ISTOCK

BONUS
SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION

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BONUS making a difference:

Impacting on scientific excellence and policymaking in the Baltic

In summer 2016, BONUS, the joint Baltic Sea research and development programme, commissioned two studies to assess the programme's impact with particular emphasis on the years 2009–2016 of BONUS projects' implementation. Given the policy-driven nature of BONUS, key emphasis was put on the impact of BONUS on the progress of Baltic Sea science and the practical use of BONUS-generated knowledge for stakeholders, as stipulated in the BONUS strategic research agenda[1].

This briefing provides a summary account of some key findings of the two assessment studies. The first study reported how BONUS has contributed to scientific excellence and dissemination of results from Baltic Sea research, the progress of science in the region, and ultimately to evidence-based decision-making on the Baltic Sea ecosystem. The second study reported on the practical use of BONUS-funded research in support of relevant policies, innovative industries and structuring the macro-regional research area. This includes evaluations of how well the BONUS challenges research themes, as defined in the BONUS strategic research agenda, were addressed by the BONUS-funded projects, and of the views of project participants, funders and stakeholders in relation to science and policy development, funding, engagement and BONUS in general.[2]

Study 1: The BONUS impact on scientific excellence and dissemination

The findings of the assessment on the BONUS impact on scientific excellence and dissemination, carried out by *Pauline Snoeijs Leijonmalm* from Stockholm University, show that the BONUS impact on scientific excellence and dissemination until now has been positive and substantial.

BONUS funding increases the quality of Baltic Sea science

BONUS-funded Baltic Sea core papers[3] on average had higher citation rates (Fig. 1, page 2) and were published in journals with higher Journal Impact Factors (JIFs) than non-BONUS-funded Baltic Sea core papers (Fig. 2, page 2). Especially the BONUS Baltic Sea core papers, but also the non-BONUS-funded Baltic Sea core papers had higher average citation rates than the JIFs of the journals in which they were published. This indicates that Baltic Sea science in general, and BONUS-funded research in particular, has a high impact on marine science in general.

BONUS boosts cross-national cooperation, which in turn increases scientific quality

An increase in cross-national cooperation as a result of BONUS funding was found to be substantial for all countries (Fig. 3, page 3). Moreover, cross-national publication increased the scientific quality of the papers (Fig. 4, page 3) and is thus a major instrument to strengthen scientific excellence.

[1] The BONUS strategic research agenda (BONUS Publication No. 14) is a systemic process, jointly developed by scientists, policy-makers and other end-users across the region, and responds to the environmental challenges faced by the region.

[2] A comprehensive article based on both assessments has been submitted for an open-access international scientific publication in May 2017.

[3] Baltic Sea core paper = published in Web of Science (WoS)-ranked journals and mentioning the Baltic Sea.

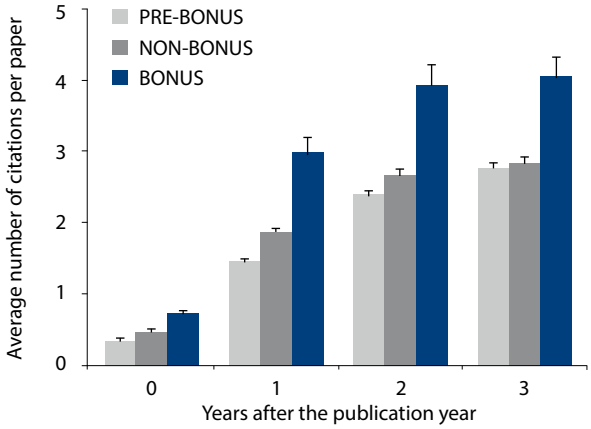

Figure 1. Average number of citations (a measure of the 'scientific merits' of a specific paper by indicating the influence of the paper on the progress of science) for the BONUS Baltic Sea core papers compared with the PRE-BONUS and NON-BONUS Baltic Sea core papers in years 0–3 after the publication year[4]. Error Bars show the standard error of the mean.

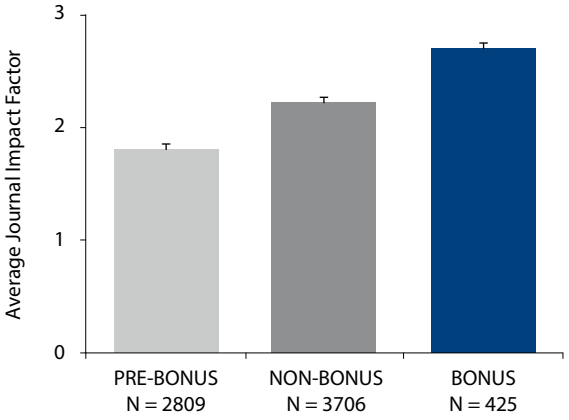

Figure 2. Average Journal Impact Factor (JIF, a measure of 'how promising' a specific paper is in the eyes of the journal editor and the peer reviewers) of the journals in which the PRE-BONUS, NON-BONUS and BONUS core papers were published in the years 2009–2015[5]. Since JIFs vary from year to year, the JIFs of the publication year were used for each paper. Error Bars show the standard error of the mean.

BONUS-funded science contributes substantially to the dissemination of the Baltic Sea science

The data used in the assessment on 'BONUS scientific excellence and dissemination' **contains 642 verified international scientific BONUS publications** (80 % Baltic Sea core papers and 20 % published in conference proceedings, as book chapters, in non-WoS-ranked journals or as general papers in WoS-ranked journals but not mentioning the Baltic Sea, i.e. about general phenomena, theories and methods, or e.g. deal with species that occur in the Baltic Sea but were studied in the Skagerrak (North Sea) or in rivers), reported by the BONUS projects in 2009–2016:

- 16 BONUS+ projects implemented in 2009–2011 and funded with EUR 22,4 million have in 2009–2016 produced **480 international scientific publications**
- 27 BONUS Art 185[6] research projects implemented in 2014–2020 and funded with EUR 73,6 million have in 2014–2016 produced **144 international scientific publications**
- 13 BONUS Art 185 innovation projects implemented in 2014–2017 and funded with EUR 6,2 million have in 2014–2016 produced **22 international scientific publications**
- The BONUS Art 185 research projects are roughly predicted to produce **1 500 international scientific publications in 2014–2024**, and BONUS Art 185 innovation projects are roughly predicted to produce **75 international scientific publications in 2014–2022**, assuming that the projects will be equally productive as the BONUS+ projects[7]

During the eight years studied in the assessment (2009–2016), 10 % of all WoS-ranked papers published on Baltic Sea science were funded or co-funded by BONUS (Fig. 5, page 4). Since this included the start-up phase of the BONUS funding, and the scientific production of the BONUS Art 185 projects is now accelerating (projects funded from the 'BONUS call 2012: Viable ecosystem' and 'Innovation' as well as the 'BONUS call 2014: Sustainable ecosystem services'), it is expected that the proportion of BONUS-funded papers will rise to 15–20 % in the next few years. This will be even more when also the projects from the 'BONUS call 2015: Blue Baltic' (implementation 2017–2020) will be disseminating scientific results.

BONUS boosts the research focus towards solving environmental problems, sustainable use of ecosystem services and multidisciplinary research

The data used in the assessment show that BONUS has helped to change the research focus of Baltic Sea science towards solving environmental problems and sustainable use of the Baltic Sea ecosystem through multidisciplinary research. Thus, thanks to the policy-driven BONUS programme, the highest-quality Baltic Sea research is more and

Data collection for the bibliometric study

The Baltic Sea core papers 2002–2016 that were used in the study of the impact of the BONUS programme were collected from the Web of Science (WoS) core collection of citation indices. Altogether, 18 590 publications were identified by 25 geographical search criteria in the WoS and 42 % of these were core papers that deal with Baltic Sea research. These 7 809 Baltic Sea core papers, 97 % original research papers and 3 % review papers, were used to build the three data sets PRE-BONUS (2002–2008), NON-BONUS (2009–2016) and BONUS (2009–2016) analysed to study of the impact of the BONUS programme on Baltic Sea science as a whole.

[4] Only data for 2009–2013 could be used because for this time period three citation years were available after the publication year (years 0-3). Figure based on 3 256 Baltic Sea core papers and 44 241 citations downloaded from the Web of Science on 25 January 2017.

[5] The Journal Impact Factors for 2016 were not yet available at the time the analysis was carried out (25 January 2017).

[6] 'BONUS Art 185' refers to BONUS, the joint Baltic Sea research and development programme, established by the Decision 862/2010/EU of the European Parliament and the Council in September 2010 to be implemented during 2010–2017 (projects running until 2020) under article 185 of the Treaty on the Functioning of the European Union within EU's Seventh Programme for research, technological development and demonstration.

[7] The expected total output of the BONUS Art 185 projects is estimated using the cost of one BONUS+ research paper as a price estimate per paper (EUR 47 000), and an inflation rate of 1 % per year.

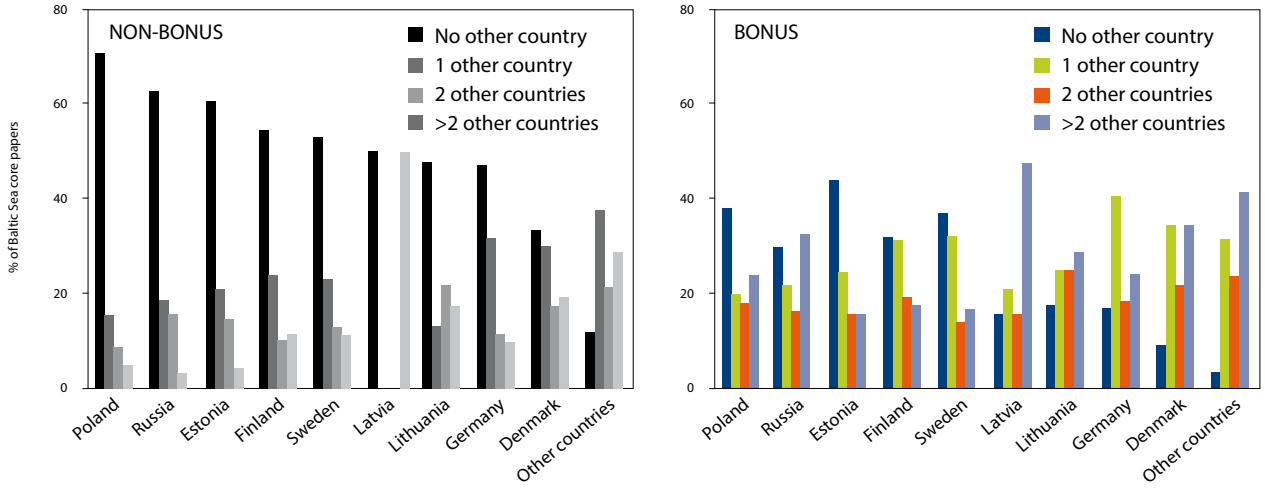

Figure 3. The percentage of within-country publication (= No other country) and cross-national co-publication of NON-BONUS and BONUS papers. More than half (52 %) of the BONUS Baltic Sea core papers published in 2009–2016 were the result of cross-national cooperation while for the NON-BONUS Baltic Sea core papers this was only 32 %.

more addressing challenges of societal importance, not just questions based on pure scientific interest. Based on a comparative Web of Science (WoS) analysis of research subjects, it was shown that the four research subjects boosted most by BONUS were social sciences, evolutionary biology, genetics and environmental engineering (Table 1, page 4). BONUS stimulated also other research subjects such as toxicology, multidisciplinary science, international relations followed by multidisciplinary geosciences, biodiversity conservation, engineering and technology.

Baltic Sea countries increase their publication volume of Baltic Sea core papers through BONUS funding

All Baltic Sea countries, except Poland, increased their publication volume of Baltic Sea core papers through BONUS funding, both in comparison with PRE-BONUS and in comparison with NON-BONUS.

Future considerations on accessibility and use of the scientific results of the BONUS-funded projects

If the research output from a project does not reach other scientists, it will not contribute to the progress of science. Of all BONUS-funded international scientific publications produced in 2009–2016, 80 % were published as Baltic Sea research with high accessibility for scientists, while the publication of the remaining 20 % could have been better arranged, i.e. they should be published in WoS-ranked journals and (at least in the introduction) mention the Baltic Sea. Better accessibility through open access publication is another goal. Almost half of the BONUS-funded papers were published with open access (available online for anyone) but there was a decreasing trend with time.

It can be concluded that the way the scientific results from BONUS were published in 2009–2016 was good for a high-profile research and development programme, but it can be improved. According to the assessment made, cross-national cooperation should be stimulated even more in the BONUS projects in the future, e.g. by requiring co-publication between countries. There is room for this because in 2009–2016 about half of the BONUS-funded papers were still produced within one country.

The findings of the assessment suggest that besides several excellent ways highlighted as stimulants for increased cooperation between projects already in practice in BONUS (e.g. for young scientists), also other additional means of improvement could be considered: Among other, inclusion of direct "match-making" at the BONUS website for improved linking between projects' skills and other assets' arsenals, a 'BONUS publishing policy for international scientific papers' in order to increase the likelihood of scientific output's contribution to the progress of science in the Baltic Sea and elsewhere. It could be encouraged to publish even more than accomplished until now in peer-reviewed WoS-ranked international journals with open access. Also, the recommendations of the assessment suggest that projects should more vigorously be tasked to install and update their own web sites that enable anyone to follow the project's progress, especially their scientific output.

Finally, to tackle the scientific papers' 5-year publication time lag **after the projects have ended**, more concerted effort to highlight all BONUS-funded international scientific publications on the BONUS website could provide a good mean to inform, impress and inspire scientists, end-users

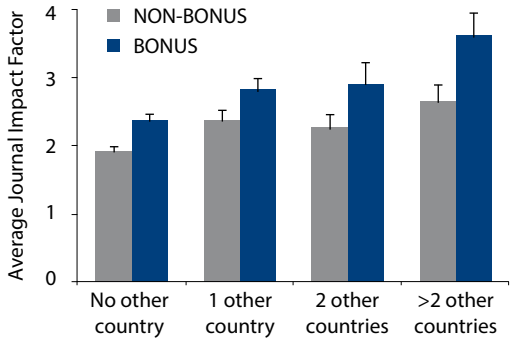

Figure 4. The average Journal Impact Factor of the journals in which the papers were published increased with the number of countries of co-publication, both for the NON-BONUS and the BONUS Baltic Sea core papers, but more so for the BONUS papers. Figure based on data downloaded from the WoS on 25 January 2017. Error Bars show the standard error of the mean.

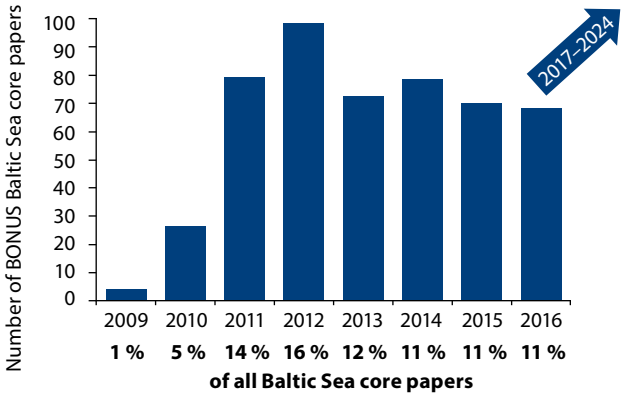

Figure 5. Percentage of BONUS Baltic Sea core papers of all Baltic Sea core papers published in 2009–2016.

The pilot case of BONUS+ projects 2009–2011 shows that 70 % of the scientific results were published during a 5-year time lag after the projects had ended

The reporting from the BONUS+ projects (implemented 2009–2011) can be used as a compelling pilot case for the ongoing and coming BONUS Art 185 projects. It provides a possibility to follow a (close to) full cycle of scientific dissemination of a cohort of 16 BONUS projects. Most importantly the results of the assessment show that the top publication year for BONUS+ projects was 2012 and only 30 % of the papers were published during the projects' implementation phase and 70 % during the five years after that (Fig. 6).

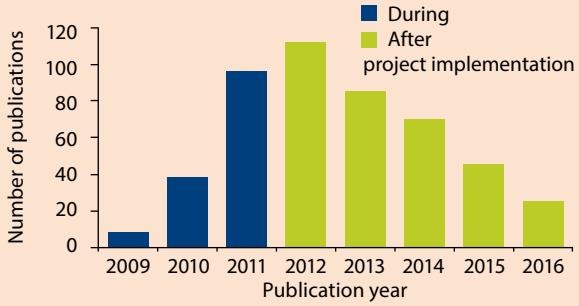

Figure 6. Summary of the publication years of the 480 verified international scientific publications from the 16 BONUS+ projects.

Table 1. Results of the comparative WoS analysis of research subjects showing the percentage change between NON-BONUS and BONUS Baltic Sea core papers in 2009–2016; +100 % means that publication was doubled, -50 % means that publication was halved. Red = more than doubled for BONUS compared to NON-BONUS, green = increased by 50-100 % for BONUS compared to NON-BONUS, blue = more than halved for BONUS compared to NON-BONUS.

Research subject	% Difference between NON-BONUS and BONUS
Social sciences	339
Evolutionary biology	274
Genetics (heredity)	176
Environmental engineering	156
Toxicology	95
Multidisciplinary sciences	71
International relations	71
Multidisciplinary geosciences	64
Biodiversity conservation	60
Engineering	56
Technology	49
Geology	47
Environmental sciences ecology	26
Ecology	26
Oceanography	20
Economics	20
Geochemistry geophysics	18
Marine and freshwater biology	10
Meteorology atmospheric sciences	9
Business economics	0
Biochemistry molecular biology	-1
Microbiology	-23
Geography physical	-25
Water resources	-49
Fisheries	-58
Plant sciences	-59
Chemistry	-75
Zoology	-100
Remote sensing	-100

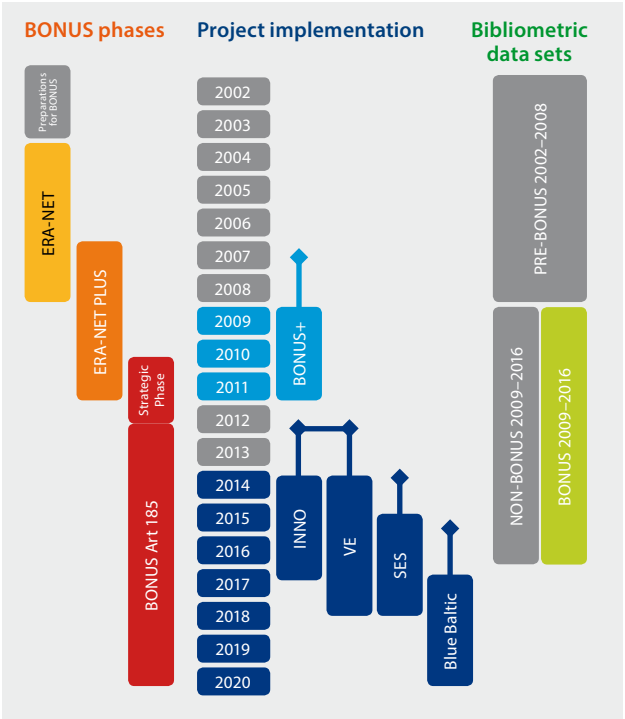

Figure 7. Timeline summarising the different BONUS programme phases, the implementation of the BONUS-funded research projects and the time covered by the three bibliometric data sets referred to in the briefing. Diamonds indicate the time of the BONUS calls: the BONUS+ pilot call in 2007, the 'BONUS call 2012: Viable ecosystem' (VE) and 'BONUS call 2012: Innovation' (INNO), the 'BONUS call 2014: Sustainable ecosystem services' (SES) and the 'BONUS call 2015: Blue Baltic'.

and other stakeholders about the outputs generated. The science published during the time lag could be translated and disseminated better for optimal use by stakeholders.

Looking ahead

It is now 10 years ago that the BONUS programme became operational with the start of the BONUS ERA-NET+ and the BONUS+ call (Fig. 7). The present assessment was made just before the full bloom of BONUS Art 185. While the BONUS innovation projects will finish within a few months from publishing this briefing and report their findings, the 'Viable ecosystem', 'Sustainable ecosystem services' and 'Blue Baltic' projects will generate a wealth of new knowledge about the Baltic Sea in 2017–2020. The results of the BONUS programme in the form of international scientific publications will be disseminated at least until 2024. If BONUS Art 185 will be as successful as BONUS+ in generating and publishing scientific results, the knowledge base for an economically and ecologically prosperous Baltic Sea region where resources and goods are used sustainably and where the long-term management of the region is based on sound knowledge derived from multi-disciplinary research, will be comprehensive.

Study 2: Assessment of BONUS impact: BONUS delivery, performance, and stakeholder opinions

The assessment of BONUS impact: BONUS delivery, performance, and stakeholder opinions was carried out by *Steve Barnard* and *Mike Elliott* from the Institute of Estuarine and Coastal Studies (IECS) at the University of Hull. The results indicate that the BONUS programme has had a strong positive impact on three key areas: the application of science to policy development; changes in funding patterns both for research and for the development of innovative industries, and on the involvement of different actors (engagement).

In this briefing, two areas from the main report are detailed in order to provide an overview of different perspectives related to the BONUS impact:

- the coverage by BONUS-funded projects of research themes identified in both the BONUS+ and BONUS Art 185 calls;
- stakeholder views, collated by the study, relating to science and policy development, funding, engagement, and BONUS in general.

Coverage of BONUS call research themes is comprehensive

All projects funded by BONUS are required to address one or more specified research themes. Both the degree to which different themes have been addressed by BONUS projects and the overall pattern of theme coverage can be used to inform the extent to which the overall scope of the BONUS programme has been addressed.

The research themes that underpinned the BONUS+ call differed from those applied to the three subsequent calls under BONUS Art 185. Seven themes were considered under BONUS+, whilst a total of 19 themes underpinned the three BONUS Art 185 calls. Although there are some obvious synergies between these two sets of themes, they were sufficiently different to consider the two sets of projects separately.

Whilst the coverage of research themes by projects under the BONUS+ call appears reasonably robust (with all themes being addressed by a number of different projects) (Table 2), the coverage of research themes by projects under the BONUS Art 185 calls is more variable (Table 3, next page). Also the 'BONUS call 2015: Blue Baltic' projects' coverage is included in this analysis (due to be implemented over the period 2017–2020).

The results show that despite the variability the overall coverage of the themes in BONUS Art 185, there are two themes not identified as a key theme by any of the projects. These two themes are:

- Theme 1.1: Ecosystem resilience and dynamics of biogeochemical processes, including cumulative impacts of human pressure; and
- Theme 3.4: Evaluation framework for fisheries management.

Whilst Theme 1.1 coverage is specified as a sub-theme in as many as nine different projects, no project addresses the Theme 3.4 as the key theme and only one of the projects has identified this theme as a supplementary theme.

Stakeholder views relating to science and policy development, funding, and engagement

Across all three stakeholder groups: *participants*, *funders* and *users* (see 'Membership and respondent rates of stakeholder groups' page 8) there was overwhelming agreement regarding the realisation of almost the entire range of benefits or positive outcomes considered in the assessment (Table 4, page 7). That

Table 2. Specification of BONUS+ themes as 'key' themes (red shading) or 'supplementary' themes (green shading).

	THEME						
BONUS+ projects	1: Linking Science and Policy	2: Understanding Climate Change and Geophysical Forcing	3: Combating Eutrophication	4: Achieving Sustainable Fisheries	5: Protecting Biodiversity	6: Preventing Pollution	7: Integrating Ecosystem and Society
AMBER	Sup.	Sup.	Sup.	Sup.			Key
BALCOFISH		Sup.	Sup.		Sup.	Key	
BALTGENE	Key	Key		Key	Key		Key
BALTIC-C	Key	Key	Key			Key	Key
BALTIC GAS	Key	Key	Key				Key
BALTICWAY	Key	Sup.		Sup.	Sup.	Sup.	Key
BAZOOCA	Key	Key	Key	Key	Key		Key
BEAST	Key	Sup.	Sup.	Sup.	Sup.	Key	
ECOSUPPORT	Key	Key	Key	Key	Sup.	Sup.	Key
HYPER	Key	Key	Key		Key		Key
IBAM	Sup.	Sup.	Sup.	Sup.	Sup.	Sup.	Sup.
INFLOW		Key					Key
PREHAB	Key	Sup.	Sup.	Sup.	Sup.	Sup.	Sup.
PROBALT	Key		Sup.				Key
RECOCA	Key	Key	Key				Key
RISKGOV	Key		Sup.	Sup.	Sup.	Sup.	Sup.

is, BONUS has been responsible for specific (and wide-ranging) improvements seen in science and policy development, of funding, and engagement.

The only topic where a benefit or positive outcome was not identified by all respondents was in relation to the speed of uptake of scientific knowledge into policy-making and management. Although *participants* see this as having improved, there is no clear view as to whether this is as a result of the BONUS programme. Also, in contrast to the mainly academic researchers of the *participants* group, *users* (who are perhaps more likely to have direct experience of the relevant issues affecting uptake) have suggested a more pessimistic view – that the speed of uptake of scientific knowledge into policy-making and management has not increased, and may even have decreased (although the *users* group suggests that BONUS has not been responsible for this). Apart from this one exception, there was generally strong agreement that these benefits had been realised due to the impact of the BONUS programme.

The opinions of the *participants* group regarding issues around the application of science to policy development (questions A, B and D) are closely aligned with those of the *users* group (who appear likely to be more familiar with policy matters and might therefore be expected to provide a more informed opinion on this topic). In this context, the views of the smaller *users* group can be seen to be adding weight to the consensus of opinion provided by the (larger) *participants* group.

Table 3. Specification of BONUS Art 185 themes as the key theme (red shading) or as a supplementary theme (green shading).

		THEME																		
	Calls and projects	1.1 Dynamics of biogeo-chemical processes	1.2 Changing biodiversity	1.3 Food web structure and dynamics	1.4 Impacts of hazardous substances	2.1 Changes in catchment land cover patterns	2.2 The role of the coastal systems	2.3 Integrated coastal management	2.4 Eco-technological approaches	3.1 Maritime risk analysis and management	3.2 Effects of air and water pollution by shipping	3.3 Improving stock assessments, spatial heterogeneity of stocks	3.4 Evaluation framework for fisheries management	3.5 Sustainable aquaculture in the Baltic Sea	4.1 Governance structures, performance and policy instruments	4.2 Linking ecosystem goods and services to human lifestyles and well-being	4.3 Maritime spatial planning	5.1 Integrated monitoring programmes	5.2 Innovative measurement techniques	5.3 User-driven ICT services
VIABLE ECOSYSTEM	BAMBI	Sup.	Key												Sup.			Sup.		
	BIO-C3		Key	Sup.			Sup.					Sup.						Sup.		
	BLUEPRINT	Sup.	Sup.	Sup.														Key		
	CHANGE				Sup.		Sup.								Key					
	COCOA	Sup.	Sup.				Key											Sup.		
	INSPIRE		Sup.	Sup.								Key	Sup.					Sup.		
	SOILS2SEA					Key									Sup.			Sup.		
INNOVATION	AFISMON	Sup.	Sup.	Sup.														Sup.	Key	
	ANCHOR							Sup.									Sup.			Key
	ESABALT							Sup.		Sup.							Sup.			Key
	FERRYSCOPE	Sup.						Sup.										Sup.	Key	Sup.
	FISHVIEW		Sup.			Sup.													Key	
	GEOILWATCH								Sup.										Sup.	Key
	HARDCORE						Sup.			Sup.								Sup.	Key	
	MICROALGAE	Sup.				Sup.			Key					Sup.	Sup.					
	OPTITREAT				Sup.	Sup.			Key						Sup.					
	PINBAL		Sup.															Sup.	Key	
	PROMISE					Sup.	Sup.		Key											
	SWERA				Sup.				Key	Sup.	Sup.							Sup.		
	ZEB				Sup.				Key	Sup.	Sup.									
SUSTAINABLE ECOSYSTEM SERVICES	BALTCOAST							Key							Sup.	Sup.	Sup.			
	BALTICAPP			Sup.											Sup.	Key	Sup.			Sup.
	BALTSPACE							Sup.							Sup.		Key			
	GO4BALTIC					Sup.			Sup.						Key	Sup.				
	GOHERR									Sup.					Key.	Sup.				
	MIRACLE					Sup.		Sup.							Key	Sup.				
	SHEBA										Key				Sup.		Sup.			
	STORMWINDS									Key					Sup.		Sup.			Sup.
BLUE BALTIC	BALTHEALTH	Sup.		Sup.	Key													Sup.	Sup.	
	BLUEWEBS	Sup.	Sup.	Key											Sup.					
	CLEANAQ							Sup.	Sup.					Key						
	CLEANWATER				Sup.				Key										Sup.	
	FLAVOPHAGE		Sup.						Sup.					Key						
	OPTIMUS								Sup.					Key		Sup.	Sup.		Sup.	
	SEAMOUNT	Sup.					Sup.										Sup.	Sup.	Key	
	BB1*				Key				Sup.									Sup.		
	BB2*								Key						Sup.					Sup.
	BB3*							Sup.							Sup.		Key			
	BB4*	Sup.					Sup.											Key	Sup.	
	BB5*		Sup.				Sup.										Sup.	Sup.	Key	

* The Grant Agreement negotiations for a number of 'BONUS call 2015: Blue Baltic' projects, listed in Table 3 as BB1 - BB5, were ongoing at the time of publishing this briefing. Formal announcement of these projects is expected by June 2017.

Table 4. Summary of stakeholder views relating to science and policy development, funding and engagement.

Responses to statement:	Participants	Funders	Users
A: The extent to which science-based thinking and argument is used and incorporated into the policy-making process has increased	☺	n/a	☺
B: The perceived level of scientists' direct involvement in the provision of advice at the policy-making level has improved	☺	n/a	☺
C: The speed of uptake of scientific knowledge into policy-making and management has increased	☺	n/a	☹
D: Policy-making and governance have evolved from insular, sectoral processes to ones that are now more integrated and cross-sectoral	☺	n/a	☺
E: Cooperation (and coordination) between the funders of academic research and the funders of innovative industries has increased	☺	☺	n/a
F: Funding, management and implementation of research has shifted from an insular, predominantly national model to an increasingly transnational and integrative model	☺	☺	n/a
G: The level of coordination and integration between the funding organisations for both research and innovation across EU Member States in the Baltic region has increased	☺	☺	n/a
H: The incidence of collaborative input from private enterprise (as partners/contributors) into research projects has increased	☺	☺	☺
I: The direct involvement of other stakeholders in scientific research (such as by contributing to research activities) has increased	☺	☺	☺
J: Stakeholders and potential knowledge-users (for example, policy-makers, or innovative industries) have become more involved in defining research agendas	☺	😐	☺
K: The contribution of academia to the development of innovative industries has increased	☺	☺	☺

NB: 'n/a' indicates not assessed; views not sought

Key to other symbols used			
Benefits realised have been due to the impact of BONUS:	Overall disagreement	No clear view	Overall strong agreement
Agreement that specified benefits/ positive outcomes have been realised		☺	☺
Not clear whether specified benefits/positive outcomes have been realised			😐
No positive outcomes realised; possible negative effects seen	☹		

Table 5. Summary of stakeholder views relating to specific impacts of the wider BONUS programme.

Responses to statement:	Participants	Funders	Users
L: Since 2009, has the BONUS programme had a positive impact on the joint use of research infrastructure by scientists of different Member States?	☺	☺	☺
M: Since 2009, has the BONUS programme had a positive impact on the cost-efficiency of research?	☺	☺	☺
N: Since 2009, has the BONUS programme had a positive impact on the development of integrated research, governance and management structures at the European sea-basin scale?	☺	☺	☺
O: Since 2009, has the BONUS programme had a positive impact on the development and harmonisation of research management practices in the participating states?	☺	☺	☺

Key to symbols used	
☺	Overall opinion of >75 % of those respondents that expressed a view is that a positive impact (either slight, moderate, high, or very high) has been seen since 2009
☺	Overall opinion of >50 % of those respondents that expressed a view is that a positive impact (either slight, moderate, high, or very high) has been seen since 2009

Similarly, the opinions of the *participants* group regarding issues around funding (questions E to G) are closely aligned with those of the *funders* group (who appear likely to be more familiar with funding matters and might therefore be expected to provide a more informed opinion on this topic). In this context, the views of the *funders* group add weight to the consensus of opinion provided by the (larger) *participants* group.

Positive impact of the wider BONUS programme

Qualitative stakeholder views were also gathered relating to impacts of the wider BONUS programme (Table 5). The assessment results show that there appears to be very little variation between the different stakeholder groups regarding their opinions on specific impacts of the wider BONUS programme (questions L to O) and all statements presented are strongly supported by all three stakeholder groups, the only discrepancy being the relative level of consensus on the views expressed within-groups. Also, despite slightly lower support rate, there was still a strong opinion across all three stakeholder groups that BONUS has, since 2009, also had a positive impact on the joint use of research infrastructure by scientists of different member states, and a positive impact on the cost-efficiency of research.

Membership and respondent rates of stakeholder groups

The ***participants* group** included individuals working within the BONUS programme and consisted of the main participants (for example Project Coordinators and Principal Investigators) in each of the 16 BONUS+ and 28 BONUS Art 185 projects (162 and 177 individuals respectively). In total, 289 potential participants were identified and approached within this group.

The ***funders* group** included representatives of those bodies/organisations that make up the BONUS Steering Committee plus representatives of those additional bodies/organisations responsible for *ad-hoc* funding of one or more BONUS projects. In total, 20 potential participants were identified and approached within this group.

The ***users* group** included those who may be expected to make use of the information generated by the BONUS programme, for example in support of the development of regional strategies or policy. In addition to representatives from state-funded bodies the *users* group also included one or more representatives from each of the following pan-regional groups:

- HELCOM (the Baltic Marine Environment Protection Committee, Helsinki Commission)
- VASAB (Vision and Strategies around the Baltic Sea)
- ICES (the International Council for the Exploration of the Seas)
- Interreg Baltic Sea Region Programme
- CBSS (the Council of the Baltic Sea States)

The group was augmented with key contacts from the EU Strategy for the Baltic Sea Region (EUSBSR), identified from details provided on the EUSBSR website (www.balticsea-region-strategy.eu/contacts). This included Policy Area Coordinators (PACs), Horizontal Action Coordinators (HACs), National Coordinators (NCs), and National Focal Points (NFPs) for each of those for those EUSBSR Policy Areas most relevant to the BONUS programme. Overall, a total of 166 potential participants were identified and approached within this group.

Although lower than hoped for, the number of returns was nevertheless considered sufficient to allow robust conclusions to be drawn. There was a wide geographic spread of respondents from the *participants* group (with representation from all eight Baltic states, and with no significant geographic bias evident). Despite the low number of returns, the six respondents from the *funders* group still represented four countries between them; Germany, Lithuania, Finland and Sweden. Between them the respondents from the *users* group claimed to represent all eight Baltic states (several respondents identified themselves as representing more than one country, perhaps reflecting the international role of many of the stakeholders that were contacted).*

Table 6 Questionnaire return rates by stakeholder group

Stakeholder group	Number originally contacted	Number of completed questionnaires received (appr. %)
Participants	289	59 (c.20 %)
Funders	20	6 (c.30 %)
Users	166	8 (c.5 %)
Overall	**475**	**73 (c.15 %)**

* NB: The 'cold-calling' approach to contacting stakeholders may have not resulted in optimum levels of response from stakeholders. If such an exercise is to be repeated in the future it is recommended that 'pre-engagement' of stakeholders by the BONUS Secretariat should be considered as a means of initialising and supporting the engagement process. For some stakeholders this may help in 'legitimising' the exercise, and so be a simple way of encouraging their full participation. a face-to-face workshop of key players from the Baltic region would allow aspects of the three key delivery areas considered in this study (relating to aspects of policy development, funding and engagement) to be debated in full.

Impact assessment studies on the BONUS programme 2009-2016:

Pauline Snoeijs Leijonmalm (2017): *Assessment of the BONUS impact on scientific excellence and dissemination*

Steve Barnard and Mike Elliott (2017): *Assessment of the BONUS impact: BONUS delivery, performance, and stakeholder opinions*

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