

Interns for Sustainability: SANO Exchange Programme

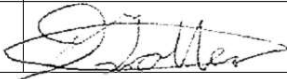
REVIEW REPORT

April 2024



GENERAL INFORMATION:

1. TITLE OF REPORT: Interns for Sustainability: SANO Exchange Programme, Review Report
2. AUTHOR(S): S Oelofse
3. PROJECT NO: ESWM0
4. TYPE OF REPORT: External contract report
5. REPORT NUMBER:
6. CLIENT: Prof Karl Klingsheim at NTNU

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CONTENTS

Executive Summary	5
1 Introduction	6
2 Background	6
2.1 Recruitment of SANO IfS Participants	6
2.2 Structure of the SANO IfS Programme	8
2.3 SANO Evaluation workshop 3 April 2024	9
3 Review of the Interns for Sustainability Programme	10
3.1 What are the main results and lessons learned, positive and negative?	10
3.2 How and to whom has IfS made a difference?	14
3.3 How can IfS participants be expected to instigate meaningful actions in South Africa?	15
3.4 What will it take for these actions to be implemented?	15
3.5 What are the weakest links in circular value chains for plastic material in South Africa?	16
3.6 How can these circular value chains be strengthened?	17
3.7 In future programme designs, which elements should be retained from the IfS experience, and which areas should be considered for improvements?	17
3.8 Indications on how future projects' focus on value chain gaps could be assessed	18
4 Recommendations for future	18

List of Annexures

Annexure A: Sustainable Seas Trust (SST)	20
Annexure B: South African Waste Research Development and Innovation Roadmap	22
Annexure C: Invitations to participate in the SANO IfS programme	23
Annexure D: Webinars presented as part of the SANO IfS programme	26
Annexure E: SANO poster competition	33
Annexure F: Presentations from the Evaluation Workshop	34
Annexure G: Participant Evaluation	40

List of Tables

Table 1: Topics covered by the IfS Programme	7
Table 2: Summary of the cohort details	8
Table 3: SANO/IfS Expert review panel	9

List of Figures

Figure 1: Participants by country/region.	11
Figure 2: Number of participants with repeat involvement.	11
Figure 3: Participants by age group per cohort	12
Figure 4: Responses on whether the overlap of the conference and workshop worked well.	40
Figure 5: Did knowledge of presenting in the plenary session influenced participant approach or participation?	41
Figure 6: Respondent responses to enjoyment/interest and relevance of excursions	41
Figure 7: Excursion ranking by participants.	42
Figure 8: Respondents' preference for receiving more feedback over the interleading months	43
Figure 9: Respondents' ranking of collaboration amongst team members	43
Figure 10: Respondents' ranking of coordinator communication	44
Figure 11: Respondents' score relating to lack of physical get togethers.	44
Figure 12: Value of the webinar series as rated by respondents	45
Figure 13: Summary of Participant expectations.	46
Figure 14: Respondent's rating of how well the program have met their expectations	47
Figure 15: Relevance of the program towards research and collaboration skills development.	47
Figure 16: Sessions relevance to respondents	49

Executive Summary

The SANO (South Africa, Norway) Interns for Sustainability (IfS) Programme could be viewed as an experiment that was run over three years, with adjustments and improvements being implemented throughout. Covid-19 restrictions on travel and in-person meetings impacted negatively on cohort 1 and cohort 2 participants, but it also added benefits to cohort 2 and 3 participants in that the savings from year 1 was used to fund competitions in year 2 and 3, with substantial monetary prizes awarded to the winners.

The evaluation by the expert review panel complimented by the feedback from the participants confirmed that the objective of the programme (to give students and young professionals exposure to knowledge on plastic pollution issues, practical experience, tools, methods, formal qualifications, and international networks – thereby enabling them to "think globally & act locally" across diverse cultural and legislative environments in Norway, South Africa, and other countries in Africa) was largely achieved. The programme involved 170 individuals from 33 nationalities and engaged in 23 different group projects over the 3-year programme period. It was very successful in creating networks, stimulating intellectual cross-disciplinary growth, raising awareness on the issue of plastic pollution, and enabling participants to "think globally and act locally".

It is premature to evaluate the success of the programme to "produce future business managers, researchers, educators, and government officials in the global fight against plastic pollution", but it may be possible to track the careers of the participants based on the database of participants. A total of 15 participants were involved in two or more cohorts, and two participants in all three cohorts. This could be an indication that participants were keen to have a longer-term exposure to the programme.

International travel was probably the key drawcard to attract participants into the programme, and therefore the programme was successful in exposing participants to different cultures and a broader perspective of the global plastic pollution issue. However, the impact of the programme will be strengthened if action can be realised based on the findings and experience gained. Development of a shared research agenda between the two countries and allocation of sufficient funding to support the research going forward could go a long way to realise the potential impact of this programme.

The suggested way forward is to make the programme more attractive to senior people that could act as mentors for the youngsters. Specifically, a workshop of mentors working in plastic to build partnerships and to facilitate future submissions is recommended, to build partnerships and ensure alignment with specific research focus areas that students will work on as part of their studies. The projects should focus on impact as opposed to general environmental topics. It is recommended that project focus areas should include:

- **Upstream interventions – product design, alternative delivery methods, elimination, and**
- **Downstream interventions – improved waste management, unlocking reuse/recycling.**

1 Introduction

The SANO (South Africa, Norway) Interns for Sustainability (IfS) Programme, which is an initiative from the Norwegian University of Science and Technology's (NTNU) Action Ocean Plastic Waste research area, is funded by the Norwegian Retailers' Environment Fund, as an effort to address issues of plastic pollution from a multitude of disciplinary angles. The objective of the programme is to "produce future business managers, researchers, educators, and government officials in the global fight against plastic pollution – by giving them relevant knowledge, practical experience, tools, methods, formal qualifications, and international networks – thereby enabling them to "think globally & act locally" across diverse cultural and legislative environments in Norway, South Africa, and other countries in Africa. The programme took the form of an exchange programme targeting students and working professionals from diverse backgrounds in Norway and South Africa. The NTNU has partnered with the Sustainable Seas Trust (SST) in South Africa to oversee the coordination of the programme. More detail on the SST as an organisation and their role and involvement in the SANO IfS programme is available in Annexure A.

The Council for Scientific and Industrial Research (CSIR) has been contracted by the SST on behalf of the NTNU to do an independent review of the SANO IfS Programme. The programme was a first of its kind exchange programme funded by the Norwegian Retailers' Fund. The next section provides some background information on the programme under review.

2 Background

The information provided in this section is important to put the review into context. We start by providing background on the process that was followed to recruit participants, and then go into more detail on how the programme was structured, as well as the review process followed.

2.1 Recruitment of SANO IfS Participants

The programme started as a concept with the objective to "produce future business managers, researchers, educators, and government officials in the global fight against plastic pollution – by giving them relevant knowledge, practical experience, tools, methods, formal qualifications, and international networks – thereby enabling them to "think globally & act locally". The intention was to foster collaboration between Norwegian and South African students and early career professionals to work together in teams on projects of mutual interest towards solving the global plastics pollution problem. Therefore, an open invitation was sent out as a wide-reaching broadcast into existing professional networks in Norway (mostly academia, but also through the Embassy of Norway) and in South Africa (through the SST mailing list, as well as through the networks of

organisations that SST has previously worked with, including academia and industry). The invitation was also shared with the South African Waste Research Development and Innovation Roadmap (Waste RDI Roadmap) Network. A broad overview of the Waste RDI roadmap as it applies to plastic waste, as well as links to the website and plastic waste related research reports, are provided in Annexure B.

The invitation was open, with little guidance on what was expected. The focus was rather on making the programme as interesting as possible and hoping that people with adjacent interests would come together and find a topic that would engage more people. Therefore, some teams were organically formed, while others were facilitated through nudging and encouragement at workshops.

Separate calls (Annexure C) were circulated to attract participants for each cohort.

The project topics covered by the cohorts are summarised in Table 1, and the results from these studies are available online at <https://www.ntnu.edu/oceans/actionoceanplasticwaste>.

Table 1: Topics covered by the IfS Programme

Cohort 1	1. Remote detection of plastic waste 2. Collecting plastic waste from rivers and oceans 3. Breakdown and distribution of plastic debris in the oceans 4. Microplastics in marine animals and their environment 5. 3D printing from recycled plastics 6. Material flow analysis of plastic waste 7. The plastics value chain and within circular economy business model opportunities including EPR. 8. Perceptions on plastic problems and solutions in different cultures/countries 9. Using AI-tools to reduce plastic pollution
Cohort 2	1. Cradle to Cradle: Promoting environmentally conscious decision making in the production of plastics. 2. Further investigation into toxicity of various recycled plastics and their potential effects on the environment. 3. Investigating the plastisphere: Understanding opportunities and threats of bacteria on plastics in estuaries. 4. Spatial distribution of plastics in the global ocean to predict plastic hotspots. 5. Ocean plastic pollution: Sources, effects, challenges, and mitigation measures. 6. A quantitative analysis of fishing gear waste from beaches in South Africa/Norway 7. Addressing plastics bags consumption crises through plastic bag levy, retailer monetary and non-monetary interventions in South Africa.
Cohort 3	1. The origin of river plastics and economic plastic flow in Norway and South Africa 2. Valorisation of waste plastics into chemicals and energy carriers 3. Valorising Plastic Waste 4. Trojan horse or just useful horse; the combined impact of trinity, micro plastic, bacteria and adsorbed elements on marine ecosystem 5. Consumer practices relating to the reduction and reuse of plastic packaging in the food and beverage industry: A comparative study of Norway and South Africa

2.2 Structure of the SANO IfS Programme

The SANO IfS programme was structured as a 3-year exchange programme, which was run as three separate cohorts between November 2020 and August 2023. More than 170 individuals from 33 nationalities have been engaged in various roles and to varying degrees, contributing to 23 different group projects over the programme period.

Each Cohort consisted of 4 steps:

1. Virtual meet and greet – designed to brief the participants on the programme, the issue of marine plastic pollution which needs to be addressed in the programme, and to facilitate the formation of the groups.
2. Kick-off workshop – working session for groups to finalise their project details and do planning for the duration of the cohort. Teams were supported by relevant experts and tools to help facilitate the planning and during the design phase of the projects.
3. Remote interleading months – the teams worked remotely from their respective home institutions on the assigned projects. Weekly webinars were arranged during this period where different speakers presented on topics related to the projects. The details on the webinars per cohort is attached as Annexure D.
4. Concluding workshop – groups came together to present the findings of their respective projects.

A comparative summary of the three cohorts is provided in Table 2.

Table 2: Summary of the cohort details

	Cohort 1	Cohort 2	Cohort 3
Time frame	Nov 2020 – June 2021 (7 months)	Oct 2021 – May 2022 (7 months)	Dec 2022 – Aug 2023 (8 months)
Statistics	9 groups 42 participants 12 Institutions 11 Disciplines	7 groups 32 participants 12 Institutions 6 Nationalities 12 Disciplines	7 groups 50+ participants 15 Institutions 18 Nationalities 12 Disciplines
Comments	100% virtual.	Virtual kick-off.	In person kick-off

	Covid-19 pandemic restrictions applied. No competition	In-person conclusion. SANO competition was open to all interested parties including IfS projects.	In-person conclusion. Poster Competition restricted to SANO IfS participants
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During Cohort 2 and 3, competitions with monetary prizes were made available. This was a result of the savings that were realised due to Covid-19 travel and meeting restrictions that were in place in 2020 and 2021. The SANO competition was held during Cohort 2, although this was an open competition not limited only to the SANO IfS teams. A poster competition for the SANO IfS teams was introduced into Cohort 3 (Refer to Annexure E). All teams were automatically entered into the competition and had to motivate how they will spend the prize money to further their research or to implement their research findings.

2.3 SANO Evaluation workshop 3 April 2024

An expert review panel participated in an evaluation workshop that was held on 3 April 2024 in Gqeberha, South Africa. Members of the SANO/IfS Expert review panel are listed in Table 3.

Table 3: SANO/IfS Expert review panel

Affiliation	Name	Role
CSIR	Prof. Linda Godfrey	Chairperson
CSIR	Prof. Suzan Oelofse	Review Report Editor
SST	Ms. Janine Osborne	
Plastics SA	Mr. Douw Steyn	
IWMI	Dr. Henry Roman (formerly DSI)	
NMU	Dr. Jessica Fraser	
NWU	Dr. Claudine Roos	
SST	Dr Stacey Webb	
SST	Ms. Tara Scheckle	Administrative support
NTNU	Prof. Karl Klingsheim	Administrative support

The expert review panel were requested to review the programme based on the following seven questions:

1. What are the main results and lessons learned, positive and negative?
2. How and to whom has IfS made a difference?
3. How can IfS participants be expected to instigate meaningful actions in South Africa?
4. What will it take for these actions to be implemented?
5. What are the weakest links in circular value chains for plastic material in South Africa?
6. How can these circular value chains be strengthened?
7. In future programme designs, which elements should be retained from the IfS experience, and which areas should be considered for improvements?

The workshop started with a presentation by SST providing a brief overview of the three cohorts, including the challenges that were experienced. This was followed by presentations from two participants in the project who shared their experiences as mentors. They also shared feedback from students that they received during as well as at the end of the programme. Lastly, Douw Steyn presented his views on what is needed for the plastics value chain (refer to Annexure F1) and Prof Oelofse presented the findings from CSIR research on plastics (Refer to Annexure F2).

The workshop concluded with a strategic discussion on the potential for the programme going forward.

3 Review of the Interns for Sustainability Programme

This section provides a review of the SANO IfS Programme, including the process followed to recruit participants, to inform future programme designs. This section is structured around specific review questions, providing perspectives from the expert review panel and participants involved in the programme.

Programme participants provided feedback by responding to survey questionnaires at the end of cohort 2 and 3. There was no participant survey soliciting feedback on cohort 1. The detailed survey results are provided in Annexure G.

3.1 What are the main results and lessons learned, positive and negative?

International participation by region is illustrated in Figure 1. Most participants in all three cohorts were South African, followed by Norwegian in second place, but participation was not limited to South African and Norwegian nationals. A significant number of participants were from the rest of Africa, but there were also participants from the rest of the world including Europe, North- and South America, Asia, the Middle East, and Russia. It is reasonable to assume that participants from countries other than South Africa and Norway are international students studying in Norway and South Africa respectively based on the networks that were used

to distribute the invitations. These international participants made up 38.6%, 36% and 38.8% of Cohort 1, 2 and 3 respectively while 8% of participants in Cohort 3 did not disclose their nationality.

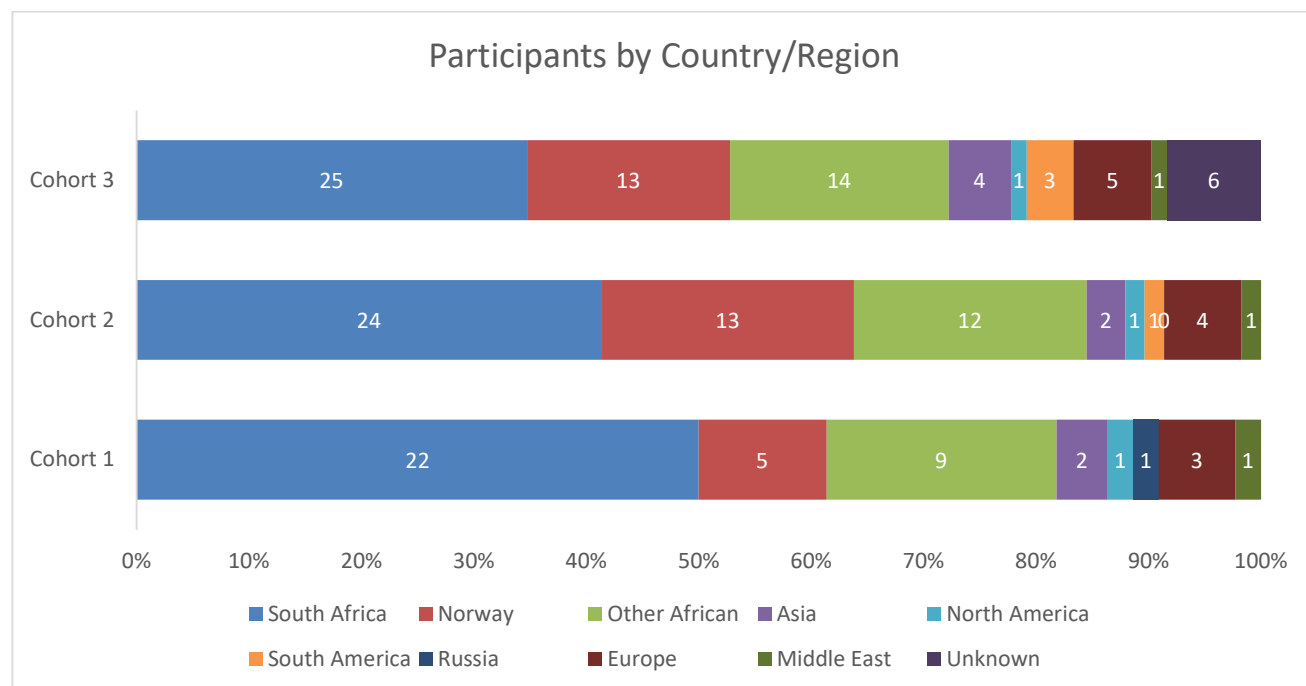


Figure 1: Participants by country/region.

A total of 15 participants were involved in two or more cohorts. Two participants were involved in all three cohorts and 13 participated in two cohorts each. The number of repeat participants between the cohorts is illustrated in Figure 2. Cohort 1 and 2 shared nine participants, Cohort 2 and 3 shared seven, and Cohort 1 and 3 shared three.

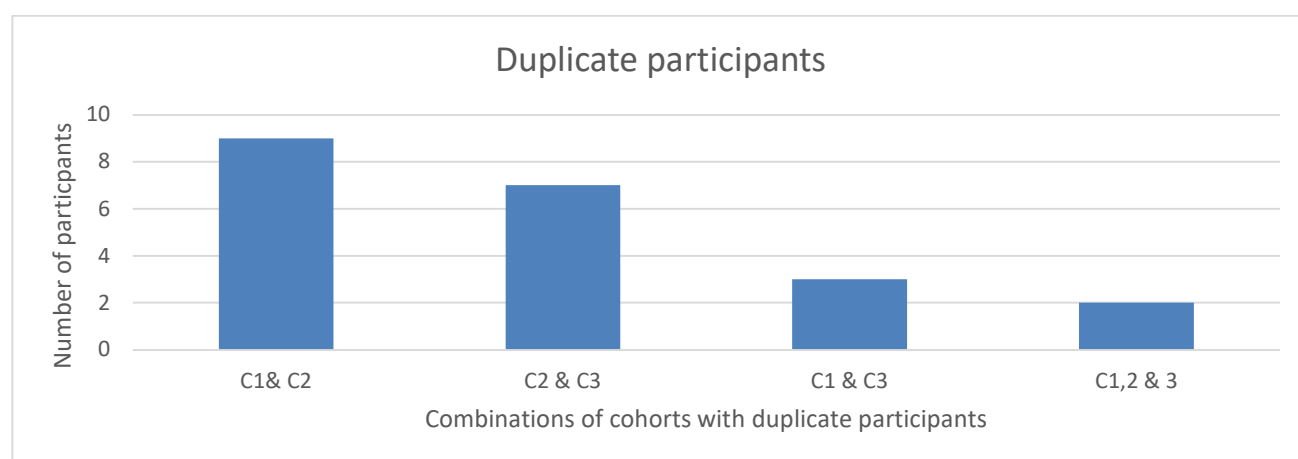


Figure 2: Number of participants with repeat involvement.

The age distribution per cohort is illustrated in Figure 3. The programme targeted the youth, specifically students and early career professionals. Considering that 35 is typically considered the cut-off age when targeting young scientists in South Africa, it can be concluded that the programme was very successful in attracting participants aged 35 and younger. Cohort 1 had 86% confirmed youth involvement, although this number fell to 57% for Cohort 2 and 50% for Cohort 3. However, there was an increasing number of participants not disclosing their age between cohorts 1, 2 and 3 as indicated in Figure 3.

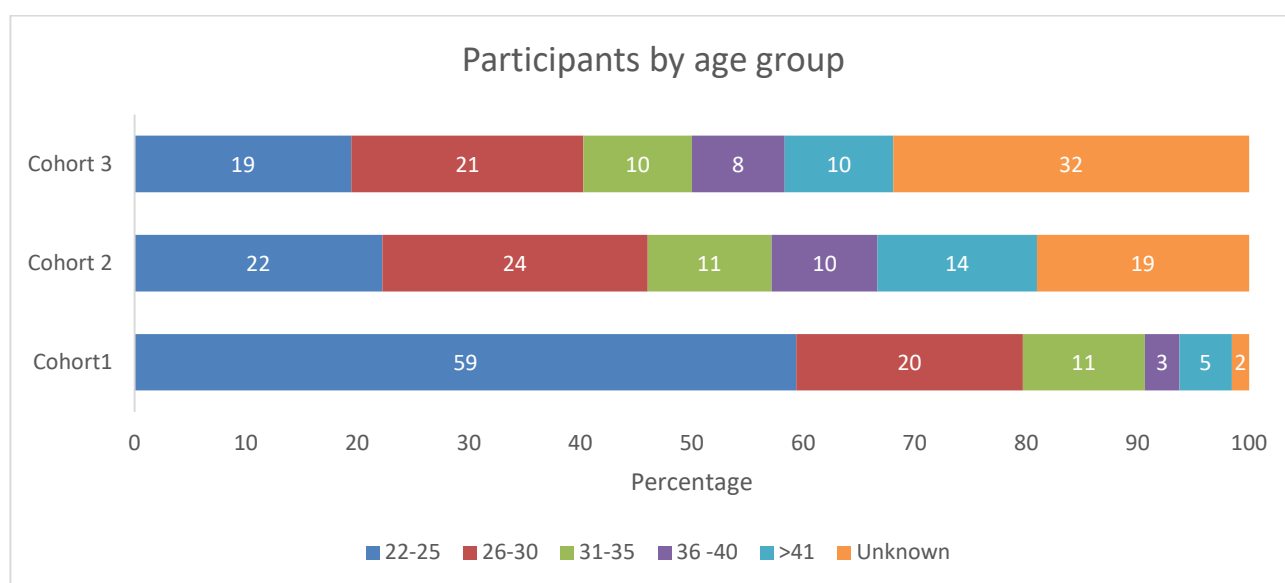


Figure 3: Participants by age group per cohort

It is premature to comment on the success of the programme in meeting the overall objective of producing future business managers, researchers, educators, and government officials in the global fight against plastic pollution. However, the programme was very successful in creating networks, raising awareness on the issue of plastic pollution, and enabling participants to “think globally and act locally” across diverse cultural and legislative environments. Networking is the most frequently mentioned benefit reported by participants, but cultural diversity and involvement of multidisciplinary teams also featured in the feedback. Specific quotes from participants included:

- “Get to interact with South Africans and was interesting to know about the culture”.
- “Interesting insights into the current ocean plastic pollution discussion, getting to know other students/researchers/interested people in the field. I in general think it’s broadening one’s perspective!”
- “The cohort [3] is excellent, we grow as academics and students of life. The projects challenge one to think creatively about difficult problems and try to find solutions.”

- *"Plastic pollution causes a lot more damage to our ecosystem, more than we imagine and it requires a collaborative effort from research in various disciplines to solve the issue."*
- *"I learnt more than I expected about the research process (as a bachelor student). It was so beneficial to be exposed to this process already. I enjoyed the interdisciplinary aspect. I learnt so much about plastic pollution from different avenues."*

Feedback from the experts at the evaluation workshop highlighted the importance multidisciplinary teams, as follows:

- Intellectual cross-disciplinary growth
- Cultural learning and exchange; students who never travelled abroad; strengthen relationships with SST.
- Prize money was spent on research that may never have been done; findings will inspire further impetus; everyone now is a SANO ambassador; questions ethics of SA retailers on use of funds raised from plastics levy.
- Finding solutions to plastic pollution involves several aspects/factors: scientific evidence, understanding behaviour and psychological factors, developing realistic policy, and finding means of implementing policy (economic, social, cultural, behavioural, technological, capacity needs). Creating networks/platforms to contribute to all these factors are very important.
- Understanding consumer needs/behaviour is a good point of departure.
- The expected output from each project was a poster, but not all teams concluded the posters. It should be kept in mind that the projects were not a requirement for their studies and the IfS did not specifically provide incentives for seeing it through to completion.

Cohort 3, group 3F delivered three posters, and plan to write up the findings in a DHET accredited journal.

Positive feedback

Overall, the feedback from all involved is very positive, including comments such as:

"Very good", "very exciting experience", "amazing and engaging", "great experience", "I had a fun time and learned a lot", "a good mix of good vibes between and on groups", and "loved the collaboration with other students and industries".

Some more specific positive feedback shared at the evaluation workshop include:

- Creation of a science-based platform to analyse, sound board, and brainstorm on solutions that are necessary to reduce, eliminate and valorise marine plastic waste.
- Collaborative effort across international borders to combat plastic waste.

- Value of teamwork/group thinking: Each participant had a unique background and set of skills, knowledge, and experience to deliver.
- Drawing conclusions based on findings of a larger group with different opinions.
- Seven SANO groups participated in the 2nd International Africa Marine Waste Network Conference held at the Board Walk Hotel in Port Elizabeth from 23-27 May 2022 through presenting their projects.

Negative feedback

The negative points that were raised, which should be considered for improvement of the programme going forward, include:

- There was a shortage of senior people to act as mentors for the teams.
- No internships were realised, and this may be a result of the programme being interesting, rather than attractive to industry and mentors.
- The invitation was very open and optimistic, resulting in a number of applications seeking funding to support existing projects at universities. This could be addressed by structuring the invitation more as a call and being more specific on what the programme seeks to achieve.
- The time difference in the start and end of the academic year between Norway and South Africa makes it difficult for students to connect and work together, especially if their projects are not directly aligned with the topics of their formal studies.
- The programme should be more results oriented to ensure impact.
- 7-8 months per project is too short for meaningful participation by students.
- The group of collaborators is relatively small in comparison to the plastic pollution problem.
- *"It is mostly an awareness creation platform, whereas, it could have collaborated with funders in implementing some of the innovative ideas created."*

3.2 How and to whom has IfS made a difference?

The programme targeted students and early career professionals, but also involved mentors and others. It is therefore important to consider if and how the programme made a difference. The following comments were made:

- IfS has created meaningful opportunities for networking and collaboration between young scientists/researchers. *"My network with SANO collaborators (Isabel, Nicolas) continues with teaching and learning and further research"*.
- The platform has also created opportunities for students through training, capacity building, and creating research ideas for further post-graduate research.

- IfS has provided opportunities for young scientists/early career researchers to raise awareness on plastic pollution.
- Contribute to new ideas and stimulating conversations.
- Networking opportunity for individuals across borders with different backgrounds.
- Different cohorts focused on different areas – including rural and underdeveloped areas.
- Travelling and working together influenced the perspective of plastic pollution amongst different demographic groups (Global North vs Global South).
- It is from these realisations that area-specific solutions are derived, and credible solutions are developed.
- IfS contributed to future research areas/ideas (PhD/MSc research).
- In the long run, the outcomes of IfS will benefit a broad range of people – if action is taken and measures are implemented.
- The programme provided an opportunity for overseas travel to participants who have never travelled before.

3.3 How can IfS participants be expected to instigate meaningful actions in South Africa?

The impact of the programme will be strengthened if action can be realised based on the findings and experience gained through IfS. The following suggestions were made by experts at the evaluation workshop:

- IfS has created a platform and opportunities to research specific areas of concern. The research may have generated findings for which solutions may be implemented. As far as possible, research findings should be shared with policy-makers, private institutions, the public and academic institutions.
- The research may also have highlighted new knowledge/research gaps, which should be added to the research agenda.
- Continuing to explore the research agenda/aspects set as part of the IfS process.
- Raising awareness through publishing research findings.
- Creating and implementing science-based solutions.
- Building on newly established networks and seek future collaboration opportunities.
- Sharing research focus areas/agendas with post-graduate students to further encourage research on plastic waste.

3.4 What will it take for these actions to be implemented?

The response from the experts at the evaluation workshop included the following:

- Involving the **correct stakeholders** is key towards implementing actions/solutions.
- **Funding** for further research or implementation of actions.
- **Collaboration** between different institutions (different expertise and focus areas).
- **Sharing research findings** through public engagements, conferences, and meetings/platforms with policymakers.
- Obtaining **funding** for further research and the implementation of viable solutions.
- Creating **platforms for stakeholders** to share meaningful findings and plan possible solutions.
- **Collaborating with industry/entrepreneurs** will create a “*private market*” that is committed to implementing meaningful solutions”.
- Share the **research agenda** and communicate ongoing **research opportunities**.

3.5 What are the weakest links in circular value chains for plastic material in South Africa?

Experts at the valuation workshop identified the following as weak links in circular plastics value chains in South Africa:

- There are still different interpretations as to what a circular economy means. Many still consider circular economy as waste management interventions rather than the required system change that it calls for.
- Demand reduction and substitution with more environmentally sustainable alternatives.
- Collection of source separated waste and recycling rates must be improved.
- Collection of non-recyclable plastics and safe disposal in sanitary landfills are required.
- The majority of interventions focus on end-of-pipe, whereas system wide interventions are lacking.
- Although we have an aspirational/visionary policy framework towards the avoidance/reduction of waste, implementation thereof is mostly lacking.
- Plastic products are rarely designed with a specific end-use in mind – the design/manufacturing of imported products may be difficult to influence/control.
- Influencing and changing consumer behaviour may be one of the weakest links in the circular value chain for plastic materials.
- The lack of infrastructure to reuse and recycle different types of plastic materials (at a municipal level).
- Human behaviour – purchasing of plastics, and no separation at source.
- Incentives to participate in “good/positive behaviour” are insufficient.
- *“As much as plastics are harmful to the environment, they are equally useful, cost effective and, thus, unavoidable. South Africa has progressed in the plastic recycling efforts, especially through informal waste picker associations. However, the challenge lies in the non-recyclable plastics. There is need*

for public-private partnerships to create opportunities to divert non-recyclable plastics from landfill...Public awareness is a weak link at present.”.

3.6 How can these circular value chains be strengthened?

The following suggestions were offered at the evaluation workshop held in April 2024 in Gqeberha (Port Elizabeth), South Africa:

- By finding solutions that focus on all aspects of the plastics value chain – scientific, environmental, economic, social, cultural, behavioural, technological, etc. This can only be done through the collaboration of the correct stakeholder groups.
- Investing in infrastructure to separate waste at source and to recycle the different types of plastics.
- *“Rewarding”/incentivising plastic avoidance/re-use/recycling.*
- Implementing the "Pant" system/deposit refund schemes for plastics in all areas in South Africa.
- Creating awareness (start at schools) to change behaviour.
- *“Encourage collaboration among stakeholders along the value chain, including waste collectors, recyclers, manufacturers, retailers, and policymakers; promote the design of products with circularity in mind, focusing on recyclability, reusability, and waste reduction”.*

3.7 In future programme designs, which elements should be retained from the IfS experience, and which areas should be considered for improvements?

This section synthesises the feedback from the evaluation workshop and the from the participants, as follows:

- The SANO IfS programme has created a wonderful platform for collaboration between South African and Norwegian researchers.
- Aspects to consider in future:
 - Extend the reach of SANO beyond SA and Norway only to include more African and Scandinavian countries.
 - Extend the scope of projects to focus on aspects such as governance and policy implementation, as well as social/behavioural studies.
 - *“I think the research projects and event was well orchestrated but, more action should be taken from the research generated from the cohorts.”*
 - *“It is important to push the best ideas into practise.”*
 - *“One improvement that can be made is to have a balance between social science and environmental science projects”.*

- Research objective for short-term or long-term solutions (missing the local government involvement); fostering sustainability in the community beyond project duration.
- *“The programme is already very successful, there is nothing that I would recommend should change.”*
- The 3rd cohort ran well and there is some good learning from there.
- Adjust the timing to better align with the academic year in Norway and South Africa
- Allow more time per cohort, perhaps have fewer participants, and manage the programme more strongly.
- Emphasize the need for twinning of seniors (one senior person from each country) for each project.
- Find two seniors that enjoy working together to provide guidance and momentum at the expense of diversity.
- Make sure that the mentors do their job and that they keep to their promises made to the SANO groups.

3.8 Indications on how future projects’ focus on value chain gaps could be assessed

The following suggestions were made at the evaluation workshop or extracted from the participant surveys:

- Future projects may focus on evaluating the effectiveness of specific plastic pollution interventions.
- Piloting interventions suggested by Cohort 1 to 3 projects.
- *“Implement small, realistic projects and assess/evaluate their effectiveness”.*
- *“In the future, the groups need to be allowed to submit business plans, where the most effective solutions can be rewarded with a full or partial “implementation/pilot” fund. The idea here is to identify and capacitate ideas that can be replicated and rolled out especially in the areas that require employment creation etc. In this case, event organisers may include public and private funders, accelerators, and incubators.”*
- *“I would like to see solution-based projects that focusing on problems that require research in respective fields of study”.*

4 Recommendations for future

The potential for this programme lies in:

- building capability and awareness.

- Domesticating global north ideas and solutions to the African context (realism - appropriate solutions) and exposing young African professionals to best available practices.

If the aim of the programme is to have impact and specifically strategic impact, then the initiative must be moved out of the hands of the students and into the hands of the mentors (universities) and be more aligned with problem solving.

The suggested way forward is to make the programme more attractive to senior people that could act as mentors for the youngsters. Therefore, the following is recommended:

- A workshop of mentors working in plastic to build partnerships to facilitate future submissions:
 - Build partnerships.
 - Ensure alignment with specific research focus areas that students will work on as part of their studies.
 - Focus areas – impact focused areas as opposed to general environmental topics.
 - Upstream – product design, alternative delivery methods, elimination
 - Downstream – improved waste management, unlocking reuse/recycling.
- There is an opportunity to extend the duration of each cohort beyond one year.
 - The first year could focus on science and followed by implementation realising impact.
- Entrepreneurship should also be encouraged and strengthened through this programme, to allow participants opportunities to start their own businesses, especially in South Africa where job opportunities are limited.
- Include a science communication programme (cohort) who are tasked to produce short, impactful videos (YouTube, WhatsApp) that profile the project outcomes – building the next generation of science writers/communicators.

Annexure A: Sustainable Seas Trust (SST)

A1. Overview of the SST

Sustainable Seas Trust is a science-based organisation working to protect Africa's seas and communities for the benefit of all who live on the continent. We empower individuals, organisations, and communities to become passionate, involved and committed custodians of Africa's seas through an Africa-wide network empowered by research, education, economic upliftment, and collaboration. We aim to achieve six UN Sustainability Goals; Goal 4, ensure inclusive, equitable quality education and learning opportunities for all; Goal 8, promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Goal 11, working towards sustainable cities and communities; Goal 12, ensuring sustainable consumption and production patterns; Goal 14, to conserve and sustainably use the oceans, seas and marine resources for sustainable development; and Goal 17, partnering for the sustainable development of these goals. By sharing knowledge, resources and expertise and inspiring co-operation and collaboration, SST enables people across Africa to work towards and drive the blue economy for the long-term wellbeing of all who live on the continent. By empowering people across Africa to come together to value and care for her seas, SST works to ensure a thriving sustainable future for all its people.

A2. SST involvement in SANO IfS programme

Sustainable Seas Trust (SST) is a science and education-based organisation focused on creating networks of empowered and passionate individuals and organisations across Africa. SST is committed to valuing, caring for and safeguarding our seas for all who depend on them for their livelihood, their health and their enjoyment. As a registered international charitable trust, an NPO and PBO, SST operates exclusively for scientific, educational, socio-economic, and philanthropic purposes to benefit the people of Africa and the resources upon which they depend. It is driven by passionate individuals.

SST has been collaborating with NTNU for the last three years in the coordination of the South African–Norwegian (SANO) Interns for Sustainability Exchange Programme. The African Waste Academy (AWA) at SST includes our e-learning platform, webinars, as well as student exchange. The overlap with the SANO programme provides a wonderful opportunity to facilitate investigative curiosity into the multitude of plastic pollution facets and innovative approaches to address issues surrounding plastic pollution. Understanding waste in different international contexts is integral to the development of sustainable approaches. The multi-disciplinary aspect of the programme brings greater credence to its impact and lasting influence.

Despite the limitations that COVID-19 imposed on the initial running of the programme, three cohorts have shown a strong interest from South African-based participants. The activities of the first cohort (November 2020 – June 2021) were limited to online interactions, which SST was able to facilitate from a technical side. This did have its drawbacks as a large part of the perceived appeal of the programme is to travel, and online

platforms do not typically offer the same level of engagement or injection of energy that in-person interactions facilitate. The second cohort (October 2021 – May 2022) did offer more in this regard, and feedback from some participants and mentors indicated that the opportunity to present on a conference stage was a great opportunity for students to gain experience. From our experience, the third cohort (November 2022 – August 2023) – especially the ability to host an in-person kick-off workshop (December 2022) – saw the highest level of engagement, and groups seemed more invested in their activities across the board.

Some of the main challenges have been keeping participants engaged for the full duration of the cohorts as there seems to be a lull in the interleading months between workshops, despite the webinar series and check-in meetings designed to maintain contact and momentum. There have also been instances where team members have not felt that all group members participated to the same degree as others. While this is certainly not ideal, it is not an uncommon challenge with students and does provide additional experience to the group coordinators in terms of managing group dynamics. In other cases, certain members who did not take on an instigative role, still benefitted from the participation, and their experience in the SANO cohort helped inform their own thesis at a South African University.

South Africa's privacy laws under the Protection of Personal Information Act (POPIA), have very strict governance when dealing with people and their personal information. This has an effect on research projects that operate in South Africa, as they need clearance from an Ethics body to ensure that vulnerable individuals are not exploited. As such, SST has an internal Ethics Committee which evaluates each project based on how ethically (and scientifically) sound it is. SST's Ethics Committee was utilized to provide input on surveys that groups were planning. While many of the applications were straightforward, in some cases, it did provide an opportunity to suggest amendments to planned activities and offer further mentorship assistance when additional expertise became available.

Many lessons have been learnt over the last three years, and particularly during the third cohort as it was the first opportunity to run the full programme as intended. While it has been an overwhelmingly positive experience for both the participants and SST, there are a number of areas that could be addressed to improve future cohorts, including continued engagement in between kick-off and conclusion workshops, as well as an increased drive to incorporate mentors who are active in industry or organisations as opposed to a more academic focus.

The SANO Interns for Sustainability programme has provided incredible learning opportunities for many of the participants, some of whom had never flown on an airplane before, let alone gone beyond the borders of their country. The programme offers an incredible opportunity to gain perspective on the global nature of a problem as pervasive as plastic pollution. This shared experience, as well as the multinational and multi-disciplinary approach, have incredible potential to solve pollution challenges.

Annexure B: South African Waste Research Development and Innovation Roadmap

The Waste Research Development and Innovation (RDI) Roadmap was developed by the then South African Department of Science and Technology (now Department of Science and Innovation) as a 10-year roadmap to guide RDI interventions in South Africa. The project was undertaken in three phases as follows:

1. **Trend Analysis** reviewed the global and local context for waste, in terms of trends and their evolution. During three regional trends workshops, five waste streams – Municipal, Organic, Plastics, WEEE and Tyres – were prioritised by stakeholders. Structured analysis provided a starting basis from which to conduct more detailed analysis.
2. This second phase drove towards scored **Opportunity Evaluation** for these prioritised Waste Streams with respect to Attractiveness and Fit. With inputs from experts, the Attractiveness of Prioritised Waste Streams was first evaluated in a structured and consistent manner on the dimensions of Customer Need, Market Opportunity, as well as the potential Value and Impact that attaches to successful realisation of Customer Need. Next, the RDI Potential was identified through structured drill-down of the Value Chain for each Waste Stream.

In the Opportunity Evaluation, the Assessment of Fit - which covers the likelihood with which South Africa can realise the Opportunity through the contribution of identified RDI Potential - was based on a 2014 survey that mapped the emerging RDI landscape for waste to understand the foundation of research capability. From this output, the identified RDI Potential across all five waste streams was grouped into six RDI Clusters. High level RDI interventions were developed by cluster.

3. The third phase of the project developed these Interventions into a set of actionable plans and investment requirements.

More detail on the roadmap is available at <https://wasteroadmap.co.za/>

Research reports related to plastic waste funded under the Waste RDI Roadmap are available at <https://wasteroadmap.co.za/research/research-projects-plastic-waste/>

Annexure C: Invitations to participate in the SANO IfS programme

C1. Invitation to participate in cohort 1.



NORWAY AND SOUTH AFRICA EXCHANGE PROGRAMME

Calling on master's students, doctoral students and young researchers to work together across academic, social, geographic, cultural and legislative boundaries on combating plastic waste and preventing marine pollution.

The pilot project will engage +/- 30 participants (and their supervisors) forming 8-10 small working groups. Each group will focus on a relevant issue relating to plastic pollution and work towards a multi-disciplinary solution.

The sub-projects of the pilot will:

- Have a clear focus on a particular aspect of ocean plastic waste.
- Engage 4-6 participants working on individual assignments at their home institution.
- Leverage a relationship with industry and businesses in both countries, providing "real-life" challenges and motivation to find sustainable solutions, for hosting the participants, and for disseminating the results.
- Benefit from a coordinating "body" or liaison to facilitate sharing of information and networking – aiming to ensure that the combined effort of individual assignments contributes to the overall aim of the pilot project.
- Contribute to the overall aim of the pilot project by encouraging liaisons to share information and forge networking in and between the working groups.

WHO CAN PARTICIPATE
South African and Norwegian master's students, doctoral students, and young researchers.

WHEN
The programme will begin digitally in November 2020, followed by a week of introductory workshops in South Africa early 2021, then ± 5 months of remote work, ending with a concluding week in Norway midyear 2021. The digital programme will include a meet and greet, review of the challenges, and formation of sub-groups to streamline the project operations from January 2021.

WHERE
The kick-off week will be hosted in South Africa and the concluding workshop in Norway. The necessary expenses for travel, excursions and accommodations will be paid for by The Norwegian Retailers' Environment Fund. *Should travel restrictions persist due to Covid-19 we will evaluate and adjust the programme accordingly.*

APPLICATION DETAILS

- Applications forms to be sent to karl.klingsheim@ntnu.no by 30 September 2020.
- Application to be accompanied by a letter of support by supervisor.
- Indicate the preferred section of study and brief description of expected outcomes.

For more information contact Prof. Karl Klingsheim (karl.klingsheim@ntnu.no) or Tara Scheckle (tara@ssstafrica.org.za) or [click here](#).



C2. Invitation to participate in cohort 2.



NORWAY & SOUTH AFRICA EXCHANGE PROGRAMME

Calling on master's students, doctoral students and young researchers to work together across academic, social, geographic, cultural and legislative boundaries on combating plastic waste and preventing marine pollution.

The second year of the programme will engage a new group of participants (and their supervisors) from South Africa and Norway to work towards multi-disciplinary solutions to plastic pollution. Participants will work in small groups, where each group will focus on a specific, predetermined topic relating to a particular aspect of ocean plastic waste. Each group will have a coordinating member and a combination of nationalities to promote networking and collaboration while participants work individually at their home institutions.

Applications forms (available on the SST and NTNU website) to be sent to karl.klingsheim@ntnu.no by **10 September 2021** and accompanied by a **letter of support** by supervisor or manager. Applications should indicate the **top three topic choices** and include a **brief description of expected outcomes**.

WHEN The programme will begin digitally in October 2021, followed by ± 5 months of remote work, concluding with poster presentations at the AMWN's Towards Zero Plastics to the Seas of Africa conference in Nelson Mandela Bay, South Africa in May 2022. The digital programme will include a meet and greet, review of the challenges, and formation of working groups.	WHERE The kick-off workshop will take place virtually with the concluding, in person workshops in South Africa in May 2022. Travel, excursion, and accommodation expenses will be sponsored by The Norwegian Retailers' Environment Fund. Should travel restrictions persist due to Covid-19 we will evaluate and adjust the programme accordingly.	WHO CAN PARTICIPATE South African and Norwegian master's students, doctoral students, and young researchers.
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APPLICATION DETAILS

For more information contact Prof. Karl Klingsheim (karl.klingsheim@ntnu.no) or Tara Scheckle (tara@sstafrica.org.za)

TOPIC CHOICES
Please select your top three choices:

Support data collection for the MariLCA -Developing guidelines for companies that want to change/eliminate certain plastic materials | Cradle to cradle: Promoting environmentally conscious decision making in the production of plastics and plastic alternatives | Investigating the Plasticsphere: Understanding opportunities and threats of bacteria on plastics in estuaries | Further investigation into the toxicity of various recycled plastics and their potential effects on the environment | Extended Producer Responsibility | Plastic Hotspotting | A quantitative analysis of fishing gear waste from beaches in (South Africa/Norway). | Monitoring changes in recreational fishing gear waste along beaches in (South Africa/Norway). A feasibility study for the use of fishing lines bins | The impact of ocean pollution on climate change | The impact of future climate change mitigation scenarios on Ocean Pollutants the potential for co-benefits. | Design of a low-cost automated garbage collecting system | The Effectiveness of nudges in addressing plastic pollution crises in Africa | Impact of COVID-19 on ocean pollution and relation of industry and the community to plastic pollution | Successful plastics messaging on social media






C3. Invitation to participate in cohort 3.



NORWAY & SOUTH AFRICA EXCHANGE PROGRAMME

Calling on master's students, doctoral students and young researchers to work together across academic, social, geographic, cultural and legislative boundaries on combating plastic waste and preventing marine pollution.

The third year of the programme will engage a new group of participants (and their supervisors) from South Africa and Norway to work towards multi-disciplinary solutions to plastic pollution. Participants will work in small groups, where each group will focus on a specific, predetermined topic relating to a particular aspect of ocean plastic waste. Each group will have a coordinating member based in Norway, and South Africa and a combination of nationalities to promote networking and collaboration while participants work individually at their home institutions.

Application deadline: 23:59 on 24 October 2022

Application to be submitted to Prof Karl Klingsheim by midnight on 24 October 2022. For more information and application forms, please see www.ntnu.edu/oceans/actionoceanplasticwaste or www.sst.org.za/events.


karl.klingsheim@ntnu.no


tara@sstafrica.org.za






Annexure D: Webinars presented as part of the SANO IfS programme

D1. Webinars presented during cohort 1.



THE VALUE OF WASTE: INSIGHTS FROM AFRICA

WEDNESDAY, 3 FEBRUARY 2021 | 11:15 (GMT+2)

TO JOIN THE LIVE EVENT
PLEASE USE THE ZOOM
REGISTER LINK IN BIO

FOLLOW US: [YouTube](#) [Facebook](#) [Twitter](#) [LinkedIn](#) [Instagram](#)

PROF LINDA GODFREY
Principal scientist at the Council for Scientific and Industrial Research

THE AFRICA WATER AGENDA PRESENTS
SANO SUSTAINABILITY WEBINAR SERIES

CSIR AFRICAN RESEARCH NETWORK NTNU Norwegian Research Programme for Sustainable Development



SOUTH AFRICA'S NATIONAL PLASTICS HOT SPOTTING: A BASIS FOR ACTION

WEDNESDAY, 10 FEBRUARY 2021 | 11:15 (GMT+2)

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PETER MANYARA
Manager, Waste and Environmental Control, KwaZulu-Natal, South Africa

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HUMAN DIMENSION OF PLASTIC POLLUTION

WEDNESDAY, 17 FEBRUARY 2021 | 11:15 (GMT+2)

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DR ISABEL RICHTER
Head of research in environmental health and safety, Nestlé R&D

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SANO SUSTAINABILITY WEBINAR SERIES

CSIR AFRICAN RESEARCH NETWORK NTNU Norwegian Research Programme for Sustainable Development



BOTTLES, LIDS AND THE LOCKDOWN

WEDNESDAY, 24 FEBRUARY 2021 | 11:35 (GMT+2)

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PETER RYAN
Director of the Perinatal Institute of African Ombiology, Professor at the University of Cape Town

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CSIR AFRICAN RESEARCH NETWORK NTNU Norwegian Research Programme for Sustainable Development



**OPERATION CLEAN SPOT
A PROGRAMME OF THE
AFRICAN MARINE
WASTE NETWORK**

WEDNESDAY, 3 MARCH 2021 | 11:15 (GMT+2)

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LESLEY BLOY
Project Manager/Coordinator Clean Spot

THE AFRICAN WATER ACADEMY PRESENTS
SANO SUSTAINABILITY WEBINAR SERIES

CSIR AFRICAN MARINE WASTE NETWORK NTNU Norwegian University of Science and Technology Norwegian Research Programme for Environment and Development



**DEVELOPING EPR POLICY
RECOMMENDATIONS FOR
PLASTIC PACKAGING**

WEDNESDAY, 10 MARCH 2021 | 11:15 (GMT+2)

TO JOIN THE LIVE EVENT
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LORREN DE KOCK
Circular Plastics Strategy in WWR South Africa

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**WORKING TOWARDS INTEGRATING
THE IMPACTS OF MARINE PLASTIC
POLLUTION INTO LIFE CYCLE
ASSESSMENT: ATLANTIS AND
THE MarILCA INITIATIVE.**

WEDNESDAY, 17 MARCH 2021 | 11:15 (GMT+2)

TO JOIN THE LIVE EVENT
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FRANCESCA VERONES
Professor in the Institute for Energy and Environment at NTNU

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**THE PLASTIC REVOLUTION
FOUNDATION: DEVELOPING
COMMERCIALY VIABLE
PLASTIC SOLUTIONS**

WEDNESDAY, 24 MARCH 2021 | 11:15 (GMT+2)

TO JOIN THE LIVE EVENT
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SELMA SKOV HØYE
Strategy Advisor Plastic Revolution Foundation

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CSIR AFRICAN MARINE WASTE NETWORK NTNU Norwegian University of Science and Technology Norwegian Research Programme for Environment and Development

D2. Webinars presented during cohort 2.

02 FEB 2022

PARITOSH DESHPANDE

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Registration details also available on SST Events page

PARITOSH DESHPANDE
ASSOCIATE PROFESSOR AT THE NORWEGIAN
UNIVERSITY OF SCIENCE AND TECHNOLOGY

**PLASTIC POLLUTION FROM THE
FISHING SECTOR IN NORWAY:
IMPACTS AND MANAGEMENT**

WEDNESDAY, 02 FEBRUARY 2022 | 11:15 (GMT+2)

IF YOU HAVE ANY ISSUES, CONTACT WEBINARS@SSTAFRICA.ORG.ZA

WWW.SSTAFRICA.ORG.ZA

09 FEB 2022

ANNABE PRETORIUS

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ANNABE PRETORIUS
PLASTIX801

**PLASTIC WASTE
VALUE CHAIN**

WEDNESDAY, 09 FEBRUARY 2022 | 11:15 (GMT+2)

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16 FEB 2022

TORMOD STEEN

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TORMOD STEEN
PROJECT LEADER AT OCEANIZE

**CAPTURING THE VALUE OF
MARINE PLASTIC WASTE**

WEDNESDAY, 16 FEBRUARY 2022 | 11:15 (GMT+2)

IF YOU HAVE ANY ISSUES, CONTACT WEBINARS@SSTAFRICA.ORG.ZA

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23 FEB 2022

BETTIE CORMIER

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BETTIE CORMIER
POSTDOCTORAL FELLOW AT THE NORWEGIAN
UNIVERSITY OF SCIENCE AND TECHNOLOGY

**ECOTOXICOLOGICAL IMPACTS
OF MICROPLASTICS ON
AQUATIC ORGANISMS**

WEDNESDAY, 23 FEBRUARY 2022 | 11:15 (GMT+2)

IF YOU HAVE ANY ISSUES, CONTACT WEBINARS@SSTAFRICA.ORG.ZA

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02 MAR 2022

HENK BOUWMAN
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Registration details also available on SST Africa page



HENK BOUWMAN
PROFESSOR AT THE NORTH WEST UNIVERSITY

**MACRO - AND MICROPLASTIC
RESEARCH IN THE INDIAN OCEAN:**
REPORTS FROM CORAL REEF ISLANDS AND OPEN OCEAN

WEDNESDAY, 02 MARCH 2022 | 11:15 (GMT+2)

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09 MAR 2022

INGUN GRIMSTAD KLEPP
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Registration details also available on SST Africa page



**INGUN GRIMSTAD KLEPP
& TONE TOBIASSON**
PROFESSORS AT THE UNIVERSITY OF BERGEN, NORWAY

**PLASTIC TEXTILES &
FOSSIL FASHION**

WEDNESDAY, 09 MARCH 2022 | 11:15 (GMT+2)

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WWW.SSTAFRICA.ORG.ZA

16 MAR 2022

CAMERON SERVICE
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Registration details also available on SST Africa page



CAMERON SERVICE
CEO AT THE LITTERBOOM PROJECT

**THE LITTERBOOM PROJECT
FROM SOURCE TO SEA**

WEDNESDAY, 16 MARCH 2022 | 11:15 (GMT+2)

IF YOU HAVE ANY ISSUES, CONTACT WEBINARS@SSTAFRICA.ORG.ZA

WWW.SSTAFRICA.ORG.ZA

23 MAR 2022

DESHANYA NAIDOO
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Registration details also available on SST Africa page



DESHANYA NAIDOO
CIRCULAR ECONOMY ANALYST AT
GREENCAPE & THE SA PLASTICS PACT

**THE SA PLASTICS PACT-
A COLLABORATIVE APPROACH TO CREATING
A CIRCULAR ECONOMY FOR PLASTICS**

WEDNESDAY, 23 MARCH 2022 | 11:15 (GMT+2)

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30 MAR 2022

MURAT V. ARDELAN

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Registration details also available on SST Events page

MURAT V. ARDELAN
PROFESSOR IN MARINE BIOGEOCHEMISTRY AT THE NORWEGIAN
UNIVERSITY OF SCIENCE AND TECHNOLOGY

WE LINK THEREFORE WE ARE:
SAILING 4 SCIENCE - A BOTTOM-UP INITIATIVE FOR OCEAN RESEARCH

WEDNESDAY, 30 MARCH 2022 | 11:15 (GMT+2)

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06 APR 2022

CHRISTOFFER VESTLI

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[REGISTER HERE](#)

Registration details also available on SST Events page

CHRISTOFFER VESTLI
INTERNATIONAL RELATIONS OFFICER AT
THE EUROPEAN COMMISSION

**ADDRESSING PLASTIC POLLUTION
FOLLOWING THE UNEAS MILESTONE
TOWARDS A NEW GLOBAL AGREEMENT ON PLASTICS**

WEDNESDAY, 06 APRIL 2022 | 11:15 (GMT+2)

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D3. Webinars presented during cohort 3.

SANO SUSTAINABILITY SERIES 2023

**SUSTAINABILITY
IN AQUACULTURE**

WEDNESDAY

01

FEBRUARY

11:15 (GMT+2)

[REGISTER HERE](#)

JOSTEIN IVERSEN
Global Sustainability Advisor at Grieg Seafood

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SANO SUSTAINABILITY SERIES 2023

**GOVERNING PLASTICS:
THE UN TREATY TO
END PLASTIC
POLLUTION**

WEDNESDAY

08

FEBRUARY

11:15 (GMT+2)

[REGISTER HERE](#)

EMILY COWAN
Research Scientist at SINTEF Ocean

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SANO SUSTAINABILITY SERIES 2023

WEEK 3

A THERMOCHEMICAL APPROACH TO WASTE PLASTIC MANAGEMENT

WEDNESDAY
15
FEBRUARY
11:15 (GMT+2)

PROF YUSUF ISA
Associate Professor at Wits University

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SANO SUSTAINABILITY SERIES 2023

WEEK 4

A MULTI-FACETED APPROACH TO ESTUARY CONSERVATION

WEDNESDAY
22
FEBRUARY
11:15 (GMT+2)

DALE CLAYTON
Operations Manager at Zwerfhoek Conservancy

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SANO SUSTAINABILITY SERIES 2023

WEEK 5

GREEN CORRIDORS' WASTE MATERIAL COLLECTION AND BENEFICIATION PROGRAMME

WEDNESDAY
01
MARCH
11:15 (GMT+2)

JONATHAN WELCH AND MUSASHANGE SHANGE
Technical Expert: KwaMashu Materials Beneficiation Centre
Coastal & Waste Management Project Officer

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SANO SUSTAINABILITY SERIES 2023

WEEK 6

EDUCATION FOR SUSTAINABLE DEVELOPMENT - HOW MARINE PLASTIC LITTER POLLUTES NATURE

WEDNESDAY
08
MARCH
11:15 (GMT+2)

HILDE ERVIK
Senior Lecturer, NTNU

[REGISTER HERE](#)

TO JOIN THE LIVE EVENT, PLEASE CLICK THE ZOOM REGISTRATION LINK

SANO SUSTAINABILITY SERIES 2023

CIRCULAR PLASTIC IN MARINE ENVIRONMENTS

WEEK 7

WEDNESDAY
15
MARCH
11:15 (GMT+2)

HANNE DIGRE
Chief Sustainability Officer at Scale AQ

[REGISTER HERE](#)

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SANO SUSTAINABILITY SERIES 2023

PORTABLE CATAMARAN DRONES FOR REMOTE SAMPLING OF MICROPLASTICS

WEEK 8

WEDNESDAY
22
MARCH
11:15 (GMT+2)

ANDREA FALTYNKOVA AND ARTUR ZOLICH
Doctoral Student at Norwegian University of Science and Technology / Embedded Systems Developer at Norwegian University of Science and Technology

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SANO SUSTAINABILITY SERIES 2023

THE CIRCULAR ECONOMY: FROM POLICY TO IMPLEMENTATION

WEEK 9

WEDNESDAY
29
MARCH
11:15 (GMT+2)

JAMHILA BALBUT (FOUNDER & CEO TOMA-NOW), PHILIPWE MTHAMBU AND SILINDOKUHLE MOYOLOLO (SUSTAINABILITY CONSULTANT) at TOMA-NOW

[REGISTER HERE](#)

TO JOIN THE LIVE EVENT, PLEASE CLICK THE ZOOM REGISTRATION LINK






Annexure E: SANO poster competition



SANO POSTER COMPETITION



STAND A CHANCE TO WIN A CASH PRIZE OF NOK 100 000

Four-member teams (2 from South Africa + 2 from Norway) are invited to compete for funding for specific actions that in some way, shape, or form contribute to the mission of the Norwegian Retailers' Environment Fund:

*Together, we will solve the environmental issues due to plastics!
We are Norway's largest private environmental fund, and support projects that reduce plastic pollution, increase plastic recycling, and reduce the consumption of plastic bags.*

The winning team will receive a **CASH PRIZE OF NOK 100 000** (at present ZAR 179 000) and the runner-up NOK 10 000 for advancing their concept and/or implementing their plan during the remainder of 2023.

DEADLINE FOR ENTERING

17AUG23

AT 12:00 NOON

WINNERS WILL BE ANNOUNCED

18AUG23

DURING THE SANO CONCLUDING CONFERENCE

MORE INFORMATION ON HOW TO APPLY AND ASSESSMENT CRITERIA ARE AVAILABLE AT
<https://www.ntnu.edu/web/marine/sano-concluding-conference>

Annexure F: Presentations from the Evaluation Workshop

F1: SA Plastic Industry by Douw Steyn



1



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16



17



18

Plastic Makers/Converters

Plastic maker/converter actions will contribute to key elements: #1 Global Measures & Actions, #3 Public-Private Partnerships, #4 Guidance, #5 Capacity Building, #6 Pellet Containment.



- Create plastics and design products based on circular and sustainable principles, focused on reuse and recyclability of plastics
- Partner and invest across the plastics ecosystem to secure greater access to used plastics, to enable circular feed stocks in the production of plastics and to increase recycled content in plastic products
- Develop ambitious rates and dates for circularity goals
- Design/utilise additives in plastics using sustainable chemistry principles that enable broad recycling support increased transparency on additives across the value chain
- Participate in certified program to prevent plastic pellet/materials loss throughout the value chain

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19

Financial Institutions

Financial institution actions will contribute to key elements: #3 Public-Private Partnerships, #5 Capacity Building.



- Support with investments to unlock plastics collection, sorting and recycling technologies
- Set up managed funds focused on accelerating the circular economy

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20

Brands/Retailers/Users of Plastics

Brand/retailers/users of plastics actions will contribute to key elements: #4 Guidance, #5 Capacity Building.



- Choose materials based on a life-cycle approach that reduce the total environmental footprint, including, where appropriate alternative solutions to single-use plastics
- Design products/packaging based on circular and sustainable principles, including use of recycled plastics and recyclable products
- Promote advanced labeling systems and EPR (extended producer responsibility) systems to improve collection, sorting and recycling

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21

Recyclers/Waste Management

Recycler/waste management actions will contribute to key elements: #4 Guidance, #5 Capacity Building, #6 Pellet Containment.



- Increase plastics recycling yields, reliability and quality through technology advancements in collection, sorting, and recycling
- Help create markets for post-use plastics
- Participate in certified program to prevent plastic pellet/materials loss (reprocessors)

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22

Scientific/Academic Institutions

Academic/scientific institution actions will contribute to the key element: #4 Guidance.



- Conduct environmental footprint studies on the life cycle of plastics compared to alternative materials
- Conduct research on creating behaviour change at all points in the plastics ecosystem
- Research new business models and paradigms
- Conduct research on micro-plastics; develop standardised monitoring/reporting methodology

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23

We all have a role to play in the Plastics value Chain !!!



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24



South African Strategy to reduce plastic pollution

Applying the "Pathways tool" to South Africa demonstrates that no single strategy will effectively address the plastic pollution problem, but a 63% reduction in plastic pollution by 2040 as compared to business as usual could be achieved through a system change involving the following intervention strategies:

Intervention	What does it mean?	Target per annum
Reduce demand and substitute	Reduce, eliminate, alternative delivery models, substitution of plastics with paper, coated paper and composable bioplastics	2.75% reduction
Collect and recycle	Waste separation at source, collection of segregated materials, sorting of collected materials and increased recycling rates	4.85% increase
Collect and safely dispose	Capturing waste in collection systems and safe disposal at sanitary landfills (engineered and well managed)	3.36% increase



5

2022 – 9.3% of households in metros separated waste for recycling



StatsSA, GHS 2022



6

Household S@S for recycling 2019 vs 2022



7

EPR regulations vs Plastic Bag levy



Plastic packaging
Biodegradable and compostable packaging
Single-use products
Single-use compostable products
Single-use biodegradable products



Plastic carrier bags and plastic flat bags already covered under the Plastic Bag regulations are excluded from the EPR regulations

Sharp decline in number of bags used per R1000 of shopping with introduction of the levy. Consumers became used to paying for bags. After 6 months of implementation consumption of carrier bags started to increase again. There is no data on the effect of the levy on the litter stream.

8

Lessons Learnt

- CE is gaining traction in South Africa as evidenced by a broad range of plastics circular economy related interventions being implemented
- Majority of interventions are end-of-pipe focused, not circular i.e.:
 - Recycling
 - Waste diversion from landfill
- Upstream innovation and system wide change interventions are lacking
- Current fragmented policy framework is not supportive for transitioning to a CE
- Realizing the opportunities of a CE requires strong coordination and collaboration between all role-players
- The focus of current initiatives are dictated by funders who may have vested interests



9

Proposed solutions towards a CE plastics economy

- Adopting a common vision and roadmap for the circular economy
- Creating an effective enabling environment
- Improved waste collection and management to ensure recovery of recyclables and elimination of leakage
- Designing out unnecessary and problematic plastic items
- Driving design for circularity
- Scaling up reuse models
- Further development of recycling capacity where required
- Driving demand for post-consumer recycle
- Improved communication, education and behavioural change
- Promoting inclusivity and a just transition

10

Annexure G: Participant Evaluation

G1. Cohort 2 Feedback Survey

Seven responses were received to the survey that covered 15 questions relevant to this evaluation.

The answers to the open-ended questions are provided verbatim as it was captured in Survey Monkey.

1. In your opinion what didn't work well, and could be improved going forward?

The responses from the respondents are:

- More topics should be included, and the work of the interns should be published.
- In my opinion the workshop was a great success.
- Communication concerning the presentation and general schedule could have been a bit more precise and consistent. Besides that, everything was well organised.
- The communication regarding travel was made very late that was a hinderance for me.
- Flight organizing - I think involving members for their preferred time of departure and return would be much better and easier.
- The SANO competition criteria should be revised.
- Noting that I can think of.

2. Do you think the concluding workshop overlapping with the conference worked well?

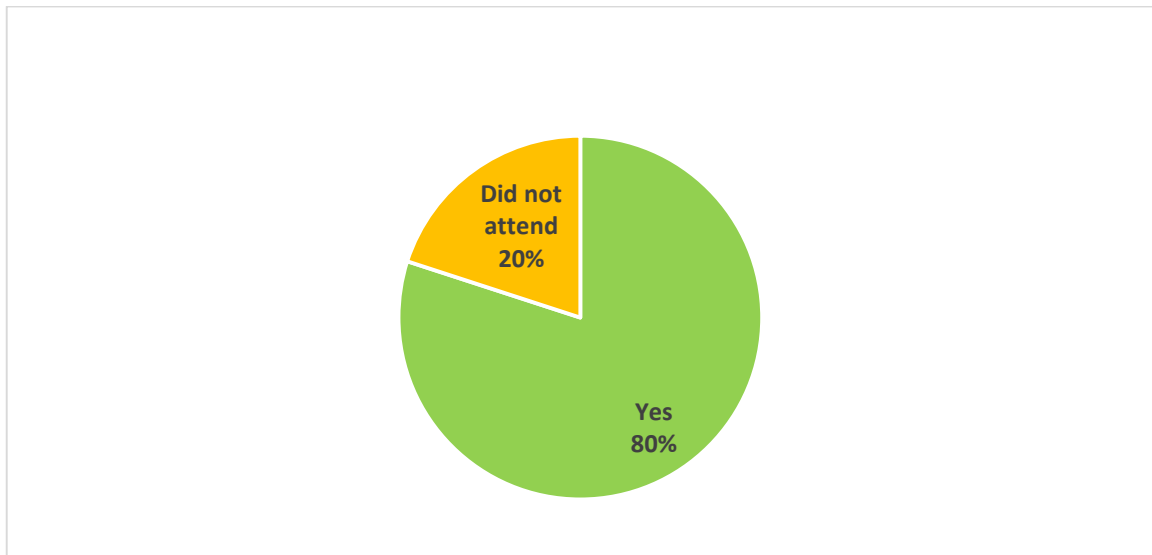


Figure 4: Responses on whether the overlap of the conference and workshop worked well.

All respondents that attended were in agreement that the overlap worked well.

Specific comments included:

- It was interesting but didn't really feel like a concluding workshop.
- The concluding workshop should be separated from the conference going forward to enhance effective engagement of all participants towards the actualization of the programme objectives.

3. Had you known you would be presenting on the plenary stage at the conference, would it have changed your approach or participation over the last few months?

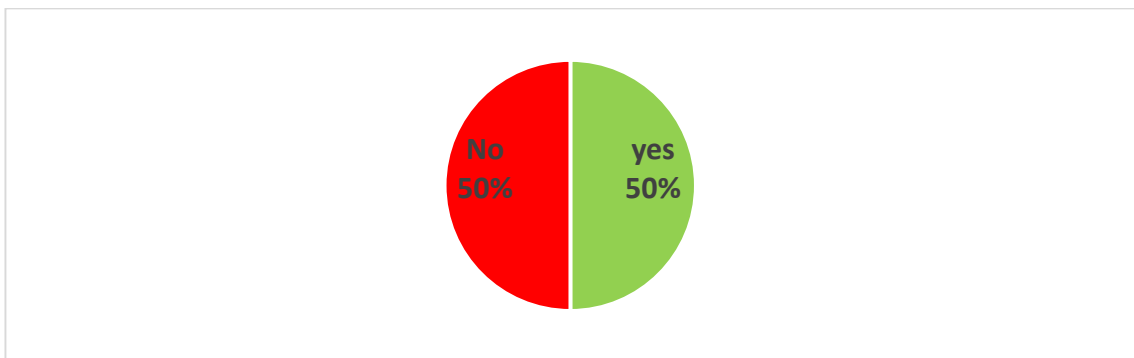


Figure 5: Did knowledge of presenting in the plenary session influenced participant approach or participation?

As indicated in Figure 5, there was a 50/50 split in responses. The detailed answers provided indicated that *"we already knew about it"*, *"the time that we were made aware was still accommodative"*, *"Presentation in the plenary was preferable"*.

4. Did you find the excursions relevant and interesting/enjoyable?

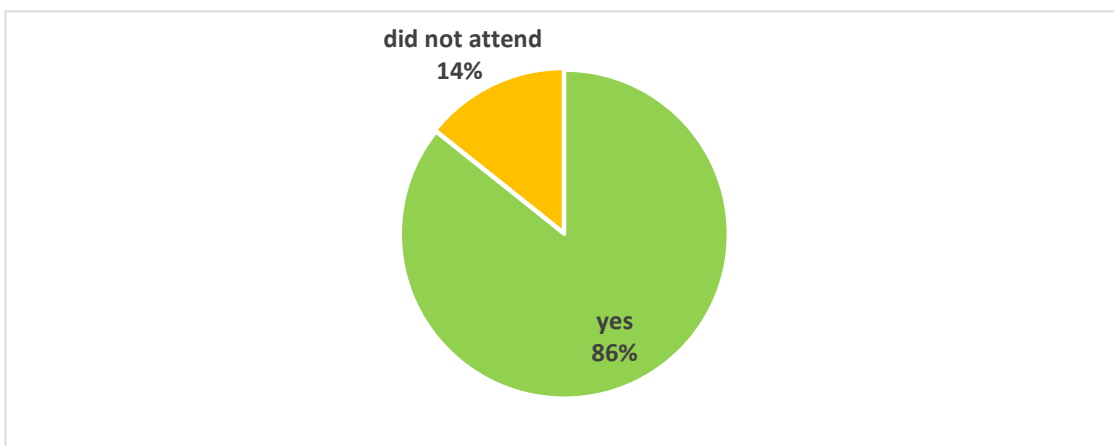


Figure 6: Respondent responses to enjoyment/interest and relevance of excursions

All respondents that went on the excursions found it interesting/enjoyable (Figure 6).

5. Please rank the excursions based on which you enjoyed the most?

The ratings assigned to the excursions is illustrated in Figure 7.

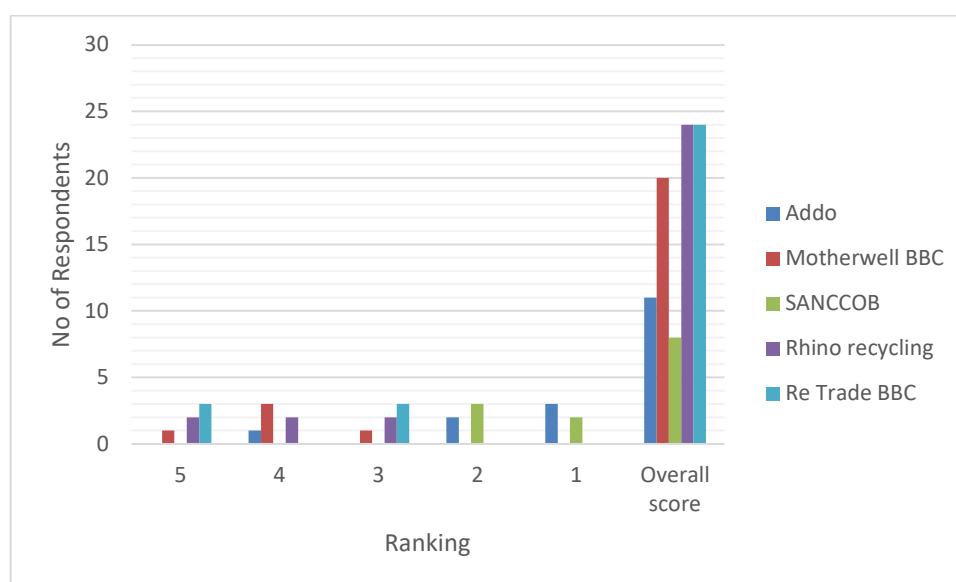


Figure 7: Excursion ranking by participants.

Considering the rankings as 5 being the highest and 1 the lowest, the three recycling excursions were generally rated higher than SANCCOB and Addo. The most popular excursions based on the overall rankings are in shared first place Re Trade BBC and Rhino Recycling, followed by Motherwell BBC, Addo and lastly SANCCOB.

6. What did you find most beneficial about participating?

Networking was the most reported benefit with one participant highlighting *“Get to interact with South Africans and was interesting to know about the culture”* whereas another participant enjoyed the *“Interesting insights into the current ocean plastic pollution discussion, getting to know other students/researchers/interested people in the field. I in general think it’s broadening one’s perspective!”* In addition, one participant mentioned *“plastic recycling and the opportunities that come with it”*.

7. What would you change about the programme, and about your participation?

One participant thought the programme was perfect as it is, The others suggested more engagement and inclusion, better communication of available time, more engagement in terms of teams. One respondent felt that the programme *“leaned more towards the governmental and NGO side. Some more academic perspectives could have evened out the program “* while another stated *“getting my organisational proposal ready before engaging stakeholders during networking”*.

8. How did you find out about the programme?

The answered varied: University, SANO, Karl, WESSA youth groups, via the SG of my organisation, it was given to me.

9. Would you have liked more feedback or insight on your project over the interleading months (November - April)

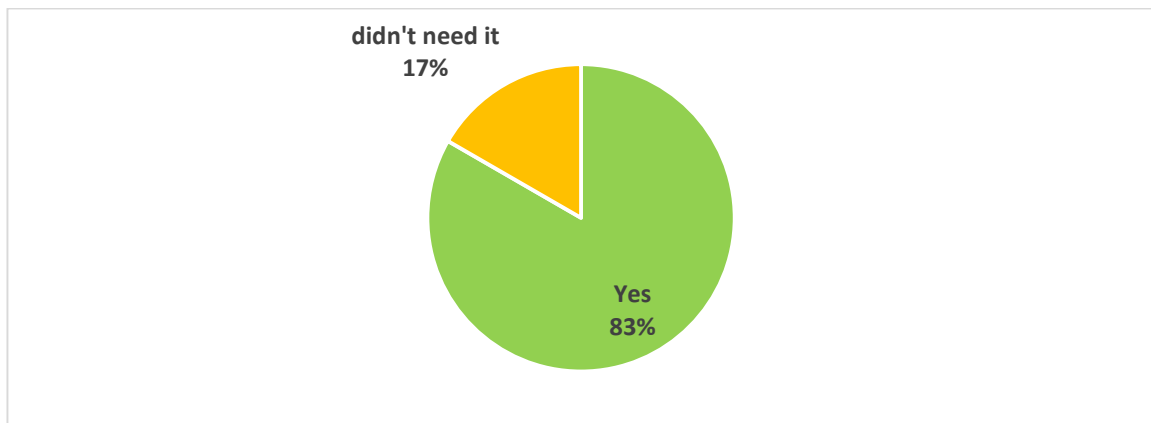


Figure 8: Respondents' preference for receiving more feedback over the interleading months

The responses illustrated in Figure 8 indicate a desire from most respondents to receive more feedback over the interleading months of the cohort,

10. How would you rank the level of collaboration amongst your team?

Respondents were asked to assign a star rating to the collaboration with 5-stars being the best and 1-star being the lowest score.

Six out of the seven respondents rated the level of collaboration as 4 or 3-star (Figure 9). One person rating the collaboration as 2 star due to lack of clarity and communication within the team.

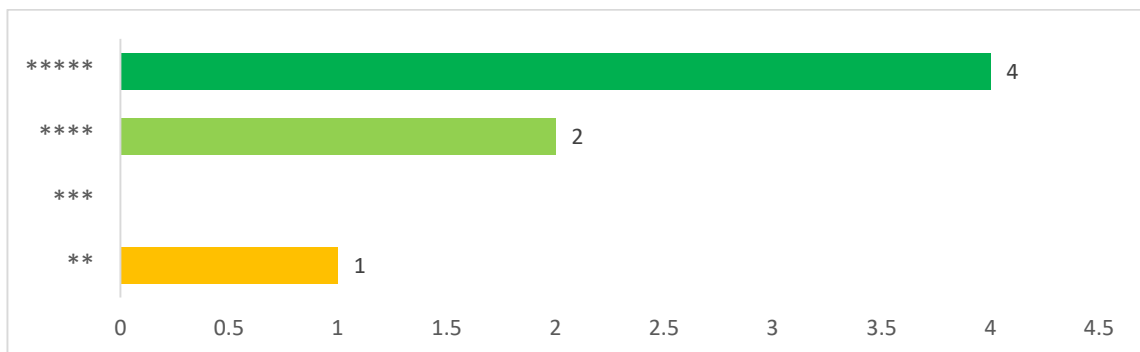


Figure 9: Respondents' ranking of collaboration amongst team members

11. How would you rank the level of communication from the coordinators?

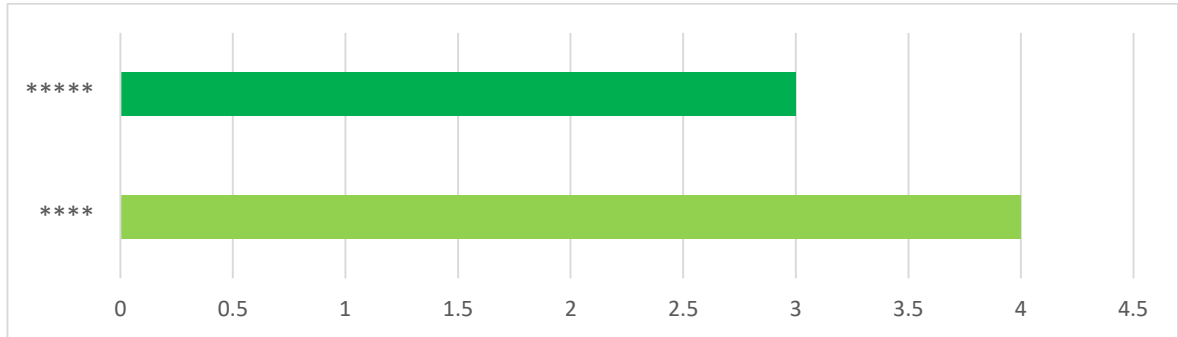


Figure 10: Respondents' ranking of coordinator communication

All the respondents ranked the communication from the coordinators as 4 or 5-star, which indicates that all respondents were satisfied with the level of communication, but with some room for improvement.

12. Do you feel that the absence of physical get-togethers reduced the value of participation?

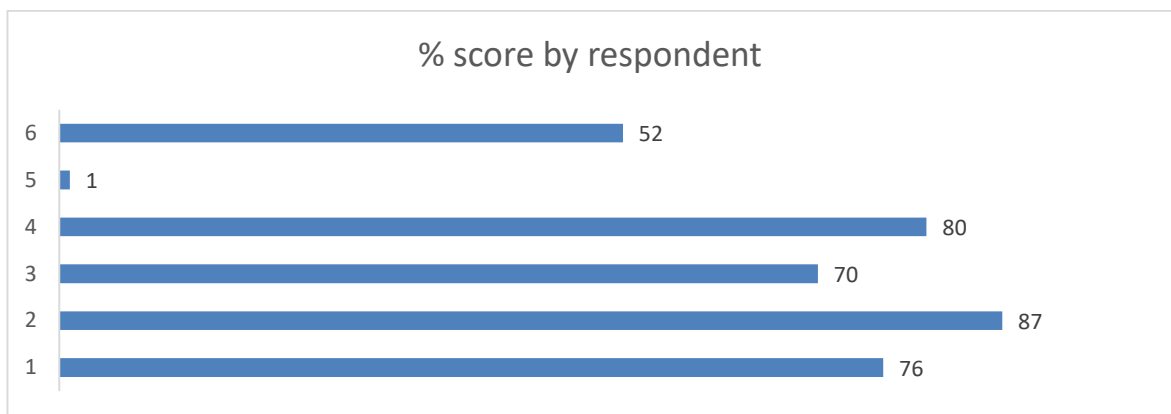


Figure 11: Respondents' score relating to lack of physical get togethers.

As illustrated in Figure 11, four respondents agreed by 70% or more that the lack of physical get togethers reduced the value of participation. One was neutral at 52% and 1 (who was the coordinator of a team) totally disagreed at 1%.

13. How valuable did you find the webinar series?

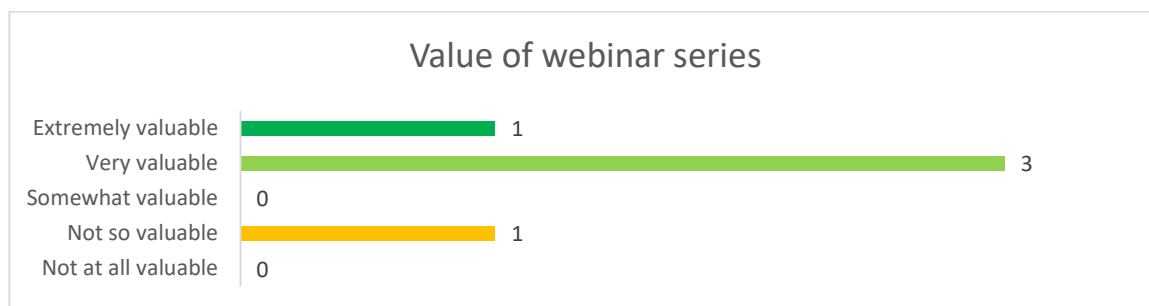


Figure 12: Value of the webinar series as rated by respondents

Four respondents found the webinar very or extremely valuable and one not so valuable whereas two respondents did not answer this question (Figure 12).

14. Based on your participation, what times of the year would you recommend for in person Kick-off workshops and concluding workshops?

The answers were a mixed bag:

- May-Jan
- During November- December or early January
- January in South Africa and June in Norway
- A little late in June for conclusion would have been a better option
- October kick-of and May concluding fine with me
- November, February
- It would be best to match the workshops with the collaborators (Norway) to avoid overlapping starting and end times.

15. What topics would you recommend for groups to investigate in Cohort 3?

- Substitute materials for plastics and viability
- The importance of Geographic Information Systems and Remote-Sensing in plastic classification and identification.
- Plastic pollution and land-use change
- Focus on waste avoidance and the opportunities and challenges of a deposit return scheme in South Africa
- SDGs, Climate Change, Ocean Water Pollution
- The application of microbes in ocean plastic waste degradation - Bioaugmentation of plastic debris
- Initiatives for enhancing environmental education in the rural areas
- Cohort 3 should be an actual follow-through of the projects from Cohort 1 and 2. Cohort 3 should be like a mini-project to see if the project can be taken to "the next level" in terms of implementation of NGO/IGO or governments.

G2. Cohort 3 Survey feedback Incorporate other opinions to research and work in an interdisciplinary team

The cohort 3 survey containing 8 questions was distributed in hard copy and online. All responses (n=321) were analysed together, and the results are presented here.

1. What were your expectations going into the program?

Respondents were provided with three options to choose from (Figure 13) and could add “other”.

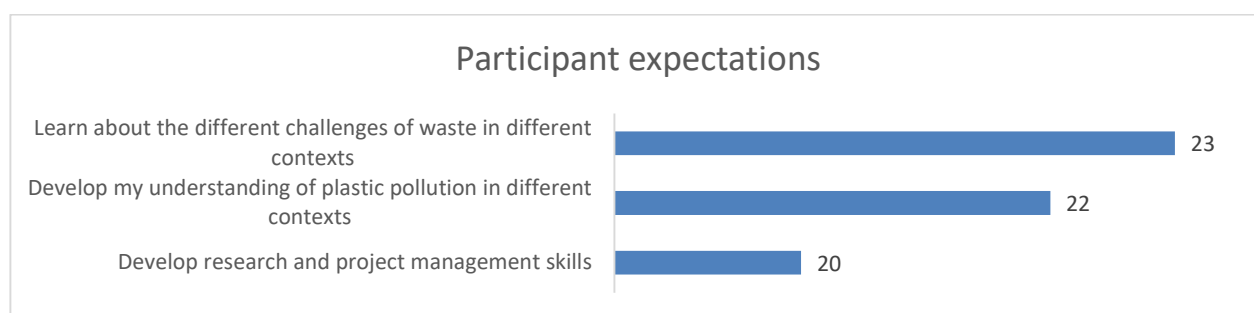


Figure 13: Summary of Participant expectations.

The most participants were expecting to learn about different challenges of waste in different contexts, followed closely by developing an understanding of plastic pollution in different contexts.

Additional expectations listed are:

- Finding ways that help communities to develop.
- Have an impact on plastic pollution in South Africa.
- Experience working in groups from different backgrounds.
- Interact with different cultures in professional and social settings.
- Incorporate other opinions to research and work in an interdisciplinary team.
- Engage with international students on a global issue.
- Networking, add-on to my knowledge - more on social/economic perspectives

2. Did the program meet your expectations?

Respondents were asked to indicate on a scale of 1-5 how well their expectations were met (Figure 14). The results indicate that most (27 or 84%) of the respondents' expectations were met, three (9%) responded neutral and 1 (3%) selected 2 indicating that the expectations were not really met.

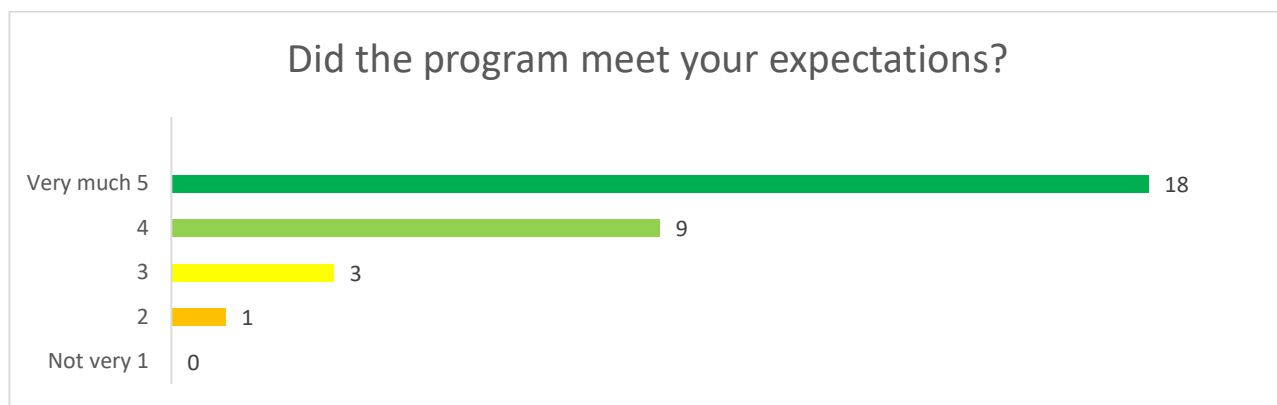


Figure 14: Respondent's rating of how well the program have met their expectations

3. How relevant and helpful do you think it was for your research and collaboration skills?

Similar to question 2, respondents were asked to indicate on a scale of 1-5 the relevance of the program towards research and collaboration skills development. As illustrated in Figure 15, most (25 out of 32 or 78% of respondents) responded positively, four (12.5%) neutral and two (6%) negatively. The one respondent added *"it does not fit my research of toxicology, but incorporating other disciplines will only make SANO an even bigger success"*.

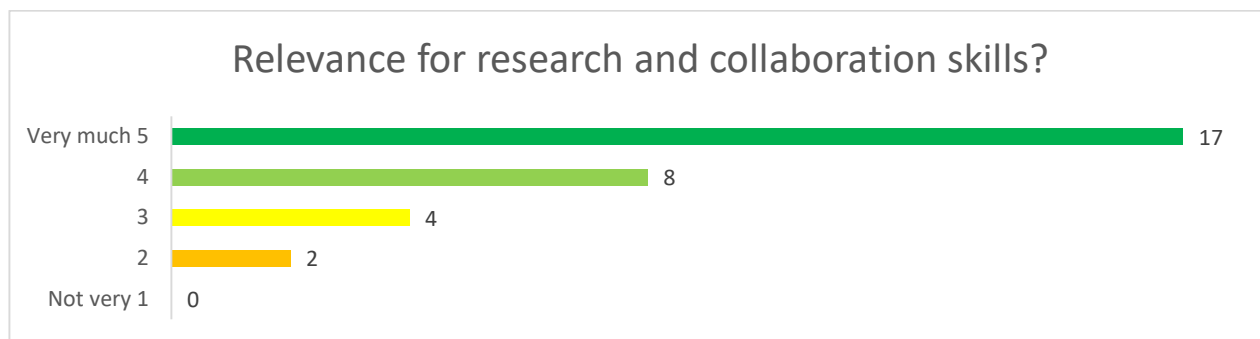


Figure 15: Relevance of the program towards research and collaboration skills development.

4. What were your key take aways from this event?

The following take away messages were recorded:

- Plastic waste management is a global issue faced.
- Policies are needed urgently in terms of plastic management.
- Human behaviour is an important aspect in terms of waste management.
- Intervention is needed.
- Working together can/will make a difference.

- Waste management knowledge, collaboration, and skills.
- We still have a lot of work to do.
- Plastic pollution causes a lot more damage to our ecosystem, more than we imagine and it requires a collaborative effort from research in various disciplines to solve the issue.
- Meeting people around the world.
- Importance of research collaboration.
- Learning new cultures.
- Shocking revelations around marine waste.
- Creative thinking.
- The plastic problem is too big for one discipline, we need more.
- The multi-disciplinarity worked together well on a complex problem.
- Good networking area, and collaboration gets stronger due to the period the project lasted.
- Plastic waste globally is far greater than what meets the eye, and more initiatives are required to make a change.
- That there continues to be a serious pollution problem that requires ALL to take serious action.
- With all the barriers surrounding ocean plastic pollution we all need to play a role to fight the problem at hand.
- Be the sustainability ambassadors in our own countries.
- Highly diverse group with lot of ideas. Did not expect Norwegian coasts to be polluted like this.
- Global collaboration required to tackle plastic pollution, there's a lot of value in plastic waste.
- The scale of the pollution in hand + the fact that despite their many differences both Norway and South Africa share many of the same problems - perhaps just manifested differently.
- Knowledge dissemination/transfer isn't easy and takes time.
- Many participants set goals that are very difficult to be achieved in the time of the project. Making the teams aware of this issue from the start can be helpful.
- "I learnt more than I expected about the research process (as a bachelor student). It was so beneficial to be exposed to this process already. I enjoyed the interdisciplinary aspect. I learnt so much about plastic pollution from different avenues."
- "Many new friends, many great memories, learned a lot in a "foreign" field.
- Collaboration: more scientists discuss and brainstorm together, the more we will be able to implement solutions towards plastics solution.
- Teamwork and group collaboration
- "So many important disciplines to consider/include in the plastic pollution issue. Very different challenges depending on country, geography, economy etc".

5. Which sessions did you find most relevant?

Each session had to be evaluated and the results per session are indicated in Figure 16.

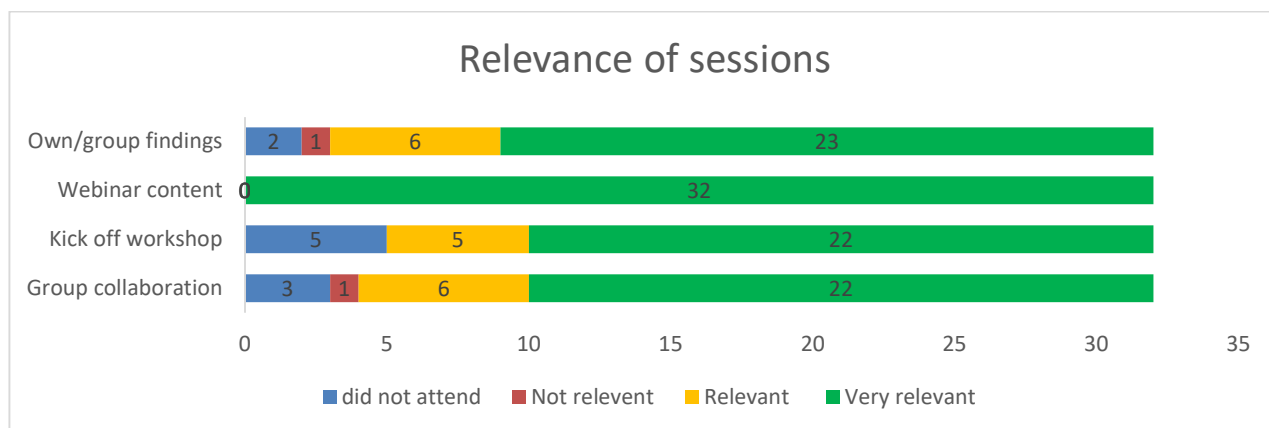


Figure 16: Sessions relevance to respondents

All respondents found the webinar content to be relevant, 29 (90%) thought the sessions on own/group finding were relevant or very relevant, 28 (87.5%) respondents agreed that group collaboration was relevant or very relevant, and 27(84%) thought the kick-off workshop was relevant.

6. Additional comments?

- To make it quicker for ethics approval.
- The session was planned well and tends to capture the current challenges which is very important in solving plastic waste.
- The concluding workshop proves how waste management is needing an integrated approach. Social science is equally key.
- It has given us the platform to voice opinions and gain information.
- Brilliant.
- Action plan for at least 2 years should be included.
- A good conclusion workshop.
- Balanced activities/tasks between the two countries.
- It was nice to actually do the clean-up and see the impact. In South Africa it was shown, a clean-up would have been great. Then there was an outing e.g., Addo Elephant park, it would have been nice to have a similar sightseeing in Norway.
- The island fieldwork was amazing.
- Would have been better to give an overall agenda on what to expect at Mausund.
- Perhaps more check-up (more frequent) could help.

- Loved the experience thanks.

7. What would you change about the program?

- Arrange shuttle transport.
- Hostel group accommodation to hotel group accommodation.
- Add in some upkeep (maintenance) allowance for participants that come from distant continent.
- I think there is more need to not only include students but also community experts or leaders so that they can be able to also share their views on plastic waste.
- Involvement from more countries.
- Invite policymakers and stakeholders involved in plastic waste management, communication to broader public, community engagement.
- Maybe control better the collaboration between the members of the group.
- More relevant mentorship through explanation on the expected output of the projects.
- Earlier access to the agenda to arrange travel plans.
- More awareness regarding the webinars
- The organisation of the event/conference were not very good. The organiser did not respond to questions. Last minute/bad organisation caused a lot of unnecessary pressure on everyone, this could have been prevented. The food on the island did not accommodate everyone.
- More Norwegians and solution-based projects that tackle feasible problems instead of constrained topics focusing on literature.
- To have more Norwegians be part of the program and not have 90% South Africans
- Group sizes have to be the same for everyone. We need to know if the sponsors benefit/find value from this.
- I believe it is a good developed and tested program. Keep it for cohort 4. Prize of NOK 100.000 is good.
- Prioritize group work as part of the daily program.
- I think the planning and organizing team should do better next time, planning on time and everything.
- Having more teams? Involve participants from other countries.
- It would be great if there could be a project that has an interdisciplinary aspect. That one group looks at plastic pollution across disciplines (e.g., natural science element to determine the most sustainable shopping bag + social science element to see how to implement this solution).

- Better communication/more check-ins with the mentors. Making sure that the group is on the right track and fully understands the aim.
- Add more relevant for content for webinars, e.g., visualisation workshop on science data.
- Collaboration with other cohorts is good.
- All activities were relevant and align with program objectives.
- Minimize physical walking.
- Timing – workshop not in December – hard to recruit Norwegian students.

8. Any overall feedback for the cohort 3?

- It was very good.
- Very exciting experience and need more of such, especially answering the many plastic pollution questions.
- It was amazing and engaging.
- The members should continuously have a platform to share opportunities and new industry trends/challenges.
- Learned a lot.
- Amazing to collaborate with people from different perspectives.
- Great experience.
- The 3rd cohort is very educative, enlightening, and full of exciting activities.
- I really loved the conference itself and the week in Norway. Group work was a highlight.
- “The cohort is excellent; we grow as academics and students of life. The projects challenge one to think creatively about difficult problems and try to find solutions.”
- I would like to see solution-based projects that focusing on problems that require research in respective fields of study.
- In conclusion, I had a fun time and learned a lot.
- Make sure the mentors do their job and that they keep to their promises made to guide the SANO groups.
- A good mix and good vibes between and in groups.
- To get full detailed programme of daily activities and what to expect. Notification regarding food and S&T were communicated a bit last minute. With earlier notification one could have made efforts to prepare alternatives.
- Overall, the cohort was informative.
- It was a great one, maybe include a few artists, adding a different dimension.
- Very fun
- Loved the collaboration with other students and industries.