NUCLEUS FIELD TRIP REPORT | PRETORIA | CIVIL SOCIETY

Deliverable [D4.4]

NUCLEUS

DELIVERABLE DESCRIPTION

This report reviews the data collected on the NUCLEUS field trip to Pretoria, South Africa in February 2016. It examines RRI in the context of civil society with a specific focus on how civil society organisations interact with research and research institutions to understand barriers to, and opportunities for, RRI.

DELIVERABLE

Deliverable:	D4.4 NUCLEUS Field Trip Report: Civil Society (Pretoria)
Version:	V1.1
Author(s) and Institution(s):	Heather Doran (University of Aberdeen)
Submission Date:	28th April 2016
Reviewer:	Annette Klinkert, HSRW

DISSEMINATION

Dissemination Level:	[x] Public
	[ ] Confidential, only for the consortium and Commission
List of Recipients:	[x] NUCLEUS Executive Board
	[x] All Consortium Members (Open Access)
	[x] Project officer (via Participant Portal)
	[ ] Others (specify):

PROJECT

NUCLEUS is a four-year, Horizon 2020 project bringing Responsible Research and Innovation (RRI) to life in universities and research institutions. The project is coordinated by Rhine-Waal University of Applied Sciences. For more information, please visit the NUCLEUS website, follow our social media, or contact the project management team at info@nucleus-project.eu.

NUCLEUS ONLINE

nucleus-project.eu

twitter.com/NucleusRRI

facebook.com/NucleusRRI

FUNDING This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 664932.

EXECUTIVE SUMMARY

Twelve partners of the NUCLEUS project visited Pretoria, South Africa, in February 2016, to undertake the third project field trip. The purpose of the trip was to explore the role of civil society in the practice of responsible research and innovation ('RRI'; Von Schomberg, 2011[1]). The main aim of the field trip was to understand barriers and best practices for embedding responsible research and innovation in the cultures of universities and research institutions. What we learned during the trip has been formulated into recommendations for institutions who will be trying to embed responsible practice of research and innovation during the second half of the NUCLEUS project.

The field trip was led by the University of Aberdeen and our host in South Africa, the South African Agency for Science and Technology Advancement (SAASTA). A series of visits and interviews with members of civil society organisations, such as science centres, community groups, education governance officials, teachers, businesses, museums, zoos and others were conducted over the three-day field trip.

Field trip participants noted the great value of the SAASTA organisation in bringing together different communities involved in engagement with science in South Africa, including universities, scientific researchers, science festivals, science museums and centres. The seeds of engaging with the public about science have already been sown in this country, and SAASTA's role as an over-arching organisation provides a great platform from which a NUCLEI can be established in South Africa. The reach of SAASTA is evident in the nearly 847 000 individuals from the South African community reached between April 2013 and March 2014, including 506 411 learners and 18 295 educators. The field trip highlighted that, although South Africa has many unique challenges, many of the barriers to the involvement of civil society in the RRI process are similar to those observed in other localities. Key opportunities in South Africa involve SAASTA bringing together best practices, funding and the co-ordination of networking between different organisations to facilitate the participation of civil society in RRI. The field trip participants observed an eagerness among some South African communities to be involved in projects that better their societies and engage with science. Existing science festivals demonstrate, through high attendance numbers, that the public has an interest in science. There are particular considerations that need to be taken into account including the volatile political atmosphere in South Africa, recent violent protests at higher education establishments, sensitivities to the use of different languages and the

[1] Von Schomberg, Rene (2011) 'Prospects for Technology Assessment in a framework of responsible research and innovation' in:
T*echnikfolgen abschätzen lehren: Bildungspotenziale transdisziplinärer Methode*, P.39-61, Wiesbaden.

diverse nature and location of populations in South Africa. In addition, the needs of researchers and funding profiles need to be considered in order to enable and empower them to engage with civil society. These all provide opportunities for involving civil society in RRI, but also may act as barriers to its acceptance and installation as part of the research process.

CONTENTS

1 INTRODUCTION

The NUCLEUS field trip to the city of Pretoria, South Africa took place from Wednesday, 24 February to Friday, 26 February 2016.

It was the third NUCLEUS field trip. The Pretoria field trip was undertaken by the NUCLEUS partners outlined below:

- University of Aberdeen (Ken Skeldon; Heather Doran)
- Beltane Public Engagement Network (Heather Rea; Sarah Anderson)
- Nottingham City Council (Jon Rea)
- Rhine-Waal University (Alexander Gerber; Annette Klinkert; Robin Yee)
- Université de Lyon (Florence Belaen)
- Ilia University (Nino Dvalidze)
- Science City Hannover (Theda Minthe)
- Wissenschaft im Dialog (Ricarda Ziegler)

The purpose of this field trip was to examine RRI in the context of civil society. We specifically explored how civil society organisations interact with research and research institutions to understand barriers to, and opportunities for, RRI.

1.1 WHY PRETORIA?

Pretoria is home to the South African Agency for Science and Technology Advancement (SAASTA). Established in 2002 as a business unit of the National Research Foundation (NRF), the organisation has a mandate to advance public awareness, appreciation and engagement of science, engineering, innovation and technology in South Africa. They have an excellent network with many civil society organisations linked to science engagement across South Africa, including science festivals, science and technology centre networks, museums and science communication volunteers. An overview of the SAASTA organisational structure is provided in Appendix A.

The SAASTA organisation enabled the NUCLEUS field trip participants to meet with, experience and generate a picture and understanding of how these civil society organisations in South Africa act as a link between the public and research and innovation. NUCELUS field trip participants also had the opportunity to experience a rural location, when visiting the Osizweni Education and Development Centre. This better allowed the NUCLEUS field trip participants to understand the diverse landscape of South Africa, including geographic and economic contrasts.

1.2 PROGRAMME

The Pretoria field trip followed the standard NUCLEUS field trip structure. A summary of the programme is provided in Table 3 (full programme provided in Appendix B).

The interview sessions were structured into parallel sessions with half of the field trip participants attending each one. This was implemented in order to focus discussions in each session and to enable the field trip participants to gather as much information as possible.

TABLE 2: PROGRAMME FOR PETORIA FIELDTRIP

TIMELINE	SESSION
24 Feb South African Agency for Science and Technology Advancement Office Visit to Ditsong Museum	Introduction and scene setting from the field trip organisers. Interviews with Ditsong management, facilitators, volunteers and staff.
25 Feb Osizweni Education & Development Centre South African Agency for Science and Technology Advancement Office	Interviews with management, educators, school management, Department of Education, science club organisers, science festival organisers and a science journalist. Meeting with management of Sci-Enza science centre management, science club organisers, science festival organisers and a representative from the Rand Show. Talk and discussion led by Shirona Patel, Communications Manager for the University of theWitwatersrand,Johannesburg.She presented a case study from the discovery of a new species of Human relative discovered at the Cradle of HumanKind.
26 Feb National Zoological Gardens (NZG) in Pretoria	Interviews and meeting with NZG management, staff from the education programme, facilitators, scientists, department of education and volunteers. Also meeting with school management and school educators from

South African Agency for Science and Technology Advancement Office	the municipality. Reflection and evaluation from the field trip.

Interviews with civil society expert witnesses

1.3 OVERVIEW OF INTERVIEWS AND PARTICIPANTS AND ORGANISATIONS INVOLVED

Interviews were conducted by the NUCLEUS field trip participants in parallel sessions with the field trip participants split into two groups. This arrangement allowed senior staff and management to be interviewed separately from staff and volunteers. It also allowed the field trip group to interact and hold focused discussions with a larger number of individuals in South Africa.

The University of Aberdeen created an interview matrix to prompt discussions and to collate notes. South Africa has 11 official languages, but all interviews were conducted in English. We have included the template as Appendix 3. The following questions were used as prompts for each interview session. An interview lead, a moderator and a note taker were assigned within each group and these roles were rotated for each interview.

The following questions formed the basis for each interview:

- Can you tell us a little more about your role and experience?
- Do you have any involvement or links to active research and innovation (e.g. to universities, companies and/or scientists)
- How is responsible research and innovation, or any other relevant concept, looked at in your organisation?
- What role do you think there is for civil society in research and innovation projects? And if these concepts are put into practice, can you tell something about how this is done?
- What barriers are you aware of responsible research and innovation?
- What opportunities are you aware of, or might suggest, that could make these connections between civil society and responsible research and innovation stronger?
- Do you feel that the role of civil society is valued in your society?
- Is there anything else you would like to say that has an influence of the above issues?

However, the participants were also encouraged to ask any questions they felt appropriate and, in practice, the questions were more diverse and wide-ranging.

As the field trip involved a number of interviews, we planned some reflection questions to be answered by the interview group after the interview sessions had concluded.

- What was the most important barrier to RRI that you identified?
- What was the biggest opportunity for civil society and RRI that you identified?
- Was there anything else that came out of this discussion?

AN OVERVIEW OF PARTICIPANTS AND ORGANISATIONS IN THE PRETORIA FIELD TRIP

Ditsong management and shareholders: Ditsong is an amalgamation of eight national museums specialising in a range of areas including cultural history, military history and natural history. We visited the Natural History Museum located about 500m from SAASTA offices. The management here refers to the management of the entire Ditsong and the Natural History Museum.

Ditsong facilitators/ volunteers/ staff: This group consisted of museum employees who lead tours of the museums and individuals who volunteer their services to the museums (young and old scientists). This may include other staff members of the museum involved in research, communications, and outreach.

Osizweni Management and SASOL Management: Osizweni Education Development Centre is funded by South African Synthetic Oil Limited (SASOL) and is one of the science centres belonging to the Network of Science Centres in South Africa. It is located in a rural area around 170km from Pretoria. SASOL has established a cohort of experts to manage the centre. The team met the management of SASOL (who develop and commercialise technologies, including synthetic fuels technologies, and produce different liquid fuels, chemicals and electricity), staff of Osizweni and their stakeholders.

Educators, School Management: Osizweni works very closely with schools and school learners. For schools to come to Osizweni, the school management and parents must be involved in approving the visits from schools to Osizweni. The team met the teachers (educators) and the management of the schools that visits the centre.

Department of Education: The schools report directly to the government department. The Department of Basic Education is the government reporting level of the schools that utilise the centre. They are a very important government stakeholder for schools.

Science Club students: Students and learners have established groups that belong to a scientific focus area or general field of science. These groups meet to share knowledge, work together for a common goal and do projects.

Media/ journalists: Communities in South Africa speak different languages and use these languages to communicate news and current affairs. The team met with the

journalists working with the community broadcasting and print media available in that particular area.

Sasol Techno X, Mpumalanga Science Festival, Eiding-Sleg, Rand Show and Scopex**:** There are various entrepreneurial projects initiated by individuals, groups, organisations and corporate sector that run science engagement events called Science Festivals. These events are recognised by the government and supported in collaboration with SAASTA. The NUCLEUS team met some of the people running these events in South Africa.

Municipality: The implementation of SAASTA programmes includes the involvement of various municipalities and they support some of these events since they uplift their communities. The country is divided into various District and Local municipalities. The team met some of these municipality representatives.

Sci-Enza Science Center Management: Like the management of the other centres, the management of Sci-Enza is managed by the University of Pretoria's faculty of science, which is the faculty to which Sci-Enza reports. The team met the University management, volunteers, student clubs and Sci-Enza management.

1.4 COMMENTS ON THE PROCEEDINGS

In February 2016, a period of unrest in universities in South Africa was taking place. At a number of universities, students were holding disruptive protests against increases in tuition fees and the use of Afrikaans as a teaching language in the universities. There is a changing political landscape in South Africa as the country approaches elections later in the year.

Due to the disruption a number of universities were completely closed throughout the duration of the field trip and we were unable to visit the University of Pretoria and the Sci-Enza Science Centre located on its campus.

During our time in South Africa, a science centre based at North-West University was completely destroyed by fire in the protests.

We thus moved the Sci-Enza session to SAASTA's Pretoria office, the most suitable venue to host the session.

2 OBSERVATIONS AND INTERPRETATION

This section summarises the observations made by our field trip participants (primarily during the case study sessions) and their interpretation of the data, recorded on the note-taking template. Several field trip participants assisted with this section by providing written summaries of their observations and conclusions.

Some of the observations presented here are moderately sensitive, so the organisations involved are not identified.

2.1 SOME CONTEXT: SOUTH AFRICA

Currently, South Africa has some significant challenges that affect the economy and population.

Financial instability: There have been two recent dismissals of successive Finance Ministers and the value of Rand has continued to fall on international currency markets.

Governance instability: There are ongoing legal and political challenges to President Zuma over corruption allegations, including a no-confidence motion in parliament and challenges to leadership from within the ruling party as well as from opposition parties.

Community safety: High crime rate and fear of crime inhibit freedom of movement and social interaction, particularly black/white interaction.

Immigration: A significant increase in immigration from neighbouring countries (Zimbabwe, Zambia, Mozambique, etc.) into already densely populated areas – including Durban in Kwa-Zulu Natal and Johannesburg & Pretoria in Gauteng – is creating pressure around jobs, housing, education, services, crime and community safety. There are no agreed-upon figures for immigration, and anecdotally there is a strong sense that official population estimates fall short of real figures by several million people.

Poverty: Approximately 10% of the overall population live in large, informally housed areas or shack dwellings, and high unemployment and income inequality are difficult challenges (e.g., the principal of Osizweni Combined School estimated that 40% of his 2,500 students received free schooling, through a waiver on account of parental hardship. The cost for fee-paying parents is approximately €30 per term.)

2.2 SOME CONTEXT: SOUTH AFRICA SCIENCE COMMUNICATION

The Department of Science and Technology (DIST) in South Africa has recently approved a new Science Engagement Framework with four strategic aims:

1. To popularise science, engineering, technology and innovation as attractive, relevant and accessible in order to enhance scientific literacy and awaken interest in relevant careers.
2. To develop a critical public that actively engages and participates in the national discourse of science and technology to the benefit of society.
3. To promote science communication that will enhance science engagement in South Africa
4. To profile South African science and science achievements domestically and internationally, demonstrating their contribution to national development and global science, thereby enhancing its public standing.

SAASTA will be heavily involved in coordinating science-society engagement across this sector. The new framework involves the development of a scientifically literate public who can critically engage on science and technology issues affecting their lives. It also focuses on science engagement including science promotion, awareness, two-way communication and public understanding of science and technology.

This new Framework will build on the already established work of SAASTA and also involves the establishment of a research chair for science communication. Under this new framework, SAASTA will be undergoing a period of reinvention and establish new implementation plans and strategies.

2.2.1 A NOTE ABOUT THE INTERVIEWERS

Interviews involved shareholders, senior staff, junior staff and volunteers. The interviews were constructed in a way that split the senior staff from the junior staff and volunteers to allow for open conversation. We have anonymised individual responses within the interviews and provided an overview of themes which emerged throughout the field trip, as identified by the field trip attendees.

Civil Society encompasses a wide range of formal and informal organisations and interest groups. During this field trip we were limited by time and, although we met with a large number of actors, it is important to note that we only engaged with a small sector of civil society. The societal actors in the interviews were primarily related to education, students, families and science communications. The interviews were conducted with a

mix of professions, from local government, school governance, research organisations and museums.

2.3 JOB ROLES AND RESPONSIBILITIES

Our interviews revealed an enthusiasm for engagement with civil society among museum staff and educators. However, discussions also revealed that unless activities are explicitly written within job roles and responsibilities, with allocated funding and budgets, then it is almost impossible for employees to dedicate time to these activities. It was often described as being beyond their 'core roles' even though they could see the benefits to RRI and their organisation. This was a large barrier for a number of individuals.

In contrast, there are a number of professionals that we interviewed who were expected to engage with civil society as part of their job role. These included science centre managers and science festival organisers who co-ordinate a mix of outreach and in-reach activities. The vast majority of these activities are focused on those of school age in South Africa.

2.3.1 SUMMARY OF SUPPORT FOR AND BARRIERS TO RRI | JOB ROLES AND RESPONSIBILITIES

With respect to the role individuals play in engaging with civil society and RRI in institutions, we can summarise our key findings as follows:

Local schemes and structures that support RRI:

- Formally recognising engagement with civil society as an important part of a job role allows individuals to drive this forward.
- Networks of those that engage with civil society, like the large network SAASTA has, have the opportunity to create reach beyond silos and beyond the major cities.

Barriers to RRI:

- The traditional hierarchical structures can make it difficult for individuals to drive change and show the value of engagement for their organisation and the wider field of RRI when they are expected to deliver on their 'core role'.
- Availability of funding and equipment is a major challenge for individuals in South Africa who wish to act as mediators between civil society and research.

- Although many individuals do have a focus on engaging civil society with RRI, there is not currently a focus in South Africa on enabling and empowering civil society to feed into and influence the research process within universities and organisations.

2.4 FUNDING AND EDUCATION

The availability of funding to support science teaching and engagement was an over-arching challenge and discussion point within interviews. Many schools are looking for funding to create dedicated lab and teaching space for science and these challenges overshadow opportunities that may exist for further engagement.

2.4.1 CIVIL SOCIETY CHALLENGES

South Africa is a diverse country with 11 official languages. Higher Education institutions in South Africa teach primarily in Afrikaans and/or English. This has been one trigger for the current disruptions in Higher Education, as protesters wish for English to be the language of all universities. Many people live in remote and rural areas that are far from universities. This poses a barrier for engagement between research and civil society. There are also significant societal challenges with poverty and inequality. In order to engage with civil society as a whole about RRI, significant barriers need to be overcome. The cost of travel and cost of entry to activities and exhibits are all barriers for involvement in any engagement activities or projects. In addition, establishments need to be open to public interaction and be welcoming environments for all members of society to engage. This should be considered by the NUCLEI as they establish a model for engagement.

Despite the challenges facing society in South Africa, there is a highly active sense of community. People are passionate and keen to get involved with projects and activities that will better their society and country. This enthusiasm is something that should be built on to encourage engagement and discussion around responsible research and innovation.

2.4.2 THE LEARNING ENVIRONMENT

Learners in South Africa are motivated by career opportunities. This was evident when we met with school pupils as part of the field trip who were keen to take up career paths in engineering as they could see a clear opportunity and career path.

The curriculum supports learning based on fact and what is known in science. It does not encourage discussion across subjects or discussions around ethics, nor does it encourage learners to question why we may investigate certain outcomes. Some schools, based in close proximity to universities, expose learners to research by using university laboratories for practical sessions (sometimes with the assistance of PhD students). Schools in rural areas, however, do not have access to these facilities or opportunities. Learning is conducted subject by subject, and not in an interdisciplinary manner. This may prove to be a barrier when involving civil society in a wider discussion around responsible research and innovation.

Science centres in South Africa provide an outlet for informal learning and offer access to facilities to some schools based further away from universities. Science centres could provide an opportunity to create new learning outcomes and discussions with school age groups and with adults. This could bridge gaps between civil society and research. However, science centres, due to their locations, are not accessible for all. Consideration and planning should, therefore, be given to provisions that allow discussions around RRI with communities in their localities. Schools could provide venues for engagement activities to take place and also play a role in facilitating interaction between civil society and research.

There could be an opportunity to engage with civil society via digital tools. However, it was noted that as we travelled to locations beyond Pretoria, the reliability of internet and data signal was reduced. If digital tools are used they should be easily accessible avoiding large files, video streaming and on responsive websites that allow access via a cell phone connection.

2.4.3 FUNDING FOR RESEARCH AND ORGANISATIONS

Funding for research in South Africa is highly competitive and is managed through the National Research Foundation (NRF). The competitive nature provides an opportunity to embed within it a focus on responsible research and innovation, including engagement with civil society. Researchers and scientists would, however, need support from their institutions and organisations in the training and implementation of engagement with civil society. The NRF has a clear focus on creating a globally competitive science research landscape in South Africa. The focus in all countries on creating high impact, globally competitive research could provide a platform within which RRI recommendations can be embedded.

South Africa is looking to showcase the world-leading research and innovation that takes place in the country to an international audience. The focus on responsible research and

innovation should not be limited to conversations within countries but also on an international level.

It was noted in interviews that some organisations are not eligible to receive funding from organisations such as SAASTA due to their structure and tax regulations. These local administration issues should be addressed and considered in countries where NUCLEI are to be established.

2.4.4 SUMMARY OF SUPPORT FOR AND BARRIERS TO RRI | FUNDING CHALLENGES

With respect to the role funding and facilities support play in embedding RRI in institutions, we can summarise our key findings as follows:

Local schemes and structures that support RRI:

- The focus of the NRF on a highly competitive, global research environment could provide an opportunity to embed RRI within research applications
- Links that SAASTA has across organisations involved in engagement enables them to act as brokers and facilitators of RRI and engagement
- Some examples of engagement with research exist in South Africa and these feed into the overall aim of RRI. The University of Pretoria expects researchers to participate in science engagement as part of their role. However, the obligation is not always fulfilled and the amount of support and training is limited. It is also unclear if this engagement can influence research or is seen as only a dissemination activity.

Barriers to RRI:

- South Africa is a diverse country with multiple languages. Location, inequality and poverty are barriers for some that need to be considered and mitigated against when planning engagement activities.
- There are significant funding challenges within the learning environment that may prove to be a barrier for engagement with RRI. However, the active schools network and enthusiasm from educators could also be used as an opportunity to reach and provide a bridge between civil society and research
- In rural locations internet and data signals are not reliable. Digital tools should not be a primary way of creating networks or communicating with rural locations (in South Africa).

- Local administration rules need to be considered when planning funding for NUCLEI and establishing the NUCLEI hub in South Africa (and China)

2.5 INDIGENOUS KNOWLEDGE

In South Africa, communities and education are still based around indigenous knowledge and beliefs. Creating conversations and links between the public and research could provide great opportunities for both parties. At present in South Africa, we saw few examples of where the two groups overlap and integrate for mutual benefit. However, there was one case study from the Cradle of Humankind that did demonstrate how this could be achieved.

There is a great opportunity to engage with civil society in South Africa through citizen science projects. Very few projects of this type have been established in South Africa and its diverse nature and indigenous knowledge systems would be a very interesting area to explore. In order to establish these projects, an exploration of how best to facilitate them would be needed at a local level. Many of these projects are run via online digital platforms, but due to connection and limited access to internet and data in more rural regions, other models might be needed in order to overcome geographic restrictions. An offline digital system could be used to access programmes that can enhance and encourage societal engagement.

2.5.1 EXAMPLES OF EXCELLENT RESEARCH AND PUBLIC INVOLVEMENT IN SOUTH AFRICA

A fantastic case study from a recent research project, led by the University of the Witwatersrand (Wits University), the National Geographic Society and the NRF at the Cradle of Humankind World Heritage site, was shared with the field trip participants. This case study highlighted how researchers from South Africa and around the globe worked together on a new discovery of a new species of a human relative was discovered.

The project was approached in a very open way with researchers, cavers and members of the local community involved in the project. This included an open approach to social media and a co-ordinated communication effort that led to global coverage of the research and discovery. The university did, however, need to convince National Geographic that this was a good idea and approach for the project. They were conscious of framing the story and exploration in a global way that belonged to humanity as a whole and not just a single news network. In addition, they worked closely with press teams at partner universities to ensure a truly global reach for the discovery.

The case study presented was focused on the communication and dissemination of the discovery; however, it highlighted how a research group can work with the local and global community in a research project.

2.5.2 SUMMARY OF SUPPORT FOR AND BARRIERS TO RRI | INDIGENOUS KNOWLEDGE

With respect to the role institutional structures play in embedding RRI in institutions, we can summarise our key findings as follows:

Local schemes and structures that support RRI:

- Case studies from high-profile inclusive research efforts like the Cradle of Humankind demonstrate clearly how the general public can be involved in research with a global impact.
- There is large support, from local communities, for bettering South Africa. The energy that people have for their communities can be captured and used to input into research and innovation. There are many examples of active community and community schemes in South Africa.
- There is a huge opportunity for researchers to learn from local communities and vice versa.

Barriers to RRI:

- There is no link between civil society and research at present. Bringing the two together and articulating why that should happen is a barrier.
- Capacity within civil society groups is limited due to transport and funding. Other issues e.g. supply of internet or lab equipment can take priority over discussions of ethics and the future.
- Challenging myths, beliefs and understanding can be a very difficult process. It has the potential to lead to disagreements and people taking sides, rather than a coming together of ideas.

2.6 LOCATION, LOCATION. LOCATION

The varied landscape and large area of South Africa is both a challenge and opportunity for engaging with Civil Society. It was noted several times that communities away from large cities felt they were at a disadvantage regarding access to equipment, facilities and expertise, while those based in the cities could take advantage of spaces such as laboratories at universities and facilities at the National Zoological Gardens.

There is little incentive for researchers once established in their careers to return to their communities of origin to take back and exchange knowledge. We heard several comments that referred to PhD's as a 'luxury' for some. Many young people are responsible for building a home for themselves and their parents, and the PhD and research pathway is often not compatible with these family responsibilities.

The science festivals and school science competitions are facilitating some exchange in this area but it is focused on engagement with school age pupils rather than with the whole of society. The reported interactions and interest from universities and the public to participate in these activities seems very high. This could provide a platform from which more in-depth engagement around responsible research and innovation could take place. The science festival organisers have an excellent knowledge and understanding of the local communities in which they operate.

3 RECOMMENDATION FOR NUCLEUS IMPLEMENTATION ROADMAP

In what follows, we map observations about barriers made during the Pretoria field trip to the local schemes and structures we observed that might help overcome them.

3.1 OVERCOMING BARRIERS TO RRI | CIVIL SOCIETY

Barrier: There are few opportunities for civil society to interact with the research process and those who are undertaking research.

- **Suggested solution:** Could space and opportunities for interactions between civil society and research be created? Universities, science festivals, SAASTA and communities are already connected; can these existing relationships be taken to the next level? In addition, SAASTA could bring together some of these organisations to work together in future projects.
- Could funding schemes for research insist that the researchers engage with civil society or encourage co-production of knowledge? This could be especially pertinent in areas of indigenous knowledge where civil society could input into the creation of research projects (e.g. on traditional healing methods).
- Can researchers be formally required to undertake community engagement as part of their project?

Considerations to this approach: it does not necessarily follow that researchers are always best placed to engage/educate/empower those in their community of origin e.g. through an obligation to engage in return for funding. This could be very off-putting and a barrier to progression for some (e.g. a researcher who had experienced

oppression/discrimination growing up in their community of origin would not necessarily want to return to do research engagement work). That is not to say that engaging with hard to reach and economically deprived communities should not be a key part of any RRI programme, but that responsibility for this work should be shared among the research community and encompass all researchers, whatever their background.

Barrier: Access to resources, universities, science centres, travel and basic science equipment

- **Suggested solution:** Discussions around research ethics and innovation do not need to involve specialist equipment. These could be facilitated in any area where people can gather together. Could researchers return to their local areas to hold discussions and conversations in areas where it would not be feasible to reach existing facilities?

Barrier: Getting civil society to engage with research

- **Suggested solution:** There is an appetite in South Africa for bettering communities and attendance at science festivals (e.g. over 1000 people attending astronomy events based within Townships) suggests that members of the public are interested in science and technology. This could be built on to enable discussions and input into research. However, any involvement between civil society and research should be mutually beneficial to ensure a long-lasting relationship. This could be achieved by ensuring that discussions around research are relevant to the public groups.

Barrier: Discussing sensitive research topics with civil society

- **Suggested solution:** There are some examples of science festivals, e.g. contraception and groups tackling challenging issues such as the space between science and religion in South Africa already. Case studies of how these discussions can be managed and best handled would be useful to empower others in this area. This is a global challenge that requires local knowledge and guidance in order to tackle and handle to the best effect.

Barrier: Segregation in society

- The separation between black and white communities (physically, politically, economically, socially/culturally) witnessed during the field trip is perhaps the greatest barrier to successful implementation of RRI. Although this landscape is changing in South Africa, these divides do still exist.
- **Suggested solution**: Within the NUCLEI, there could be a principle (or at least strong strategic emphasis) of research colleagues of all backgrounds and ethnicities working together on community-based RRI initiatives to challenge segregation orthodoxies.

3.2 OVERCOMING BARRIERS TO RRI | INSTITUTIONS

The majority of our interviews were conducted with civil society organisations rather than with institutions and their researchers. However, we did gather a number of views and perspectives from institutions including museums and science centres.

Barrier: If it is not within a job role, engagement cannot take place

- **Suggested solution:** There needs to be a clear understanding of who is expected to engage with civil society and how that is facilitated within their job role. Without support from senior management, it seems unlikely that engagement between research and civil society could take place, even where there is enthusiasm and ideas from staff.

Barrier: There are cultural barriers and challenges between researchers and civil society

- **Suggested solution:** could ensuring that engagement with civil society is a key part of research grants and funding help mitigate this gap? Schemes to encourage researchers (from PhD level upwards) to return to their local areas for engagement could also help begin to break down these barriers.

Barrier: Training and confidence to engage

- **Suggested solution:** Training for those who are expected to bring together civil society and research will be essential.
- Training during the establishment of the NUCLEI could be used as an opportunity to bring new connections in this area and could be co-ordinated through the established Nucleus in South Africa.

Barrier: Support from institutions. With major disruption within higher education institutions in South Africa at the moment, creating change around engagement with civil society could be challenging

- **Suggested solution:** Engagement with civil society about research could be a way of bridging gaps in South Africa and be a tool for institutions with which they can show their support for students and the wider community. It would need to be ensured that the efforts of the NUCLEI are focused on RRI, rather than becoming embedded within other debates taking place in South Africa.

Barrier: Institutions could see engagement with civil society as a recruitment tool rather than a way of supporting RRI

- **Suggested solution:** The articulation of expectations and measures of success for the NUCLEI will be an important way of ensuring that efforts stay on track
- It may be important to run training with the chosen Nucleus to ensure the knowledge from the NUCLEUS consortium, field trips and the academic survey is transferred to the Nucleus
- RRI initiatives delivered through South African NUCLEI should be seen as an arena for promoting positive messages and reinforcing the aspiration of equal opportunity for all South Africans in science research, through their meaningful participation in citizen science activities and other citizen co-produced research programmes.

3.3 OVERCOMING BARRIERS TO RRI | ESTABLISHING A NUCLEUS

The diverse nature of South Africa poses a challenge to establishing a local Nucleus. SAASTA as an organisation will act as a facilitator for this organisation. As we have already mentioned some significant barriers may include the location of the Nucleus and funding support for the NUCLEI. In addition, these further observations and barriers should be considered.

Barrier: Facilitation of the NUCLEI by individual Higher Education institutions should not be led by their student recruitment and outreach needs.

At the moment in South Africa, there is a large focus on encouraging and supporting learners to continue in Science, Technology, Engineering and Maths. Universities are supportive of activities within science festivals and activities but it seemed, from the narrative that we received in interviews, that these efforts are somewhat focused on encouraging learners to stay within science subjects after they finish high school. The

narrative of NUCLEUS and the focus of the NUCLEI needs to clearly communicate that the expectations will be based around embedding responsible research and innovation and will not be outreach departments.

As we had limited time in South Africa to explore the needs, drivers and understanding of universities, this is something that may need to be considered in further detail (and addressed within the international academic study) before the establishment of a NUCLEI.

4 RECOMMENDATIONS FOR FUTURE NUCELUS FIELD TRIPS

As well as recommendations for NUCLEI, the Pretoria field trip also produced recommendations for the process of future NUCLEUS field trips.

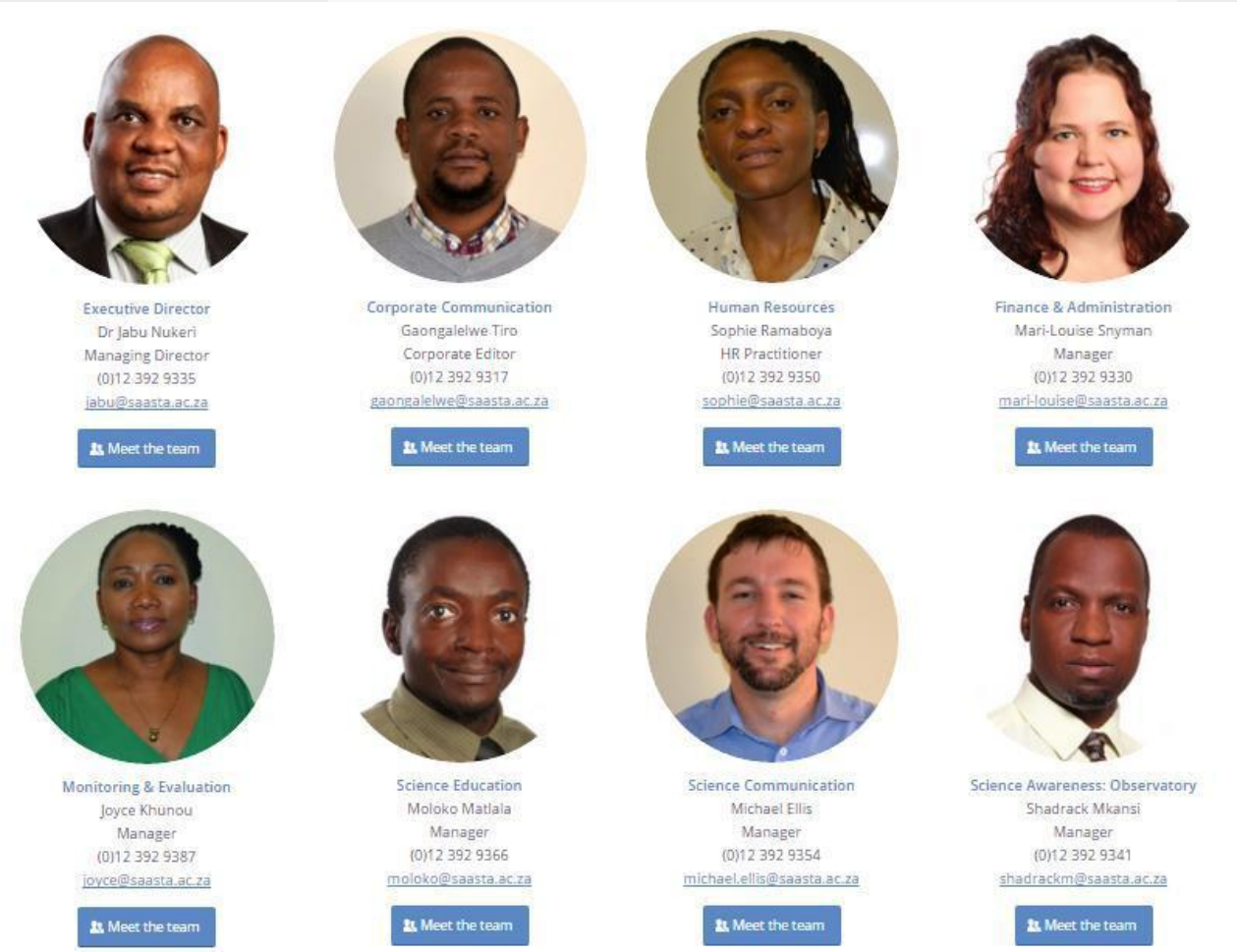
- The implementation of the notetaking template for interviews worked well and is expected to be used in future field trips.
- Receiving feedback and reflections from all participants after the field trip helped ensure that experiences and recommendations are included within the field trip report.
- If possible, in the future it is recommended that details be circulated of those who will be present in the interviews a few weeks before the start of the field trip.

5 OTHER ACTIONS RESULTING FROM THE PRETORIA FIELD TRIP

Explore in depth the practicalities of engaging higher education institutions in South Africa as established NUCLEI.

- In South Africa and China, a single institution has not been identified as a NUCLEI and there are a number of questions that we should consider:
- Should a number of NUCLEI be established in South Africa/China that could better understand the diverse populations, landscape and challenges of these countries? In South Africa, a NUCLEI hub in Cape Town might struggle to engage with northern rural areas.
- How should institutions be identified as possible NUCLEI and what considerations, support and engagement with the NUCLEUS project and its aims need to be considered before moving forward?

APPENDX 1: THE SAASTA ORGANISATION



Executive Director
Dr Jabu Nukeri
Managing Director
(0)12 392 9335
jabu@saasta.ac.za
Meet the team

Corporate Communication
Gaongalelwe Tiro
Corporate Editor
(0)12 392 9317
gaongalelwe@saasta.ac.za
Meet the team

Human Resources
Sophie Ramaboya
HR Practitioner
(0)12 392 9350
sophie@saasta.ac.za
Meet the team

Finance & Administration
Mari-Louise Snyman
Manager
(0)12 392 9330
mari-louise@saasta.ac.za
Meet the team

Monitoring & Evaluation
Joyce Khunou
Manager
(0)12 392 9387
joyce@saasta.ac.za
Meet the team

Science Education
Moloko Matlala
Manager
(0)12 392 9366
moloko@saasta.ac.za
Meet the team

Science Communication
Michael Ellis
Manager
(0)12 392 9354
michael.ellis@saasta.ac.za
Meet the team

Science Awareness: Observatory
Shadrack Mkansi
Manager
(0)12 392 9341
shadrackm@saasta.ac.za
Meet the team

APPENDIX 2: THE FIELD TRIP AGENDA

DRAFT PROGRAMME
NUCLEUS Fieldtrip Cell 3 – Civil Society in Pretoria 24-26 Feb 2016

TIMELINE	SESSION(S)	SESSION(S)
24th Feb 11hr00-13hr30	11hr00 – 11hr10	**Introduction to the field trip focus 'Civil Society' and setting the scene for participants.** Welcome to Pretoria from SAASTA and the field trip Planning team (5 minutes)
	11hr10 – 11hr40	An icebreaker/introduction session for everyone who is participating in the Field trip, Ken/Heather (30 minutes)
	11hr40 – 12hr10	Framing of the field trip theme and a general introduction session to RRI and Civil Society - the NUCLEUS team (30 minutes)
		20 minute break
	12hr30 – 13hr00	An introduction to the local hosts in Pretoria, local governance and to the SAASTA organisation (30 minutes)

	13hr00 – 13hr30	Overview of the field trip agenda and organisation for the interviews. We will guide participants in what is expected from their interviews. This will include a section on how interviews might be conducted (example questions and assigning a note taker/facilitator), Ken/Heather (30 minutes)
13hr30-15hr00	**Lunch and travel to Ditsong Museum**	
15hr00-15hr30	**Arrival and introductions at Ditsong Museum**	
15hr30-16hr30	Parallel Session A Field Trip Visit: Ditsong **1.** Ditsong: **Management and shareholders**	Parallel Session B Field Trip Visit: Ditsong 1. Ditsong: **Facilitators/ volunteers/ staff**
16hr30-17hr00	Field trip Visit : Ditsong Wrap-up with Ditsong management	
17hr00-18hr00	NUCLEUS team to reflect and compare observations (at hotel)	
	DINNER ….. DINNER …. DINNER	
	SESSION(S)	**SESSION(S)**
25TH Feb 6hr30-8hr00	**Travel to Osizweni Education and Development centre**	
8hr00-08hr30	**Arrival and introductions**	
	08:30-09:00 : Visit to school at Osizweni Education Development Centre (Meet parents (SGB) and school management	
9hr00-10hr00	Parallel Session A Field Trip Visit: Osizweni Science Centre 1. Osizweni Management 2. Sasol Management	Parallel Session B Field Trip Visit: Osizweni Science Centre 1. Educators 2. School Management 3. Department of Education
	Parallel Session A	Parallel Session B Field Trip Visit : Osizweni Science

10hr00-11hr00	Field Trip Visit : Osizweni Science Centre 1. Science Clubs students : Tertiary Students and schools **(25 minutes)** 2. Media/ journalists **(35 minutes)**	Centre 1. Science Festival Organisers : a. Sasol Techno X b. Mpumalanga Science Festival
11hr00-11hr30	**Wrap-up with Management**	
11hr30-13hr00	**Travel to Sci-Enza/ University of Pretoria (REARRANGED TO BE AT THE SAASTA OFFICES)**	
13hr00-14hr00	**Lunch break and introductions (AT SAASTA)**	
14hr00-15hr00	Parallel Session A Field Trip Visit : Sci-Enza/University of Pretoria 1. Sci-Enza Management	Parallel Session B Field Trip Visit : Sci-Enza/University of Pretoria 1. Educators 2. School Management 3. Department of Education
15hr00-16hr00	Parallel Session A Field Trip Visit : Sci-Enza /University of Pretoria 1. Science Clubs students : Tertiary Students and schools	Parallel Session B Field Trip Visit : Sci-Enza /University of Pretoria 1. Science Festival Organisers : a. Sci-Fest (Anja Fourie) b. Salamax : Science Unltd (Richard Chernis) c. Sleg : (Bushy) d. Rand Show (Cathy)
16hr00-17hr00	Field trip Visit : Sci-Enza /University of Pretoria Media/Journalists/Researchers(Homo Naledi)	
17hr00	**Wrap-up with Management**	
18hr00	NUCLEUS team to reflect and compare observations (at hotel)	
	Dinner (at Fire and Ice Hotel)	

26th Feb 9hr00-10hr00	Parallel Session A Field trip Visit : NZG 1. NZG Management	Parallel Session B Field trip Visit : NZG 1. Education Programme Management/ Facilitators/ Volunteers
10hr00-11hr00	Parallel Session A Field trip Visit : NZG 1. DoBE District and national 2. School management	Parallel Session B Field trip Visit : NZG 3. Municipality 4. Educators
11hr00	**Break for Tea**	
11hr30	**Return to SAASTA**	
12hr00-13hr30	Coming together of thoughts from Day 2 Groups will provide insight into barriers and opportunities that have been explored during the Field trip	
13hr30-14hr30	**Break for lunch**	
14hr30-16hr00	Reflection This time will be spent focusing on the outcomes from the Field trip for the NUCLEUS project, including synthesising the recommendations for the role of Civil Society in RRI and recommendations for the RRI implementation roadmap.	
16hr00-17hr00	Evaluation Field trip participants will evaluate their experience of the Field trip to inform future planning	

APPENDIX 3: THE NOTETAKING TEMPLATE

Interview (Location, Time, date):				
NUCLEUS Field Trip Participants present:				
Team Lead:				
Note taker:				
Moderator				
Interviewee name				
Role of Interviewee				
Question prompts and discussion				
How would you rate your involvement / influence / links into research and innovation or those undertaking it?				
Thinking more generally, what role do you think there is for civil society in research and innovation projects?				
Can you identify connections between the RRI agenda and civil society as it related to your locality?				
What barriers and opportunities are you aware of, or might suggest, that could				

make these connections stronger?				
Do you feel that the role of civil society is valued in your society?				
Is there anything else you would like to say that has an influence of the above issues?				
After the discussion has finished				
What was the most important barrier for civil society's relationship with RRI that you identified?				
What was the biggest opportunity for civil society and RRI that you identified?				
Was there anything else that came out of this discussion?				
Discussion with the other parallel session				
Compared with the other parallel session, what similarities/differences were identified?				