

Work package 1

Deliverable: 1.4 The Strategic Orientation Workshop (SOW) Report

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The main outcomes

- A three-day web-based BANOS SOW was coordinated by the BANOS CSA Coordinating office from Helsinki during 31 March – 2 April 2020.
- Despite the last-minute change to transfer the event to a web-based format, due to the force majeure circumstances caused by the COVID-19 pandemic in spring 2020, the event was considered highly successful among the participants and BANOS CSA consortium members.
- In total over 100 stakeholders attended the workshop representing all BANOS region countries from primarily policy and science communities but also industry and NGOs. This enabled reach of and engagement with a wide range and substantial number of stakeholders in codesigning the main programmatic document of BANOS, its SRIA.
- The participants were very active and engaged during all the sessions. In total 130 questions were asked during the three days. In addition, a total of 151 online feedback forms were received that covered all 31 draft R&I themes included in the pre-draft SRIA with 74 forms submitted to the thematic session A (Healthy Seas and Coasts), 53 to thematic session B (Sustainable Blue Economy) and 24 to thematic Session C (Human Wellbeing).
- Recommendations on the pre-draft SRIA were also provided and presented by the BANOS CSA Advisory Board.
- After the SOW, all the feedback was passed to the BANOS SRIA drafting team who will critically evaluate and carefully consider all the stakeholder and AB comments and modify the content of the pre-draft SRIA accordingly.

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Description of task: (i.e. as in the Description of Action)

The project will employ the well-approbated BONUS Art. 185 approach to SRIA development (Andrusaitis et al., 2014). According to this approach, a Strategic Orientation Workshop (SOW) is the central event both in the process of SRIA development, as well as in its subsequent updates. It guarantees early, real and substantial engagement of the stakeholders in programme's work by co-designing the main programmatic document. The SOW will involve representatives of all stakeholder groups: governments and NFIs, research implementing agencies, industries and NGOs – altogether around 50 delegates (a link to T3.2). The transnational organisations acting as project's strategic partners will take active part in SOW. The objective of SOW is to scrutinise the draft SRIA as produced by T1.3, and agree on its final structure, content and the expected outcomes under different themes/topics. Following the practice refined in the ongoing BONUS Art. 185, the SRIA will also indicatively outline the elements of work programme, i.e. the preliminary plan of calls and other activities.

Planning the logistics and composing the audience of the SOW will start five months before the actual event and will continue one month after the SOW in order to finalise the report and clear the payments. The actual SOW event will be held no earlier than one month after completion of the drafting, providing enough time for its participants to study and comment the draft. Immediately after the SOW, the drafting team (DT, T1.3) will start assimilating its suggestions into the final SRIA version to be presented for approval by the BANOS CSA Steering Committee. This task will be carried out in M13-M19 with the event taking place in M18 and the SOW report submitted in M19.

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1 Executive summary

The design and running of the Baltic and North Sea Coordination and Support Action (BANOS CSA) organized Strategic Orientation Workshop (SOW) is based on the model developed and used in the ongoing BONUS Art. 185, the predecessor of the future BANOS programme as planned in the BANOS CSA. As envisaged in the BANOS CSA Description of Action (DoA), the SOW is the central stakeholder consultation event culminating the process of developing the Strategic Research and Innovation Agenda (SRIA) of the future, joint Baltic and North Sea Research and Innovation Programme (BANOS) (Figure 1).

The objective of the SOW is to enable early, real, and substantial engagement of the stakeholders in programme's work by co-designing the main programmatic document of BANOS.

To ensure the most desirable and effective engagement of those with a stake to the future research and innovation agenda of the Baltic and North Sea region, the timing of the SOW is a critically important consideration in the full process of developing the final SRIA. Before the BANOS SOW could take place, the general scope and framework of the future programme had to be identified¹, the relevant national level R&I priorities explored², the expert drafting team formed and the pre-draft SRIA produced³. Then with the pre-draft SRIA distributed a month in advance as the main discussion material for the invited stakeholders as SOW participants, the time was ripe for the SOW to take place.

The BANOS CSA consortium confirmed to organize the BANOS SOW during 31 March – 2 April in Leiden, the Netherlands. However, with the force majeure circumstances caused by the COVID-19 pandemic in spring 2020, the event was transferred to a fully web-based format coordinated by the BANOS CSA Coordinating office. Despite the last-minute change in the format of the SOW from face-to-face to online, no compromises in critically important stakeholder consultations had to be made and the coverage of different stakeholders amongst the SOW participants was recorded to be widely-spread across different groups and sectors.

Instead, due to the change in the event's format, a great number of benefits of operating from an online platform became self-evident: The number of the audience grew to just over 100 with some key participants who were unable to attend the face-to-face event becoming available due to the format change to an online event. Also, all participants were in the position to follow all the sessions as the parallel sessions of the face-to-face event were changed to one consecutive series of online sessions. Also, detailed recording of all feedback received from the SOW audience became possible through several online, real time communication channels. Finally, reassuring of nothing lost but possibly something gained by this change was the feedback received from the very active participants regarding the actual running of the SOW which turned out to be overwhelmingly positive.

¹ Wallberg, P. & S. Johansson (2019). Scoping the strategic framework for the future programme. BANOS CSA/D1.1. (M8, June 2019)

² Krüger, C. & K. Koho (2019). Overview of existing priorities, status and capacity in relevant fields of research and innovation in the Baltic Sea and the North Sea regions. BANOS CSA/D.1.2. (M8, June 2019)

³ BANOS CSA D1.3 The Baltic and North Sea Strategic Research and Innovation Agenda (BANOS SRIA). A DRAFT version (M16, February 2020)

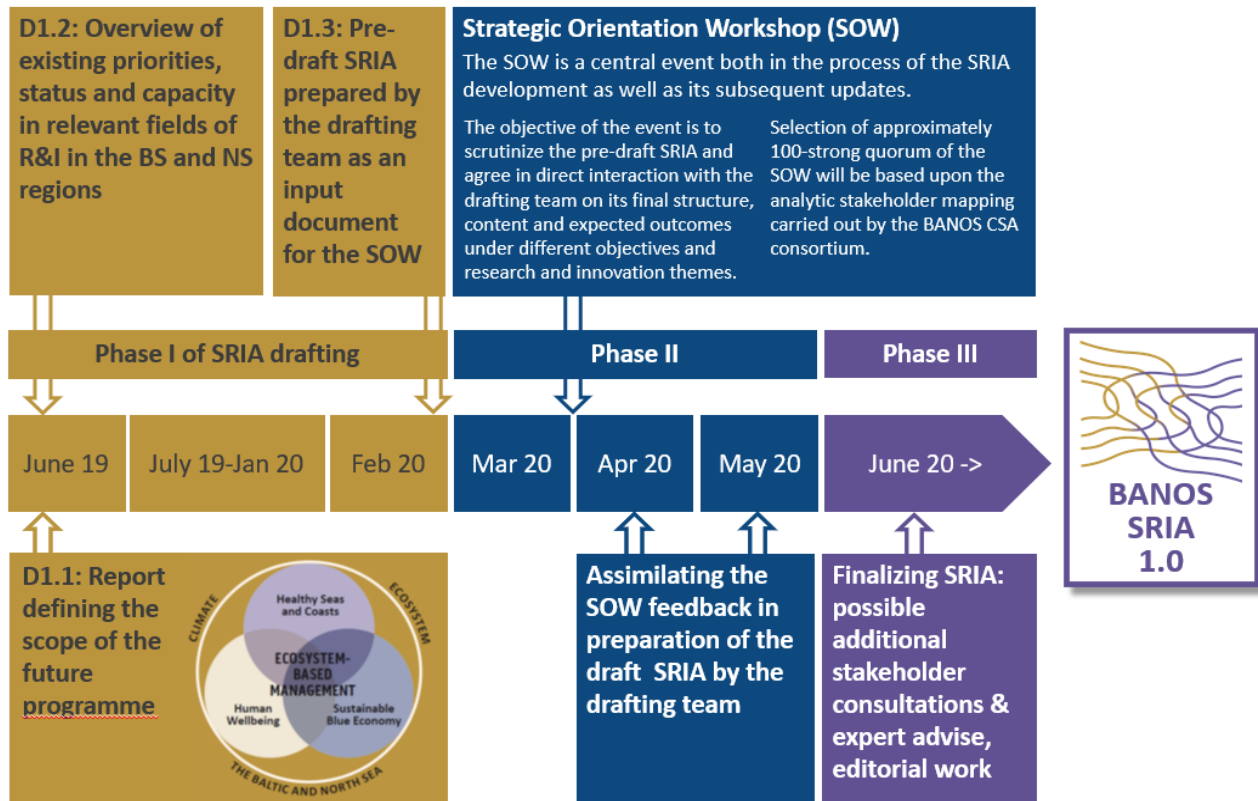


Figure 1: Role of the Strategic Orientation Workshop (SOW) in the process of developing the BANOS SRIA. The SOW was held one month after completion of the pre-draft SRIA, providing enough time for the stakeholders to prepare for the discussions. Immediately after the SOW, the drafting team (DT, T1.3) started consolidating the received stakeholder feedback and assimilating it in preparation of the draft SRIA. Depending on the outcome of Phase II, additional focused stakeholder consultation and expert advice might be necessary while finalizing the SRIA during Phase III. Eventually the SRIA will be prepared for open publication. For more information, see In Brief, November 2019⁴.

In this report, we first look at the development of the SOW concept (Chapter 2), as its roots are well-grounded in the BONUS Art. 185 experience: The concept of the SOW as the central consultation event allowing involvement of representatives of all relevant stakeholder groups in co-design of the Strategic Research Agenda (SRA) was first developed in 2009 for launching the BONUS Art. 185 – the joint Baltic Sea Research and Development Programme.

In the methodology section (Chapter 3), we introduce the approach taken by the BANOS CSA Coordinating office in preparing and running the BANOS SOW i.e. process of recruiting BANOS stakeholders as SOW participants, developing the agenda and form of the event, technical setup as well as methodology of obtaining and handling the stakeholder feedback during and after the SOW.

In the results section (Chapter 4) we first summarize the composition of the SOW participants. Then we provide brief summaries of the total of 130 questions asked by the participants during the five SOW sessions. The very core of the SOW – the participants' critically important, plentiful feedback regarding the three thematic parts of the pre-draft SRIA are summarized next, totaling 151 online feedback forms received through the online submission portal. These cover all 31 draft R&I themes included in the pre-draft SRIA with 74 forms submitted to the thematic session A (Healthy Seas and Coasts), 53 to thematic session B (Sustainable Blue Economy) and 24 to thematic Session C (Human Wellbeing). Finally, the

⁴ Karoliina Koho: The roadmap for the Strategic Research and Innovation Agenda (SRIA). In Brief, November 2019, www.bonusportal.org/files/6751/In_Brief_November_2019.pdf

recommendations provided by the BANOS CSA Advisory Board to the SOW as well as feedback received on the running of the SOW itself by the participants are summarised.

In the concluding sections of this report (Chapters 5 and 6), we briefly outline the forthcoming work on consolidating the stakeholder feedback and assimilating it into the BANOS SRIA and present the general conclusions of BANOS CSA Task 1.4.

2 Development of the SOW concept – the BONUS Art. 185 experience

The concept of the SOW as the central consultation event allowing involvement of representatives of all relevant stakeholder groups in co-design of the Strategic Research Agenda (SRA) was first developed in 2009 for launching the BONUS Art. 185 – the joint Baltic Sea Research and Development Programme⁵. The BONUS EEIG modelled the general approach of the so-called Dahlem Conferences: a series of 102 high level workshops held in Berlin between 1972 and 2012⁶. The original Dahlem format was applied for addressing a broad spectrum of challenges and research areas requiring interdisciplinary approach⁷.

The SOW format was further refined during the Strategic and Implementation phases of BONUS Art. 185. The first BONUS SOW was held in March 2011 in Dikli, Latvia and served for devising the BONUS SRA 2011-2017⁸. From the outset, the BONUS SRA was positioned as a “living document” undergoing systematic updates through a series of SOWs as well as focused stakeholder consultations and enquiries. After revisiting the dynamic policy landscape⁹, the second BONUS SOW (Tallinn, September 2013) was instrumental in producing the 2014 update of the BONUS SRA¹⁰.

Already in 2015, outlining the possible future, joint Baltic Sea and North Sea Research and Innovation Programme¹¹, it was foreseen that *“The programme’s SRIA will be based on the initial research and innovation needs ... and intensive stakeholder consultations ... and thereafter updated in an iterative process (1-2 times during the implementation period). The SRIA will underpin the policy- and industry-driven character of the whole programme.”*

In a nutshell, the main principles underpinning the SOW design are these:

- Scrupulous attention to strong key stakeholders’ representation among the SOW participants. I.e. The key actors of all relevant stakeholder groups (academia, funders of R&I, sectors of economy, industry, civil society) proportionally represented.
- Ample time for invited participants to prepare for SRIA discussions. I.e. at least a month before the event the pre-draft SRIA serving as a SOW input document is distributed to all participants.
- Openness and transparency of SRIA development. Direct engagement between the drafting team (DT) and the participants. The DT experts are presenting their respective parts of the pre-draft during the SOW thematic sessions and directly receiving feedback from the participants.
- Scrupulous attention to consolidating the stakeholder feedback and integrating it into the draft during the final phase of SRIA development.

⁵ BONUS EEIG: Outline of BONUS-169 Joint Baltic Sea Research Programme. BONUS Publication No.11, 2009.

www.bonusportal.org/files/725/Publication_No._11.pdf

⁶ www.fu-berlin.de/sites/dahlemkonferenzen/modell/index.html

⁷ https://en.wikipedia.org/wiki/Dahlem_Konferenzen

⁸ BONUS EEIG: BONUS Strategic Research Agenda 2011-2017, BONUS Publication No.12, 2011.

www.bonusportal.org/files/1246/Publication_No._12_SRA.pdf

⁹ Andrusaitis A., Kononen K., Sirola M. (2013), Policy framework analysis in the fields relevant to the BONUS programme. BONUS Publication No.13. www.bonusportal.org/files/2654/Publication_No._13.pdf

¹⁰ Andrusaitis, A., K. Kononen, M. Sirola, et al. (2014), BONUS strategic research agenda 2011–2017, update 2014. BONUS Publication No. 14. www.bonusportal.org/files/2981/Publication_No._14_update.pdf

¹¹ Andrusaitis, A., D. Cox, A. Dosdat, et al. (2016), Towards sustainable blue growth: Outline of the joint Baltic Sea and the North Sea research and innovation programme 2018-2023. BONUS Publication No. 15.

www.bonusportal.org/files/4699/BONUS_Publication_No_15.pdf

3 Methodology

The BANOS CSA Coordinating office began to prepare the set-up for and running of the SOW six months prior the event. The BANOS CSA consortium confirmed the SOW to take place from 31 March till 2 April 2020. The early enough start of preparations ensured enabling of the most desirable outcome of the event i.e. effective and meaningful co-design of the BANOS SRIA with key stakeholders as participants on board. Originally the SOW was to be organized as a face-to-face event in Leiden, the Netherlands. However, due to the unexpected circumstances caused by the COVID-19 pandemic in spring 2020, it was decided on 11 March 2020 to change the SOW to a fully web-based workshop. The original timing of the event, however, remained the same and the online SOW took place under the management and coordination of the BANOS CSA Coordinating office in Helsinki, Finland over the course of the three days. In this section below, the break-down of the full process from the run-up period to the running of the SOW itself is detailed.

3.1 Recruiting key stakeholders for SOW participation

Very much on the backdrop of the outcome of deliverable which mapped the most relevant stakeholders for the future BANOS Programme¹², the BANOS CSA consortium members, observers, strategic partners and Russia were asked to nominate representatives to the SOW from their respective countries. The cross-sectoral composition sought for included policy makers, funders and institutions dealing with marine, maritime and socio-economic issues, NGOs, the scientific community and any other individuals considered of key importance for the task of co-design of the most desirable, joint future Baltic and North Sea Research and Innovation Agenda (SRIA) based on the pre-draft SRIA prepared by the drafting team recruited.

The nominated representatives were to be in a position to cover appropriately different sectors and perspectives of the three future programme's strategic objectives, namely Healthy Seas & Coasts including four specific objectives, Sustainable Blue Economy including three specific objectives and Human Wellbeing including two specific objectives.

Based on the nominations made by 6 December 2019, the invitation letters (Annex 1 Invitation template) prepared by the Coordinating office were sent out, and in addition, many of the nominees were also contacted directly beforehand by the consortium members to ensure that as many as possible of the key stakeholders nominated would be familiar of the SOW in advance and willing and able to attend. The Coordinating office nominated also some key stakeholders directly and sent invitations accordingly covering also some key cross-border initiatives, this very much aligned with the work carried out in deliverable which mapped the relevant cross-border initiatives of the future BANOS Programme¹³ as planned in the BANOS CSA. Regular reminders were sent out throughout the run-up period to encourage those yet to register to do so and join the SOW. Once the decision to change the SOW to an online workshop was made on 11 March 2020, also additional invitations were sent out to those remaining on reserve list of the face-to-face event – this as the limited head count due to earlier venue and budget restrictions were no longer concerns. All in all, 106 unique registered participants (Annex 2 Participant list) attended the SOW with a good representative profile of the BANOS key stakeholders (see results 4.1).

All registered participants received the pre-draft SRIA, a preview of the R&I themes' feedback form to be used during the thematic session of SOW as well as other SOW related information, all a month prior to the SOW on 28 February 2020. For those who registered later, these materials were provided upon each registration separately. The SOW specific webpage was set up to further keep the registered participants actively involved in the run-up period as well as during the SOW.

¹² Lescroart, J., F. De Raedemaeker, H. Pirlet, A-K. Lescrauwaet, M. Sirola (2019). A holistic map of the programme's stakeholders. BANOS CSA/D3.2. (M13, November 2019)

¹³ Lescroart J., K. Koho, F. De Raedemaeker, M. Sirola, H. Pirlet, A.K. Lescrauwaet, A. Andrusaitis (2020). Report mapping the relevant cross-border initiatives, analysing the cooperation potentials and proposing the cooperation mechanisms with the BS/NS research and innovation programme. BANOS CSA/D3.3. (M17, March 2020)

3.2 The running of SOW based on its participatory agenda

The planning of the BANOS SOW including setting the agenda was based to a large extent on the BANOS predecessor's BONUS model of SOW.

The SOW agenda was decided to be spaced over three days similarly to the format used already in the first BONUS SOW in 2011 which already then had proved a good format in involving the participants in a truly interactive and engaging fashion. This time, due to the online format, no parallel sessions as initially planned were held. Instead all participants were able to join online and contribute to any number of sessions they desired. For each session it was considered important to have ample time for participants' questions (see 4.2) as the intention was that all questions would be discussed and answered by the panellists during the respective sessions. In addition, during the three thematic sessions, online feedback forms were opened for the participants' use (see 4.3). An introductory plenary was held at the beginning to set the scene of the three days to follow and a concluding plenary at the end of the SOW summarised the outcome and suggestions made on SRIA. (See Annex 3 for the full SOW agenda)

The regional and thematic scope of the intended future BANOS Programme as well as the SRIA preparations completed so far were covered in the introductory session that set the stage for the SOW. The BANOS CSA Coordinating office invited several members of the BANOS CSA consortium who were well placed to do the introductions to take the online stage after the SOW was opened by the BANOS SOW co-hosts Andris Andrusaitis (Coordinator of BANOS CSA and Acting Executive Director of BONUS) and Karoliina Koho (BANOS CSA Project Officer). The pre-recorded video presentations contained information regarding the regional scope of BANOS by Ann-Katrien Lescrauwaet of VLIZ, Belgium), the scope of the BANOS pre-draft SRIA to date by Petra Wahlberg of FORMAS, Sweden, the scope of BANOS policy landscape by Karoliina Koho, BANOS CSA/BONUS EEIG and the BANOS impact enabling strategies for future by Floor ten Hoopen of SWAM, Sweden. This session, similarly to all other SOW sessions to follow, was concluded with a Q&A session, which ran until all questions asked by the participants were answered by the presenting panellists.

The thematic sessions followed and were organised based on the three strategic objectives of BANOS, one after another during the first and second day of SOW. For each session (session A-, B- and C-, respectively) selected drafting team members were invited to join in as panellists (see Annex 4 for list of panellists). The selection of the panellists was based on their respective expertise and involvement in the drafting process. In general, all lead authors of the total of 31 R&I themes which were organised under the three strategic and nine respective specific objectives were invited to join in. In some cases where a lead author was unable to join, a co-author was invited to join the session instead.

During each of the thematic sessions, pre-recorded summary video presentations were given on each of the nine specific objectives. The presentations were given by the drafting team members who were leading the formulation of the specific objectives. The presentations were followed by a Q&A session during which the panellists answered participants questions in respect to the thematic content of the BANOS SRIA. In addition to submitting questions directly to drafting team, the participants were also able to submit detailed online feedback on the content of the R&I themes during the designated sessions. These filled in feedback forms totalling 151 provided the key outcome and contribution by the SOW participants to the BANOS SRIA process (see chapter 4.3).

The discussions of the thematic sessions were summarised during the closing plenary session on the third and final SOW day. During the session, the SOW participants were also able to ask any final questions they wanted from the drafting team members. Summaries of each session were presented by the lead authors of each specific objective, similarly to the thematic sessions (see Annex 3 for details). In addition, the BANOS CSA Advisory Board, represented by Donald Boesch (University of Maryland Center for Environmental Science, US), summarised the Board's impressions on the pre-draft SRIA and their recommendations for improvement. The BANOS SOW was closed by lunch time on 2 April 2020.

3.3 Technical setup of the BANOS SOW

The Zoom Webinar <https://zoom.us/webinar> was chosen as the platform for running the BANOS SOW after the decision was made to change the event format from the face-to-face event to an interactive online event on 11 March 2020. This provided a scalable webinar solution with built-in facilities for interactive participation, most importantly entailing a real-time questions facility for the workshop participants with the possibility to ‘like’ others questions as well as a chat-facility to maintain contact amongst the SOW panellists and organisers throughout the SOW for any eventualities needing attention during the live SOW sessions. In addition to the Zoom Webinar function, also an online facility was created on the BANOS CSA website for the SOW participants to submit feedback on any of the 31 R&I themes grouped under the three strategic objectives and nine specific objectives (see chapter 3.4 for more). This combination of the Zoom webinar and a time-specific feedback function through the BANOS CSA website provided an ideal set-up for the SOW to ensure the interactive participation and receive the necessary feedback on each R&I theme specifically as well as on SOW and SRIA related matters as a whole. Also, the online set-up enabled the agenda to be more flexible with ample built-in time for participants’ questions.

3.4 Integration of the participants’ feedback on R&I themes into BANOS SRIA

The purpose of the SOW was to scrutinize and critically review the content of the pre-draft BANOS SRIA, so that the final document would reflect the research and innovation needs of the BANOS region and its stakeholders.

Written feedback by the SOW participants on the 31 R&I themes included in pre-draft SRIA was provided by filling in and submitting online feedback forms during the respective thematic sessions A, B and C. The online submission portal (Figure 2) was created on the BANOS CSA website. By providing registered participants the SOW materials in advance (see chapter 3.1) coupled up with the pre-structured form (Annex 5) used for collecting all the feedback ensured organisers of consistent, ample and high quality suggestions made by participants for further development of the pre-draft SRIA.

The online submission portal was open to all SOW participants for the duration of each of the three thematic sessions, during which stakeholders were able to submit unlimited number of feedback forms (Figure 2, Step 1).

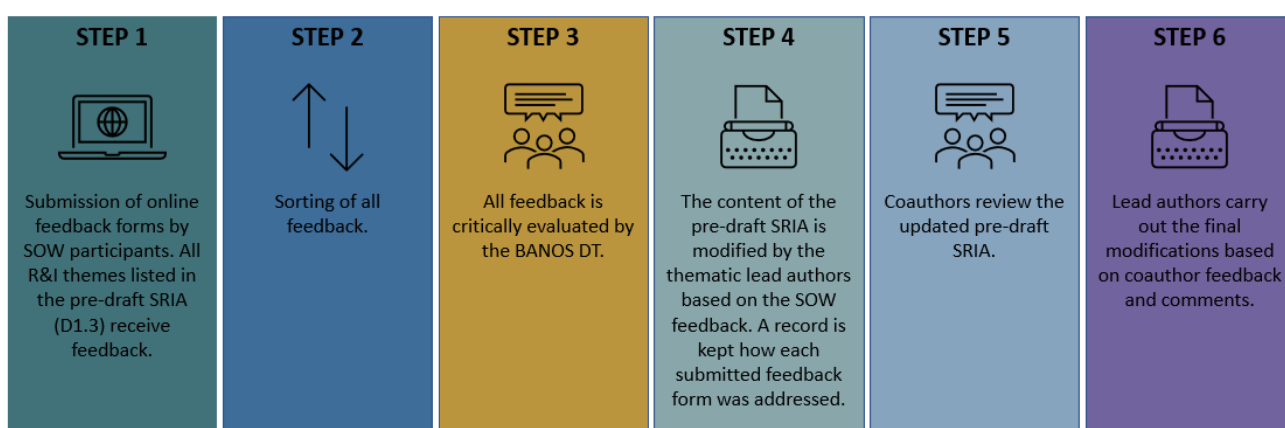


Figure 2: Integration of stakeholder feedback into BANOS SRIA.

Following the SOW, all the feedback was sorted by the BANOS coordinator (Step 2) and passed on to the drafting team. All feedback was subsequently critically reviewed (Step 3) and the content of the pre-draft SRIA modified and updated (Step 4). Prior to finalization of the draft SRIA, the modifications are being reviewed internally among the DT members and the Coordinating office (Steps 5 & 6)

4 Results

4.1 Profile of the participants and attendance

The BANOS SOW webinar gathered altogether 106 unique registered participants representing all 13 BANOS CSA participating countries, with participants also registered from Turkey and the USA. The participants represented different sectors: in close to equal numbers Policy & Management and Science and smaller participation from Industry, NGOs and others.

During the first day there were in total 100 unique viewers and 80 maximum concurrent viewers. A poll was run both in the opening plenary as well as the first thematic session on Strategic Objective A to map the representation. During opening plenary 39% represented Policy & Management, 37% Science, 4% Industry, 9% NGO and 11% others. At the Session A representation shifted slightly to Science, with 35% representing Policy & Management, 47% Science, 6% Industry, 6% NGO and 6% others.

During the second day there were 86 unique viewers, with 70 maximum concurrent viewers. In the session on Strategic objective B 41% represented both Policy & Management and Science, 7% Industry, 6% NGO and 6% others. The numbers stayed almost identical for the session Strategic objective C, with 40% representing Policy & Management, 43% Science, 8% Industry, 4% NGO and 6% others.

During the last day of the webinar there were 74 unique viewers, with 60 maximum concurrent viewers.

The sectoral representation throughout the SOW was considered good, with nearly half of the online participants representing policymakers. This consistently big share of the Policy & Management sector in the mix of the very proactive SOW participants transpires well with the policy-driven nature of the future BANOS Programme as is planned in the BANOS CSA.

4.2 Summary of the participants' questions during the SOW

The SOW participants had the possibility to interact with the panellists in real-time by asking questions during all the five sessions spread across the three days of the SOW. A total of 130 questions (Figure 3) were put to the respective panellists and all the questions were answered during the panel sessions. The only exception was the thematic session B in which, nevertheless, most of the questions were answered prior having to close the session for the (delayed) 'Day 2' lunch break.

In the opening plenary, the greatest number (38) of questions were asked. Judging by the 'likes' made by the participants, the most popular questions were asked in the thematic session A (Healthy Seas and Coasts) and session B (Sustainable Blue Economy). Within the session A, questions were especially related to specific objective A.4 (Efficient techniques for environmental monitoring), and within session B to specific objective B.1 (Sustainable resource management of marine global commons). Also, in the session C (Human Wellbeing), the specific objective C.1 (Safe Food and Feed) received ample amount of questions and discussion among the panellists and the participants.

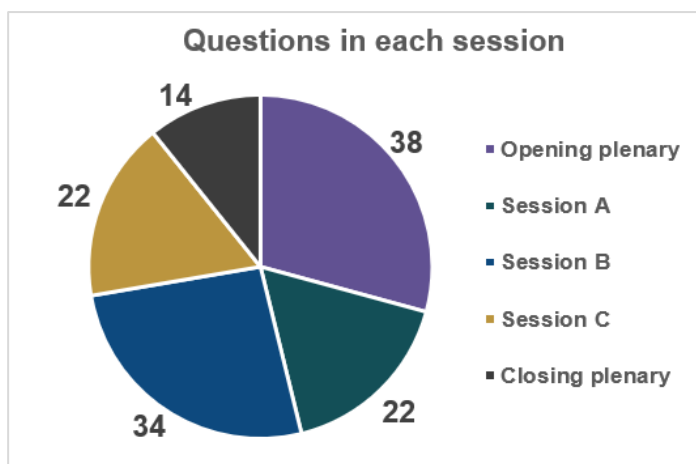


Figure 3: Number of questions asked in each of the BANOS SOW sessions. For more details on the sessions, see Annex 3 for the SOW agenda

While the content of the questions was to a great extent specifically related to details of the specific themes, also some common questions were raised during the different sessions:

- how to ensure the integration if the topic within the theme is covered in more than one specific objectives?
- how to ensure stakeholder involvement and dissemination of results?
- how to ensure industry involvement, including specifying funding share to small and medium-sized enterprises (SMEs), required technology readiness levels (TRL), etc?

4.3 Summary of the participants' feedback on the pre-draft BANOS SRIA research and innovation themes

The SOW participants submitted a total of 151 online feedback forms to the online submission portal. All draft R&I themes (Annex 6) received some feedback (Figure 4). In total, 74 forms were submitted to the thematic session A (Healthy Seas and Coasts), 53 to thematic session B (Sustainable Blue Economy) and 24 to thematic Session C (Human Wellbeing). On average 5 feedback forms were submitted per R&I theme, however, the most feedback was received by theme B.1.1 (10 forms) followed by themes A.1.4 (9 forms) and A.4.3, B.1.2 and C.1.1 (8 forms), respectively. Themes A.2.3, A.4.1 and C.2.2 received of the least feedback of all themes with 2 forms submitted on each.

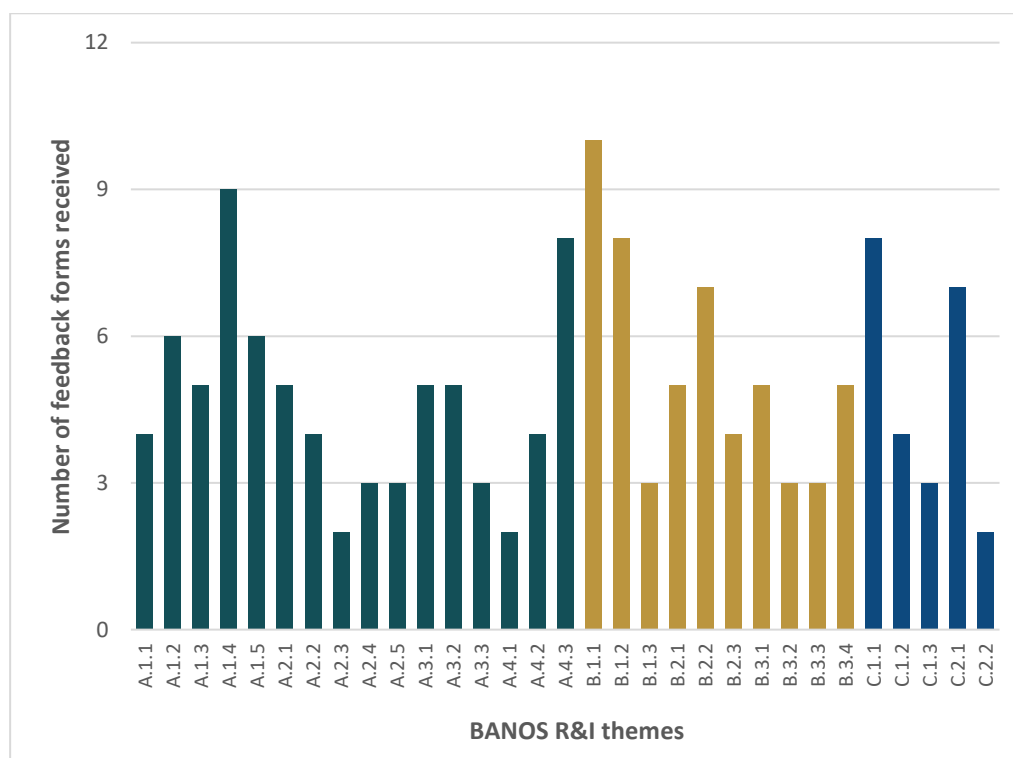


Figure 4: Number of online feedback forms submitted during the thematic sessions. In green session A: Healthy Seas and Coast, in gold session B: Sustainable Blue Economy and in blue session C: Human Wellbeing. See Annex 6 for the full titles of the R&I themes.

4.3.1 Priority and geographical scope of the R&I themes

In general terms, the participants considered the content of the pre-draft SRIA very relevant and topical, reflecting the R&I needs of the BANOS regions (Figure 5 A). Of the submitted feedback, 97% of the entries suggested the R&I themes commented to have either high or medium priority in respect of their inclusion in future calls. Of the 31 themes, four R&I themes (A.1.2, A.2.5, A.3.3 and B.1.2, respectively) were ranked only as top priority (Table 1). Another five R&I themes (A.1.1, A.1.4, A.2.2, A.3.1 and C.1.1) were

considered to be relatively high priority, scoring 'top scores' for 75% or above of the submitted forms per the R&I themes in question (Table 1 A). No R&I theme was ranked only 'low' scores.

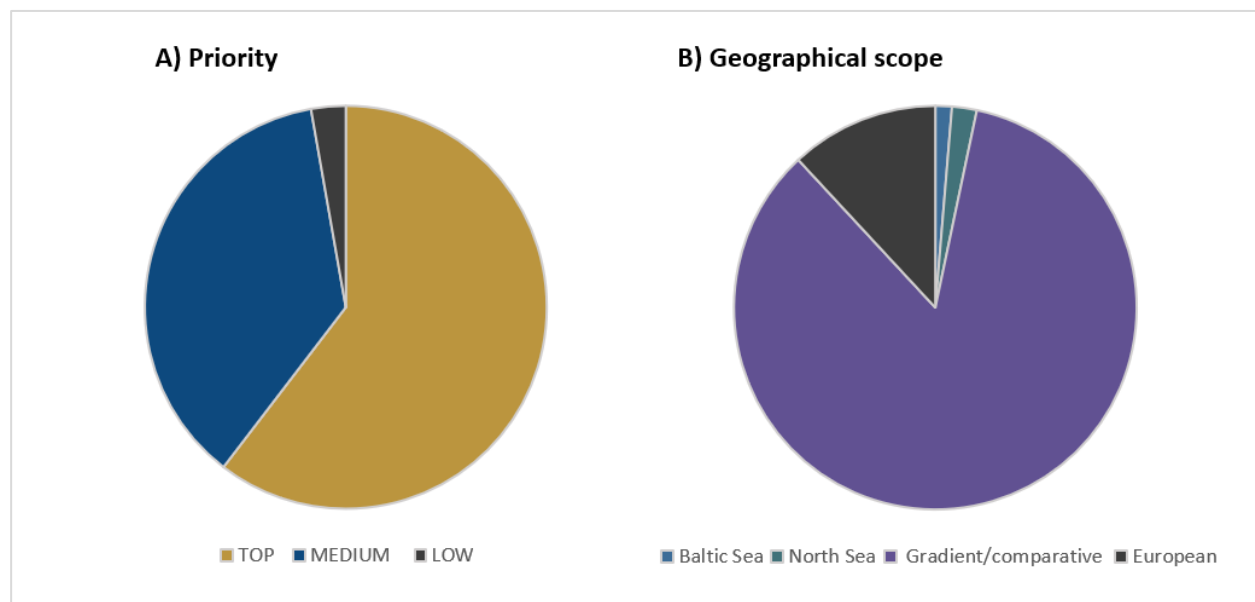


Figure 5: The participants were asked to rank the A) priority of the draft R&I themes in respect to potential future calls and B) the geographical scope of the R&I themes in terms of best study approach.

Table 1. The draft titles of R&I themes as listed in pre-draft SRIA distributed in advance of the SOW to all participants. Section A.) R&I themes scoring only 'top priority' and 'high priority' in the online feedback. Section B.) R&I themes considered best for gradient approach across the Baltic Sea and North Sea, and themes more suitable for a wider, European approach.

A) PRIORITY	
Top priority only R&I themes	
A.1.2	Understanding critical components of marine ecosystem resilience and drivers of change
A.2.5	Develop fast feedback mechanisms from maritime observation to support surveillance and control activities, evaluation of management measures and risk-assessment
A.3.3	Development of models to predict tipping points or cascade effects in biological systems, including identification of the drivers of the changes and their impact on biota
B.1.2	Explore possibilities for innovation in seafood and zero food waste throughout the entire production system, for example, through valorization of bycatch and recycling of waste
Relatively high priority R&I themes (top score $\geq 75\%$)	
A.1.1	Understanding food-web interactions and their services, with respect to species, population and system levels
A1.4	Scientific support for the implementation of the ecosystem approach
A.2.2	Evaluation of effectiveness and cost-effectiveness of various pressure mitigation actions
A.3.1	Development of machine learning methods for ecosystems data analysis and models
C.1.1	Sustainable and safe fisheries, aquaculture and food production in the sea and on land under the changing climate
B) GEOGRAPHICAL SCOPE	
100% score for 'Gradient/comparative BANOS approach'	
A.1.1	A.1.1 Understanding food-web interactions and their services, with respect to species, population and system levels
A.1.3	Understanding the potential of marine organisms and ecosystems to adapt to rapid environmental changes (e.g. climate change and ocean acidification).

A.1.4	Scientific support for the implementation of the ecosystem approach
A.2.1	Understanding the impact of land-derived pollution, litter and nutrients on the status of the marine environment and ecosystem services (e.g. fish stocks, aquaculture and tourism), including ways to reach good environmental status (GES)
A.2.3	Evaluation of synergies and conflicts of targets and innovative solutions to assess environmental status in relation to different environmental targets, taking multiple stressors into consideration
A.2.4	Development of alternative policy instruments and new governance structures, which respond to current and future sustainability challenges
A.2.5	Develop fast feedback mechanisms from maritime observation to support surveillance and control activities, evaluation of management measures and risk-assessment
A.3.1	Development of machine learning methods for ecosystems data analysis and models
A.3.2	Improved, ecologically relevant modelling of underwater landscapes and the associations between species and abiotic parameters
A.4.1	Application of powerful DNA approaches to monitor ecosystem resilience and changes
B.2.1	Integrated analyses of the ecosystem and social-economic system, describing and quantifying linkages between human activities, pressures, state of the environment, ecosystem services and human welfare to support the implementation of the ecosystem approach in marine policies
B.2.3	Incorporation of ecosystem goods and services into national accounts (cf OECD, UN environment)
B.3.1	Secure, clean and efficient renewable energy
B.3.3	Towards a smart blue economy
C.1.2	Update of strategies for reduction of health risks from toxic substances in regional sea food and feed chains
C.2.2	Developing innovative and sustainable blue tourism and recreation
European approach (score of ≥33-60%)	
A.3.3	Development of models to predict tipping points or cascade effects in biological systems, including identification of the drivers of the changes and their impact on biota
B.1.2	Explore possibilities for innovation in seafood and zero food waste throughout the entire production system, for example, through valorization of bycatch and recycling of waste
B.1.3	The development of multifactorial marine spatial planning management tools as knowledge bases for the competing demands of space utilization and ocean challenges
B.3.4	Technological aspects of development of new recyclable materials, pharmaceutical substances, food products and natural fabrics from marine resources

The geographical scope of the intended future BANOS Programme is both the Baltic Sea and North Sea. Therefore, it is important that the final R&I themes are highly relevant for both seas. To assess this, the participants were asked to indicate the most appropriate geographical scope region of the R&I themes. Four options were included: 1.) this theme is specific for the Baltic Sea, 2.) this theme is specific for the North Sea, 3.) this theme is best addressed in a gradient/comparative study involving both the Baltic Sea and the North Sea, and 4.) this theme is best addressed in a study covering other European sea basins.

The results clearly indicate that majority of the draft R&I themes are highly relevant for both sea basins with 16 themes receiving a 100% score for 'Gradient/comparative BANOS approach' (Figure 5 B, Table 1 B) and further 9 themes receiving a score of ≥75%. A few R&I themes (A.3.3, B.1.2 and B.1.3 respectively), however, were considered to be relevant also on a wider European regional scale, scoring ≥33-50% for 'European approach'. Only one theme (B.3.4) was clearly suggested to be best assessed on a European level, receiving a score of 60% for the 'European approach'. No themes were considered to be specific for only one sea basin, and only negligible scores were given in these categories.

In respect to the results (Figure 5, Table 1) discussed above, it should be kept in mind that the both the priority labelling as well as the geographical scope analyses should be considered with care due to the variable and, in case of some R&I themes the limited amount of feedback received (Figure 4), which could

possibly skew the results. Nevertheless, the results here can be used as a preliminary guideline reflecting the general orientation of perspective within the BANOS stakeholder community. This outcome should be discussed further within the BANOS CSA consortium and putative future research funders.

4.3.2 Other general feedback

All draft R&I themes received feedback, including suggestions for modifications and improvements (Figure 4). Much of the feedback was very specific for the R&I theme in question and hence will not be outlined here further. However, general feedback applicable to multiple themes or the whole SRIA were also received. These are summarized below.

General positive feedback was received for the content of the pre-draft SRIA including:

- The structure of the R&I themes was considered very appropriate and especially the section “State of the art and knowledge gaps” useful, which should be used as a basis to build new research and innovation on.
- The sister seas approach was commented to be useful and comparison of the two seas very appropriate in many cases. It was also mentioned that the Baltic Sea and North Sea could be used as models and/or case studies, from which the results could later be translated into practices in other areas.
- The content of the pre-draft SRIA was also complemented to be closely connected to existing policy landscape and having an overarching inclusion of climate change.

General constructive feedback on how to improve the pre-draft SRIA content was also received including:

- Interlinkages should be clearly identified among the R&I themes and also determined on the specific objectives level. For example, existing interlinkages were pointed out to be very evident among the R&I themes falling into A.1 and A.3, however, modelling (A.3) aspects were also pointed out to be relevant for R&I themes falling under C1, especially C.1.2 and C.1.3. Also linkages between A.1 and B.1 should not be overlooked.
- Case studies were considered useful, however, only if the results can be extrapolated to general level and something can be learnt from them in respect to the functioning of the whole eco- and human system.
- Social sciences should be further strengthened and incorporated into the content of the R&I themes. Also, understanding of human behaviour should be included, for example, in respect to understanding behaviour to littering and plastic pollution and related consumer behaviour.
- In some cases, the relevance of regional specifics should be further strengthened.
- The current draft is strong on research, yet more emphasis is needed for innovation.
- The current COVID-19 situation should be considered and how future R&I can prepare for such a situation in a future, for example, in terms of securing food supply chains and human health.

4.4 BANOS CSA Advisory Board feedback

The task of the BANOS CSA Advisory Board (AB) is to assist the BANOS CSA SC and its Coordinating office by providing independent advice, guidance and recommendations regarding scientific and policy-related issues of relevance to BANOS CSA in setting up the framework for the future BANOS Programme. For covering the broad field of expertise needed to fulfil this task, eight experts have been nominated as members of the AB (see Annex 7).

The pre-draft BANOS SRIA, as well as the agenda and a preview of the ONLINE SOW work sheet were sent to the AB members by the Coordinating office on 28 February 2020. This allowed one month’s time for familiarising with the SRIA as the pre-SOW homework. Two AB members sent their comments in advance and six members attended the SOW during 31 March – 2 April 2020 through the Zoom webinar. During the SOW, the AB members raised questions and submitted their evaluations through online thematic

worksheets on the Strategic Objectives. The AB members came together twice in closed, online sessions for formulating its feedback, which was presented orally in the closing plenary by Professor Donald Boesch (University of Maryland Center for Environmental Science, US) and later sent written to the BANOS CSA Coordinator. The minutes of the AB meetings during the SOW are in Annex 8.

The AB was very positive about both the contents of the pre-draft SRIA and the practical organisation of the SOW. Altogether, the AB gave eight general comments respective to the three Strategic Objectives. In the brief summary below, emphasis is on suggestions for further development of the SRIA. A more detailed text with praising and justifications is given in Annex 9.

General comments and recommendations

1. **Pre-draft Strategic Research and Innovation Agenda (SRIA).** The objectives should go beyond an aspirational list to become SMART (specific, measurable, achievable, relevant and timely), so that their outcomes can be evaluated, not just their outputs such as publications. There should be a clear emphasis on improvements specifically in the Baltic and North Seas, which serve as a testbed of global significance. A condensed, punchier version of the SRIA should also be produced, as well as shorter versions targeted at specific audiences (e.g. policymakers, industry, news media, etc.).
2. **Strategic Objectives and their integration.** As there are substantial relationships and interdependencies among the strategic objectives, it would be useful to provide some higher-level integration, perhaps accompanied with graphical representations (particularly if aimed at policymakers, media, general public). The SRIA could benefit from the inclusion of figures and exemplary boxes in order to make it more approachable for readers.
3. **Relevance to policy setting and dynamics.** In addition to comprehensive inventory of regional, European and global policies, a number of additional recent global activities and reports that are relevant should be considered. While ecosystem based management is the central integrating notion among the three Strategic Objectives, the implementation of the programme should not, however, be overly prescriptive, and should allow the pursuit of novel and even nonconformist or risky scientific ideas and approaches in the future.
4. **Climate change agenda.** It is very important the SRIA strives to address the climate change crisis both through mitigation and adaptation across its objectives. This will, however, require effective collaboration with the scientific and other communities engaged in climate change assessments and responses.
5. **Risks and opportunities.** The SRIA needs to address the treatment of risks versus opportunities in a more balanced way, focusing more on the opportunities for innovation and solutions for mitigating and adapting to climate change, rather than just describing the risks. Science and innovation should be harnessed to guide recovery more effectively and efficiently. The science required for management measures and policy development should be conceived and executed as a component of risk assessment and management.
6. **Participation and transparency.** The SRIA should make clear the extent of contributions from industry, social and health sciences, decisionmakers and local stakeholders. It should reflect how the perspectives of people living around the Baltic and North Seas have been considered. The SRIA should include a plan for the engagement of these sectors in the implementation phase of BANOS.
7. **Impact enablers.** A coherent strategy for enabling impact through various mechanisms described in SRIA would be an improvement. This strategy should include the identification of responsibilities of individual projects and tasks assumed by the programme as a whole. All parts of the stakeholder typology should be engaged, from those carrying out and regulating activities to the beneficiaries and those influencing the policy agenda. BANOS should ensure that the end users are involved in the implementation and endorse and commit to using the research and innovation being carried out. Monitoring and assessment should differentiate between outcomes (e.g. environmental improvements, changes in policies, etc.) and outputs [e.g. publication, conferences, etc.). The already started synthesis and user consultation should be ongoing throughout the research and innovation processes; not activities that just happen at their conclusion.

- 8. Identifying priorities.** The SRIA should whittle down the list of themes. Beyond that, the SRIA should clearly state the overall high-level principles and process by which funding priorities will be determined. It is particularly important that the SRIA takes into account national research strategies in order to obtain synergies and prevent duplication of effort.

The BANOS drafting team has started consolidating the received AB feedback and assimilating it in preparation of the draft SRIA together with the other SOW participants' feedback received (see Figure 1).

4.5 Summary of the general feedback on SOW arrangement

In general, achieving a smooth and well-organised event appears to be a shared opinion by the BANOS Coordinating office and the participants of the SOW based on the feedback and many compliments received from inside and outside of the BANOS consortium during and after the SOW.

According to the results of the participant poll that was carried out during the closing plenary session (Figure 6), 86 % of the 50 participants taking part in the voting were satisfied with the meeting and had a view that the content of the webinar delivered well against their expectations. Also, a clear majority of the participants (>70%) found the presentations interesting, informative, and valuable. In contrast, only 4% of the participants found the content of the webinar not to deliver against their expectations.

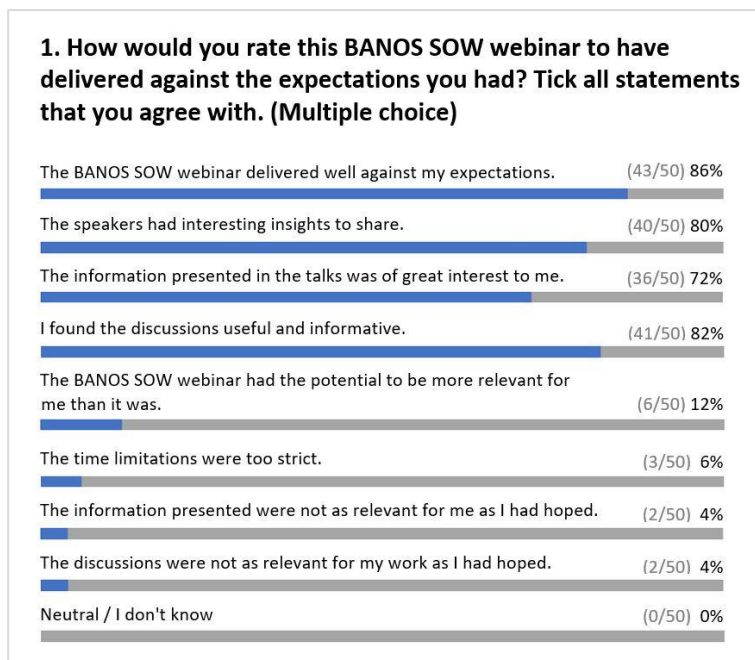


Figure 6: Participants feedback on the SOW. The poll was run during the closing plenary session. The poll clearly indicates that the participants were very happy with the content and format of the SOW.

Some examples of the SOW participant feedback received by the Coordinating office at the end of SOW on 2 April 2020:

"I want to express my sincere appreciation for your work with the SOW! I am really impressed that you were able to organize everything so efficiently and well at such a short period of time."

"THANKS once more for a very, very well organised, hosted and run e-ws. Impressive! And the discussions were very good, too!"

"Thanks for all your hard work 'behind the screen'. I think it has been instrumental in the success of the workshop."

"Thank you for an extremely well completed web meeting!!"

5 Next steps of the SRIA process post-SOW

The work of the recruited BANOS drafting team will end on 31 May 2020. By then the draft BANOS SRIA is intended to be complete, including the incorporation of the SOW participants' stakeholder feedback (chapter 4.3) and the Advisory Board feedback (chapter 4.4).

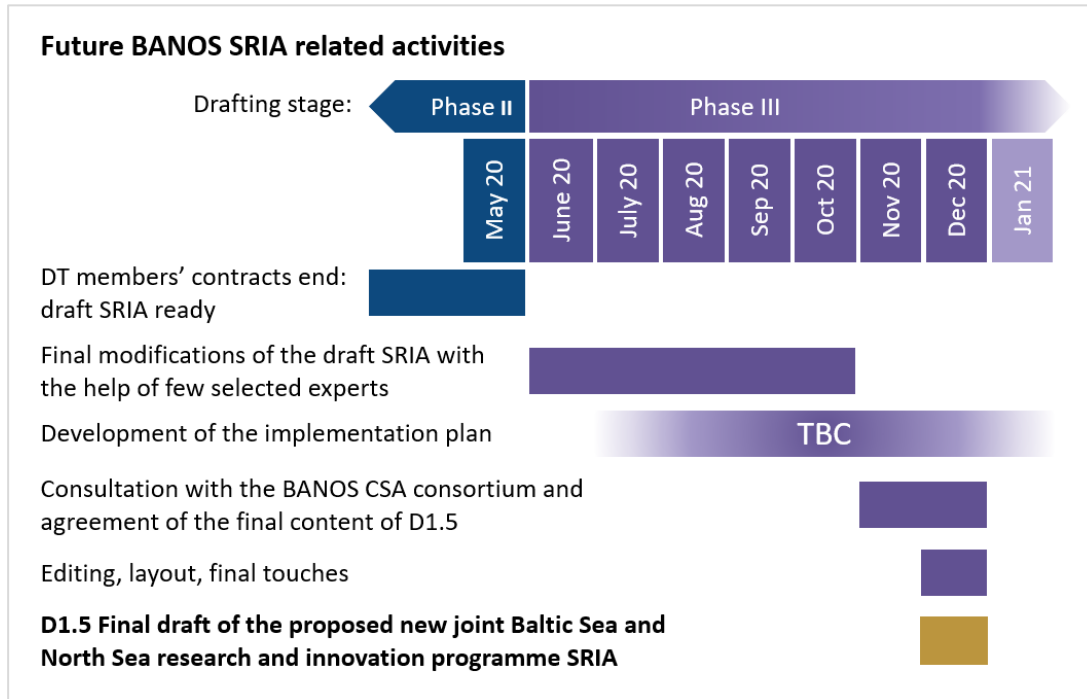


Figure 7: A detailed steps in development of BANOS SRIA after the SOW. The development timeline of the implementation plans is approximate and to be confirmed (TBC). For an overview on different phases of the BANOS SRIA, see Figure 1.

The subsequent steps of the BANOS SRIA process (Phase III) are outlined in the Figure 7. This phase aims to finalizing the BANOS SRIA, or BANOS deliverable *D1.5 Final draft of the proposed new, joint Baltic and North Sea research and Innovation Programme SRIA* ready, latest by early 2021.

The final modifications and critical evaluation of the draft SRIA will commence in June 2020. This work, which will ensure that the document is consistent and the research and innovation priorities of the BANOS region are thoroughly covered, is likely to be carried out by the coordinator together with a few selected external experts. In addition, during this time period the SRIA preface, executive summary and introductory chapters on each of the three strategic objectives will be written.

The chapter on the policy landscape included already in the pre-draft SRIA, which outlines how the BANOS SRIA is closely associated with many regional, European and global policies, will be also reviewed and updated against any recent developments in the relevant field to ensure its timeliness.

Many BANOS deliverables in Work Package 4 titled *Specific measures reinforcing future programme's lasting impact* are due in November 2020. Therefore, the current chapter on *impact enablers* will be updated as the impact strategies on open science, data and innovation, human capacity building, citizen science etc. are further developed this summer and the coming autumn.

A distinguishing character of the BONUS Art. 185 Strategic Research Agenda (SRA) is its integration to actual implementation (e.g. the intended content and timing of the competitive calls for R&I proposals). This linking, set concretely in the very core of the programme's main document, expressed policy commitment and provided certainty and therefore was also highly appreciated by the BONUS stakeholder community – both the implementers of R&I as well as potential users of R&I outcomes. Following suit, similar approach was planned in BANOS CSA. The current rapid development of the policy context may,

however, prompt revisiting of this approach, e.g. in order to achieve coherence with the possible pan-European Blue Economy partnership's SRIA. The decision on this matter will be taken by the BANOS CSA Consortium during the coming months. Should it be decided that the SRIA shall still include implementation plan elements, the work on the implementation plan for the BANOS SRIA will commence in the latter part of 2020 and possibly extend into 2021. The work will involve:

- Analyses of interlinkages of R&I themes, to identify which themes would compliment each other best in a specific call.
- Assessment of prioritisation of R&I themes. The funding organisations will be consulted in respect to their wishes and priorities. In addition, SOW stakeholder feedback will be consulted.
- Analyses of the regional scope of the R&I themes, to assess which themes are most relevant for both the Baltic Sea and North Sea, and which themes, for example, may be more appropriate for Pan European approach. The results of this analyses may also help with the prioritisation of R&I themes.

After the final draft is ready, it will be presented to the BANOS Steering Committee's approval. The next BANOS SC meeting is scheduled for 4 November 2020, which would be a convenient data for discussing and potentially approving the deliverable D1.5.

Prior to the external publishing, the final BANOS SRIA will undergo still a thorough editing and layout process. The published BANOS SRIA will start the BANOS report series (number 1) and its executive summary will be extracted and issued as a general, brief introduction to the BANOS SRIA while also other, targeted, 'stakeholder audience specific' versions of the BANOS SRIA will be considered and developed as appropriate e.g. to cater for policymakers, society at large etc.

6 Conclusions

- The design and running of BANOS SOW (31 March – 2 April) was transferred in a last minute to a fully web-based workshop run on Zoom Webinar platform due to the force majeure circumstances caused by the COVID-19 pandemic in spring 2020.
- The web-based SOW, including opening and closing plenary and three thematic sessions dedicated to three strategic objectives of BANOS, proved to be very successful and the core objective of the SOW *'to enable early, real, and substantial engagement of the stakeholders in programme's work by co-designing the main programmatic document of BANOS'* was filled.
- In total over 100 stakeholders representing primarily policy and science but also including representatives of industry and NGOs attended the web-based SOW.
- During the online sessions, the participants were very active and engaged during all the sessions. In total 130 questions were asked during the three days and great majority of the questions answered by the panellists during the sessions.
- Plentiful written feedback was received on the three thematic parts of the pre-draft SRIA that were submitted by the participants via an online submission portal specifically set up on BANOS-website for this purpose. A total of 151 online feedback forms were received that covered all 31 draft R&I themes included in the pre-draft SRIA with 74 forms submitted to the thematic session A (Healthy Seas and Coasts), 53 to thematic session B (Sustainable Blue Economy) and 24 to thematic Session C (Human Wellbeing).
- Recommendations on the pre-draft SRIA were also provided and presented by the BANOS CSA Advisory Board.
- After the SOW, all the feedback was passed to the BANOS SRIA drafting team who will critically evaluate and carefully consider all the stakeholder and AB comments and modify the content of the pre-draft SRIA accordingly.

7 Annexes

Annex 1 Invitation template

Annex 2 Participant list

Annex 3 BANOS SOW agenda

Annex 4 List of panellists

Annex 5 Online feedback form

Annex 6 Pre-draft SRIA R&I themes

Annex 7 Composition of BANOS CSA Advisory Board

Annex 8 Minutes of the BANOS CSA Advisory Board meeting

Annex 9 BANOS CSA Advisory Board report on SRIA

Date, Helsinki

Dear XXX,

You have been nominated as a representative of xxx by the [Belgian/Danish/etc.] member of the Steering Committee for the Baltic and North Sea Coordination and Support Action (BANOS CSA) to attend the BANOS Strategic Orientation Workshop (SOW) on 31.3.-2.4.2020 in Leiden, The Netherlands.

OR

You have been nominated by BONUS EEIG, the Coordinating Office of the Baltic and North Sea Coordination and Support Action (BANOS CSA), to attend the BANOS Strategic Orientation Workshop (SOW) on 31.3.-2.4.2020 in Leiden, The Netherlands.

We hereby cordially invite you to join us and ask for your contribution to the BANOS SOW. We would be most grateful if you would be able to lend your time and expertise on this occasion. Should you be joining us, your travel and accommodation costs would be covered by the BANOS CSA Coordinating Office.

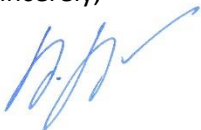
The main objective of the SOW is to achieve consensus concerning the content of the future Baltic and North Sea Strategic Research and Innovation Agenda (BANOS SRIA) among the funding organisations, major stakeholders and scientists. Approximately 100 people will attend representing science policy as well as natural and socio-economic sciences and innovation.

We have enclosed the draft agenda of the SOW, the draft BANOS SRIA objectives and themes, and the BANOS CSA brochure for your immediate reference. Further additional information and supportive documents [i.e. participants' list, participants' guide, logistical information etc.] will be provided in the run-up period to the SOW. More information about BANOS CSA can be obtained at www.banoscsa.org.

We would be grateful for your **confirmation of attendance by Monday, 13 January 2020** by emailing to tiina.launiainen@bonuseeig.fi. Should you require any further information related to the preparations of the SOW at this point of time, please do not hesitate to get in touch with us.

We look forward to welcoming you to Leiden in late March 2020,

Sincerely,



Andris Andrusaitis
Coordinator of BANOS CSA
Acting Executive Director of BONUS EEIG

Baltic and North Sea Coordination and Support Action (BANOS CSA): Web-based Strategic Orientation Workshop (SOW)

31 March – 2 April 2020, coordinated by BONUS EEIG in Helsinki, Finland

Participant list

Name	Organization
Ahtiainen, Heini	HELCOM
Aigars, Juris	Latvian Institute of Aquatic Ecology
Ancans, Janis	VIAA
Andersson, Helén	Swedish Meteorological and Hydrological Institute
Aslan, Filiz	PtJ
Bagdonaite, Edita	Agency for Science, Innovation and Technology
Baines, Rhodri	Centre for Environment, Fisheries and Aquaculture Science
Bartule, Inese	Ministry of Agriculture of Latvia
Bergström, Lena	Swedish University of Agricultural Sciences
Błaszczak, Cezary	NCBR
Blauw, Anouk	Deltares
Blok, Daan	NWO
Boesch, Donald	University of Maryland CES
Bonsdorff, Erik	Åbo Akademi University
Born, Wolf	Ministry of the Interior and for Europe Mecklenburg-Vorpommern
Brenča, Lāsma	SEDA
Brudevoll, Anders	JPI Oceans
Byrith, Christian	North Sea Region programme
Debruyne, Dries	De Blauwe Cluster
Dekeling, René	Ministry of Defence
Duchovskiene, Zita	Ministry of Education, Science and Sport of Lithuania
Elliott, Michael	University of Hull
Engelbrektsson, Magnus	CPMR North Sea Commission
Enserink, Lisette	Rijkswaterstaat
Fleming, Lora	University of Exeter Medical School

Freiherr von Lukas, Uwe	Fraunhofer
Ghijsselen, Jozef	VLAIO
Gipperth, Lena	University of Gothenburg
Gøtke, Niels	Danish Agency for Science and Higher Education
Habicht, Mari	ETAG
Haldin, Jannica	HELCOM
Hancke, Torunn	Norges Forskningsråd
Harms, Joachim	FZJ Beteiligungsgesellschaft mbH
Heller, Marit	norwegian research council
Heral, Maurice	ANR
Herman, Peter	Deltares
Heteren, Sytze	TNO - Geological Survey of the Netherlands
Heymans, Sheila	European Marine Board
Hjerpe Olausson, Jessica	Region Västra Götaland/ North Sea Commission
Hoopen, Floor	Swedish Agency for Marine and Water Management
Humborg, Christoph	Stockholm University
Hummel, Herman	Royal Netherlands Institute for Sea Research
Hyytiäinen, Kari	University of Helsinki
Jennings, Simon	ICES
Johansson, Sif	konsult Formas
Jürjens, Ene	Ministry of Economic Affairs and Communication, Estonia
Kiefer, Thorsten	JPI Oceans
Kolosova, Elena	Interreg Baltic Sea Region Managing Authority/Joint Secretariat
Kononen, Kaisa	BANOS
Köster, Friedrich	Innovation Fond Denmark
Krüger, Careen	Project Management Jülich
Külmallik, Eve	Ministry of Rural Affairs, Estonia
Laamanen, Maria	Ministry of the Environment
Latacz, Michał	NOA Marine
Launiainen, Tiina	BONUS EEIG
Le Roux, Xavier	BiodivERSa
Lefever, Koen	BELSPO - Belgian Federal Science Policy Office

Lehtimäki, Jaana	Academy of Finland
Lericolais, Gilles	Ifremer
Lescrauwaet, Ann-Katrien	VLIZ
Lindblad, Cecilia	Swedish Environmental Protection Agency
Lips, Urmas	Tallinn University of Technology
Lisbjerg, Dennis	DTU Aqua
Mahnke, Petra	Gesellschaft für Maritime Technik e.V.
Malde, Ketil	Institute of Marine Reserach, Norway
Marchal, Paul	Ifremer
Martens, Chantal	VLIZ- Flanders Marine Institute
Martinsone, Inese	Council of Human Biomonitoring/ Riga Stradins university
Mawduk, Paweł	Mawi Consulting Engineer
Merkus, Henk	Netherlands' ministry of Infrastructure and Watermanagement
Metaal, Rosalie	Ministry of Agriculture, Nature & Food quality
Meyer, Stefan	BaMS / CAU
Moguedet, Philippe	IFREMER
Neyts, Alexandra	European Aquaculture Technology and Innovation Platform (EATiP)
Ollikainen, Markku	University of Helsinki
Pintz, Anne	North Sea Region Programme Joint Secretariat
Pirttimaa, Lotta	Ocean Energy Europe
Plesner, Lisbeth	Dansk Akvakultur
Reeves, Stuart	Cefas
Rense, Ronald	Rijkswaterstaat
Risager-Simonsen, Christian	DTU Aqua
Sahin, Ezgi	METU, Institute of Marine Sciences
Salihoglu, Baris	METU
Saout, Claire	ANR
Sarna, Olga	The MARE Foundation
Schallier, Ronny	MUMM-RBINS
Scharin, Henrik	Formas
Schrum, Corinna	Helmholtz Zentrum Geesthacht
Seidel, Gerd	Sea & Sun Technology GmbH

Sirendi, Meelis	BONUS
Stagnol, Doriane	AQUIMER
Stancikaite, Migle	State Research Institute Nature Research Centre
Suni, Tanja	Ministry of the Environment
Thoreson, Ottilia	WWF Baltic Ecoregion Programme
Ulvila, Minna	BONUS
Urtans, Evalds	Latvian fishermen federation
Ustups, Didzis	SEDA
Uygurer, Pinar	METU IMS
van Rijswick, Marleen	Utrecht university
Vandegehuchte, Michiel	Flanders Marine Institute (VLIZ)
Viitasalo, Markku	Finnish Environment Institute SYKE
Wallberg, Petra	Formas
Willemsens, Laura	Netherlands Enterprise Agency (RVO)
Yucel, Mustafa	METU Institute of Marine Sciences
Yven, Claude	ANR - France
Zweifel, Ulla Li	Swedish Institute for the Marine Environemnt

Baltic and North Sea Coordination and Support Action (BANOS CSA): Web-based Strategic Orientation Workshop (SOW)

31 March – 2 April 2020, coordinated by BONUS EEIG in Helsinki, Finland

Moderators of the BANOS SOW: Andris Andrusaitis and Karoliina Koho, BONUS EEIG

Tuesday 31 March 2020 (all times in CEST)

- 09:00 **Opening plenary, Welcome by hosts** Andris Andrusaitis, BANOS CSA Coordinator, Acting Executive Director, BONUS EEIG and Karoliina Koho, Project Officer, BANOS CSA
- 09:10 **Regional seas perspective: Why a ‘sister seas’ approach?** Ann-Katrien Lescrauwaet, Director of International Relations, Flanders Marine Institute, Belgium
- 09:30 **BANOS Strategic Research and Innovation Agenda, overall framework and summaries of the objectives** Petra Wallberg, Senior Research Officer, Sweden’s Research Council for Sustainable Development
- 09:50 **Policy landscape** Karoliina Koho
- 10:10 **Impact enablers** Floor ten Hoopen, Science Affairs Department, Swedish Agency for Marine and Water Management
- 10:30 **Panel discussion and participants’ questions** Andris Andrusaitis, Ann-Katrien Lescrauwaet, Karoliina Koho, Floor ten Hoopen and Sif Johansson (instead of Petra Wallberg, Sweden’s Research Council for Sustainable Development)

For participants: Ask questions throughout the session using the webinar tool provided!

Closing the session as and when discussion and participant questions have been addressed, or latest by noon.

Lunch break

- 13:00 **Introduction to the BANOS SRIA thematic work** Andris Andrusaitis and Karoliina Koho
BANOS Strategic Objective A: *Healthy Seas and Coasts* – introductions
- 13:10 **A.1: A resilient marine ecosystem** Christoph Humborg, Professor of Coastal Biogeochemistry and Scientific Director of the Baltic Sea Centre, Stockholm University, Sweden
- 13:20 **A.2: Seamless governance linking land, coast and sea** Ulla Li Zweifel, HELCOM/Research Coordinator, University of Gothenburg, Sweden
- 13:30 **A.3: Digital Ocean - Competent ecosystem modelling, assessments and forecasting** Peter Herman, Professor of Ecological Hydraulic Engineering, Delft University of Technology, the Netherlands
- 13:40 **A.4: Efficient techniques for environmental monitoring** Urmas Lips, Professor of Marine Physics, Tallinn University of Technology, Estonia
- 13:50 **Panel discussion and participants’ questions** Christoph Humborg, Ulla Li Zweifel, Peter Herman, Urmas Lips are joined by members of the BANOS SOW drafting team on their respective spheres of expertise as needed depending on participants questions:
A.1.2 Nils-Christian Stenseth, Research professor of Ecology and Evolution at Department of Biosciences, University of Oslo, Norway

A.1.2, A.1.3, A.4.1 Kerstin Johannesson, Professor in Marine Ecology and Director of Tjärnö Marine Laboratory, University of Gothenburg, Sweden
 A.2.3, A.2.5, A.4.2, Lisette Enserink, Senior policy advisor, Rijkswaterstaat, the Netherlands
 A.2.4 Lena Gipperth, Director for the Center of Sea and Society, University of Gothenburg, Sweden
 A.3.1, A.4.1 Ketil Malde, Associate Professor, Department of Informatics, University of Bergen, Norway
 A.4.3 Michiel Vandegehuchte, see C

For participants: Submit your feedback on R&I themes of the A session using the BANOS SOW work sheet available at www.banoscsa.org/SOW20 from 13:00 until 16:30 (31 March), and ask questions throughout the session using the webinar tool provided!

Closing the session as and when discussion and participant questions have been addressed, or latest by 16:30.

Wednesday 1 April 2020 (all times in CEST)

09:30 **BANOS SRIA thematic introduction continues, Welcome by hosts** Andris Andrusaitis, Karoliina Koho
BANOS Strategic Objective B: Sustainable Blue Economy – introductions
 09:40 **B.1: Sustainable resource management of marine global commons** Dennis Lisbjerg, Head of Section for Maritime Service, Denmark's Technical University, Denmark
 09:50 **B.2: Understanding the value of ecosystem goods and services** Kari Hyytiäinen, Professor in Economics of Marine Protection, University of Helsinki, Finland
 10:00 **B.3: Smart Seas - sustainable, circular and bio-based blue solutions** Uwe von Lukas, Professor Maritime Graphics, Fraunhofer Institute for Computer Graphics Research, Germany
 10:10 **Panel discussion and participants' questions** Dennis Lisbjerg, Kari Hyytiäinen, Uwe von Lukas are joined by members of the BANOS SOW drafting team on their respective spheres of expertise as needed depending on participants questions:
 B.1.1 Paul Marchal, Head of Department of Fisheries Resources - Channel/North Sea, IFREMER, France
 B.1.1 Chantal Martens, Innovation Officer, Flanders Marine Institute, Belgium
 B.1.2 Stuart Reeves, Principal fisheries scientist & advisor, Cefas Lowestoft Laboratory, United Kingdom
 B.1.3 Lisette Enserink, see A
 B.1.3 Lena Gipperth, see A
 B.2.1 Heini Ahtiainen, Project Coordinator, HELCOM
 B.3.1, B.3.3, B.3.4 Jessica Hjerpe Olausson, Senior Maritime Expert, Region Västra Götaland, Sweden

For participants: Submit your feedback on R&I themes of the B session using the BANOS SOW work sheet available at www.banoscsa.org/SOW20 from 09:30 until 12:00 (1 April), and ask questions throughout the session using the webinar tool provided!

Closing the session as and when discussion and participant questions have been addressed, or latest by noon.

Lunch break

- 13:00 **BANOS SRIA thematic introduction continues Welcome back by hosts** Andris Andrusaitis, Karoliina Koho
BANOS Strategic Objective C: Human Wellbeing – introductions
- 13:10 **C.1: Safe food and feed** Michiel Vandegehuchte, Research Department Manager, Flanders Marine Institute, Belgium
- 13:20 **C.2: Safe and accessible coast** Anouk Blauw, Senior Scientist, Marine and Coastal Systems, Deltares, the Netherlands
- 13:30 **Panel discussion and participants' questions** Michiel Vandegehuchte and Anouk Blauw are joined by members of the BANOS SOW drafting team on their respective spheres of expertise as needed depending on participants questions:
C.1.2 Janis Ancāns, Senior Expert, State Education Development Agency, Latvia
C.1.1 Stuart Reeves, see B
C.2.1 Peter Herman, see A
C.2.2 Kari Hyytiäinen, see B

For participants: Submit your feedback on R&I themes of the C session using the BANOS SOW work sheet available at www.banoscsa.org/SOW20 from 13:00 until 15:00 (1 April), and ask questions throughout the session using the webinar tool provided!

Closing the session as and when discussion and participant questions have been addressed, or latest by 15:00.

16:00-17:30 *Closed Drafting team wrap-up discussion*

16:00-17:30 *Closed BANOS Advisory Board wrap-up discussion*

Thursday 2 April 2020 (all times in CEST)

- 09:00 **Concluding plenary session – Welcome back by hosts** Andris Andrusaitis, Karoliina Koho
Stock taking and summaries of the thematic feedback (from the SOW thematic work feedback sheets) and discussions
- 09:10 **A. Healthy Seas and Coasts** Christoph Humborg, Ulla Li Zweifel, Peter Herman & Urmas Lips
- 09:40 **B. Sustainable Blue Economy** Dennis Lisbjerg, Kari Hyytiäinen & Uwe von Lukas
- 10:10 **C. Human Wellbeing** Michiel Vandegehuchte & Anouk Blauw
- 10:40 **BANOS Advisory Board's feedback to the BANOS SOW** Donald Boech, Professor and President Emeritus, University of Maryland Center for Environmental Science, USA
- 11:00 **Q&A final questions, next steps** Andris Andrusaitis & Karoliina Koho

For participants: Ask questions throughout the session using the webinar tool provided!

Closing the SOW as and when discussion and participant questions have been addressed or latest by noon.

13:00-16:00 *Closed BANOS CSA Steering Committee*

13:00-15:00 *Closed Advisory Board meeting*

Baltic and North Sea Coordination and Support Action (BANOS CSA): Web-based Strategic Orientation Workshop (SOW)

31 March – 2 April 2020, coordinated by BONUS EEIG in Helsinki, Finland

List of panellists

Tuesday 31 March 2020

BANOS Strategic Objective A: *Healthy Seas and Coasts* – introductions

A.1: A resilient marine ecosystem

Christoph Humborg, Professor of Coastal Biogeochemistry and Scientific Director of the Baltic Sea Centre, Stockholm University, Sweden

A.2: Seamless governance linking land, coast and sea

Ulla Li Zweifel, HELCOM/Research Coordinator, University of Gothenburg, Sweden

A.3: Digital Ocean - Competent ecosystem modelling, assessments and forecasting

Peter Herman, Professor of Ecological Hydraulic Engineering, Delft University of Technology, the Netherlands

A.4: Efficient techniques for environmental monitoring

Urmas Lips, Professor of Marine Physics, Tallinn University of Technology, Estonia

Wednesday 1 April 2020

BANOS Strategic Objective B: *Sustainable Blue Economy* – introductions

B.1: Sustainable resource management of marine global commons

Dennis Lisbjerg, Head of Section for Maritime Service, Denmark's Technical University, Denmark

B.2: Understanding the value of ecosystem goods and services

Kari Hyytiäinen, Professor in Economics of Marine Protection, University of Helsinki, Finland

B.3: Smart Seas - sustainable, circular and bio-based blue solutions

Uwe von Lukas, Professor Maritime Graphics, Fraunhofer Institute for Computer Graphics Research, Germany

BANOS Strategic Objective C: *Human Wellbeing* – introductions

C.1: Safe food and feed

Michiel Vandegehuchte, Research Department Manager, Flanders Marine Institute, Belgium

C.2: Safe and accessible coast

Anouk Blauw, Senior Scientist, Marine and Coastal Systems, Deltares, the Netherlands

Thursday 2 April 2020 (all times in CEST)

Concluding plenary session

A. Healthy Seas and Coasts

Christoph Humborg & Ulla Li Zweifel

B. Sustainable Blue Economy

Dennis Lisbjerg & Jessica Hjerpe Olausson

C. Human Wellbeing

Michiel Vandegehuchte & Anouk Blauw

Web-based BANOS Strategic Orientation Workshop

31 March – 2 April 2020 (managed by BONUS EEIG, Helsinki, Finland)

Web-based SOW thematic work sheet

Name: _____

R&I theme (to be selected from a drop-down menu)

Check list	Details
Strengths	
Weaknesses	
Modifications	
Additions	
Deletions	
Priority (in resp. calls)	Checkboxes (please tick one only): - Top - Medium - Low
Baltic Sea and North Sea specificities	Checkboxes (please tick one only): - This theme is specific for the Baltic Sea - This theme is specific for the North Sea - This theme is best addressed in a gradient/comparative study involving both The Baltic Sea and the North Sea - This theme is best addressed in a study covering other European sea basins

Outline of the Baltic and North Sea Strategic Research and Innovation Agenda (BANOS SRIA)

DRAFT version, 28 February 2020

Strategic objective A: Healthy Seas and Coasts

Specific objective A.1: A resilient marine ecosystem

- A.1.1 Understanding food web interactions and their services, with respect to species, population and system levels
- A.1.2 Understanding critical components of marine ecosystem resilience and drivers of change
- A.1.3 Understanding the potential of marine organisms and ecosystems to adapt to rapid environmental changes (e.g. climate change and ocean acidification)
- A.1.4 Scientific support for the implementation of the ecosystem approach
- A.1.5 Coastal and marine ecosystems as nature-based solutions

Specific objective A.2: Seamless governance linking land, coast and sea

- A.2.1 Understanding the impact of land-derived pollution, litter and nutrients on the status of the marine environment and ecosystem services (e.g. fish stocks, aquaculture and tourism), including ways to reach good environmental status
- A.2.2 Evaluation of effectiveness and cost-effectiveness of various pressure mitigation actions,
- A.2.3 Evaluation of synergies and conflicts of targets and innovative solutions to assess environmental status in relation to different environmental targets, taking multiple stressors into consideration
- A.2.4 Development of alternative policy instruments and new governance structures, which respond to current and future sustainability challenges.
- A.2.5 Develop fast feedback mechanisms from maritime observation to support surveillance and control activities, evaluation of management measures and risk-assessment.

Specific objective A.3: Digital Ocean - Competent ecosystem modelling, assessments and forecasting

- A.3.1 Development of machine learning methods for ecosystems data analysis and models
- A.3.2 Improved, ecologically relevant modelling of underwater landscapes and the associations between species and abiotic parameters
- A.3.3 Development of models to predict tipping points or cascade effects in biological systems, including identification of the drivers of the changes and their impact on biota

Specific objective A.4: Efficient techniques and approaches for environmental monitoring and assessment

- A.4.1 Application of powerful DNA approaches to monitor ecosystem resilience and changes
- A.4.2 Novel techniques and approaches in monitoring and assessment for sustainable ecosystem management and weather and climate models/forecasts.
- A.4.3 Innovative techniques for monitoring and long-term solutions for micro and macro debris in aquatic environments.

Strategic objective B: Sustainable Blue Economy

Specific objective B.1: Sustainable resource management of marine commons

- B.1.1 Sustainable harvesting/extraction and use of marine living and mineral resources

- B.1.2 Explore possibilities for innovation in seafood and zero food waste throughout the entire production system, for example, through valorization of bycatch and recycling of waste.
- B.1.3 The development of multifactorial marine spatial planning management tools as knowledge bases for the competing demands of space utilization and ocean challenges.

Specific objective B.2: Understanding the value of ecosystem goods and services

- B.2.1 Integrated analyses of the ecosystem and social-economic system, describing and quantifying linkages between human activities, pressures, state of the environment, ecosystem services and human welfare to support the implementation of the ecosystem approach in marine policies
- B.2.2 Spatial and temporal analysis of the contribution of ecosystem services and environmental changes to human welfare
- B.2.3 Incorporation of ecosystem goods and services into national accounts (cf OECD, UN environment)

Specific objective B.3: Smart Seas - sustainable, circular and bio-based blue solutions

- B.3.1 Secure, clean and efficient renewable energy
- B.3.2 Sustainability of marine infrastructures
- B.3.3 Towards a smart blue economy
- B.3.4 Technological aspects of development of new recyclable materials, pharmaceutical substances, food products and natural fabrics from marine resources.

Strategic objective C: Human Wellbeing

Specific objective C.1: Safe food and feed

- C.1.1 Aquatic food security in a changing environment
- C.1.2 Update of strategies for reduction of health risks from toxic substances in regional sea food and feed chains
- C.1.3 Prediction on the prevalence and reduction of the impacts of marine toxins, including from cyanobacteria

Specific objective C.2: Safe and accessible coast

- C.2.1 Challenge-driven transformation of (local) coastal economies (or areas)
- C.2.2 Developing innovative and sustainable blue tourism and recreation

Composition of BANOS CSA Advisory Board

(status in April 2020)

AB Coordinator: Kaisa Kononen, BONUS EEIG Special Advisor

Members:

Name	Position, Affiliation	Website	Sphere of expertise
Donald Boesch	Professor and President Emeritus, University of Maryland Center for Environmental Science (USA)	www.umces.edu/don-boesch	Cross disciplinary and cross sector governance and management of marine ecosystem services Nominated by BONUS
Mike Elliott	Professor of Estuarine and Coastal Sciences/ Research Professor, Institute of Estuarine and Coastal Studies, The University of Hull (UK)	www.hull.ac.uk/staff-directory/mike-elliott	Cross disciplinary and cross sector governance and management of marine ecosystem services Nominated by BONUS
Lora E Fleming	Director of the European Centre; Chair of Oceans, Epidemiology and Human Health, University of Exeter (UK)	https://medicine.exeter.ac.uk/people/profile/index.php?web_id=Lora_Fleming	Oceans and human health Nominated by BONUS
Jessica Hjerpe Olausson	Senior Maritime Expert, Region Västra Götaland (SE)	www.vgregion.se/en/regionale-development/programmes/sustainable-marine-industries/	Development of sustainable maritime industries Nominated by CPMR North Sea Commission
Paweł Mawduk	Independent engineering consultant	www.linkedin.com/in/pawel-mawduk/	Broad expertise in development of maritime industry Nominated by NCBR
Philip Monbet	Deputy director, Pole Mer Bretagne Atlantique (FR), a member of European Cluster Collaboration Platform	www.clustercollaboration.eu/cluster-organisations/pole-mer-bretagne-atlantique	Broad expertise in developing cross-sector maritime clusters Nominated by ANR
Henn Ojaveer	Professor, University of Tartu (Estonia), Vice-Chair, ICES Advisory Committee	www.ut.ee/en/henn-ojaveer	Sustainable exploitation of marine living resources Nominated by ICES
Katherine Richardson	Professor, Center for Macroecology, Evolution and Climate, University of Copenhagen (DK)	https://research.ku.dk/search/result/?pure=en%2Fperson%2Fkatherine-richardson(f9e940b1-29fc-487b-99c1-f8392020a08e)%2Fcv.html	Global authority in marine systems science Nominated by BONUS

Minutes of the second meeting of the BANOS CSA Advisory Board

Time: 1 April 2020 during 16:00 – 17:30 CEST & 2 April during 13:00 – 15:00 CEST

Place: ZOOM webinar

Participants:

Donald Boesch, University of Maryland Center for Environmental Science
Mike Elliott, Institute of Estuarine & Coastal Studies (IECS), University of Hull
Lora Fleming, European Centre for Environment and Human Health
Jessica Hjerpe Olausson, CRPM North Sea Commission
Kaisa Kononen, Coordinator, BANOS
Pawel Mawduk, Independent expert

1. Opening

The meeting was opened. The participants introduced themselves.

2. BANOS Strategic Orientation Workshop

The AB members attended the BANOS Strategic Orientation Workshop during 31 March – 2 April 2020 through the ZOOM webinar. The AB congratulates the BANOS Secretariat for the well organised, over 80 participants' workshop, which had to be arranged with a short notice due to the exceptional situation caused by the COVID-19 pandemic. The AB recognised that the almost equal share, ca 40 % /40 % of the participants was by policymakers and researchers, while the representation of industry remained very low, only 8 %.

3. Advisory Board feedback on the Strategic Research and Innovation Agenda (SRIA)

The AB members had received the draft SRIA on month prior the SOW. Written comments prior SOW to the draft had been sent by Philippe Mondet and Lora Fleming. The lively discussion during the meeting was synthesised into eight general recommendations and additional comments on the three strategic objectives as presented in the Annex.

4. AOB

3.1. Two deliverables

The following two deliverables of BANOS CSA were brought to the attention of AB:

Deliverable 3.3. Report mapping the relevant cross-border initiatives, analysing the cooperation potentials and proposing the cooperation mechanisms with the BS/NS research and innovation programme

Deliverable 4.1 Report proposing impact indicators and programme-level impact monitoring mechanisms

3.2. BANOS CSA extension

Kaisa informed that due to the 'force majeure' caused by the COVID-19 virus several BANOS activities have to be delayed. For finalising all the tasks fully the consortium is requesting a no-cost extension of 6 months, until the end of October 2021. For the Advisory Board it would mean that the planned AB meeting for November 2020 would be postponed as the BANOS activities of M20-M36 will have to be re-planned.

The AB judges that it is reasonable to extend the CSA completion in light of both the complexity of the process and the present health-risk circumstances. The AB recommends

that BANOS CSA should use this opportunity for broadening the stakeholder consultation, in particular towards industry.

3.3. BELSPO joining the BANOS CSA

Kaisa informed is that BANOS has received a message from the Belgian Science Policy Office (BELSPO) exploring options for joining BANOS CSA at a Belgian federal level. The AB considered this as positive development.

4. Actions

- AB recommendations to be finalised by Wednesday 8 April 2020

5. Closing

The meeting was closed.

Annex: The Baltic and North Sea Strategic Research and Innovation Agenda (BANOS SRIA)
Report of the BANOS Advisory Board, 7 April 2020

The Baltic and North Sea Strategic Research and Innovation Agenda (BANOS SRIA)

Report of the BANOS Advisory Board

7 April 2020

General Comments and Recommendations

1. **Draft Strategic Research and Innovation Agenda (SRIA).** The Draft represents a tremendous amount of work by numerous experts with experience in the Baltic and North Seas. It is well-organized with consistent treatment of nine specific objectives (covering overall rationale, state of the art and knowledge gaps, and impact and linkages) and the 31 themes under these objectives (covering state of the art and knowledge gaps and expected outcomes) and well-edited.
 - a. The objectives should go beyond an aspirational list to become SMART (specific, measurable, achievable, relevant and timely), so that their outcomes can be evaluated, not just their outputs such as publications.
 - b. There should be a clear emphasis on improvements specifically in the Baltic and North Seas, which serve as a testbed of global significance. Even though an overarching research and an innovation programme may be eventually be developed for Europe's regional seas, the benefits and opportunities afforded by a joint effort for the North and Baltic Seas are timely and compelling.
 - c. Although a detailed Agenda is needed, the length and detail of the Draft SRIA do, however, make it very challenging to read and comprehend. A condensed, punchier version of the SRIA should also be produced, as well as shorter versions targeted at specific audiences (e.g. policymakers, industry, news media, etc.).
2. **Strategic Objectives and Their Integration.** The selection and definition of the three Strategic Objectives (A. Healthy Seas and Coasts, B. Sustainable Blue Economy, and C. Human Wellbeing) is reasonable and sound.
 - a. There are, however, substantial relationships and interdependencies among them, as well as among the component themes, both within and across the Strategic Objectives. While the details of the interrelationships among themes are essential to include, it would be useful to provide some higher-level integration, perhaps accompanied with graphical representations (particularly if aimed at policymakers, media, general public). Such an integrated perspective could be an opportunity to focus on higher level objectives and decrease the number of specific themes (see 8).
 - b. The Draft SRIA is very word-dense and could benefit from the inclusion of figures and exemplary boxes in order to make it more approachable for readers.

3. **Relevance to Policy Setting and Dynamics.** The SRIA includes a comprehensive inventory of Regional, European and Global policies, the implementation of which any BANOS programme should contribute.
 - a. In addition, there are a number of additional recent global activities and reports that are relevant and should be considered. These include OECD's The Ocean Economy in 2030, the High Level Panel for a Sustainable Ocean Economy, the Second World Ocean Assessment, the G7 Future of the Seas and Oceans Working Group, and the UN Decade on Ecological Restoration (relevant for catchments and coastal environments) that will proceed at the same time as the UN Decade of Ocean Science for Sustainable Development. At the other end of the spectrum, it should be recognized in the document that human health policies are typically set at the national level, rather than for Europe or its regional sea basins, and as such there is currently little overlap currently between human health and environmental policies.
 - b. While BANOS is a research and innovation programme, its conceptualization was premised on the principle that the programme would be respond to and contribute to policies, rather than a curiosity-driven, exploratory research programme. Consequently, placing Ecosystem Based Management as the central integrating notion among the three Strategic Objectives is justified. However, the implementation of the programme should not be overly prescriptive, and should allow the pursuit of novel and even nonconformist or risky scientific ideas and approaches in the future.
4. **Climate Change Agenda.** The pervasive consideration of climate and related changes is a definite improvement over the early vision for BANOS.
 - a. It is very important the SRIA strives to address the climate change crisis both through mitigation and adaptation across its objectives. Indeed, because of the rising attention to climate and related changes, BANOS might make its greatest contribution by supplying the science and technology required to address the consequences of climate change on regional sea human activities and uses and their management.
 - b. This will, however, require effective collaboration with the scientific and other communities engaged in climate change assessments and responses.
5. **Risks and Opportunities.** Overall, there is somewhat of an imbalance in the treatment of risks versus opportunities; the agenda needs to address both. Certainly, an emphasis on a sustainable blue economy good for the health of both humans and the environment provides such opportunities.
 - a. Indeed, environmental science might also need paradigm changes to focus more on the opportunities presented to seek opportunities for innovation and solutions for mitigating and adapting to climate change, rather than just describing the risks.

- b. Those aspects that deal with risks should recognize that substantial efforts are already underway to reduce pressures and promote recovery and resilience (e.g. for overfishing or eutrophication). Science and innovation should be harnessed to guide recovery more effectively and efficiently.
 - c. The science required for management measures and policy development should be conceived and executed as a component of risk assessment and management.
- 6. **Participation and Transparency.** The SRIA was developed by a highly competent community mostly drawn from the natural sciences, but also with significant experience in informing policy and management. Yet, human behavior, health and wellbeing, innovation, and political and economic decisions are also enormously important.
 - a. Efforts to manage the natural world are influenced by cultural, moral, ethical and political considerations, and both natural and social sciences need to reflect that.
 - b. The SRIA should make clear the extent of contributions from industry, social and health sciences, decisionmakers and local stakeholders. It should reflect how the perspectives of people living around the North and Baltic Seas have been considered (both the engagement processes utilized and their perspectives). The SRIA should include a plan for the engagement of these sectors in the implementation phase of BANOS. Such transparency would increase the credibility and effectiveness of BANOS.
- 7. **Impact Enablers.** The SRIA includes a section on impact enablers, including numerous strategies for effective communication, impact monitoring and assessment, knowledge synthesis, collaboration across marine and maritime funding streams, human capacity development, firm establishment of 'open science,' open data, citizen science, innovation diffusion, and building systematic cooperation among Europe's regional seas. These impact enablers received very little discussion during the online workshop, but all are important and should not be ignored.
 - a. A coherent strategy for enabling impact through these various mechanisms would improve the SRIA. This strategy should include the identification of responsibilities of individual projects and tasks assumed by the programme as a whole. All parts of the stakeholder typology should be engaged, from those carrying out and regulating activities to the beneficiaries and those influencing the policy agenda.
 - b. Most outcomes seem to have policymakers and managers as end users. BANOS should ensure that the end users are involved in the implementation, and endorse and commit to using the research and innovation being carried out. This is especially important for the effective integration of industry and citizen science.

- c. Monitoring and assessment should differentiate between outcomes (e.g. environmental improvements, changes in policies, etc.) and outputs [e.g. publication, conferences, etc.). In fact, both synthesis and user consultation began even before this SRIA and should be ongoing throughout the research and innovation processes; not activities that just happen at their conclusion.
8. **Identifying Priorities.** The array of research and innovation themes is bewildering. BANOS will not be able to support sufficient work in all of the 31 themes. While one might rely on competitive proposals to sort this out, this would likely result in gaps that are critical to the broader programme.
- a. As difficult as it is to do, the SRIA should whittle down the list of themes. Beyond that, the SRIA should clearly state the overall high-level principles and process by which funding priorities will be determined.
 - b. Some considerations might be near-term return on investment, potential value for the longer term, and “need to know” versus “nice to know” objectives. It is particularly important that the SRIA takes into account national research strategies in order to obtain synergies and prevent duplication of effort.

Some Additional Comments on the Strategic Objectives

The Advisory Board did not undertake a detailed review of each of the nine specific objectives and their 31 research and innovation themes. Such detailed consideration was the focus of the presentations and panel discussions during the Web-based Strategic Orientation Workshop held from 31 March to 2 April 2020. During that workshop, Advisory Board members were able to raise questions and submit their evaluations through online thematic worksheets. The Advisory Board is confident that there was thorough deliberation on the themes, their priorities and their interrelationships to provide sound advice for the revision of the BANOS Strategic Research and Innovation Agenda (SRIA).

The following comments on the three Strategic Objectives add to these inputs, but are in no way comprehensive:

1. **Strategic Objective A: Healthy Seas and Coasts.**

The description of this strategic objective, with its specific objectives and themes, is very thorough. There are areas of overlap with the other objectives, given that both a Sustainable Blue Economy and Human Wellbeing depend on Healthy Seas and Coasts. As stressed in the Board’s general comments, greater prioritisation and focus on outcomes, going beyond just improved understanding, are needed.

Would End-to-End models duplicate or incorporate existing physical and ecological models and lead through ecosystem services to societal goods and benefits? The limitations in using such models in the policy context should be recognized. The SRIA emphasises the amount of marine monitoring and assessment currently carried out or required, but should acknowledge the recent initiatives to harmonise the

monitoring, assessment and reporting across Europe and its Regional Seas Convention management initiatives. These include the science behind harmonising the terms used (e.g. Good Environmental and Ecological Status, Favourable Conservation Status, etc.).

In developing the extensive rationale, the SRIA should be careful not to give the impression that we know little about these seas or to over-promise that the research and innovation would lead to dramatic breakthroughs of recalcitrant barriers. For example, are the eDNA approaches, as interesting as they are, truly powerful with regard to improving policy implementation. There should be clear and consistent use of the concept of resilience; in some places it seems that it is seen as ecosystem resistance. Given that many stressors will not be prevented, there is the need to consider adaptation to ecosystem changes while ensuring the systems maintain their ecological structure and continue their ecological functions.

While there are a number of conceptual frameworks, such as the DPSIR framework, linking the science to management measures, recent advances allow the natural and societal aspects to be considered further, especially when coupled with Objectives B and C. The Agenda should consider cumulative effects and activity-, pressures- and effects-footprints to ensure that the science is not devoted to single stressors acting on single ecological components. Furthermore, it should take these ideas further and suggest a role for systems analysis as a means of bringing together all the aspects in novel ways.

Despite its comprehensive nature, the Healthy Seas and Coasts agenda should be more focused on the targets, thresholds and trigger values and link these to monitoring, but at the same time be aware of shifting baselines, such as due to climate change. It should be mindful of exogenic pressures as well as those exerted within these coastal seas and their basins, within a risk assessment and management framework. the carrying and assimilative capacities. As mentioned in our general comments, there should be more emphasis on opportunities such as informing the restoration trajectory and accommodating irreversible realities that might be associated with climate change or invasive species, for example.

2. Strategic Objective B: Sustainable Blue Economy

The concept of a Sustainable Blue Economy is more inclusive and appropriate than the concept of “blue growth,” which suggests unconstrained growth. Yet, blue growth is still mentioned extensively in the SRIA. The final version should sort out any conflicting usage of terms. Also, the concept of marine commons should be expanded on and receive more prominence.

There should be greater coherence among the Objective B themes. As the themes lack clear borders, should the treatment be more general, while ordering specific examples to ensure clarity? For example, both themes B.1.1 (living and mineral resources) and B.3.1 (renewable energy) concern the use of the seas’ resources. How might these resource uses be harmonised? There is also the risk of overreach in the inclusion of so many issues. Should the focus be narrowed? For example,

theme B.3.2 on the sustainability of marine infrastructures seems somewhat tangential and verges into practical marine engineering.

Particularly within the Sustainable Blue Economy theme, the SRIA should emphasize opportunities for industrial innovation and commercial development. This is particularly so with the Objective B.3 dealing with Smart Seas.

3. Strategic Objective C: Human Wellbeing

This Strategic Objective has the potential to be truly transdisciplinary and trans-sector, with wide appeal to diverse stakeholders (e.g. communities, businesses, NGOs, government, etc.). Currently, it is very risk- and marine-focused, particularly Specific Objective C.1, without indicating potential opportunities and benefits. In addition, focusing on the mixtures of exposures rather than specific contaminants, with their potential synergies and antagonisms and using new modeling and Artificial Intelligence (AI) are an area of opportunity. In both Specific Objectives C.1 and C.2, going beyond a purely economic focus is essential; and interacting with diverse communities to understand their priorities would enrich this objective. Issues and perspectives of public health and human behavior are currently not well represented; inclusion of expertise in social science and public health is recommended. The areas of restoration, regeneration, and industry innovation present opportunities as applied to severely impacted and degraded coasts in the Baltic and North Sea regions. This could be emphasized more as a potential benefit and model for low-to-middle-income communities and beyond. Finally, there are opportunities around effective measurement and monitoring across the environment and human health to understand and document changes, both positive and negative.