



DEPLOYING PRIVATE CAPITAL TO ACCELERATE THE GREEN TRANSITION

Green solutions in ports, waterways and coastal projects have increasingly become available thanks to many years of research and pioneering efforts in practice. These sustainable and/or nature-based solutions have shown to be good alternatives for classic solutions, but application is far from mainstream yet. One of the major hurdles is the lack of access of private capital to finance these kinds of solutions despite the strong interest of capital markets in green infrastructure opportunities. Identifying the hurdles and paving a way forward to overcome these hurdles could therefore help to increase the uptake of those green solutions.

A promising perspective

Although state-of-the-art sustainable and nature-based solutions have proven to be effective in practice, application at scale is certainly not the case. A major hurdle is that these types of solutions almost entirely rely on direct public investment and the willingness of governmental bodies around the world to take such a step. This limits the uptake and scaling of such solutions.

From the investment side, limitations in public budgets mean there is a bigger role for private capital to play to finance such projects. Moreover, increasingly this private capital is seeking such green opportunities. This increase is driven by fiscal regimes, regulations and reputational drivers. This capital is deployed, for instance, in wind parks, solar fields, electrification of railways, but seeks further diversification in the infrastructure sector. Deploying

private capital to accelerate the uptake of green solutions for ports, waterways and coastal projects is therefore a promising perspective.

This particular issue came to table in discussions with the Swiss based MAVA foundation in 2019. This foundation aims to push sustainable development in a wide sense. Leveraging the force of capital markets to make real-world impact is a key pillar of their approach. The discussion led to the idea to build an initiative around the topic of financing green infrastructure in and around ports, waterways and coastal areas. This idea quickly took shape in a cooperation between Vital Ports (a Dutch NGO dedicated to this topic), B Capital Partners AG (Swiss-based Infrastructure Investment House), Swiss Re (Re-insurance Company), IADC (International Association of Dredging Companies) and CEDA (Central Dredging Association).

Financial partners

The Swiss Re Group is one of the world's leading providers of reinsurance, insurance and other forms of insurance-based risk transfer, working to make the world more resilient. B Capital Partners is an independent investment house established in 2003 in Zurich. They work with, and for, international institutional investors and large family offices, often in close co-operation with developers. In a broader sense, Switzerland positions itself as the world's capital for green finance. Linking these Swiss networks to the networks of the dredging community at large therefore seemed a promising way forward.

A promising perspective however, is not something that will unfold itself to deliver its fruits, as soon became quite clear. To find the synergy, a roundtable was organised in Zurich at the Swiss Re Centre for Global Dialogue. This roundtable, with representatives of all involved organisations and their constituents, took place in February 2020 before the COVID-19 pandemic restricted travel worldwide.

The roundtable clarified a few points. The first being that the financial world and the world of dredging and engineering companies speak different languages. The financial specialists were very unfamiliar with vocabulary, project types and activities of the dredging community. And vice versa. The landscape of financial concepts, specialisations, interests and way of working was a lot to digest for the dredging community. Secondly, it was clear both communities aim for similar goals; increasing the uptake of green infrastructure projects, which is in line with the ambitions of all individual companies

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at the table. Thirdly, it was clear that progress can only be made when mutual understanding is further increased.

A joint study

The dialogue in Zurich asked for a practical step to gather all current understanding and knowledge about green projects and finance in a dedicated report. Such a report could be used to support further conversation with a wider variety of actors in the field. This led to the publication of the report "Financing of Sustainable Marine and Freshwater Infrastructure: A joint study to explore financing of green coastal, river and port projects". The report is based on the findings of a broad international team of experts.

The study provides six key lessons to enhance the uptake of green investment in this sector. In a later stage, these lessons have been summarised in an infographic. In a series of webinars following the report's publication, further learnings were gathered. This article discusses the key lessons, introduces the infographic and discusses the further reflections on the key lessons from a wider audience. Conclusions and recommendations are also provided.

Green port and waterway infrastructure

Before diving deeper into the role of private capital, it is useful to describe what is meant by green port, waterway and coastal infrastructure and how this differs from classic solutions. (Note: terms, such as green, sustainable and nature-based solutions (NbS) are used interchangeably in this article. For specifics of definitions and associated solutions, reference is made to the PIANC and EcoShape website and publications of the EC, UN and other organisations.) The collection of works at coastlines, rivers, canals and port areas are generally required to enable or provide flood protection, urban development, port development, navigable waterways and upgrade of recreational areas. Perhaps most telling is a summary of project types that describe the field. Classic examples, not necessarily green, are:

- land reclamation;
- flood barriers like dams, dykes, dunes;
- beach nourishment;
- integrated coastal zone management;
- riverbank protection;
- dredging of navigable waterways;
- port development; and
- breakwater construction.

Green variants of these assets can be seen as ranging from "more sustainable than a classic solution" up to nature-based solutions where benefits of natural processes from ecosystems help to deliver upon project needs. In general, the sustainable concepts are not only technically different, but also rely on early and extensive stakeholder involvement and execution methodologies with minimised ecological impact. Such green examples are:

- wetland restoration;
- mangrove forestry;
- coral reef restoration;
- hybrid land reclamation, including habitat improvement and expansion;
- circular use of materials, use of local materials;
- eco-friendly river protection;
- eco-friendly breakwaters;
- bird islands from dredged materials; and
- integrated river system development.

These green solutions are readily available to be applied on the precondition of a suitable financial structure. Important to mention is that all these described concepts are mature solutions and have been applied in real-world situations. For many cases, monitoring and evaluations took place and showed the effectiveness both in terms of services provided as well as ecological quality.

Financing projects

In short, financing means that capital is provided to develop a project where the capital provider expects, in time, to receive or earn back this capital including some interest or profit. However, the majority of marine and freshwater infrastructure projects are traditionally funded by the public sector (i.e. with taxpayers' money), without involving financing. The responsible public agency will pay for project development expenses directly in accordance with the contractual arrangement with the developer/contractor. In contrast, financed projects have a capital provider covering the costs of development with a payback mechanism kicking in after completion of the project. Two different types of financed projects can be distinguished on the basis of the cashflow for interest payments and loan repayments. These broadly fall into two categories based on the origin of those cashflows:

- Public service projects (e.g. coastal protection): The government, as project client, pays periodically after completion, where the payments may be based on performance or availability criteria (Figure 1).

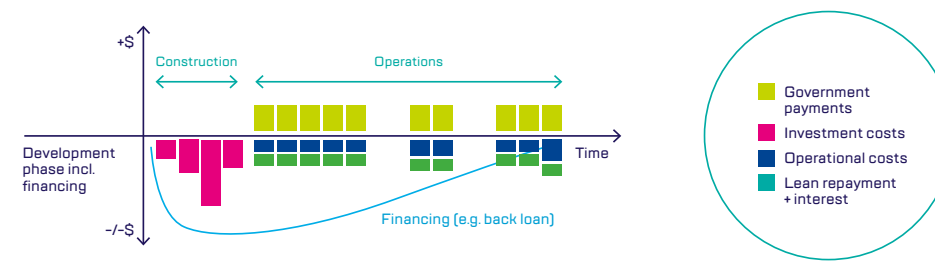


FIGURE 1
Public service projects.

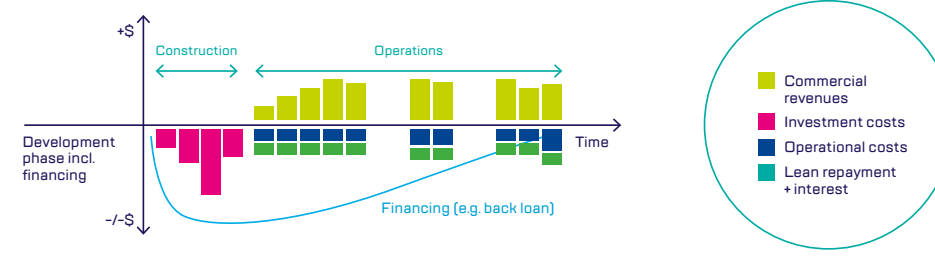


FIGURE 2
Commercial projects.

- Commercial projects (e.g. private port development): The users or beneficiaries pay for the project's results or services. Cashflow is generated based on the project's business model (Figure 2).

Figure 1 and 2 show graphically how these two types of financing differ. In practice, a wide spectrum of variants and combinations can be used, sometimes referred to under the title of "blended finance".

Key lessons identified in the report

Experts from Vital Ports, B Capital Partners, Swiss Re, CEDA and IADC constituents explored what is needed in order to improve the connection between private capital and sustainable waterborne infrastructure projects. One main conclusion is the need to clarify sustainable concepts and associated financial structures in order to introduce the topic to both the financial sector and the dredging community. In addition, to develop ideas on how to bring this to mainstream infrastructure investment asset classes.

The report provides content for further dialogue to foster the uptake of green marine and freshwater concepts by private investors. This dialogue, including a webinar series as part of it, concentrates around the key lessons as identified in the report. These key lessons are:

1. To improve the availability of private capital in this segment, a joint screening by sponsors and private capital suppliers is strongly encouraged. Working jointly early on may avoid following leads, which may be attractive from a mere construction CapEx (capital expenditure) side but are unviable for investors economically and/or sustainability wise. A joint selection effort based on sustainability and contractual solutions can focus scarce resources on the most promising opportunities, with a snowball effect of projects' private funding;
2. Since 2021, the European Commission requires institutional investors, financial intermediaries, lenders and asset managers to comply with a stringent investment process as well as transparent reporting

(Sustainable Finance Disclosure Regulation (SFDR)) with respect to the sustainability and Sustainable Development Goals (SDGs) impact of their investments. These mandatory requirements urge financial investors of all kinds to adopt a pre- and post-investment ESG (environmental, social and governance) risk management and controlling system. Certification of green projects might be instrumental in moving forward;

3. Develop standard frameworks that allow private capital to enter sustainable marine and freshwater infrastructure market – including, for example, updating concession-type legal frameworks that allow public-private partnerships;
4. Reporting tools and harmonised methodologies still need to be built to capture some of the associated benefits that are often overlooked as they are difficult to quantify, particularly in relation to future savings;
5. The insurance industry as a "de-risker" can be transformational in establishing a longer-term investment framework. It can create new types of insurance offerings that make infrastructure projects more standardised, cashflows more predictable and infrastructure as an asset class more attractive to investors – thus unlocking financing; and
6. Green solutions require a more holistic approach and greater coordination, and cooperation. They will also need to be incentivised through policy frameworks that increase their uptake and allow rerouting or unlocking new funds to support them.

Given the size and attractiveness of the sustainable marine and freshwater works segment, and the growing appetite for sustainable infrastructure projects, it is expected that in due time more avenues will open up to pursue the kind of projects featured in the report and more private capital can be put to work.

Infographic

The report captures the content and provides examples of the way financing of green infrastructure in port, waterways and coastal areas can be structured. In that sense, it serves its purpose well to support further conversations between the dredging and financial communities. Further outreach was foreseen in a series of webinars, but wider dissemination of a message by means of a report can be challenging. In discussion with



FIGURE 3
Mangrove restoration in the village of Timbul Sloko, Java, Indonesia.

Green solutions might open up new ways of cost recovery as these solutions typically offer wider societal benefits.

the MAVA foundation, it was decided the development of an infographic could help in spreading the message to a wider audience.

As an infographic should be self-explanatory, it proved quite a task to bring in all the elements. Projects involving dredging are a world in itself. The meaning of nature-based solutions can fill bookshelves. The same is true of finance and cost recovery models. Bringing this all together for an audience specialised in one sector, but unfamiliar with others, was a challenging task. The resulting infographic (Figure 4), just like the report, is free to use and distribute.

The infographic conveys the message of three steps: basic options and structures for green solutions; the key lessons learned; and the goal of accelerated uptake to be reached through these steps. The element at the left-hand side shows the key parts of a tailor-made puzzle. A desired solution needs to be embedded in a structure where the institutional setting, a cost recovery model and financing fit together.

Cost recovery models require particular attention. Green solutions might open up new ways of cost recovery as these solutions typically offer wider societal benefits.

This requires special effort to capture and monetise these societal benefits to ensure these can be of support for the project. Some examples of such models are selling carbon credits (either in voluntary or compulsory markets), habitat banking, inclusion of sources supporting natural development or involve outside beneficiaries (tourism sector, fisheries) with an interest to make the project happen. Figure 5 shows an example of this.

Further lessons from the webinar series

Following the launch of the report in September 2021, a series of three webinars were held to disseminate the results and

stimulate mutual learning on the basis of the findings. These sessions were organised jointly with PIANC, CEDA and IADC and reached an audience of 330 people. The majority of the audience came from the public sector, engineering firms, contractors, infrastructure finance/ investment sector and insurance industry. In all three sessions, the key lessons from the report were discussed and used to spur interaction with the public. The reflections from the audience have been anonymised, sorted and grouped together. These results are summarised below around three main questions.

Subsequent steps are needed to support the influx of private capital in order to accelerate the uptake of green solutions.

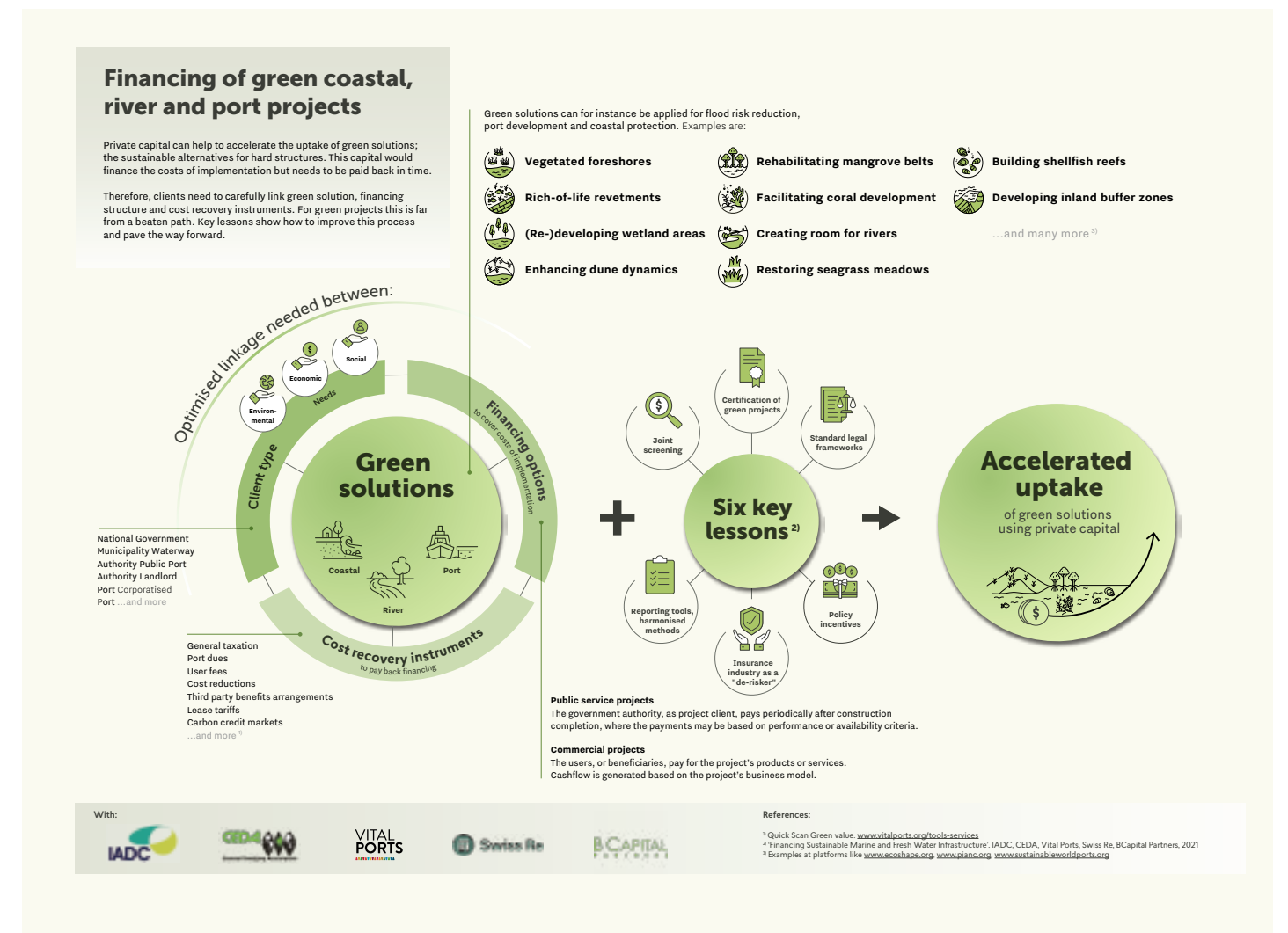


FIGURE 4
Financing of green coastal, river and port projects infographic.

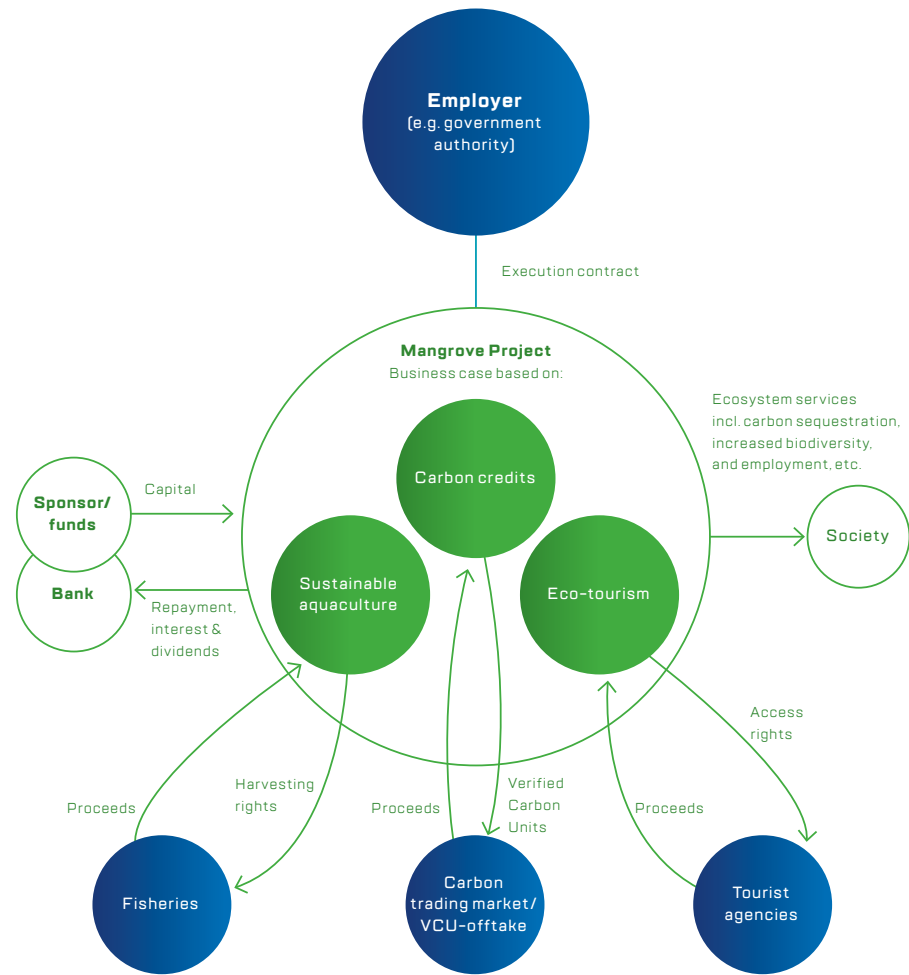


FIGURE 5 Example of utilising the wider socio-economic benefits created by a mangrove restoration project.

Question 1: Do you agree on the key lessons to address as mentioned in the report?

This question gave a wide variety of responses. The key lessons were generally recognised but triggered other reflections. Many comments were made with regard to determination and uncertainty of the benefits of green solutions. More transparency and knowledge is needed about NbS and the benefits of NbS should be made clear to counter discussions on higher costs. A holistic assessment of projects is lacking, resulting in exclusion of externalities that would tilt the balance more towards NbS. Costs was also an issue, as costs of nature-based solutions are perceived higher than traditional grey solutions. Uncertainty about the costs of carbon credits was seen as an important issue to resolve.

Certification and a common legal framework were also addressed. The legal framework is insufficiently developed to fit the needs of green projects. The expectation was that some of the hindrances around certification and the legal framework would diminish when the EU taxonomy is in place and becomes a familiar concept.

A lack of a proper business model for green infrastructure in the sector was one of the major talking points with the audience. Commercial investors need a proper business model, which is often lacking in NbS projects. Revenue streams can be quantified easily for energy transitions projects such as windfarms, not so much for integrated coastal or river projects. Working with carbon credits and habitat banking is one of the potential solutions. Climate adaptation and coastal

protection projects do not generate a cashflow, which is an important barrier for investors. Blended finance is presented as a potential solution in the report but it takes a long time to organise. This makes it of less interest for tendering parties.

Improving awareness was one of the additional issues that came forward. The financial world is often not aware of waterborne infrastructure projects. Green alternatives in this sector are often considered to be more expensive than classic solutions, which is not necessarily the case. Very often, a green solution is no more expensive than a grey one. The coastal protection project Hondsbossche and Pettemer Sea defence in the Netherlands was considered a clear example of such a case.

Question 2: How can the identified key lessons be put into practice?

The most important steps coming forth from the audience were the need to build awareness, develop proper business models and strengthen policy incentives.

Awareness and communication are certainly issues to work on. This counts for the broader public as well as specialised sectors, including the diversified group of investors and financiers. Currently many stakeholders are so called "sea blind", meaning what happens outside our usual direct view, as with what happens outside on the seas, does not feel very familiar. Activities of the dredging industry for instance, are well known in the sector itself, but to a lesser extend to the general public. Raising awareness of all the work that needs to be done, and which can be done, in a sustainable way was therefore seen as helpful.

Again, the absence of clear business models was a major talking point. A potential solution was seen in establishing support from international organisations to develop a classification/certificate system to determine the value of a project. However, this would be a long-term exercise. Public-private partnerships could also be of help. As would realising a dialogue early in the process between private investors and public sector to give the private sector more detailed information. In addition, creating platforms where investors have access to positive externalities was considered helpful to support the sustainable variants of projects. Involvement of contractors on board at an early stage, without limiting them in tendering, could also

Example solutions at various sustainability levels

Project	Grey	Hybrid grey-green	Green
Land reclamation	Straightforward new land for desired purpose	Reclaiming land including habitat improvements or enlargements	
		Creation of polders using less material	
		Combine land reclamation with protecting vulnerable low laying areas/ecosystems	
		Use locally sourced materials and apply soil improvement	
Port development	Purpose built port infrastructure	Biodiverse breakwaters fostering marine life	Natural harbour-ports
	Smooth, closed concrete and steel surfaces	Open structure revetments and quay walls	Sheltered waters through ecosystem restoration
Coastal protection	Concrete smooth levees and dykes, dams	Beach nourishments and/or sand dunes	
		Protecting estuaries by movable open barriers	Mangrove forestry
	Closing off estuaries by closed dams	Open structure revetments	Wetland/Marshes restoration
		Habitat improvements and enlargements	Coral reef restoration
Riverine flood risk reduction	Artificial levees, dykes, walls	Green embankments	Restoring natural flood plains
		Open structure revetments	Restoring natural flood plains
		Habitat improvements and enlargements	Wetland/Marshes restoration
Navigational dredging	Dredging and disposal of dredged materials	Dredging and disposal of sediments where beneficial for ecosystems	
		Use of dredged sediments for habitat improvement or enlargement (e.g. wetlands, bird islands)	
		Circular use of materials, dredged materials for construction purposes	
Shore/ bed protection	Concrete slabs	Open structure revetments	Mangrove forestry
	Asphalt embankment and bed lining	Green embankments	Use of local natural materials
	Steel sheetpiling	Biodiverse breakwaters fostering marine life	
Nature development			Ecosystem restoration
			Wetlands, bird islands
			Habitat improvements, enlargement

FIGURE 6 Grey, hybrid grey-green and green elements in typical marine and freshwater infrastructure projects.

spur the uptake. And perhaps having focus on a subset of projects (e.g. ports), could help drive momentum.

Policy incentives and government backing are also a field where progress can be made. Distinction for these kinds of projects can be made between social goods and commercial goods. Usually, governments pay for social goods. However, only countries with a well-developed tax structure are able to do so. By clearly determining all the benefits coming from NbS and providing a wide societal Cost Benefit analysis, the specific benefits could be allocated to either the public and/or commercial stakeholders. This might enable the possibility of both sectors jointly financing when both private and public sectors benefit.

Question 3: How can we build momentum to assure steady progress in this field?

This question gave rise to a rich spectrum of suggestions. Broadly, these comments fell into two groups: communication and instrumentation.

On the topic of communication, it was mentioned that financiers and the dredging community need to speak the same language. Contact persons at financial institutions are often unknown because they do not talk to corporations. Collaborating with other NGOs, such as the International Association of Ports and Harbors (IAPH) and the International Federation of Consulting Engineers (FIDIC) could be helpful. An initiative like EcoShape can also help spread the message. Another suggestion made was to develop part two of the report with tailor-made solutions for a selection of barriers mentioned in the existing report. Establishing a dedicated program and taskforce to assure steady progress was also a suggestion from the audience. Make the purpose of this taskforce clear to the outside world as the waterborne infrastructure sector needs a voice.

The other group of comments related to all sorts of instrumentation. This provided a myriad of suggestions. The financial sector is very transactional, which means agreements play a central role and should therefore receive special emphasis to accelerate the uptake of green projects in this sector. Define what "green projects" are and demonstrate the additional values of the sustainable solutions. These green solutions bring more than only the primary aim of the

project. At the same time the European Investment Bank is bound by the EU taxonomy, determining what might be called green or not. On the financial side, new instruments, such as blue bonds and insurance products are considered to be useful to build further momentum.

Conclusions

The main conclusion of the report and the webinar series is that sustainable waterborne infrastructure solutions are available, have been tested and are economically viable. The potential of these kind of solutions was widely recognised and seen as the way forward.

As clear as this conclusion may stand, the picture becomes far more nuanced when deployment of private capital is brought into the conversation. One of the key issues that comes with this is the necessity of generating cashflows to ensure paying off those loans and investments. Rich discussions took place around appropriate business models, identifying beneficiaries of the wider benefits of sustainable solutions, converting benefits into revenue streams and the roles of the public and private sectors in this. A first general conclusion is that work needs to be done to establish widely acknowledged business models for green port, waterway and coastal projects. Such business models should include clear ways to determine the additional, holistic, benefits of sustainable solutions and ways to monetise these.

Directly following this conclusion is the debate around the definition of "green". Although a diffuse concept in the wider infrastructure sector itself, it is a sensitive and important topic for investors and bankers as well. Defining what is green and sustainable is key considering a large influx of green-labelled capital and potential reputational and financial damage when mislabelling investments. At the same time regulations for utilising these labels and associated benefits, like the green taxonomy in the EU, is growing. However, this is still work in progress in the sector itself and needs further maturing. The conclusion from the report that certification could be helpful was supported by the wider audience and seems like a no-regret step to take.

Recommendations

In terms of recommendations, it was clear that much work is still to be done.

First, awareness of the possibilities to apply sustainable solutions in the port, waterway and coastal infrastructure sector is to be strengthened. Particularly strengthening outreach to the private capital sector would be helpful. A dedicated programme and taskforce to keep building such awareness was seen as useful.

Developing further instrumentation was another reflection on the report. Proper instrumentation to assess the wider societal benefits of sustainable infrastructure was mentioned in this light. The transactional nature of the entire sector, both developers and investors alike, calls for fitting frameworks and agreements.

In general, the webinars, as learning opportunities based on the earlier report, provided further nuanced insights for the sector. The topic of deploying private capital to accelerate the green transition in this sector has gotten more visible on the agenda of major players in development and financing of such projects. In many aspects, it remains a long journey but support and progress appeared to be strong and feeds a positive outlook.

As the conclusions make clear, subsequent steps are needed to support the influx of private capital in order to accelerate the uptake of green solutions. Carving this path forward is the topic of a dedicated 1-day conference titled "Financing Sustainable Marine and Freshwater Infrastructure", organised by IADC in Dubai on 9 February 2023.

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For more information

The full report, which is free to download, can be found at www.financing-smafi.org along with the infographic and other background information. Contact the author at hijdra@vitalports.org.

Summary

In the past decades, multitudes of sustainable and nature-based solutions have become available to apply in port, waterway and coastal projects. In practice, the application of such solutions is still far from mainstream. Meanwhile, public budgets for these projects are limited while private capital providers are seeking green infrastructure projects to put their money at work. Unfortunately, the specific field of green port, waterway and coastal infrastructure is mostly overlooked with regard to deployment of private capital.

This topic was the focus of a joint study by Vital Ports, Central Dredging Association (CEDA), International Association of Dredging Companies (IADC), Swiss Re and B Capital Partners, which resulted in the report "Financing of Sustainable Marine and Freshwater Infrastructure". The report provided six key lessons that can help to develop this market: 1) joint screening of projects by sponsors and private capital suppliers; 2) certification of projects; 3) standardised legal frameworks; 4) harmonised methods and reporting tools; 5) utilise insurance industry for de-risking projects; and 6) reinforced policy incentives. In a series of webinars following the publication further learnings were gathered. This article discusses these six key lessons, as well as the further reflections on the key lessons from a wider audience.



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References

Clark W. (2021)

Construction Disputes – Seeking Sensible Solutions, London Publishing Partnership, UK.

EcoShape (2021)

Paving the way for scaling up investment in nature-based solutions along coasts and rivers: How to finance and accelerate implementation of nature-based solutions.

European Commission (2020)

EU taxonomy for sustainable activities. https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en.

European Investment Bank and European Commission (2019)

Investing in nature: financing conservation and nature-based solutions.

IADC, CEDA, Vital Ports, Swiss Re and B Capital Partners (2021)

Financing Sustainable Marine and Freshwater Infrastructure: A joint study to explore financing of green coastal, river and port projects.

International Union for Conservation of Nature (2020)

Blue Infrastructure Finance: A new approach, integrating nature-based solutions for coastal resilience.

World Wildlife Fund (2020)

Bankable Nature Solutions – Blueprints for Bankable Nature Solutions from across the globe to adapt to and mitigate climate change and to help our living planet thrive.