least
some concern about
environmental events

8. Promise and reservation attitudes towards modern and traditional S&T

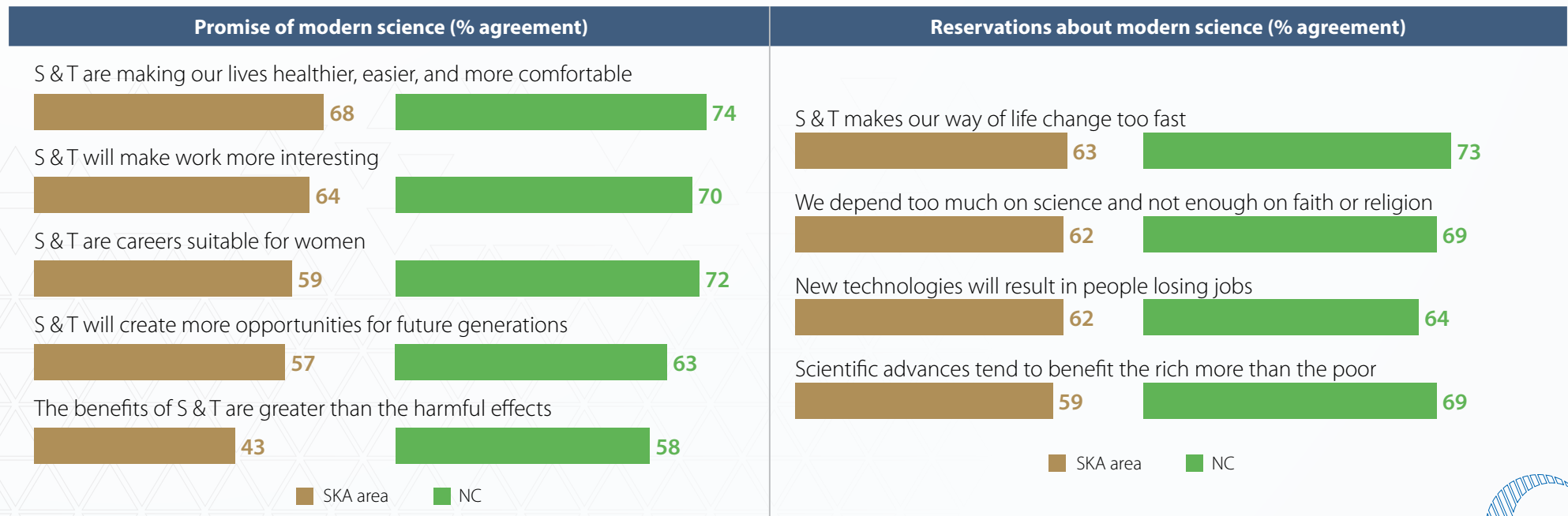
The SKA and NC public responded to sets of items about their attitudes of promise (potential benefits) and reservations (concerns, fears and risks) related to modern and traditional science. The SKA and NC public acknowledged both the promise of, as well as concerns about, S&T.

8.1 Promise and reservation attitudes about modern S&T

We computed the promise and reservation indices by calculating the average responses for each battery of items. The **Index of promise towards modern S&T** for the SKA area was 58, while the **Index of reservation towards modern S&T** was 62. The levels of promise and reservation towards S&T were higher for the NC province than the SKA area, with the corresponding indices of 67 for promise, and 69 for reservation.

The biggest potential benefits reported were in relation to S&T making daily life

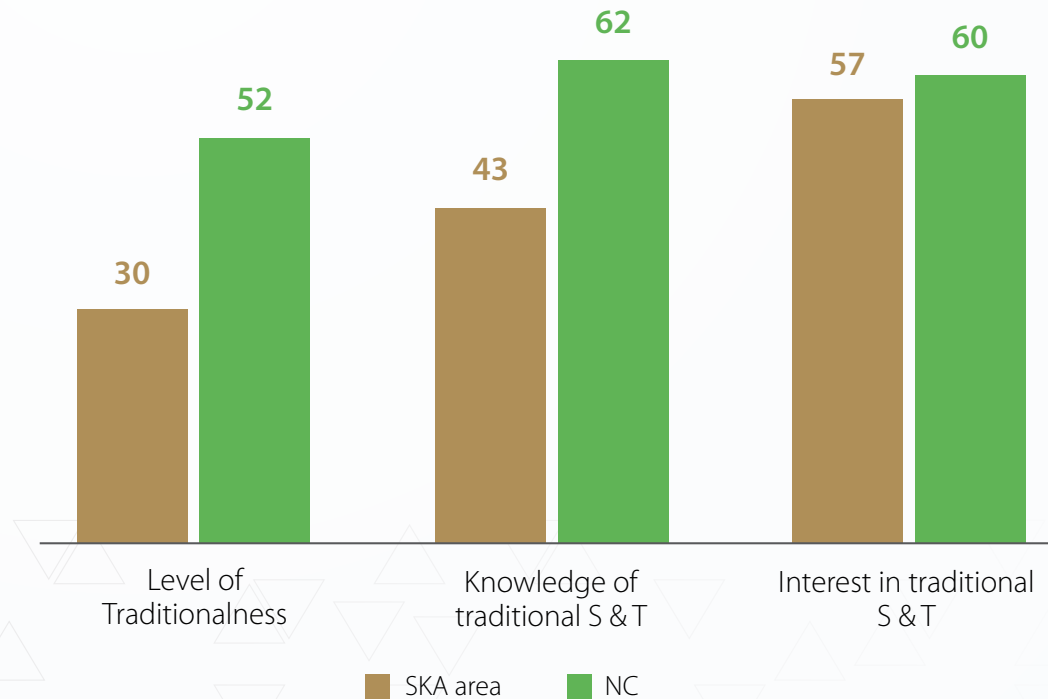
healthier, easier and more comfortable, as well as work more interesting; while the greatest concerns related to S&T making our way of life change too fast and depending too much on science as opposed to faith or religion. It is noteworthy that only 43% of the SKA (compared to 58% of the NC) public viewed the benefits of S&T as greater than the potential harmful effects, while over six in ten adults were concerned that technological advancement will result in people losing their jobs (62% for SKA and 64% for NC) and benefit the rich more than the poor (59% for SKA and 69% for NC).



8.2 Promise and reservation attitudes towards traditional S&T

There is growing recognition that community or traditional knowledge, which favour intuitive and holistic approaches, and is passed on from generation to generation, should be valued and promoted (Masoga, 2017). The public therefore rated their levels of traditionalness, as well as their knowledge of, and interest in, traditional S&T.

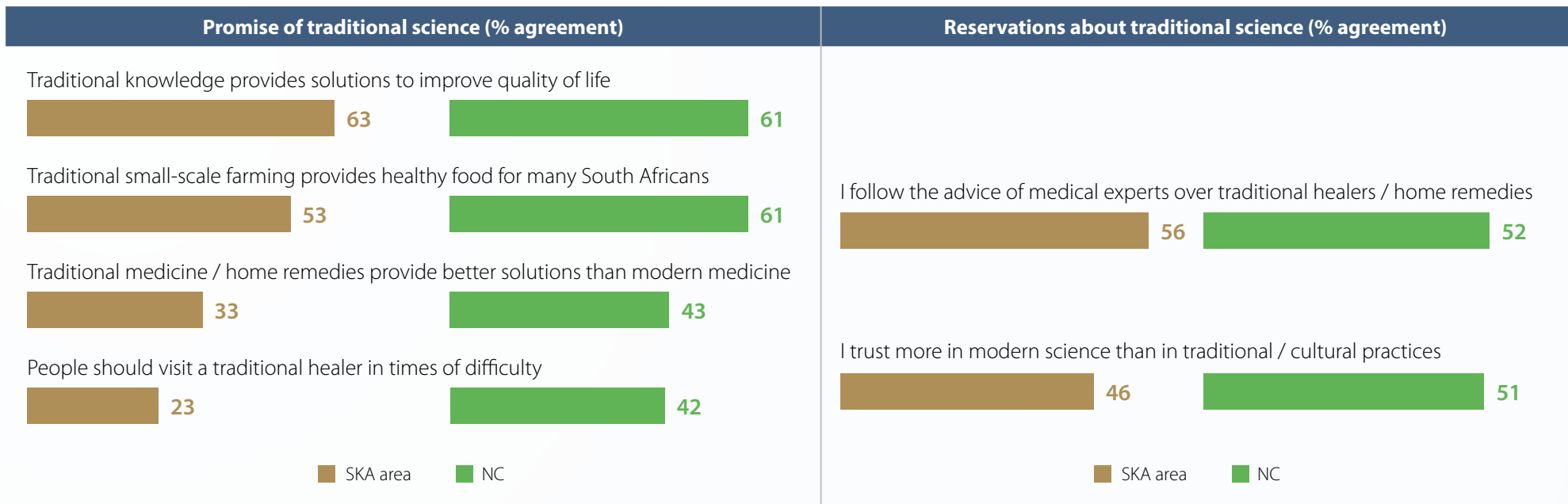
Levels of traditionalness, and knowledge of, and interest in, traditional S&T (% at least 'somewhat')



Three in ten SKA adults (30%), compared to five in ten NC adults (52%), rated themselves as, at least 'somewhat', traditional.

Four in ten SKA (43%), compared to six in ten NC (62%), adults rated themselves as knowledgeable about traditional S&T.

There were similar levels of interest in traditional S&T in both the SKA and NC areas.



In addition to eliciting the views of the public about modern science, we asked the SKA and NC public about their views of promise and reservation towards traditional S&T.

Around six in ten of the SKA (63%) and NC (61%) public saw the value of traditional knowledge in improving the quality of life, as well as in small-scale farming. When it came to the views about traditional versus modern healthcare, both the SKA and NC public preferred modern medicine.



9. Trust in the work of scientists and science information from institutions

Science and scientists produce knowledge about how to solve societal challenges. For their advice to be accepted, the public must be able to trust the knowledge produced by scientists, as well as have confidence in the institutions that produce such knowledge.

9.1 Promise and reservation attitudes towards the work of scientists

The public reported their views on several statements which were categorised as either a promise or reservation about the work of scientists.

On the one hand, three-quarters of the SKA public felt that scientists make life better for people (73%),

while two-thirds felt they provide explanations of the way the world works (67%). On the other hand, the SKA public had concerns, with half (52%) reporting that scientists sometimes harm people and animals, as well as keeping their work secret (50%). Two-thirds of the public lamented that there is too much information about science which makes it hard to know what to believe.

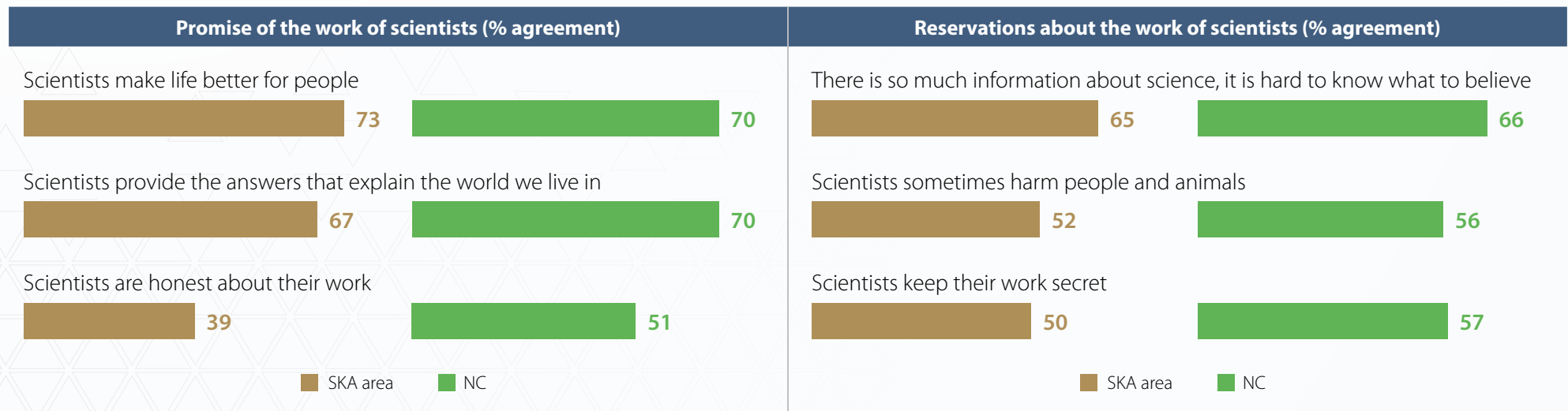
For most items, the level of promise and reservations towards the work of scientists was similar for the SKA area and the NC public, with the exception of scientists being honest about their work: Four in ten (39%) adults in the SKA area, compared to five in ten (51%) in the NC, felt that scientists were honest.

60% of SKA adults recognised the promise of the work of scientists, while

56% expressed reservations.

64% of NC adults recognised the promise of scientists while

60% expressed reservations.



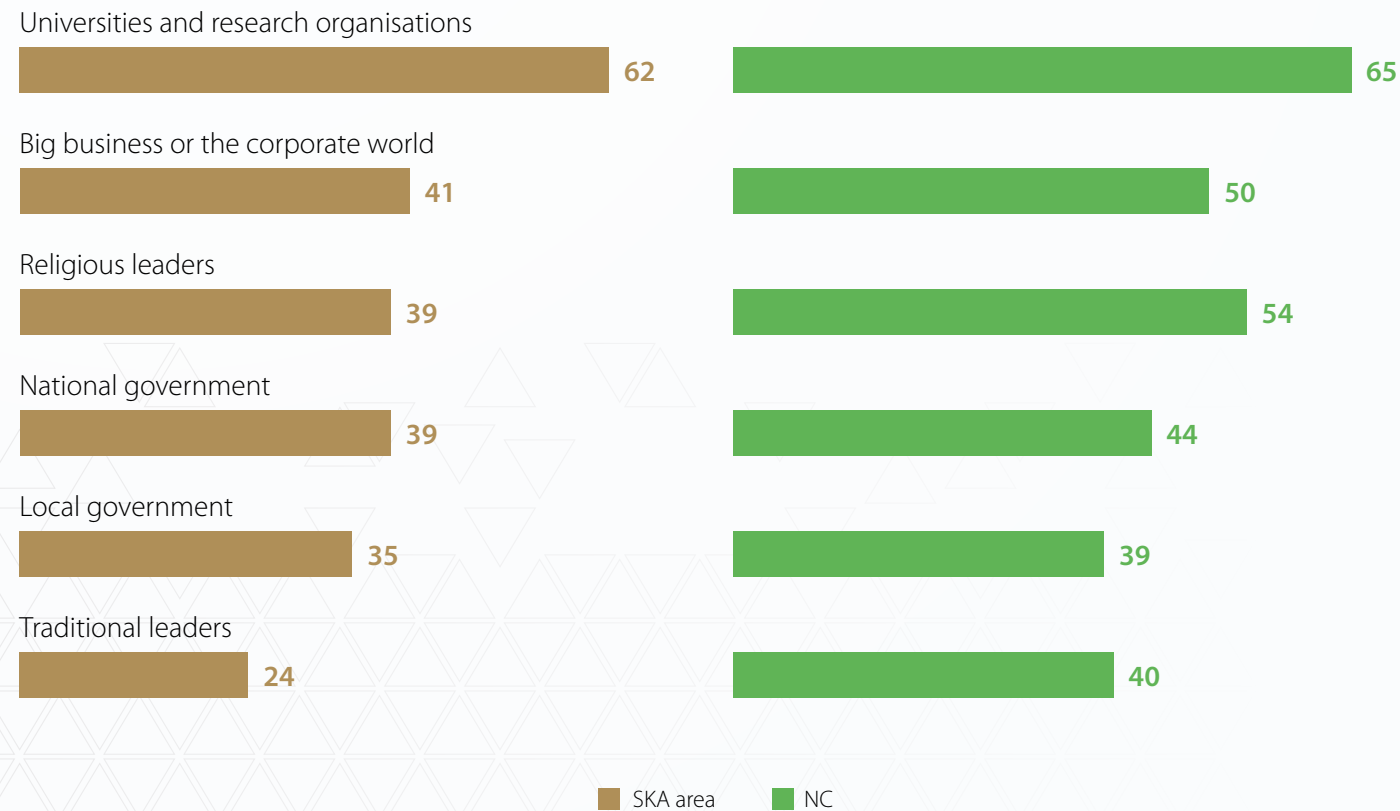
9.2 Confidence in information from science organisations

To understand confidence in institutions, we asked the public to rate the trust placed in the S&T information that emerges from several institutions.

Just over six in ten adults in the SKA area (62%) and the NC (65%) trusted S&T information provided by universities and research organisations. In both the SKA area and the NC, lower percentages of the public trusted S&T information from

non-knowledge producing organisations. Close to four in ten SKA adults trusted S&T information from business corporate world, religious leaders, and national and local government, while only one in four adults trusted S&T information from traditional leaders. The confidence in S&T information from these institutions was slightly higher for the NC public than the SKA public.

Confidence in S&T information from different institutions (% agreement)



Just over six in ten adults in the SKA area and the NC trusted S&T information provided by universities and research organisations.

62% SKA area  65% NC

10. Confidence in government's decision-making processes

The South African government is committed to evidence-based and participatory decision-making processes. Two items in the survey asked about the public's trust in government's evidence-based decision-making (E) and two items asked about their views on government's participatory decision-making processes (PP).

There were low levels of trust in the way government made decisions. On average, 29% of SKA adults and 40% of NC adults agreed that government used participatory decision-making processes. Furthermore, a slightly higher 42% of SKA adults and 50% of NC adults agreed that government used an evidence-based approach to decision-making.

Overall, there were higher levels of scepticism area about government's decision-making in the SKA, when compared to the NC. Around a quarter of the SKA and NC public reported that they neither agreed nor disagreed with the statements.

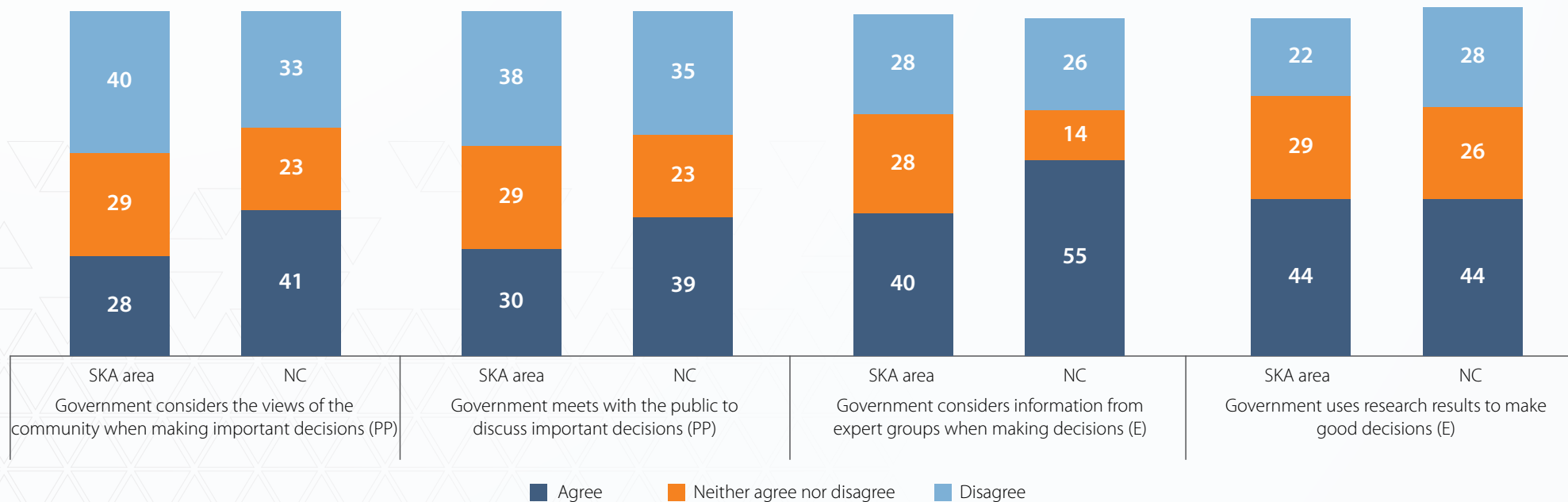
Index for confidence in government's decision-making processes

SKA area
36



NC
45

Confidence in government's evidence-based (E) and participatory decision-making (PP) processes (% agreement)

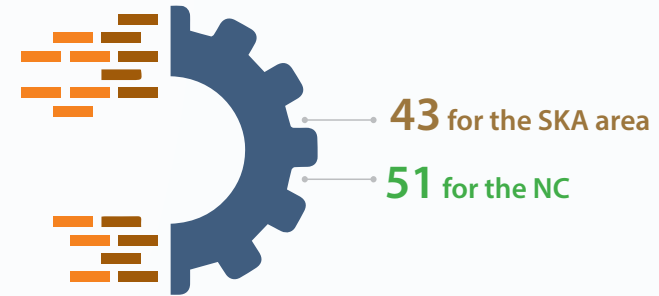


11. Views on the transformation of cultures within science organisations

South African organisations are required to: (i) make their work more relevant and responsive to the needs of the public (RR), and (ii) have workforces that are transformed and more representative of the population group and gender demographics of the country (T). We asked five questions about these two dimensions relating to the transformation of cultures within science organisations.

Both the SKA area and NC public did not perceive that there has been sufficient transformation of cultures within science organisations. On average, 44% of SKA area adults and 52% of NC adults agreed that scientists are representative of the population group demographics of the country and that women are well-represented in scientific jobs. Furthermore, 43% of the SKA public and 50% of the NC public agreed that the research being conducted was relevant and responsive to the needs of the public.

Index for transformation of cultures within science organisations



Transformation of cultures within science organisations (% agreement)

Science organisations produce relevant knowledge about daily life in South Africa (RR)



Scientists are representative of all racial groups in South Africa (T)



Science organisations listen to the people before deciding what research they should do (RR)



Women are well represented in scientific jobs (T)



Science organisations include traditional knowledge in their work (RR)



■ SKA area ■ NC

12. Access to and trust in scientific information

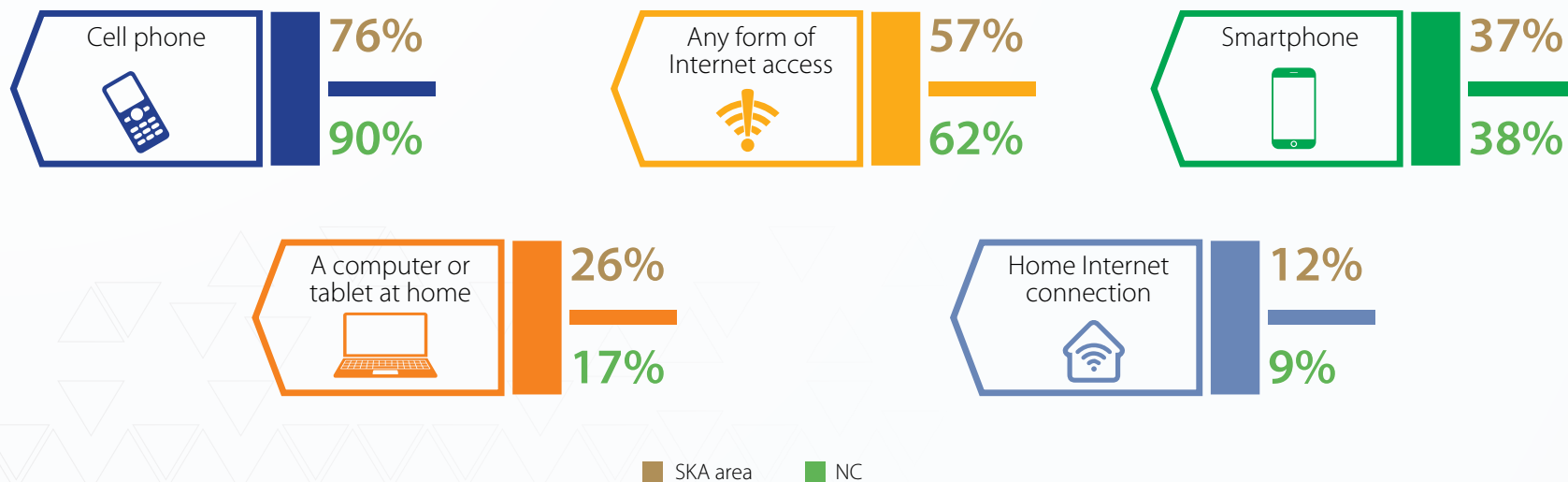
A healthy relationship between science and society depends on the sharing of S&T information and ensuring that the public can access and trust this information. The SKA and NC public's access to digital devices and the internet plays an important role in enabling access to S&T information.

In this section, we report on the availability of digital assets and internet access, frequency and patterns of internet usage, exposure to and consumption of S&T information, as well as trust in news content and information sources.

12.1 Availability of digital assets and internet access

In the SKA area, terrestrial internet infrastructure is not allowed as the person-made electronic waves interfere with sensitive radio signals measured from space. Since 2021, the SKA community could access satellite internet. In 2022, the digital and internet access in the SKA area and NC was reported as follows.

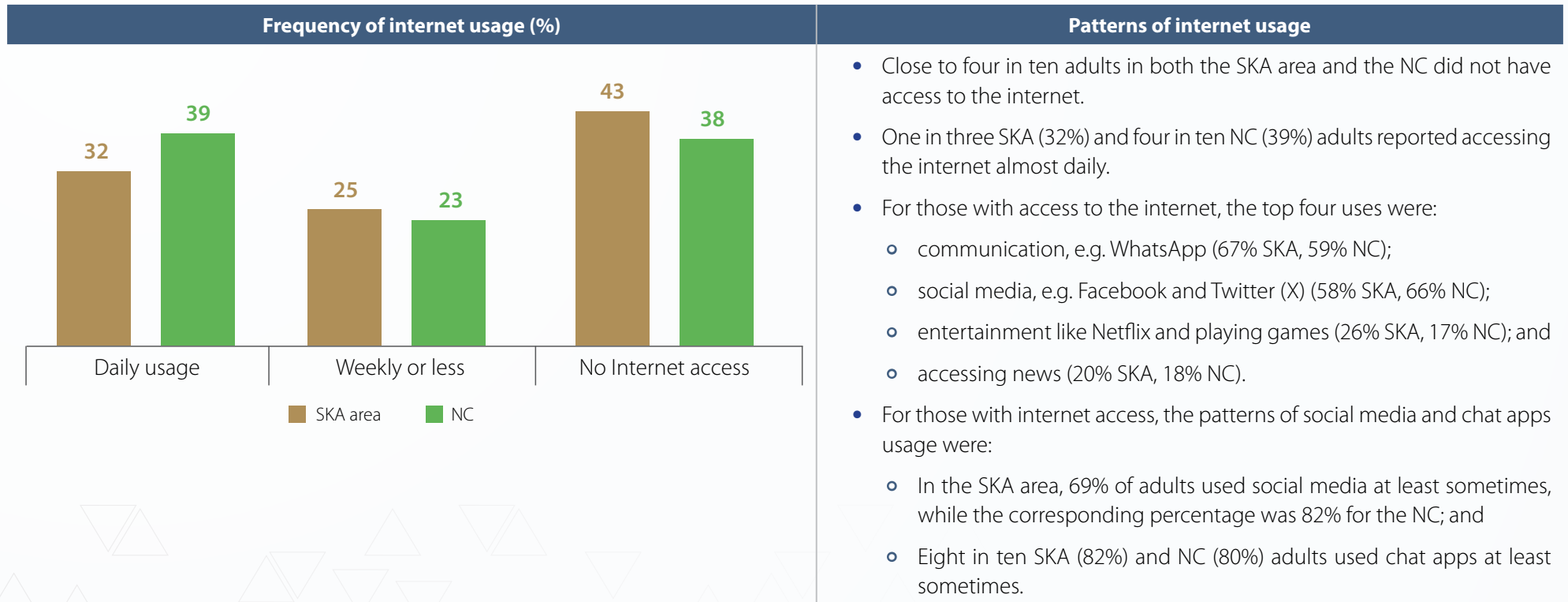
Access to digital devices and the internet (%)



While three-quarters of SKA adults (and 90% of NC adults) had a cell phone, close to six in ten adults in the SKA area (57%) and the NC (62%) had access to the internet. Just over a third had access to a cell phone with internet access (i.e. a smartphone). The NC access to smartphones was considerably lower than for South Africa where 61% of adults had access.

12.2 Frequency and patterns of internet usage

The public reported on how often they accessed the internet and what they used the internet for.



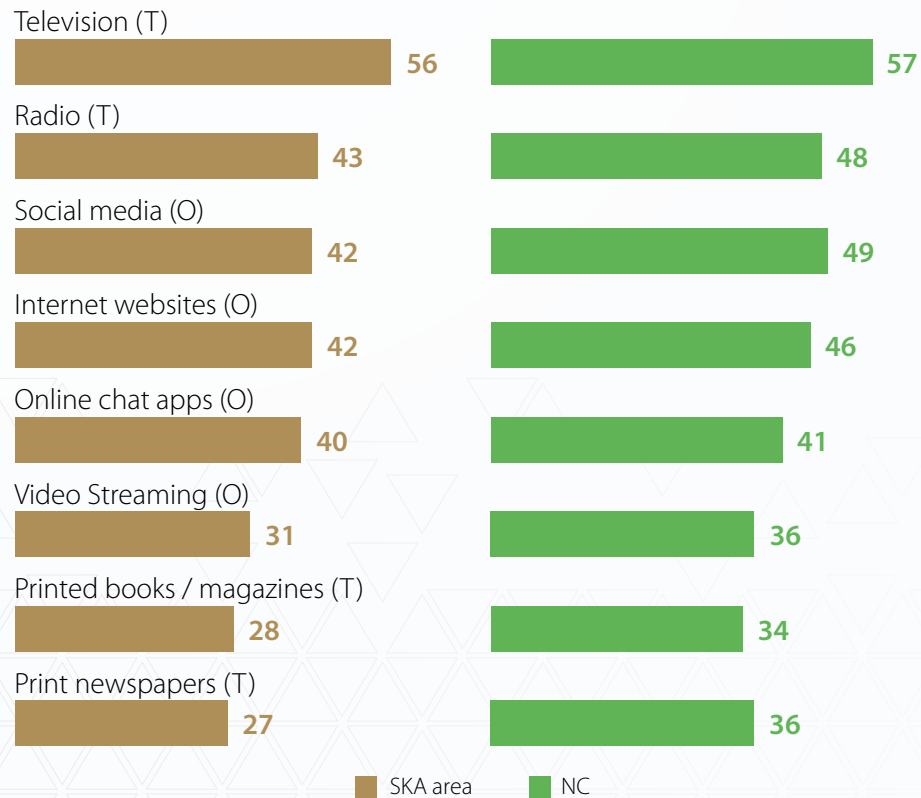
Close to 4 in 10 adults in both the SKA area and the NC did not have access to the internet.

12.3 Exposure to, and consumption of, S&T information

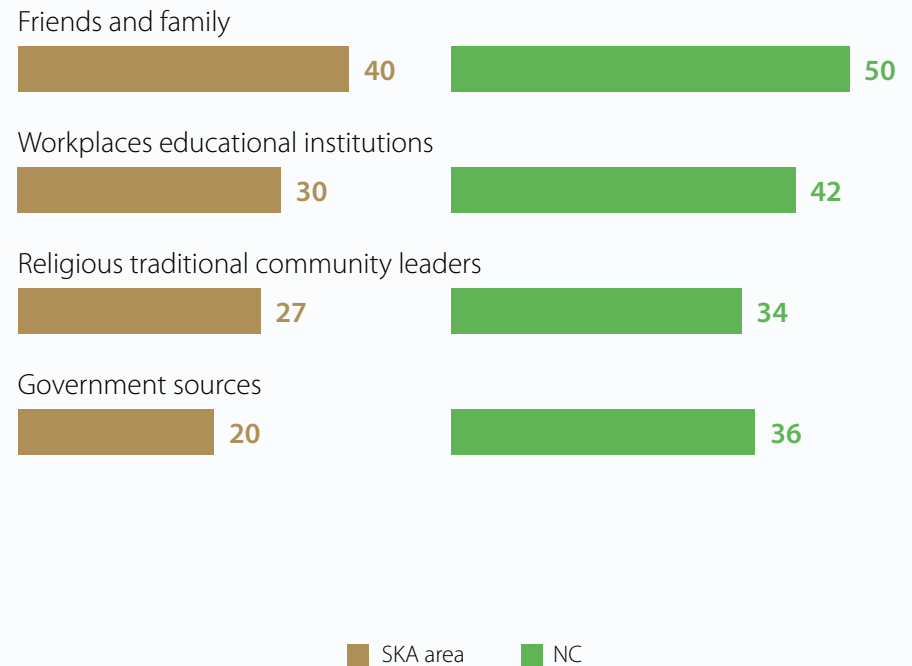
Information is key to decision-making and could subsequently influence actions and behaviours. Both the SKA and NC public reported being exposed to (receiving) and consuming (actively accessing) low amounts of S&T information. Close to half of the SKA and NC adults reported that the S&T information they received was 'too little' or 'none at all'.

The following two sets of figures report: (i) the sources from which the public received S&T information, and (ii) the most popular ways the public actively sought S&T news (consumption).

S&T news received from traditional (T) and online (O) sources (% at least weekly)



S&T news received from traditional social network sources (% at least weekly)



In both the SKA area and the NC, the most popular media sources for S&T information were television and radio, while internet websites and social media were the most popular online sources. Family and friend networks, as well as chat apps, were also popular sources of S&T information. The least popular sources of information were government and religious, traditional and community leaders.

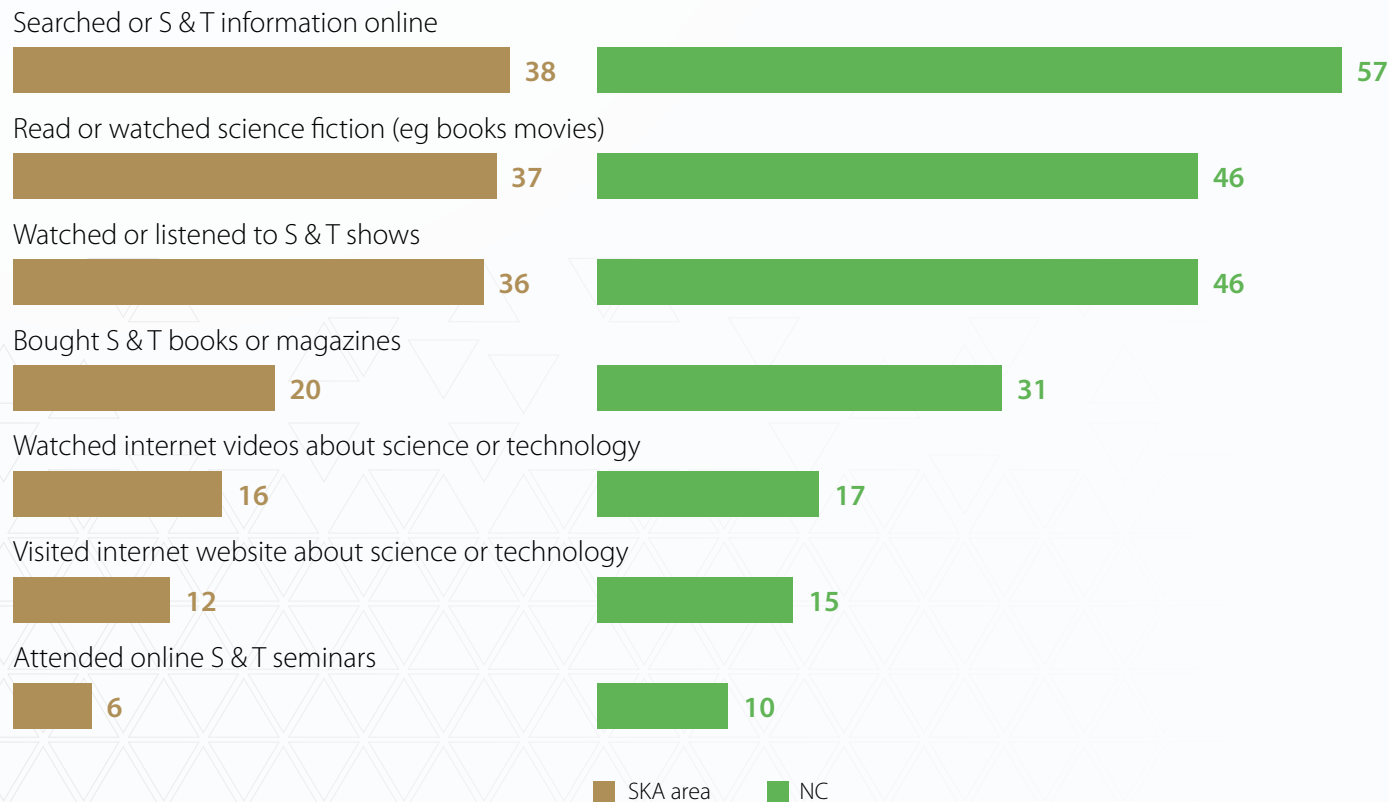
Slightly higher percentages in the NC province than in the SKA area reported receiving S&T news through each source. Across the 12 sources mentioned, the average **index score for S&T news received**, at least weekly, was 36 for the SKA public and 42 for the NC public.

One in three SKA (34%) and NC (35%) adults reported they actively read, watched or listened to S&T information (consumption), at least a few times a week. The following graph reports the consumption of S&T information.

Index for consumption of S&T information



Consumption of S&T information (% at least sometimes)



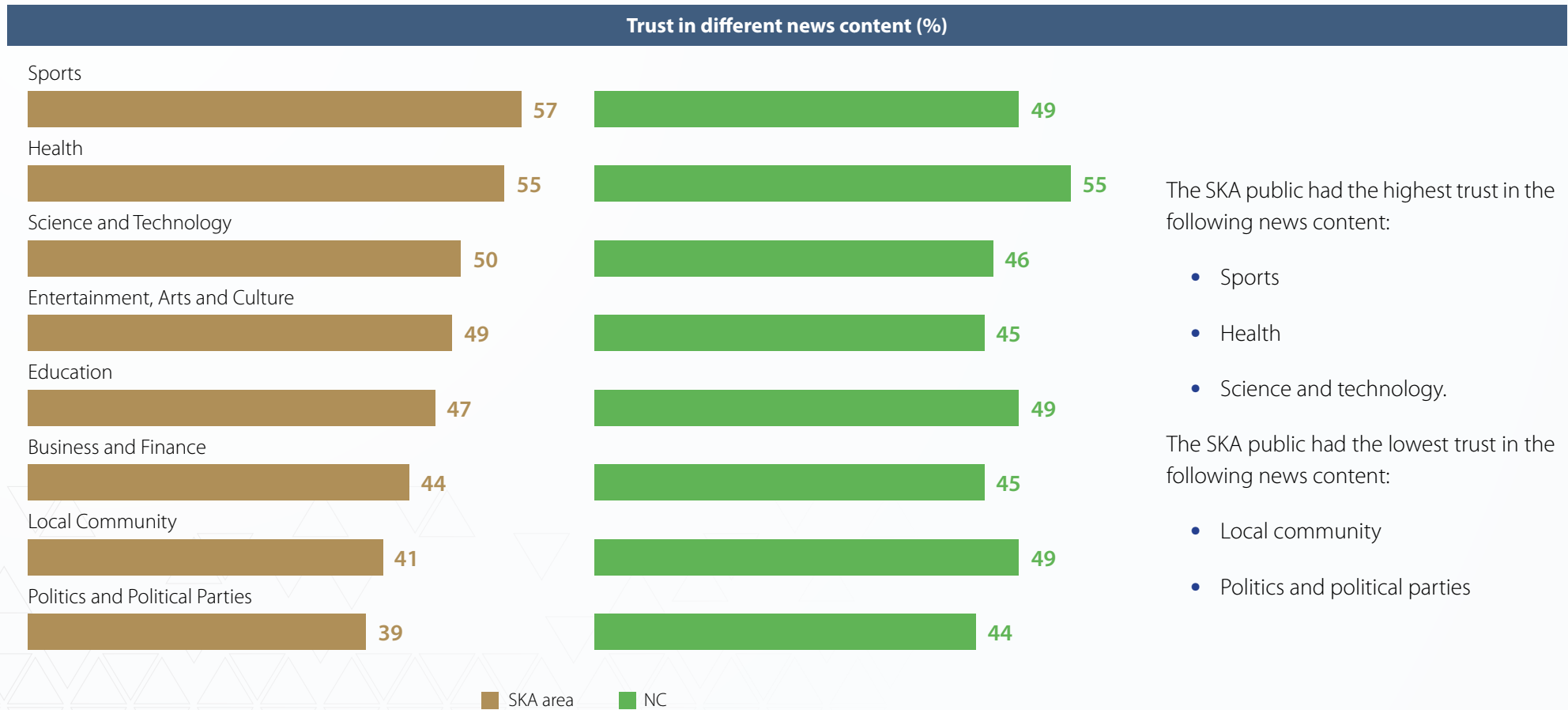
The most common method of actively accessing S&T information was through online searches, followed by reading, watching or listening to science fiction and S&T shows.

The least popular ways of accessing S&T information were through watching internet videos, visiting S&T websites and attending online S&T seminars.

Although there were similar levels of internet access in both NC and SKA area, adults in the NC sought more S&T information than adults in the SKA area.

12.4 Trust in news content and information sources

Close to half of the adults in the SKA area and the NC were satisfied with the way the media reported S&T news. In this section, we report on: (i) trust in the news content examined, and (ii) trust in S&T information sources.



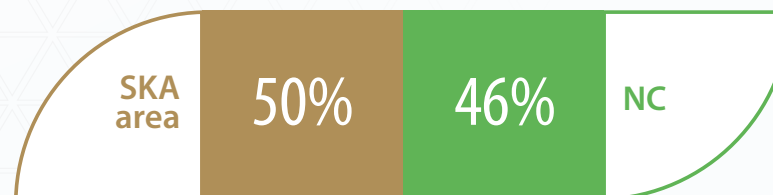
The SKA public had the highest trust in the following news content:

- Sports
- Health
- Science and technology.

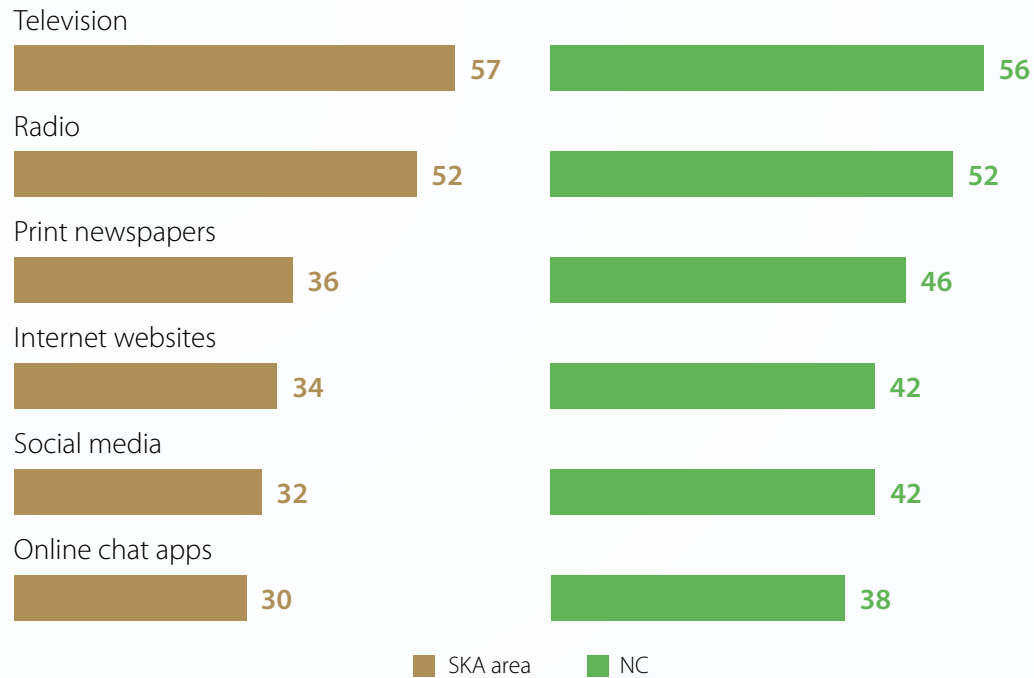
The SKA public had the lowest trust in the following news content:

- Local community
- Politics and political parties

Trust in news about S&T



Trust in S&T information sources (%)



The most trusted news sources for S&T information were television and radio, with similar levels of trust from the SKA and NC adults.

There were lower levels of trust in S&T information received from online sources such as internet websites, social media and chat apps. Close to three in ten SKA adults (34%) and four in ten NC adults (42%) trusted these sources.

Index of trust of information sources



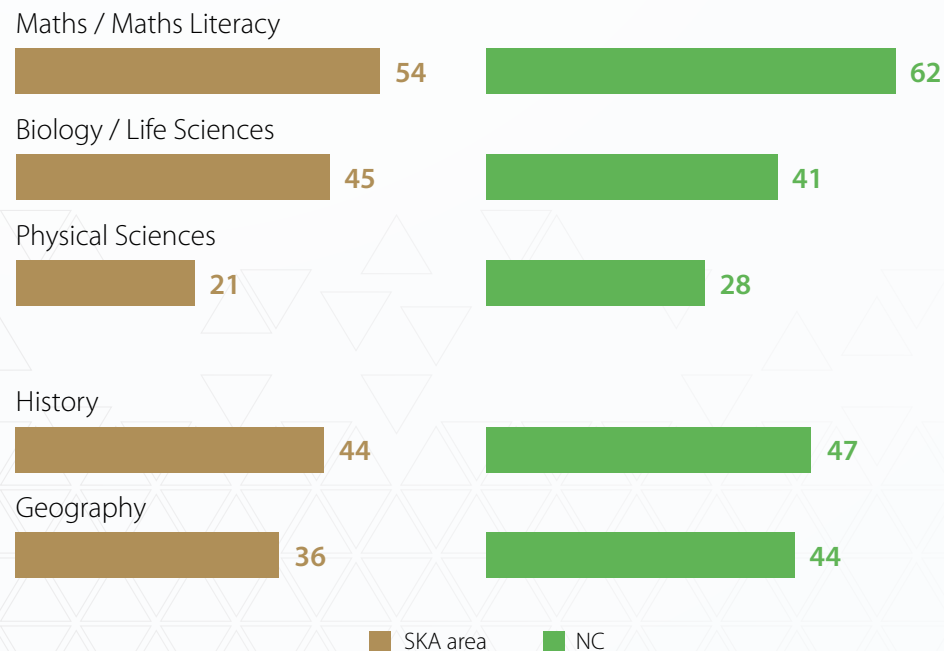
13. Science engagement outcomes: Activities and behaviours

Survey respondents were asked whether they had participated in various S&T-related activities or events, as this serves as an expression of their science engagement behaviours. The activities or events were categorised into five broad types of engagements: 1) academic engagement, 2) attraction-based engagement, 3) community-based engagement, 4) information sharing engagement, and 5) personal engagement with online apps.

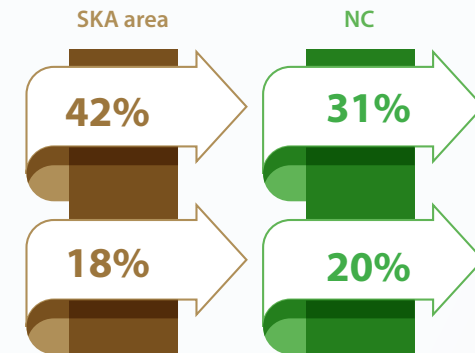
13.1 Academic engagement: Exposure to secondary school STEM and Social Science knowledge

Science knowledge and attitudes towards science are interrelated. Two-thirds of the SKA public (63%) and three-quarters of the NC public (75%) reported that they remained in secondary school after Grade 9. The survey respondents reported the STEM subjects they had selected to study at school post-Grade 9. As a point of comparison, we also asked about participation in social science and humanities (SSH) subjects.

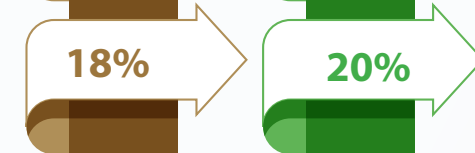
Exposure to STEM and SSH school subjects post-Grade 9 (%)



Adults that had no exposure to any school STEM subjects after Grade 9



Adults that had high exposure, taking all three STEM subjects

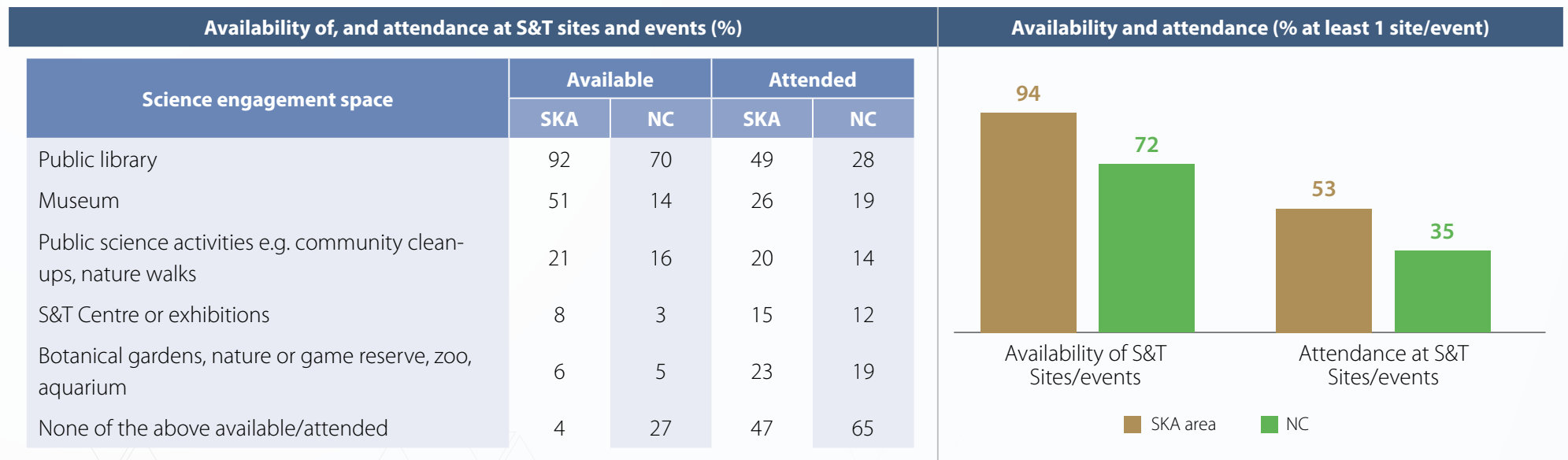


- Close to half of the adults in the SKA area (52%) and the NC (45%) had no exposure to either history or geography after Grade 9, while close to a third pursued both history and geography as school subjects.

13.2 Attraction-based engagements: Availability of, and attendance at, S&T sites and events

Event-based engagements are dependent on activities being conducted near where one resides. We asked the public whether a set of S&T-related sites and events were available close to their place of residence, and whether they had attended any of these sites or events.

Public libraries were the most commonly available S&T sites for the SKA (92%) and NC (70%) public, followed by museums (51% for the SKA area, but only 14% for the NC).



- We created an additive **Index of the number of S&T places available close to where one resides** as well as an **Index of attendance at S&T sites**.
- 94% of the SKA adults, compared with 72% of the NC adults, had at least one public engagement site or event close to where they lived. On the other hand, only 19% of the SKA public and 8% of the NC public reported having between three to five sites/events in close proximity.
- Half the SKA adults (53%) and one third of NC adults (35%) had attended at least one S&T site or event.
- It is noteworthy that public libraries and museums are two cases where availability exceeded attendance, suggesting these facilities are underutilised by the public.

13.3 Community-based S&T engagement

As observed in the table on the previous page, the availability and participation in public science activities was low, with 21% of the SKA public and 16% of the NC reporting the availability of these activities in their areas.

Drilling down further, between 19% and 32% of the SKA and NC public participated, at least sometimes, in community-based science activities. The highest participation was for recycling materials (32% for the SKA area, 31% for the

NC) and the lowest was for raising awareness for science-related issues (19% for SKA area, 23% for NC).

The **Index of community-based S&T engagement** was computed by calculating the average score for the five activities. The low scores highlight a need for greater involvement in science activities for the betterment of communities.

Index of community based S&T engagement



Involvement in community-based S&T activities (% at least sometimes)

Recycled materials or reduced the use of plastic



Participated in a national or international science awareness event



Took part in marches or demonstrations related to the environment



Participated in public hearings or official meetings on science issues



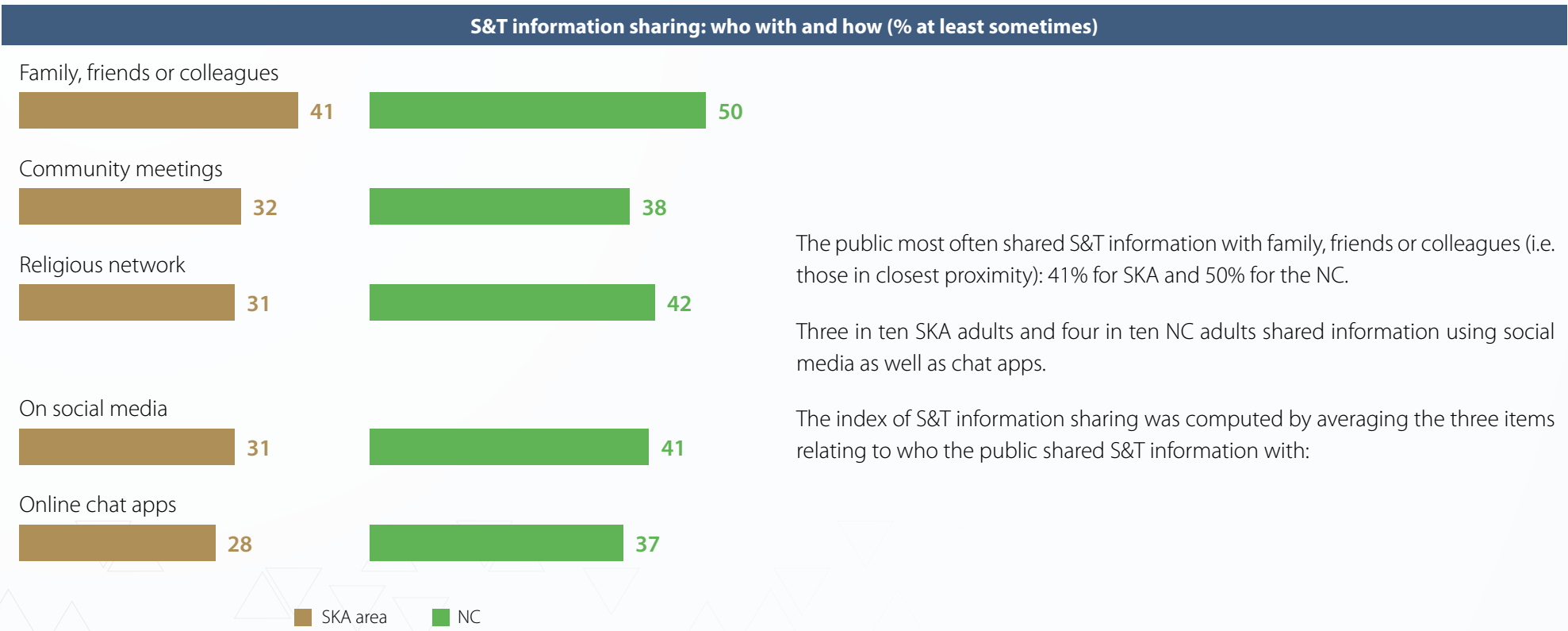
Raised awareness for science-related issues



■ SKA area ■ NC

13.4 S&T Information sharing engagement

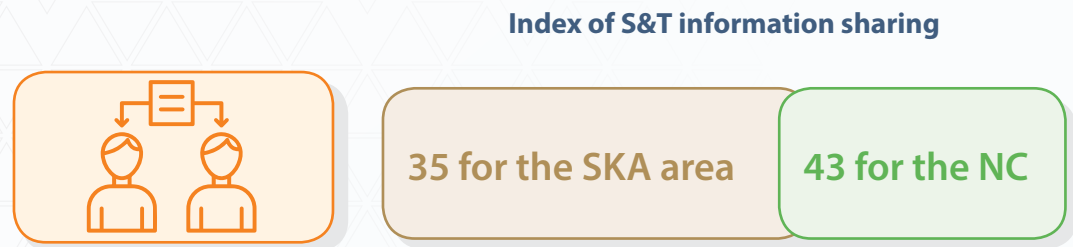
In addition to receiving S&T information, the public also shared information. There were low amounts of information sharing reported in the SKA area and the NC.



The public most often shared S&T information with family, friends or colleagues (i.e. those in closest proximity): 41% for SKA and 50% for the NC.

Three in ten SKA adults and four in ten NC adults shared information using social media as well as chat apps.

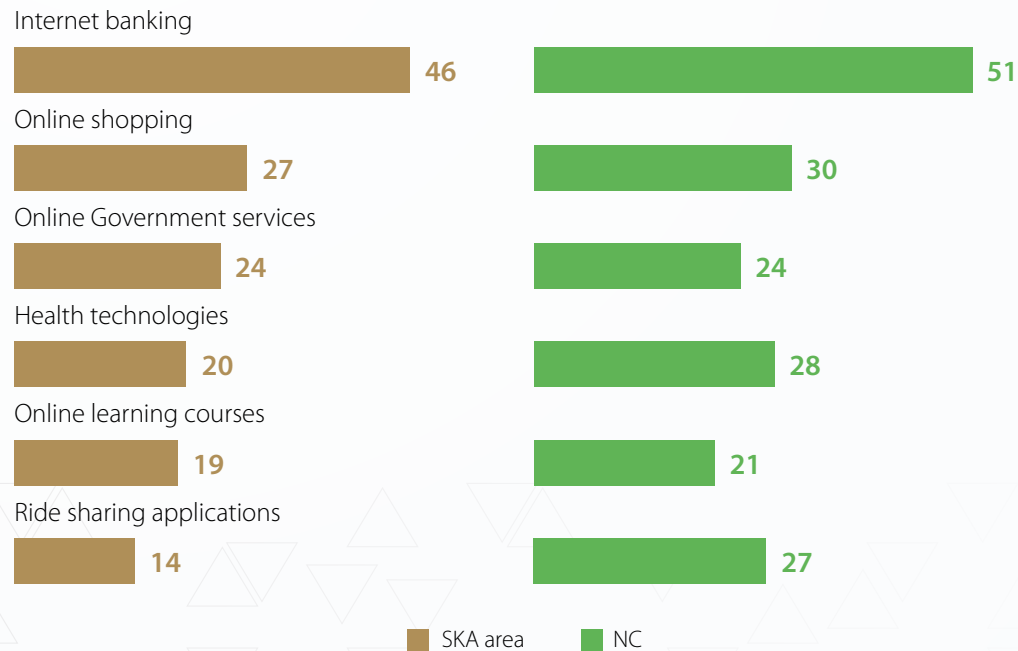
The index of S&T information sharing was computed by averaging the three items relating to who the public shared S&T information with:



13.5 Personal engagement with select online apps

We asked the public about their use of select online apps. The use of online apps requires access to the internet and as we showed in the [South African Public Relationship with Science: 2022 Survey Results](#), the characteristics of those who use these apps more frequently were younger, with higher educational attainment and from higher SES homes. There was generally low usage of these apps in both the SKA area and the NC.

Usage of select online apps (% at least sometimes)



From the list provided, the most frequently used online app was internet banking, with close to half of the SKA and NC adults reporting usage. Close to a quarter of the SKA and NC public used online apps for shopping and to access government services. The least commonly used technologies were ride sharing applications (such as Uber and Bolt), and online learning courses.

Index of usage of online apps



14. Views of pride, promise and priorities about the national system of innovation

A science-aware society is one that is underpinned by values which embrace and support the national system of innovation (NSI). To obtain measures of how the SKA and NC public valued and supported the NSI, we surveyed their pride in, promise of, and priorities for, S&T.

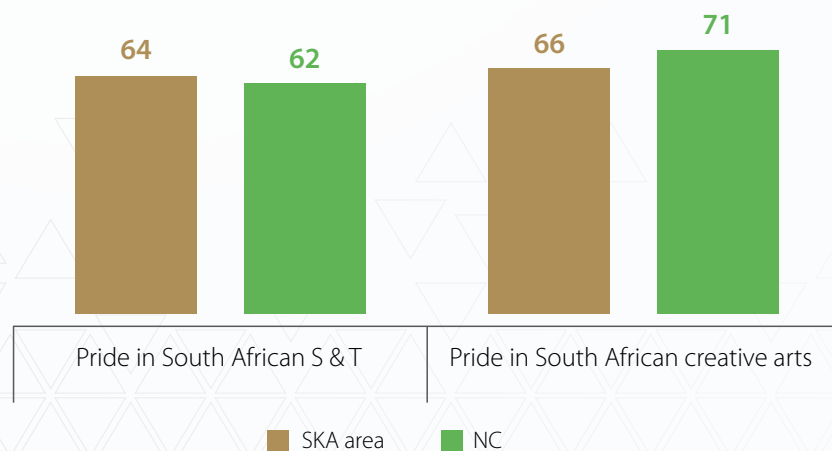
14.1 Pride in South Africa's S&T and creative arts achievements

The SKA and NC public reported on their pride in South African S&T and creative arts achievements. Close to two thirds of adults were, at least "quite", proud of South African S&T and creative arts achievements.

While South Africans were proud of the S&T achievements, they were realistic about these achievements compared with other regions of the world, with close to three-quarters of SKA and NC adults agreeing that South African S&T achievements were not better than those in Europe, North America and Asia. Half of the SKA and NC public felt that South African S&T achievements were however better than other parts of Africa.

The **index of South Africa being better than other world regions** was computed, with a result of 33 for both the SKA area and the NC.

Pride in South African S&T and creative arts achievements (% at least 'quite')



How do South African S&T achievements compare with other world regions? (% agreed)

Percent agreeing that South Africa is better than.....	SKA area	NC
other parts of Africa	49.8	49.9
Europe and North America	27.5	27.2
Asian countries	22.1	21.9

14.2 Promise of S&T skills for young people

The SAPRS survey estimated that four in ten SKA adults and five in ten NC adults were between the ages of 16- and 34-years old (see section 3, the demographic characteristics of the sample). The youth are encouraged to acquire S&T skills, for

both their personal development, as well as to participate in the modern labour market. The respondents shared their views of the promise of S&T skills for young people.

Promise of S&T skills for young people (% agreement)

Young people should be encouraged to learn about S&T



Digital and computer skills are becoming more important for young people



S&T prepare young people to respond to challenges in local communities



S&T qualification gives young people more job options

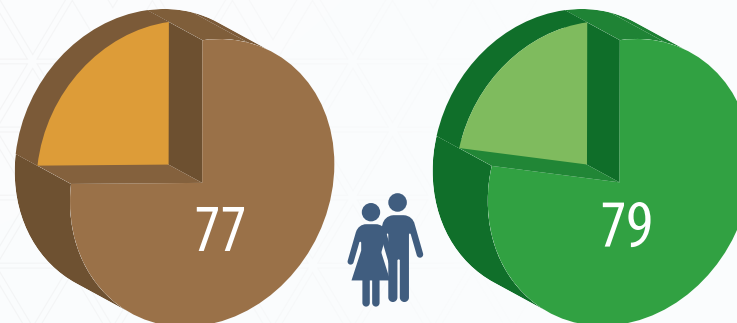


■ SKA area ■ NC

The SKA and NC public rated the promise of S&T skills for young people highly, with more than seven in 10 adults agreeing with each of the statements.

These high positive views of promise send a positive message to young people about the importance and value of S&T skills.

Index of promise of S&T skills for young people



14.3 Value of S&T experiences in daily life

S&T plays an important role in everyday lives. We are more likely to value something if we consider it important in our lives. There were varied levels of agreement to the set of statements about the value of S&T experiences included in the survey.

Value of S&T experiences in daily life (% agreement)

Technology has made it easier for me to connect with friends and family anywhere



Science knowledge helps us manage events such as pandemics and natural disasters



The internet helps my household get any information we need



Internet banking makes it easier for my household to make monthly payments



Science and technology have improved the quality of food



Technology has helped my household to save money



I often use the science I learnt at school



Information from the internet is accurate and trustworthy



■ SKA area ■ NC

Most of the public recognised the utility of S&T for daily activities:

- Three-quarters of SKA and NC adults agreed that technology made it easier to connect with family and friends
- Six in ten SKA and seven in ten NC adults valued science knowledge in managing events such as pandemics and natural disasters
- Close to six in ten adults valued the role of S&T in improving the quality of food
- The internet was valued, by more than half of the SKA adults and two-thirds of the NC adults for making banking easier, as well as providing information that their households needed.
- While the public valued the internet, only a third of SKA and less than half of NC adults considered information from the internet as accurate and trustworthy.
- Disappointingly, only four in ten SKA adults and five in ten NC adults claimed to use the science learnt at school.

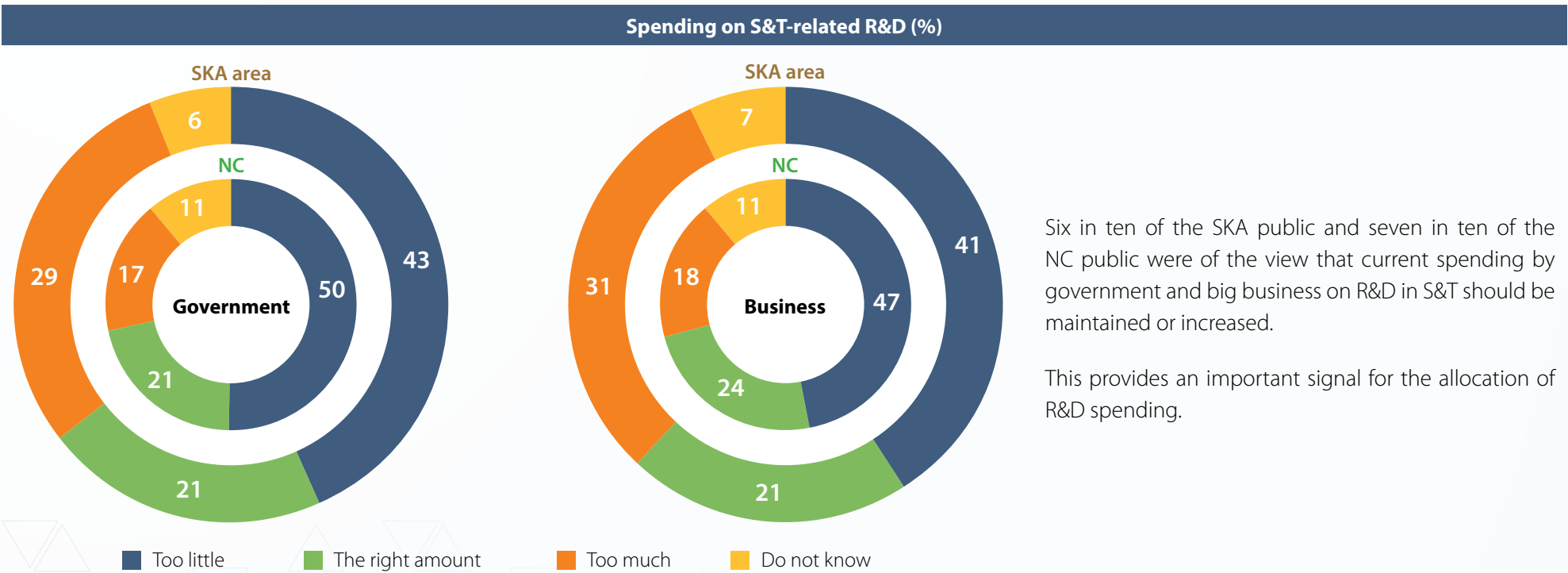
Index of valuing S&T experiences in daily life

53 for the SKA area

62 for the NC

14.4 Public support for R&D spending

The public's views on the investments in research and development (R&D) can give an indication to government on how the S&T budget could be allocated.



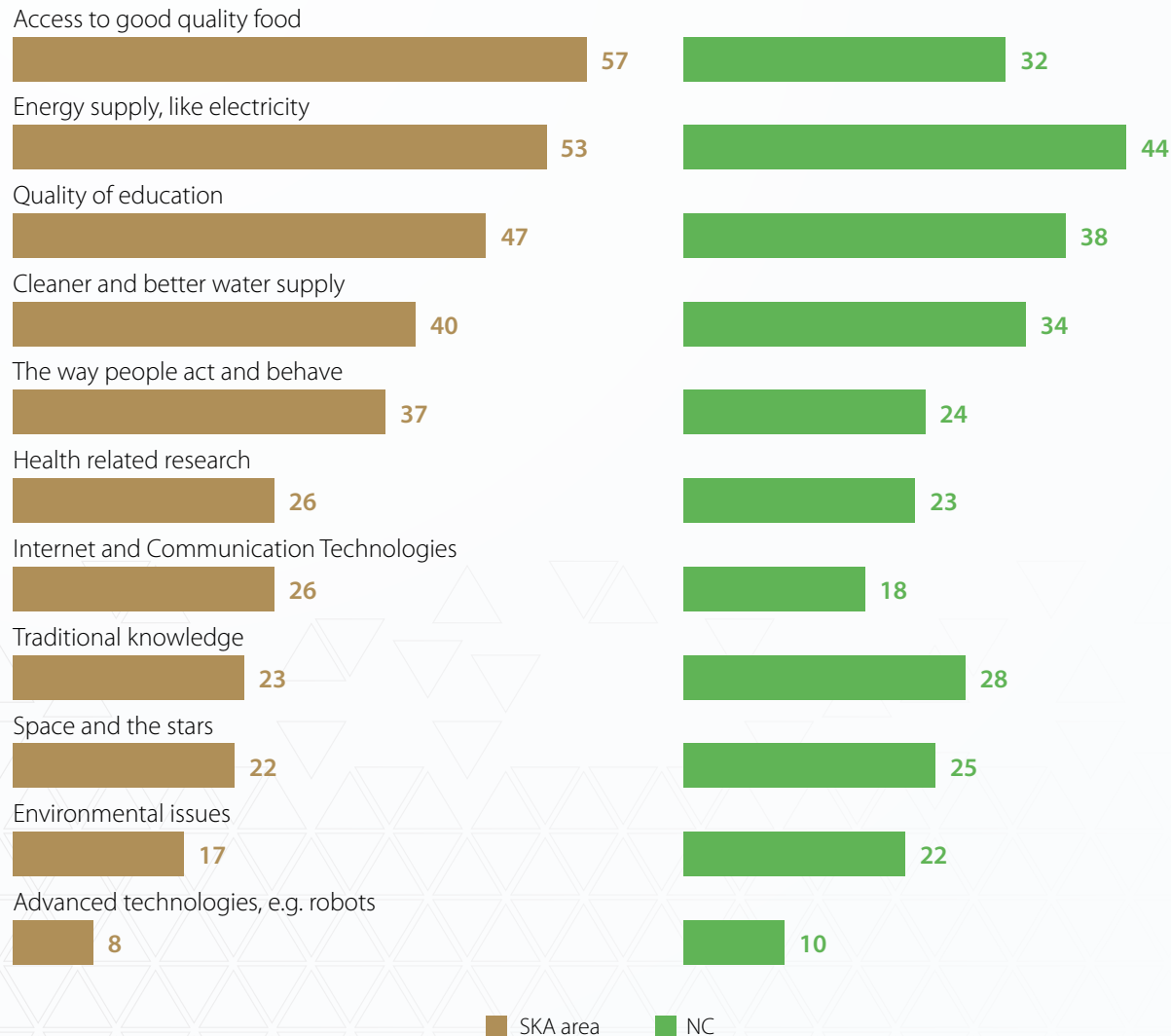
Six in ten of the SKA public and seven in ten of the NC public were of the view that current spending by government and big business on R&D in S&T should be maintained or increased.

This provides an important signal for the allocation of R&D spending.

14.5 Research priorities for South Africa

From the list of contemporary S&T priority areas, the SKA area and NC public selected the four research areas that they felt the government should continue to fund.

Priorities for future research funding (%)

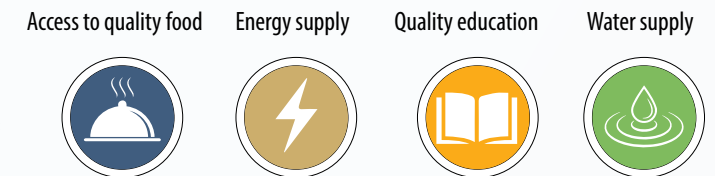


The top four research priorities for the SKA area and the NC were related to: quality food, energy supply, quality education, and a cleaner water supply. These topics are considered 'urgent and important'. They represent contemporary societal challenges, the effects of which impact the lived daily experiences of the public.

The three least important research priorities for the SKA area were: space and the stars, environmental issues and advanced technologies.

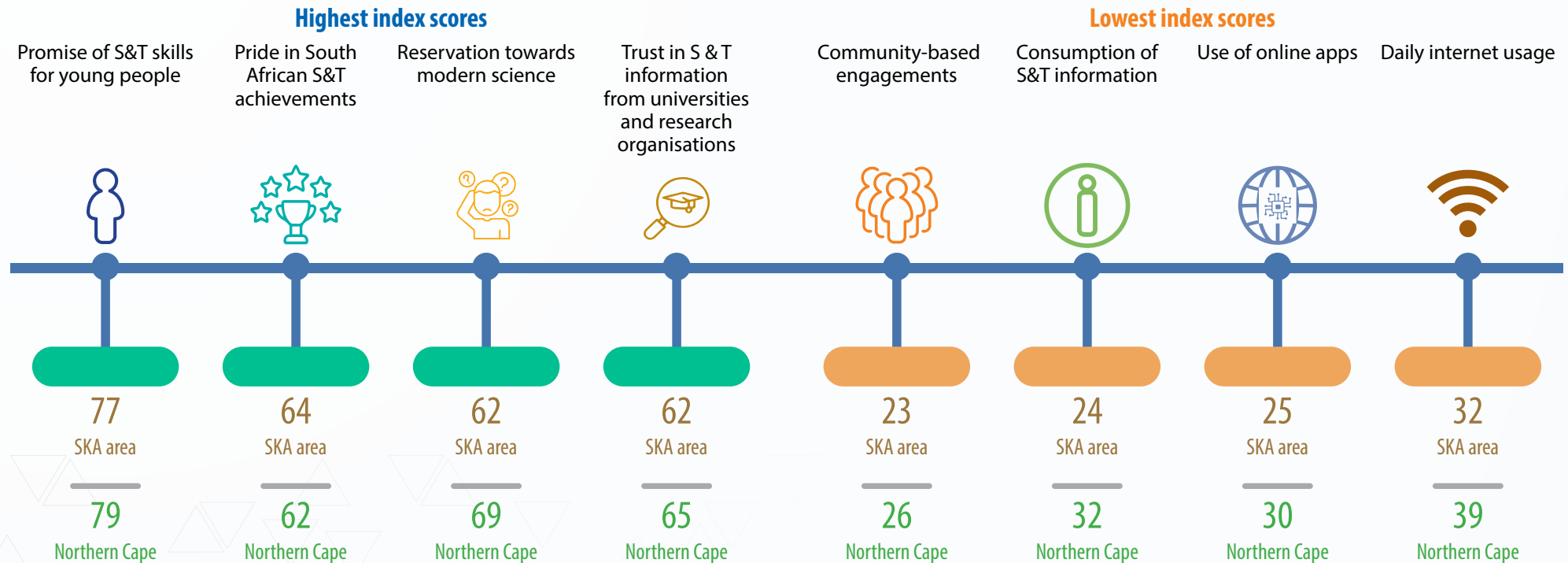
The topics *space and the stars* and *advanced technologies* are more likely to fall into the 'blue-sky' research category, where real-world applications are not immediately apparent to the public.

Top research priorities for the SKA area and the NC public



15. The fingerprint of the SKA area and the NC public relationship with science

For each of the 36 identified sub-indicator measures¹, we computed the index score (out of 100). These measures were made up of either single or multiple items. For single item measures, we use the average score for that item, while for the multiple item measures, we created a simple index score by computing the average score (out of 100) using all items that constituted each index.

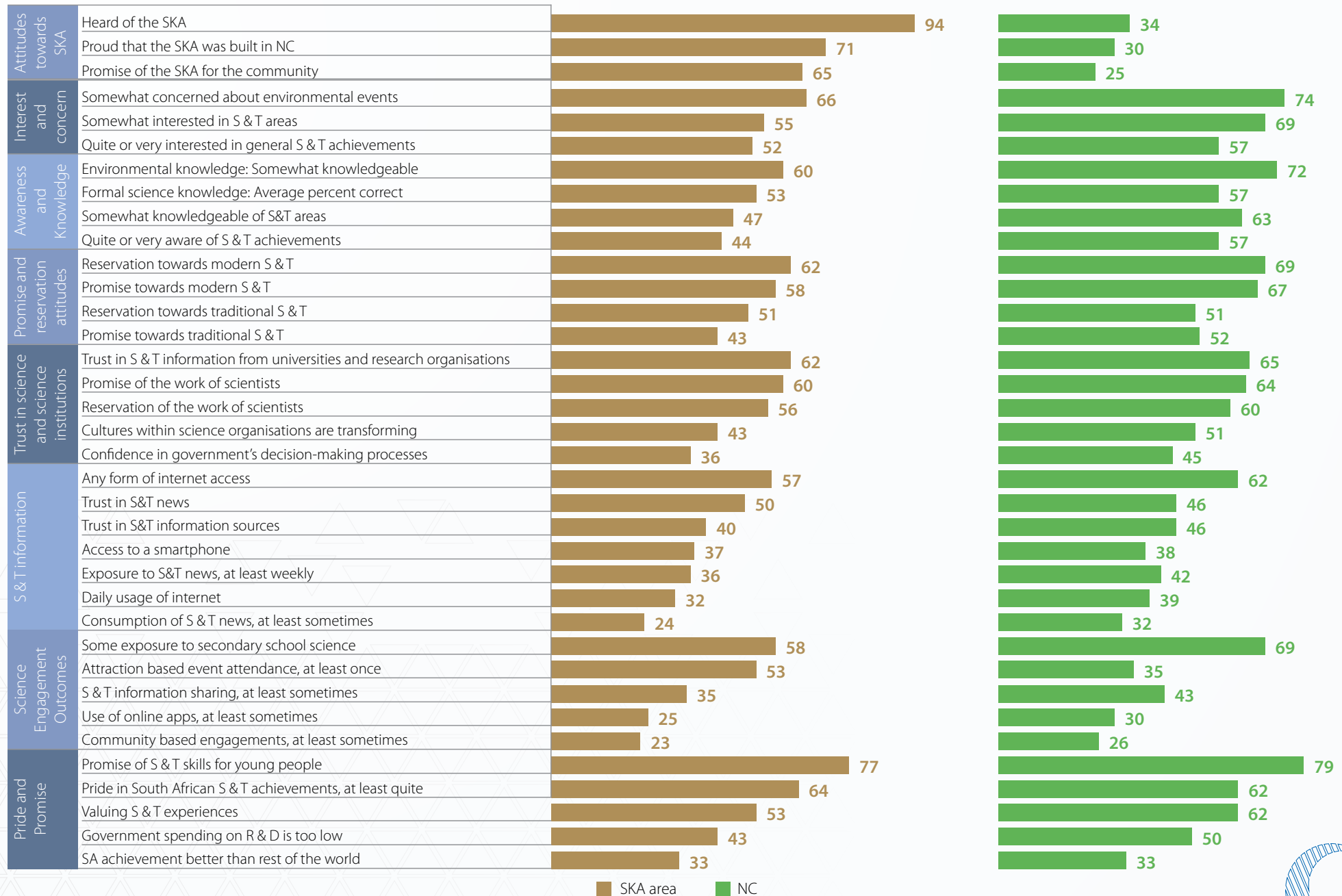


On most measures, the levels of knowledge, attitudes and engagement were higher for the NC than for the SKA area. The noteworthy difference was for the measures of attitudes about the SKA telescope. Almost all adults in the SKA area (94%) had heard of the SKA telescope, while only a third (34%) of those in the NC had heard of it. This influenced the lower levels of attitudes in the NC towards the SKA telescope.

We then created the unique fingerprint for the SKA area and NC public's relationship with science by plotting the index score for each measure. This captures, in a simple way, the diversity of the public's science knowledge, attitudes and engagements.

¹ The South African national fingerprint reports on 27 measures. For the SKA area special sample, we included additional measures, resulting in a total of 36 measures.

The SKA area and NC fingerprint of the relationship with science



16. Key findings and recommendations for the SKA area and the NC province

- 1. There are differences in the levels of science knowledge, attitudes and engagements at the national, provincial, and local level, such as the SKA area.** The survey highlights differences in these measures, although at this point, we are unable to explain these differences. However, these findings point to the need for targeted interventions informed by the baseline information to bring about changes.
- 2. Increase the awareness of, and interest in, big science projects, like the SKA telescope:** The SKA is a massive infrastructure development project in the NC. The NC offers an amazing stargazing experience, with its crystal-clear skies, desert landscape and minimal light pollution. The SKA telescope collects data on the stars, space and sky that could lead to groundbreaking scientific discoveries. While almost all adults living near the SKA infrastructure had heard of the SKA telescope, surprisingly, only a third of adults in the NC overall had heard of it. Of those who had heard of the SKA, more than six in ten adults recognised the promise of the SKA project. Surprisingly, the public reported relatively low levels of interest and knowledge in the topic space and the stars.

The DSTI had planned to build the SKA Science Information Centre in the Northern Cape. The existence of the Centre could be a hub of both information and activities that could inform the NC public about the SKA telescope.

We recommend the implementation of more public education programmes, focused on astronomy, stars and the sky that are relevant and inspiring for local communities. The objective of these programmes would be to increase awareness of, and interest in, the SKA telescope.

The project had promised to change the lives of the people in the NC through improved education, business investments and job creation. This does not seem to have happened as yet. There needs to be an investigation into

the immediate impact for the NC and SKA communities from the project, especially in the areas of education and job creation.

- 3. Foster interest in astronomy to promote a science culture:** There were moderate levels of interest in South African S&T achievements, with interest notably lower in the SKA area than in the NC. Interest was higher than knowledge, indicating that people are curious about S&T, even though they may feel that they are not very knowledgeable about them.

The topic of astronomy, the stars, space and the sky offers a unique opportunity to promote interest in S&T and build a culture of science, while at the same time linking traditional knowledge and folklore about the stars and sky to modern astronomy.

- 4. Promote educational attainment, as well as S&T and environmental knowledge:** The levels of educational attainment and science knowledge were lower in the SKA area than in the NC, which in turn were lower than for South Africa. The public reported higher knowledge for items that had recently dominated news and public discussions (like the petrol price and the Covid-19 vaccines), as well as those items with a direct impact on individuals' lives (like a cleaner and better water supply, good quality food and good quality education). Considering the geographic context of the NC, these adults also reported higher levels of knowledge and concern about environmental events.

These findings highlight the importance of promoting education in general, as well as science and environmental knowledge, both through school and public education programmes. These programmes should integrate topics that resonate with individuals' lived experiences, and leverage both traditional and social media platforms to reach as wide an audience as possible.

5. Cultivate positive attitudes towards modern and traditional S&T: While adults in the NC acknowledged the promise and reservations related to S&T, these levels were lower than the national level. Furthermore, NC adults reported lower levels of promise and reservations towards traditional science than the national population (DSTI, 2024). A focus on improving the culture of science in society will improve attitudes towards science. However, there remains a need to communicate, and raise awareness about traditional S&T and the topic of astronomy offers a perfect opportunity to make the link between traditional and modern science.

6. Build awareness and trust in science, science institutions and government evidence-based decision-making: There was moderate trust in the work of scientists, with NC adults having higher levels of trust than SKA adults. Both the SKA and NC public had high trust in S&T information from universities and research organisations but had less trust in information from government or religious or traditional groups. There was low trust in the way that government makes decisions, with only small proportions of the public agreeing that government used a participatory or an evidence-based approach.

The lack of trust in government decision-making processes may, partly, be due to the public being unaware of government processes. We recommend that the Government Communication and Information System (GCIS) develop active strategies to communicate the process and outcomes of the work of government at national, provincial and local levels. We recommend GCIS provide regular communication and showcase the social relevance of S&T-related work.

7. Promote access to and trust in S&T information: Three-quarters of the NC public had access to a cell phone, six in ten adults had internet access, while four in ten had a smartphone and one in three used the internet on a daily basis. In addition, there was low exposure to, as well as consumption of, S&T information. Around half the public trusted S&T news.

The most popular uses of the internet were for communication and social media. The most popular and trusted sources of S&T information were television and radio. The most popular news content was sports, health and S&T.

To enhance access to and engagement with S&T information, efforts should, firstly, focus on increasing digital infrastructure in the area, and secondly, equipping residents with digital literacy skills needed to access and evaluate online S&T information.

Television and radio should be prioritised for targeted S&T communication campaigns. Tailored programming, such as educational series, community discussions, and features on local science initiatives such as the SKA, should be developed to make S&T topics relevant and engaging for the local audience. Developing community-based S&T engagement initiatives, such as workshops, exhibitions, and school programmes, to supplement traditional and digital media efforts, could encourage active participation and consumption of S&T information.

8. Promote science engagement amongst the public: Another source of S&T information is physical science engagement spaces. Although there was reasonable availability of public libraries and museums in close proximity to households, the concern is that these spaces were not fully utilised.

Make libraries and museums, as well as other spaces, attractive and interesting to the public. Introducing incentives, such as free entry days or community-based transportation programmes, which may also encourage attendance. Engagement may be further promoted through initiatives such as mobile science labs, travelling exhibitions, or pop-up science events. Participation in science activities that directly impact communities should also be encouraged.

Expanding mobile and digital resources and promoting digital literacy may lead to increased usage of the internet for accessing and sharing S&T information. Developing user-friendly, locally relevant science apps or platforms that encourage engagement in topics like health, recycling, environmental sustainability and practical science for daily life, while increasing S&T knowledge and interest should be considered. Zero-rating these apps would enable them to be used by more of the public.

- 9. Appreciate the public's research-related priorities:** The top four research priorities for the public were quality of food, energy supply, quality of education, and a cleaner and better water supply. Topics rated as less important were space and the stars, advanced technologies, and environmental issues. The

top priorities can be considered 'urgent and important', as they represent contemporary societal challenges, the effects of which form part of the lived-daily experiences of the public.

It is surprising that environmental issues were lower on the list of research priorities, particularly given the contextual condition as well as the moderate to high levels of knowledge and concern reported in relation to environmental events. We interpret this to mean that, relative to the many pressing issues in the area, this did not rate as highly. Programmes focusing on raising awareness and support for addressing environmental issues, as well as informing the public about their role in protecting the environment, should be encouraged and implemented.

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