

## PROGRESS REPORT #4

### September 2024 – November 2024

#### Summary of the Project:

**Duration:** 3 years (01/02/2023 – 31/01/2026)

**Main aims:**

- To replant 1.5 hectares of seagrass meadows in Hong Kong
- To restore 4.5 hectares of seagrass meadows in Hong Kong

**Deliverables:**

- Assessment of Carbon sequestration from the replanting and restoration of 6 hectares of seagrass meadows that will target biological Carbon capture.
- Half yearly progress reports of activities and achievements throughout the 3 year period of this project.
- Community and stakeholders' engagement through outreach activities, workshops, citizen science, and social media and press releases.
- Proof of concept allowing HK Seagrass Restoration Association to apply for larger funding to scale up.

To achieve these aims and all the deliverables, we have designed a project following a stepping stone structure. The progress each year will inform the activities for the next one. Therefore, each year addresses a specific question(s):

**Year 1 (a.k.a. The baseline):** How much carbon is already out there in the sediments? Is this carbon from the seagrass or does it come from somewhere else? How do seagrasses or environmental conditions (pollution, typhoons) influence this carbon stock?

**Year 2 (a.k.a. Re-wilding):** How much carbon can be captured by restored/replanted seagrass? How fast is this new carbon stored?

**Year 3 (a.k.a. Moving forward):** Is this new carbon stable or lost? What is more efficient for carbon sequestration, replanting or restoring seagrasses? What do we need to scale it up?

		Year 2											
		Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25
Assessment	Activity												
	Renewal permits												
	Fieldwork monitoring												
	Collection plants												
	Collection seeds												
	Laboratory nursery												
	Lab seed germination												
	Replanting phase												
	Restoring phase												
	Carbon assessment												
Engagement	Analysis C material												
	Project reports												
	Workshop / Seminar												
	Outreach												
Engagement	Citizen science												

This fourth report is part of the **Re-wilding Phase** (i.e., *determining how much carbon can be captured through restored/replanted seagrasses*). During this year, we have focused most of the efforts on fieldwork targeting seagrass restoration activities and assessment of carbon sequestration.

### Our role promoting Seagrass Restoration as a Nature-Based Solution in Hong Kong:

During the period covered by this fourth report, the HKSRA team has been actively involved in the development of the new/updated biodiversity policies for Hong Kong. JD co-led two of the working groups from the Hong Kong Biodiversity Expert Group (HKBEG), aiming to develop initial recommendations for the forthcoming Biodiversity Strategy and Action Plan (BSAP) 2025 – 2035, of the Hong Kong Government. We used the HKSRA project as an example to explain to the Environmental authorities in Hong Kong how business and the finance sector can get involved in biodiversity conservation and restoration through Nature-Based Solutions (NbS). Some of these recommendations include the creation of a clear policy framework that encourages private sector investment in Hong Kong's biodiversity and ecosystem functioning (e.g., blue carbon) and the development of nature based credits to promote restoration of the local environment.



**Figure 1.** Discussion sessions for the BSAP 2025-35, JD contributing with the Hong Kong seagrass work developed in this project.

We continue with the “Roadmap for seagrass restoration” strategy described in the previous report. This part involves intense transplantations of seagrasses from our nurseries at SWIMS. In addition, we are monitoring the progress of these plants in terms of their survival and growth after transplantation. As you can see below, most of the sites are showing positive trends, with expanding seagrass meadows after transplanting plants from the HKSRA nurseries. Although our HKSRA project has an overall target of 1.5 hectares replanted and 4.5 hectares restored, we have expanded our efforts covering a total of 20 hectares. This massive effort aims to maximize the impact of our restoration work and to ensure the highest chance of success in achieving the 6 hectares targeted in this project. We continue monitoring these sites, developing some outreach and educational activities with the community, and engage with NGOs and the Government Sector in the transplantation efforts (See pictures below).



**Figure 2:** Example of seagrass patches growing at Clear Water Bay in Oct 2024. Pictures taken by the seagrass team



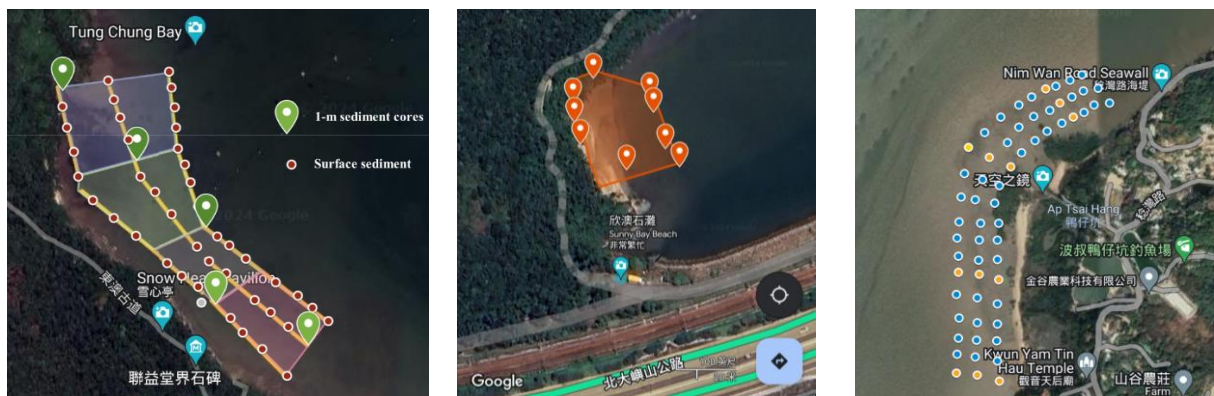
**Figure 3.** Indoor seagrass nurseries at SWIMS (left panel), and seagrasses producing fruits/flowers and seed (right panel), evidencing their health and growth.



**Figure 4:** Positive trends of restored seagrass sites (90% coverage) in Lantau Island during this report period.



**Figure 5:** Monitoring of seagrass sites after transplantation



**Figure 6:** Sampling and monitoring of carbon sediment stocks associated to seagrass sites under restoration management

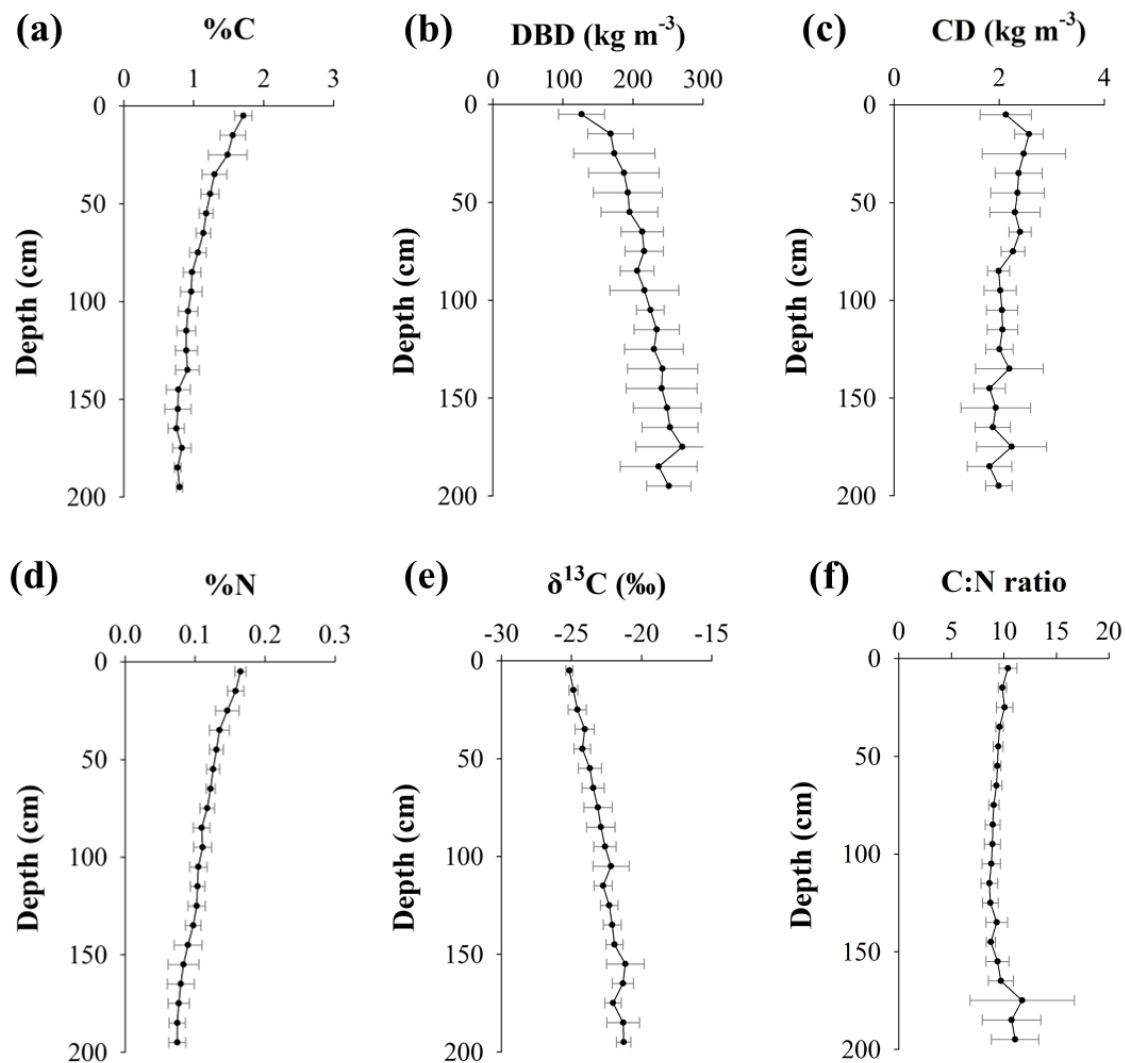


**Figure 7:** Restoration activities involving the community as part of our efforts to engage local stakeholders in the protection and sustainable use of blue carbon ecosystems in Hong Kong.

### Sediment Carbon Stocks and Sequestration Assessment

Throughout year two of the project, we have been working hard processing sediment samples from seagrass meadows in Hong Kong. In previous reports, we shared some information about our findings of carbon stocks in shallow levels of the sediment cores. We are now gathering data regarding the rate of sequestration of these carbon stocks and their overall storage potential. Although most samples are still being processed at the Stable Isotope Laboratory, we have some preliminary data from sites in which seagrasses were lost during the last decade. These sites will be used as our reference point for carbon loss in areas without seagrass management/restoration. In these sites, Carbon stocks for the top 2 meters vary between 37.2 to 51.2 Mg C ha<sup>-1</sup> (**136 – 187 Mg CO<sub>2</sub> ha<sup>-1</sup>**), which is within the range of the Carbon stock for areas with seagrasses for only the top 15cm of sediment. This clearly indicates that seagrass sediments have significantly more Carbon stock potential than areas without seagrasses. Based on the Carbon stock and sedimentation rates, the Carbon accumulation rates for these bare sites ranged between 0.18 to 0.64 Mg C ha yr<sup>-1</sup> (**0.66 – 2.4 Mg CO<sub>2</sub> ha<sup>-1</sup> yr<sup>-1</sup>**).

**NOTE:** 1 Mg is = to 1 tonne.



**Figure 8.** The vertical profile of: (a) C%, (b) Dry Bulk Density (DBD), (c) Carbon Density (CD), and (d) N%, (e)  $\delta^{13}\text{C}$ , (f) C:N ratio at every 10 cm for sediment cores in sites where seagrass has been extirpated in the last few years. This is preliminary data and we are still working with the other samples from seagrass sites to use as a comparison.

This figure shows a clear profile for Carbon accumulation with depth. This can be translated to carbon accumulation through time in which deeper layers are older. In this sense, Carbon profiles in these sites tend to stabilize around 100 cm depth suggesting that accumulation remains unchanged after that. The areas with greater accumulation are between 0 cm and 100 cm, which is represented by the slope of the curve. We will compare these profiles with the ones we are developing now for the seagrass sites under restoration.

## Outreach activities and science communication

The team has continued promoting the core activities of the HKRSA through both knowledge exchange and education. We have developed several workshops with schools in Hong Kong (See Fig. 9), and JD has continued promoting our blue carbon efforts with scientists and the Hong Kong Government (Fig 10.)



**Figure 9.** Workshops with Schools at SWIMS for seagrass education and conservation. This picture is an example of the workshop developed for the Victoria Shanghai Academy in October 2024.

**【公眾研討會 Public Seminar】**

**濕地與氣候變化之間的相互關係**  
**Inter-relationship between wetlands and climate change**

**26 Oct, 2024 (SAT)**  
**10:30am - 12:00pm**

尖沙咀梳士巴厘道 3 號 Star House / 線上 Zoom  
 Star House, 3 Salisbury Road, Tsim Sha Tsui / Zoom

座位有限 Limited seats  
 即日起至10月20日可預先登記 Pre-registration by 20 Oct, 2024

**立即報名 REGISTER NOW**

**嘉賓講者 Invited Guest Speakers**  
 兩場演講均會以英語進行 Two talks will be conducted in English



**Juan Diego GAITÁN-ESPITIA**  
 Assistant Professor  
 School of Biological Sciences,  
 The University of Hong Kong



**Xiaoguang Ouyang**  
 Professor  
 Southern Marine Science and  
 Engineering Guangdong Laboratory  
 (Guangzhou)

**Figure 10.** JD has been regularly invited to seminars in Hong Kong and Mainland to share our experience working on blue carbon ecosystem management and restoration through the HKRSA. This is a unique opportunity to engage other stakeholders in this effort and expand later on our activities to Mainland and the Southeast Asia region.

We appreciate your support to the project and will keep you updated about the progress! Stay tuned!

Best  
 The HKRSA core team