

Blue Forests Project

GEF FULL SIZE PROJECT DOCUMENT

Appendix 21

Component 2.e Description

Application of the Blue Forests methodologies and approaches through small-scale interventions

Intervention 5 - Abu Dhabi Blue Carbon Demonstration Project

(This intervention is provided through 100% co-finance support)

COVER SHEET

- Name of small-scale intervention: Abu Dhabi Blue Carbon Demonstration Project
- Name of Lead Partner Organization:
 - a) Abu Dhabi Global Environmental Data Initiative (AGEDI)
- Contact person:
 - a) Dr. Frederic Launay, Acting Director, AGEDI, Senior Advisor to Secretary General - Secretary General Office at Environment Agency - Abu Dhabi (EAD), Director General and Board Member at Mohammed bin Zayed Species Conservation Fund, Chair at IUCN/SSC Reintroduction Specialist Group
- Blue Forest ecosystem focus: mangrove, seagrass, salt marsh, sabkha, and intertidal algal flats
- Total area covered: 176,400 ha (for both improved understanding and improved ecosystem management)
- Duration of sub-project: entire project, 48 months (the project was initiated in Fall 2012)
- **Amount of GEF grant: \$0** (*this intervention is provided through 100% co-finance support*)
- Amount of AGEDI Co-financing (applied to Component 2e): \$1,800,000 USD*
- Total funding: \$1,800,000 USD

*Total co-finance from AGEDI is \$5,515,000, which is identified by the following:

- \$1,800,000 to **Component 2e** (Activities 2.1.1.5 and 2.2.1.5), representing the Abu Dhabi Blue Carbon Demonstration Project as a featured small-scale intervention (intervention #5); and
- \$3,715,000 to Sub-Activity 2.3.2.1.5 of **Component 2**, representing other Abu Dhabi blue carbon activities contributing to the global baseline for blue forests (e.g., blue carbon discussions at the Eye on Earth Summit, the Oceans and Blue Carbon Special Initiative, and the regional Feasibility Assessment).

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1. SMALL-SCALE INTERVENTION SUMMARY

The focus of the GEF Blue Forests Project small-scale intervention titled 'Abu Dhabi Blue Carbon Demonstration Project' is to investigate opportunities in building a local greener Emirate through the better understanding of carbon and coastal ecosystem services and its potential contribution to climate change mitigation efforts.

The project aims to improve local understanding of carbon storage and sequestration and the other ecosystem services that coastal blue carbon ecosystems provide in Abu Dhabi. The project will identify options for the incorporation of these values into policy and management, leading to the sustainable use of these ecosystems and their services preserved for future generations. Experience and knowledge gained from the project is also intended to help guide other national blue carbon projects and international efforts as well as building local capacity to enable Environment Agency – Abu Dhabi to undertake future further studies themselves.

The intervention is applicable to an area covering a total of 176,400 ha. This sub-project will help meet national priorities in coastal management, especially pertaining to the protection of mangrove, seagrass, saltmarsh (all three blue forest ecosystems) and sabkha ecosystems (including algal flats), and priorities in national climate change policy. These ecosystems are particularly important in Abu Dhabi as they represent a significant part of the Emirates natural ecosystem resource. It will also serve as an example in natural carbon mitigation for a region heavily dependent on extraction of fossil fuels.

The Abu Dhabi Blue Carbon Demonstration Project was initiated in the Fall of 2012 and is expected to be completed by the end of 2013. The project is the world's largest and most ambitious blue carbon project to date, exploring carbon and ecosystem services for all three blue carbon/blue forest ecosystems as well in sabkha (including algal flats) which has the potential to be a local and/or regionally important blue carbon resource.

GEF Blue Forests funds will not be used in the Abu Dhabi Blue Carbon Demonstration Project. This intervention is funded solely by the government of Abu Dhabi (via the Environment Agency – Abu Dhabi (EAD), through AGEDI). This project will build on existing Blue Forest related activities within the Emirate as well as at a national level and will support the incorporation of mangrove, seagrass, and salt marsh (and potentially sabkha and algal flats) carbon storage and sequestration and other ecosystem services in national policy, fostering support for the Blue Forests concept on the international scale.

This has already been evidenced during the Blue Forests Project PPG stage through the world's premiere multilateral international capacity building in the blue forests concept - though field-based cross training with 'blue carbon' teams from Indonesia and Madagascar as well as staff from EAD and the leading international scientists in these fields. Research teams, comprised of 75% women and representing partners from the GEF Blue Forests Project, supported the baseline mangrove and salt marsh carbon assessments in Abu Dhabi. This important and unique cross training experience supports advancing gender equality, and improved understanding and coordinated application of blue forests in developing nations.

Coordination with the GEF Blue Forests Project and the identification of the Abu Dhabi Blue Carbon Demonstration Project as one of the Blue Forests Project's featured interventions will allow the experiences gained through the intervention in Abu Dhabi to be developed into internationally scalable experiences comparable with the other sub-project sites of the Blue Forests project allowing increased efficiency and focus.

2 SMALL-SCALE INTERVENTION DESIGN

2.1 Background and Context

As a featured intervention of the GEF Blue Forests Project, the Abu Dhabi Blue Carbon Project plays a leading role in a coordinated international effort to demonstrate methodologies and approaches for carbon accounting and ecosystem services (ES) valuation in blue forest ecosystems. The project will provide evidence-based experience that supports replication, up-scaling and international adoption of Blue Forests concepts. At an Emirate as well as national level, this project represents an opportunity to improve the understanding of ES, carbon sequestration, storage, avoided emissions and management of Blue Forest ecosystems in the Arabian Gulf. Regionally, this project serves as a demonstration for nature-based mitigation of carbon emissions, while preserving the other values blue forest ecosystems provide.

2.1.1 Regional Context

Carbon dioxide emissions are those resulting from the burning of fossil fuels and include gasses produced during consumption of solid, liquid, and gas fuels and the manufacture of cement. Since the discovery of oil in the Arabian Peninsula more than 30 years ago, many states have undergone a profound transformation from impoverished small desert principalities to modern states with high standards of living and rapid development of infrastructure and commerce. Rapid economic and population growth and high energy consumption have led to per capita carbon emissions at levels many times that of the world average.

The UAE and the other six countries of the Arabian Peninsula are all signatories to the Kyoto Climate Protocol, a protocol to the UNFCCC, aimed at addressing climate change. Signatory parties are directed to ensure that National Communication reports submitted to the UNFCCC include descriptions of planned mitigation measures. Many states throughout the region are pursuing a range of options to mitigate their GHG emissions, including solar power, carbon capture and storage and other innovative technologies. As the Arabian Peninsula contains no major terrestrial forests, the blue forests concept may provide options for carbon sequestration and storage in natural coastal ecosystems.

2.1.2 Regional Setting

Despite their high ecological, economic and societal values, the coastal ecosystems of the Arabian Peninsula, including coral reefs and mangrove forests, are subjected to continued degradation¹. Blue Carbon ecosystems exist in all seven regional nations.

Coastal habitats of the Arabian Peninsula also provide a myriad of essential ecosystem services. They support fisheries, protect shorelines, improve water quality (which has the potential to decrease the impacts of water desalination), provide opportunities for tourism and are important for cultural heritage and identity.

Mangroves – known as ‘Qurum’ in Arabic, four species are recorded from the region, with *Avicennia marina* being dominant. Despite low diversity and a mostly irregular distribution with many stands relatively small in size, mangroves throughout the region are regarded as ecologically significant². In the Arabian Gulf mangroves reach their northern limit in Asia, grow under hyper saline conditions and are represented by a single species, *Avicennia marina*. Mangroves are reported to be widespread in Yemen and irregular throughout the rest of the region. Notable areas of mangroves can be found near Muscat in Oman and Abu

¹ Burke L., Reytar K., Spalding M., Perry A.L., Cooper E., Kushner B., Selig E., Stackhouse B., Teleki K., Waite R., Wilkinson C. & Young T. 2011. Reefs at Risk Revisited. World Resources Institute, Washington, DC.

² Spalding M.D., Kainuma M., Collins, L. 2010. World Atlas of Mangroves. Earthscan, London, UK.

Dhabi in the UAE. Mangroves do not normally occur in Kuwait, but efforts have been made to introduce them there. Only two species have been recorded along the Red Sea coast of Saudi Arabia, *Avicennia marina*, which is widespread, and *Rhizophora mucronata*.

Mangroves are known to have been more extensive both in the recent and long-term past. The historical causes for reduction are generally accepted to be clearance, primarily from fuelwood (charcoal), collection and livestock grazing (camels). The largest current impact to regional mangroves is and conversion for development.

Mangrove nurseries are known from the UAE and Oman. Due to the legacy of the late Sheikh Zayed Bin Sultan Al Nahyan, who initiated who instituted a massive reforestation campaign, mangroves have been planted in many locations throughout the UAE since the 1970's. The Environment Agency-Abu Dhabi (EAD) recently reintroduced the mangrove species "*Rhizophora mucronata*" which was previously recorded in the UAE. It is largely unknown how much carbon sequestration and storage would result from mangrove afforestation. Various rates of carbon storage and sequestration for natural versus planted mangroves will be assessed during the project along.

Seagrasses – Eleven species of seagrass are reported from the Arabian Peninsula. The highest diversity is reported from the Red Sea (11 species) and the lowest in the Arabian Gulf (3 species). Seagrasses are reported from Kuwait, western and eastern Saudi Arabia, Bahrain, Qatar, and the UAE³. Approximately 42% of Yemen's Red Sea coastline supports seagrass communities⁴.

In 2003, the late Dr. Ronald Phillips, a pioneer in seagrass research, noted an almost total lack of research on seagrasses in the Arabian Gulf;

"Studies needed are those on density, biomass, primary productivity, and growth rates of the seagrasses. Until these studies are done, there is no real way to quantify their contribution to the Gulf fisheries...This work is badly needed for the Arabian Gulf"³.

Research on regional seagrass density, biomass, primary productivity, and growth rates are also paramount for Blue Carbon. These needs will be addressed through the project.

Salt marshes– Commonly found in the more sheltered regions of the Arabian Gulf coast, salt marshes are intertidal biologically diverse sand and mud flat habitats. They support large numbers of invertebrates and foraging shorebirds. These rich ecosystems also provide valuable breeding and stopover habitat for a number of regionally and internationally important populations of migrant waterfowl⁵.

Coastal Sabkha – On higher ground away from the water's edge in areas of extremely high salinity (2-4 times greater than seawater), coastal sabkha, extensive areas of saltflats, occasionally flooded by extreme high tides, are hostile to all but the hardiest forms of life. The Abu Dhabi Blue carbon Demonstration Project will explore its potential as a 'blue carbon' ecosystem

Intertidal algal flats - Project field surveys have discovered an unusual potential blue carbon ecosystem, and one that is unique to the Gulf states. Cyanobacterial (blue-green algal) mats associated with areas of sheltered intertidal mud are the present day representation of the earliest known forms of life identified in rock records, dating back 3.2 billion years. The Abu

³ Phillips R.C. 2002. A short review on seagrasses of the Arabian Peninsula region with particular reference to mineralisation in sabkhat. In: Barth H.J., Böer B. (eds) Sabkha Ecosystems. Vol. 1. The Arabian Peninsula and Adjacent Countries, pp 299–302. Dordrecht: Kluwer.

⁴ UNEP, 1997.

⁵ Arkive. 2011. Jewels of the UAE, Saltmarsh. World Wide Webpage, accessed October 2011. Available at: www.arkive.org/uae/en/saltmarsh

Dhabi Blue carbon Demonstration Project will explore its potential as a 'blue carbon' ecosystem.

Ecosystem services - Services produced and supported by healthy blue forest ecosystems provide a great benefit to coastal populations throughout the Arabian Peninsula. Valuable services include supporting fisheries by providing crucial habitat for many fish species; underpinning tourism opportunities such as snorkeling over seagrass beds, diving among coral reefs, kayaking in mangroves and bird watching in saltwater marshes; maintaining global biodiversity such as the millions of migratory birds that use regional wetlands annually; and adding to the foundation of culture and heritage throughout the region; sustaining endangered and threatened species such as habitat for sea turtles and dugongs; and providing coastal protection and adaptation to climate change through mangroves stabilization of shorelines during storms high tides, and the subsequent risk of flooding.

Fisheries - Due to both their role in food security and cultural significance, fisheries are an important natural resource in Arabian Peninsula. Blue forest ecosystems are therefore vital to fisheries throughout the region. Mangrove habitat serves as critical nurseries for many commercially important marine species and plays a central role in the health of fisheries and the economic well-being of fishermen.

As mangroves and seagrasses produce a large amount of leaf litter per acre per year, which is broken down by bacteria and fungi, they also eventually provide food for sea-life. As well as a rich source of food they also offer refuge from predation for many fish species. Mangroves and seagrasses serve as essential habitat for the commercially important Hamour (*Epinephelus cooides*), Aqalah (*Lutjanus fulviflamma*), Badah (*Gerres longirostris*) and Faskar (*Acanthopagrus bifasciatus*). Fisheries throughout the region would suffer a dramatic decline without access to connected and healthy seagrass and mangrove habitats.

Regional fisheries are currently threatened by a multitude of impacts, including habitat destruction, overfishing and water pollution. Over 70% of the Abu Dhabi Emirate's fisheries are currently classified by EAD as 'over-exploited.' The stocks of 8 popular species (including the Hamour and Farsh) are heavily over-exploited. Re-building fish stocks is a high priority environmental goal for the Emirate.

High quality, local food sourcing is imperative for discerning high end tourism market. The provision of unique/region specific, local fish to restaurants and the hospitality industry could provide economic incentive to ensure long-term fishery health. In addition, the fishery industry is critical for economic propriety of local communities.

Cultural Heritage - Archaeological evidence indicates a close relationship between man and mangroves. Early man utilized mangrove associated species for food, such as the mollusc shell (*Trebreliia palustris*) and the mud mangrove crab (*Scylla serata*). The oldest occupied island with mangroves in Abu Dhabi, Murawa Island, has been inhabited for 7500 years and 2 Neolithic settlements are located on it. Early man likely over exploited mangroves for wood and fuel, and multiple species disappeared during the early Islamic period⁶.

Mangroves have been traditionally used for wood and fuel, livestock grazing (camels). Abu Dhabi's mangroves have been used for centuries for honey production⁷. Mangroves also feature in regional folklore, Jinn, or genies, are said to inhabit mangrove areas⁷.

Tourism - Tourism is arguable the world's largest industry and the largest sector supporting protected areas. Sustainable tourism incorporates positive economic, socio-cultural, environmental and climate considerations and impacts during planning and implementation. More than 50% of all tourists visiting a foreign country make use of protected areas and

⁶ Beech, M. 2011. Personal communication, July 2011. Abu Dhabi, UAE

⁷ EAD, 2006

experience in these protected areas can make tourists engage in conservation. Sustainable tourism can serve as a conduit for socio-cultural conservation and has major potential to raise investments for conservation.

Tourism in the states of the Arabian Gulf growing tourism is a rapidly growing industry⁸. A wide range of mass tourism activities are available, from scuba diving and beach-going to desert safari tours, auto racing and concerts. Ecotourism, defined as tourism in natural areas that conserves the environment and the wellbeing of local people, is relatively new in the region and may offer opportunities to advance Blue Carbon. Ecotourism when seen within the context of UNEP's Green Economy Initiative can help promote transitions to sustainable planning and development.

Ecotourism is the tourism industry's fastest growing sector globally. Well planned sustainable tourism can support conservation efforts such as Marine Protected Areas (MPA). During MPA planning and implementation, positive economic, socio-cultural, environmental and climate considerations are incorporated. Healthy intact landscapes are the most desirable for sustainable marine tourism, and they also store the most Blue Carbon.

'Blue forest' tourism activities in the Arabian Peninsula include a variety of nature-based options, examples include kayaking in mangroves of Abu Dhabi, fishing for crabs at night in the mangroves of Emirate of Umm Al Quwain, and bird watching for Greater Flamingos on the inter-tidal mudflats and inshore and seagrass beds at Ras Hayan on the southeast coast of Bahrain. Much sport fishing could be considered a 'Blue Carbon' activity, as many popular fish species, and their food sources depend on healthy Blue Carbon habitats.

⁸ Khan N.Y., 2007. Multiple stressors and ecosystem-based management in the Gulf Aquatic Ecosystem Health & Management 10: 259-267.

Table 1: Component 2 – Intervention 5 - Sub-Component, activities, sub-activities, outputs, and outcomes

Component 2) Application of Blue Forests approaches in small-scale intervention – U.A.E.			
Sub-Component 2.1) Improving the understanding of blue forests carbon storage and and ecosystem services.			
Sub-Component Output: One documented small-scale intervention where blue forests methodologies and approaches are applied			
Activity	Sub-activity	Sub-activity Output	Outcome
2.1.1.5 Small-scale intervention 5 - Improved understanding - Abu Dhabi, U.A.E. (176,400 ha)	2.1.1.5.1) Baseline Carbon Assessment	The baseline carbon assessment is accomplished	Improved understanding of ecosystem services, carbon sequestration, storage, avoided emissions and management in mangrove ecosystems covering 176,400 ha.
	2.1.1.5.2) Ecosystem Services Assessment	The ecosystems services assessment is accomplished	
	2.1.1.5.3) Policy Assessment	The policy engagement is accomplished	
	2.1.1.5.4) Communication, Outreach and Knowledge Capture	Communication, outreach and knowledge capture is accomplished	
	2.1.1.5.5) Mapping and Ground Truthing	The mapping and ground truthing is accomplished	
	2.1.1.5.6) Carbon Finance Feasibility Assessment Component	The Carbon Finance Feasibility Assessment Report is produced	
	2.1.1.5.7) Project Coordination	The project is effectively managed and coordinated	
2.1.1.6 Facilitating knowledge management on carbon storage and sequestration and ecosystem services	<i>Please see Appendix 16 for the technical support and coordination activities</i>		
Sub-Component objective 2.2) Improving blue forests capacity and ecosystem management			
Sub-Component Output: Blue forest methodologies and approaches incorporated into local and or national ecosystem management practices			
2.2.1.5 Small scale intervention 5 - improved capacity and ecosystem management - Abu Dhabi, U.A.E. (176,400 ha)	2.2.1.5.1) Capacity Building and Knowledge Transfer Component	Capacity building and knowledge transfer is accomplished	Improved ecosystem management as a result of the application of methodologies facilitated by Component 1 in the same site covering 176,400 ha.
	2.2.1.5.2) Policy and Management Engagement	Policy and management engagement is accomplished	
	2.2.1.5.3) Geographic Tools Component	The geographic tool is produced	
2.2.1.6 Facilitating knowledge management to improve capacity and ecosystem management	<i>Please see Appendix 16 for the technical support and coordination activities</i>		

2.2 Overall Objective and Outcome

The overall objective of Component 2 is the application of methodologies and approaches for carbon accounting and ecosystem service valuation in blue carbon ecosystems, including those which are unique to Abu Dhabi and the region, so as to provide an evidence-based experience that supports replication, up-scaling and international adoption of the blue forests concept.

The project outcomes associated with this small-scale intervention are an improved understanding of ecosystem services, carbon sequestration, storage, avoided emissions and management in mangrove, seagrass, saltmarsh and sabkha (including algal flats) ecosystems covering 176,400 ha, and improved ecosystem management as a result of the application of methodologies facilitated by Component 1 in the same site covering 176,400 ha.

The project outcomes will be fulfilled through increased understanding and capacity in mangrove, seagrass and saltmarsh ecosystem service valuation at the local and national scale, increased understanding of management practices that promote the preservation of mangrove ecosystem services, and the incorporation of carbon and other ecosystem services into climate and mangrove relevant policy and management at a local and potentially national scale.

As a featured intervention of Component 2 and with the assistance of the PCU, the project will demonstrate application of methodologies and approaches and share experiences with the other small-scale interventions. This cross-training and experience sharing will be facilitated through the Project Coordinating Unit (PCU) and is included under the technical support and coordination activities to Sub-Component objectives 2.1 and 2.2 described in Appendix 16.

2.3 Consistency with national, regional and international efforts

Blue forests may be a new concept, however its core strategy - the conservation of coastal ecosystems - is not. Examples of local, regional and international environmental frameworks, networks and organizations, and initiatives include the following:

IUCN ROWA - IUCN's Regional Office for West Asia covers all regional countries and is interested in advancing in Blue Carbon in the region;

ROPME - The Regional Organization for the Protection of the Marine Environment's mission involves the protection of the marine environment and the coastal area the Arabian Gulf (ROPME Sea Area). Regional members include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE. ROPME is involved in the regional conservation and management of mangroves and has expressed interest in Blue Carbon.

National carbon accounting - All regional members are UNFCCC signatories and are required to report emissions and descriptions of planned mitigation measures. Carbon stored in natural coastal ecosystems could be included.

CBD - The Convention for Biological Diversity is an international treaty with a focus on the conservation of biological diversity. All regional countries are parties to the Convention. In 2010, at the 10th Conference of the Parties to the CBD, a number of targets were adopted relevant to Blue Carbon; to at least halve the rate of loss of all natural habitats, to enhance ecosystem resilience and the contribution of biodiversity to carbon stocks, and to improved and apply science and technologies relating to biodiversity conservation (targets 5, 15 and 19 respectfully);

World Heritage Listing - A World Heritage Site is a place listed by the UNESCO as of special cultural or physical significance. The list is maintained by the international World Heritage Programme and administered by the UNESCO World Heritage Committee. Qatar and the UAE are committee members along with 19 other states;

EAD Wetland Mapping Project – EAD’s Mapping and Characterization of Coastal Wetlands project aims to classify and characterize coastal wetlands, map coastal wetlands including mangroves, salt marshes and seagrass meadows, and to develop conservation and management plan for the coastal wetlands of the Emirate; and

Ramsar Convention on wetlands - The Ramsar Convention is “an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the “wise use”, or sustainable use, of all of the wetlands in their territories” (Ramsar, 2011). Coastal wetlands of the Arabian Peninsula considered under Ramsar, include sabkha, salt pans, mangrove forests, tidal flats, coral reefs and seagrass beds.

Three countries in the region are parties to Ramsar, Bahrain, UAE and Yemen. The UAE presently has one coastal wetland site with Blue Carbon habitat designated as a Wetland of International Importance; the Ras Al Khor Wildlife Sanctuary in Dubai which includes mangrove and salt marsh habitat. Other Emirates are interested in Ramsar designation. Yemen’s Detwah Lagoon on Socotra Island is a Wetland of International Importance which includes seagrass habitat. Bahrain has two ‘Blue Carbon’ sites designated as a Wetland of International Importance, Hawar Islands which contains extensive seagrass beds and Tubli Bay which includes mangroves and seagrasses.

Interest in and experience with Ramsar throughout the region may offer opportunities for advancing Blue Carbon. For a site to be declared a Wetland of International Importance the wetland has to been protected and declared a nature reserve under national policy. For this to occur, a clear legal mandate must exist for the site, including designation of ownership, property lines, etc. Similar documentation must occur for Blue Carbon (especially if financial transactions are expected). A Blue Carbon initiative for the region should closely follow and coordinate with Ramsar and its network of wetland professionals.

2.4 Sub-Component objectives, Activities, and Sub-activities

The Abu Dhabi Blue Carbon Demonstration Project aims to improve our understanding of carbon storage and sequestration and the other ecosystem services that coastal blue carbon ecosystems provide in Abu Dhabi. The project will identify options for the incorporation of these values into policy and management, leading to the sustainable use of these ecosystems and their services preserved for future generations. Experience and knowledge gained from the project will also help guide other national blue carbon projects and international efforts.

The project concentrates on the following ten activities that are coordinated to achieve the common objectives; to provide Abu Dhabi with the further knowledge and experience of the local coastal habitats to make more sustainable decisions in the future:

2.4.1 Activity 2.1.1.5: Baseline Carbon Component (Sub-activity 2.1.1.5.1)

The baseline carbon component is a series of scientific assessments that will provide the baseline quantifications of carbon stocks for each coastal blue forests ecosystem; sea grass, salt marsh, sabkha (including algal mat) and mangrove ecosystems within the Emirate of Abu Dhabi.

This component will provide the essential data and analysis to explore the eligibility for incorporating carbon emission mitigation and valuation approaches. The science team also seeks to develop local capacity for the continuation of blue carbon assessments in the future.

A baseline carbon assessment report will be produced.

2.4.2 Activity 2.1.1.5: Ecosystem Services Component (Sub-activity 2.1.1.5.2)

The ecosystem services component builds on the focus on blue carbon and pushes the analysis of the information even further, in order to identify and value other ecosystem services coming from mangrove, saltmarsh, seagrass and sabkha (including algal mats) habitats. The assessment will use information on the distribution and condition of existing coastal habitats, and historical trends in habitat and shoreline condition, to assess the ecosystem services and their local, national, and regional value.

The assessment will produce an ecosystem services report.

2.4.3 Activity 2.1.1.5: Policy Assessment (Sub-Activity 2.1.1.5.3)

This project component presents a unique opportunity to incorporate considerations surrounding coastal ecosystem management in Abu Dhabi's climate change mitigation and development plans. Coastal ecosystems such as mangroves, seagrass and sabkha (including algal mats) are an inherent part of Abu Dhabi's culture, and they also store carbon as well as providing valuable ecosystem services, such as food security from fisheries, shoreline protection from storms or revenue from tourism.

Blue carbon and the valuation of ecosystem services will be explored in a policy context, and a policy assessment report will be produced.

2.4.4 Activity 2.1.1.5: Communication, Outreach and Knowledge Capture (Sub-activity 2.1.1.5.4)

The successful capture or experience and knowledge acquired as part of the project, and its transmission to the national, regional and international spheres, would consist in a major and necessary output.

This will be accomplished by a communication strategy including the following:

- A dedicated project website that serves as a 'global-hub' for the project, and includes a knowledge and experience capture component with an emphasis on feeding the projects activities into national and international blue forests efforts;
- Development of publication and presentation materials (e.g., e-books, flyers, synthesis reports, presentations) focused on target audiences seeking insight into the results of the accomplished work; and
- Web-based GIS maps of results and data that can be shared globally

2.4.5 Activity 2.1.1.5: Mapping and Ground Truthing (Sub-Activity 2.1.1.5.5)

One of the key tools for understanding carbon in natural ecosystems is a carbon mapping capability that shows the carbon stored in ecosystems, highlighting areas of significant biodiversity and ecosystem services importance, and threats to ecosystems themselves. This is a very visual representation of the many factors that must be taken into account in decisions on blue forests carbon management. Used together with other decision support tools, it can help countries and decision makers to develop blue forests strategies that maximize the development potential that blue forests provide.

Though the ‘Mapping and Ground Truthing’ activity, the intervention will identify blue forests ecosystem areas that are of priority for in Abu Dhabi and ground truth existing satellite data.

Tasks for this activity include the following outputs:

1. Establish a baseline spatial dataset of each Blue Carbon ecosystem extent, including the validation and ground-truthing to ensure accuracy and precision (as manager of the Geographic Component);
2. Analyze the carbon data to establish spatially explicit carbon assessments for each of Blue Carbon ecosystem. Outputs will be interpolated to provide maps of carbon stock (possibly also flux, depending on budgetary availability), along with a report documenting approaches, data limitations, assumptions, and results (as manager of the Geographic Component);

This activity will include at least one workshop and will produce at least one report.

2.4.6 Activity 2.1.1.5: Carbon and Ecosystem Services Finance Feasibility Component (Sub-activity 2.1.1.5.6)

The Carbon and Ecosystem Services Finance Feasibility Component will advise the scientific teams in their baseline carbon assessments, with regards to carbon accounting and baseline data to be used in the carbon market feasibility assessment report. This report will demonstrate options for the incorporation of carbon and other blue forests’ ecosystem services into policy an management.

2.4.7 Activity 2.1.1.5: Project Coordination (Sub-activity 2.1.1.5.7)

Project Coordination will involve taking an executive role on behalf of all the project stakeholders. It will involve both strategic and tactical management of the project from inception to project end. Project coordination is a critical task and is vital to the optimal realisation of the stakeholders' goals and returns – the potential for climate mitigation in the UAE through Blue Carbon mechanisms.

- Primary duties and responsibilities Project Coordination include the following outputs:
- Coordination of all project activities according to the Master Schedule;
- Management of the Project Management Team;
- All contract or subcontract administration, authorization and memorandums of understanding (MOUs);
- The on-time production of project deliverables; and
- Project reporting.

Project Management will involve the management of the Baseline Carbon Assessments and other project components. The Project Management Team will meet confer regularly to assess the status of each project component (every two weeks). This team-based management approach will take place from project inception to end.

Project Management will be provided by the Project Management Team, comprised of blue carbon experts. Primary duties and responsibilities will include:

- Coordination and management of the Baseline Carbon Assessments by the Science Teams for each Blue Carbon ecosystem (mangroves, saltmarsh and sabkha (including algal mats), and seagrass).
- Coordination, management and review of other project components, according to the roles of each team member.

2.4.8 Activity 2.2.1.5: Capacity Building and Knowledge Transfer Component (Sub-activity 2.2.1.5.1)

Sustainable management of the marine environment relies on sound scientific data and information about the marine environment. Access to and availability of sound and reliable environmental data, knowledge and information is essential in forest carbon projects, as well as the integration, translation and communication of this data and information into policies, the carbon and other markets, and decision making at the national and international level.

Capacity building in carbon assessment and spatial analysis will be undertaken by fieldwork participation and workshop training.

Capacity building activities have already been initiated during the Blue Forests Project PPG stage, including both in local and international participation in the mangrove and saltmarsh baseline carbon assessments. This effort represents a global milestone in capacity building of the blue forests concept - though field-based cross training with 'blue carbon' teams from local universities and management authorities and international NGOs. The international NGOs included two research team from Indonesia and Madagascar, comprised of 3/4 women and representing partners from the GEF Blue Forests Project. This important and unique cross training experience supports advancing gender equality, and improved understanding and coordinated application of blue forests in Abu Dhabi and in developing nations.

2.4.9 Activity 2.2.1.5: Policy and Management Engagement (Sub-activity 2.2.1.5.2)

Building on the Policy Assessment and the Carbon Finance Feasibility Component, this activity will engage with high-level policy actors in Abu Dhabi and the U.A.E. in order to enhance capacity in blue carbon and advance options for the valuation of carbon and ES in policy and management.

A policy workshop will be undertaken.

2.4.10 Activity 2.2.1.5: Geographic Tool Component (Sub-activity 2.2.1.5.3)

The online carbon assessment tool that is being developed under this programme will collate the best available information on the carbon storage and sequestration potential of Abu Dhabi's diverse marine habitats. The scientific team will provide technical direction for the production of data for spatial needs and analysis. This tool is critical to better understanding Abu Dhabi's natural carbon stock, enabling decision makers with an online tool to assess, verify and manage their blue carbon resources.

The Abu Dhabi project's online carbon assessment tool is intended to be developed into the Blue Forests' Global Blue Forest Data Tool, where blue forests data layers are applied, focusing on both carbon storage and sequestration and on ecosystem services valuation (Activity 2.3.1 of Component 2).

2.5 Budget and Co-finance

The total cost of Abu Dhabi Blue Carbon Demonstration Project is \$1,800,000 USD. The entire amount is provided as in-kind co-financing to the GEF Blue Forests Project. The budget for the technical support and coordination activities are identified in Appendix 16 as they are activities cover all of the interventions.

Table 2: Budget and Co-finance

Activity	Sub-Activities	Sources of funding		
		GEF funding (US\$)	Co-financing (US\$)	Total Cost (US\$)
2.1.1.5 Small-scale intervention 5 - Improved understanding Abu Dhabi, U.A.E. (176,400 ha)	2.1.1.5.1 Baseline Carbon Component	0	720,000	720,000
	2.1.1.5.2 Ecosystem Services Component	0	150,000	150,000
	2.1.1.5.3 Policy Assessment	0	65,000	65,000
	2.1.1.5.4 Communication, Outreach and Knowledge Capture Component	0	65,000	65,000
	2.1.1.5.5 Mapping and Ground Truthing	0	150,000	150,000
	2.1.1.5.6 Carbon Finance Feasibility Assessment Component	0	155,000	175,000
	2.1.1.5.7 Project Coordination	0	310,000	310,000
	2.1.1.6 Technical support for improved understanding is provided in an efficient and coordinated manner	<i>The budget of the technical support activity is identified in Appendix 16</i>		
TOTAL for Activity 2.1.1.5		0	1,630,000	1,630,000
2.2.1.5 Small scale intervention 5 - improved capacity and ecosystem management Abu Dhabi, U.A.E. (176,400 ha)	2.2.1.5.1 Capacity Building and Knowledge Transfer Component	0	75,000	75,000
	2.2.1.5.2 Policy and Management Engagement Component	0	45,000	45,000
	2.2.1.5.3 Geographic Tool Component	0	50,000	50,000
	2.2.1.6 Technical support for improved ecosystem management is provided in an efficient and coordinated manner	<i>The budget of the technical support activity is identified in Appendix 16</i>		
	TOTAL for Activity 2.2.1.5		0	170,000
TOTAL for intervention 5		0	1,800,000	1,800,000
TOTAL co-finance for intervention 5		1,800,000		

2.6 Workplan and Timeline

Table 3: Workplan and Timeline

Activity	Activity and Sub-Activities Description	YEAR 1				YEAR 2				YEAR 3				YEAR 4			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 5	Quarter 6	Quarter 7	Quarter 8	Quarter 9	Quarter 10	Quarter 11	Quarter 12	Quarter 13	Quarter 14	Quarter 15	Quarter 16
COMPONENT 2: Abu Dhabi Blue Carbon Demonstration Project																	
2.1.1.5	Improved understanding																
2.1.1.5.1	Baseline Carbon Component																
2.1.1.5.2	Ecosystem Services Component																
2.1.1.5.3	Policy Assessment																
2.1.1.5.4	Communication, Outreach and Knowledge Capture Component																
2.1.1.5.5	Mapping and Ground Truthing																
2.1.1.5.6	Carbon and Ecosystem Services Finance Feasibility Assessment Component		M/R														
2.1.1.5.7	Project Coordination																
2.1.1.6	Facilitating knowledge management on carbon storage and sequestration and ecosystem services	<i>The workplan and timeline of the technical support activity is identified in Appendix 16</i>															
2.2.1.5	Improved capacity and ecosystem management																
2.2.1.5.1	Capacity Building and Knowledge Transfer Component																
2.2.1.5.2	Policy/Management Component																
2.1.1.5.3	Geographic Tool Component																
2.2.1.6	Facilitating knowledge management to improve capacity and ecosystem management	<i>The workplan and timeline of the technical support activity is identified in Appendix 16</i>															

M = Meeting, **R**= Report, **W** = Workshop

Notes:

- 1) The Abu Dhabi Blue Carbon Demonstration Project was initiated in Fall 2012 and is expected to be completed by the end of 2013. Most of the project activities are expected to be completed by the end of the second quarter of the Blue Forests Project. However, to facilitate exchange with and uptake of experiences by other BF interventions, activities and aims, those Abu Dhabi activities that support such interaction will remain active throughout the BF project life (though interaction with AGEDI facilitated by the PCU, e.g., the technical support and coordination activities (Activities 2.1.1.6 and 2.2.1.6)).
- 2) The execution of the component work plan and timeline is expected to be an iterative and evolving process during the course of the project. Changes to the work plan and timeline will be vetted by the project's sole funding agency, AGEDI.
- 3) Please refer to Appendix 16 for the technical support and coordination activities (Activities 2.1.1.6 and 2.2.1.6), which cover across all of the interventions and are implemented over entire duration of the project (quarters 1 – 16).

- 4) AGEDI also engages with the Blue Forests Project through output 2.3.2, Additional documented evidence-based experiences resulting from existing baseline initiatives (including 2 GEF-IW project sites).

2.7 Awareness, communications and dissemination mechanisms

See section 2.4.4 for the Communication, Outreach and Knowledge Capture activity.

2.8 Execution Arrangements

The project is conducted under the auspices of AGEDI. GRID-Arendal is contracted with the project components by AGEDI. GRID-Arendal manages the project's Project Management Team and sub-contracts all other project partners.

The Project Management Team is comprised of international Blue Carbon experts including UNEP-WCMC, Forest Trends, UNEP, and GRID-Arendal. This team will provide project guidance and components (deliverables), with overall project coordination delivered by GRID-Arendal. Team members also have a working knowledge of the introduction of Blue Carbon in Abu Dhabi; they comprised the Blue Carbon Special Initiative Working Group for the Eye on the Earth Summit and participated in the International Break-out Session and Regional Workshop

The Abu Dhabi Blue Carbon Demonstration Project will be reported as would be appropriate for an in-kind co-finance project that has already been completed.

The **Blue Forests Project Coordination Unit** (PCU)'s role will in this case therefore be to coordinate experience sharing, learning and knowledge transfer between the Abu Dhabi Project and the other interventions and components of the GEF Blue Forests Project.

2.9 Monitoring and Evaluation (M&E)

As this project is provided as co-finance to the Blue Forests Project, the primary reporting criteria, and monitoring and evaluation criteria have been defined by AGEDI. However, the Blue Forest PCU will work to convert the project specific reporting and monitoring and evaluation content to GEF appropriate equivalent.

Evaluation parameters will be judged through a set of performance indicators (including SMART indicators) that will measure inputs, activities, outputs, outcomes, and impacts of sub-project activities (see Annex 1 Component Logframe below). The indicators will be used to set up mid-term and end of project performance targets (see Annex 1 Component Logframe below) and assess progress toward their achievement, and to flag the need for a follow-up review or evaluation of each intervention activity.

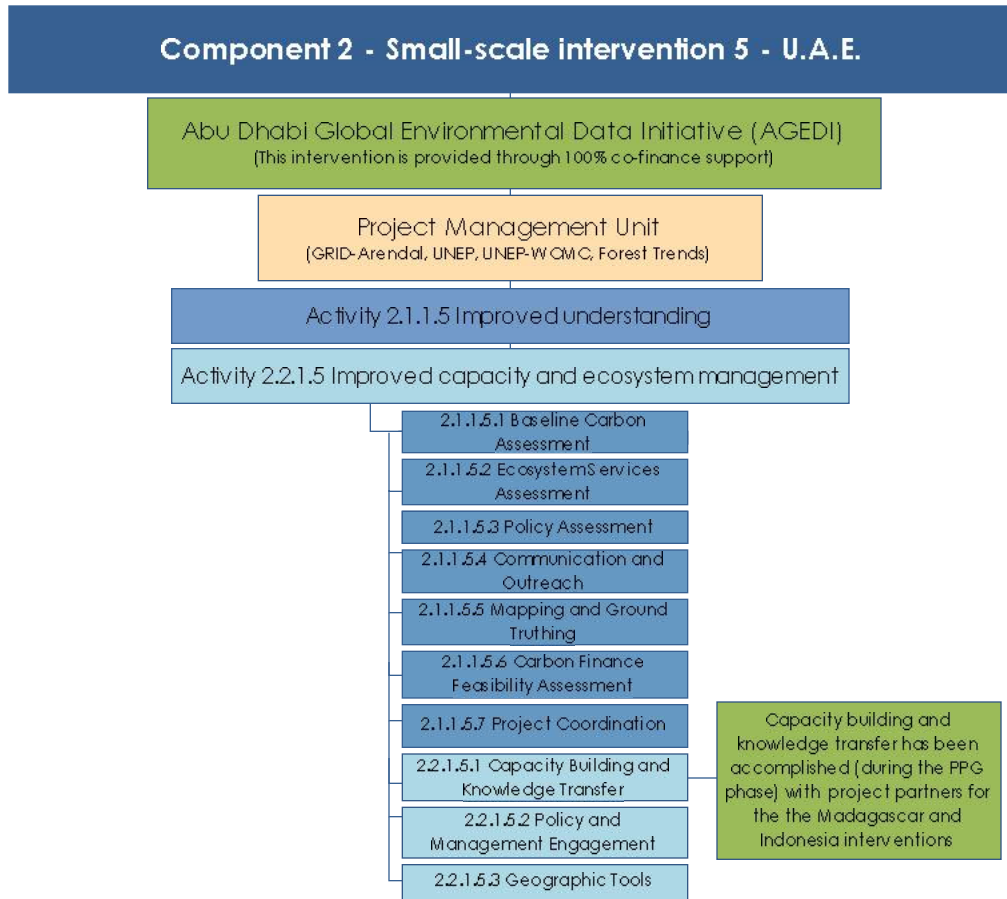
The monitoring and evaluation system will be used to measure the quantity, quality and targeting of sub-project outputs, and to measure the outcomes and impacts resulting from these outputs. The system is also expected to be a vehicle to facilitate the understanding of the causes for good and poor performance. The Monitoring and Evaluation Matrix table below describes indicators (including outcome-level SMART indicators), baseline level and mid- and end-of-project targets for the outcomes, outputs and activities of Component 2e. The BF Project Level M&E is detailed in Appendix 07.

Table 4: Monitoring and Evaluation Matrix for Component 2e

Project objective Outcomes & Outputs	Description of indicator	Baseline level	Mid-term target	End-of-project target
Overall BFP Project Objective: To apply methodologies and approaches for carbon accounting and ecosystem service valuation in Blue Forests so as to provide evidence-based experience that supports replication, up-scaling and adoption of Blue Forests concepts by the international community and the GEF.				
Component 2) Application of the methodologies and approaches through small-scale interventions				
Outcome 2.1 Improved understanding of ecosystem services, carbon sequestration, storage, avoided emissions and management in at least 3 ecosystem types (mangroves, seagrass, saltmarsh) in 5 sites (including 2 GEF-IW project sites) covering at least 176,400 ha.	BF methodologies are referred to in national planning instruments as exemplary for replication [P] BF methodologies incorporated into relevant national policy [P, ES, SR]	BF methodologies exist, but require on-the-ground application in different BF ecosystems	An integration roadmap is <u>outlined</u> with respect to achieving successful integration of BF tools in management approaches for at least three different BF ecosystem types (≤176,400 ha)	BF tools successfully integrated in management approaches in 5 sites and for three different BF ecosystem types (≤176,400 ha) BF methodologies incorporated in at least 1 country's relevant national policy
Output 2.1.1: Application of blue forests methodologies and approaches in five documented small-scale interventions focusing on both carbon storage and sequestration and on ecosystem services valuation at each site (Y4 of the project).	BF methodologies are applied in-situ AP, ICU and PSC feedback on support provided by PCU [P]	0	At least 5 assessment progress updates are provided (1 for each small-scale intervention site)	At least 5 assessments (see activities) carried out, reported and communicated (1 for each small-scale intervention site)
Activity 2.1.1.5 Output: One documented small-scale intervention where blue forests methodologies and approaches are applied (Small-scale intervention 2 – improved understanding Abu Dhabi)	1 Baseline Carbon Assessment report produced 1 Ecosystem Services Assessment report produced 1 Policy Assessment report produced 1 Carbon Finance Feasibility Assessment report produced 1 communications, outreach and knowledge capture strategy document is produced 1 Communication and Outreach package produced in agreed upon format ICU and PSC reports noting coordination and reporting efforts	0	Progress update report covering site activities	Completion of all site activities and reports for assimilation in to site assessments and overall management approaches
Activity 2.1.1.6 Output: Technical support and coordination for improved understanding is provided in an efficient and coordinated manner	AP, ICU and PSC reports noting received support	0	Technical support for improved knowledge is provided in an efficient and coordinated manner	Technical support for improved knowledge is provided in an efficient and coordinated manner

Project objective Outcomes & Outputs	Description of indicator	Baseline level	Mid-term target	End-of-project target
<p>Outcome 2.2 Improved capacity and ecosystem management as a result of the application of methodologies and approaches advanced under Component 1 in the same 5 sites (including GEF-IW project sites) covering at least 176,400 ha.</p>	<p>ES management tools applied by the BF small-scale interventions lead to maintaining ES and C storage and sequestration potential in the targeted ecosystems [P, ES, SR]</p> <p>BF methodologies incorporated into relevant national policy [P, ES, SR]</p>	<p>Few ES management tools or practices are currently including BF</p>	<p>The <u>outline</u> and table of contents of at least 1 report and best practice study on BF-based ES management is available</p>	<p>At least 1 report and best practice study on BF-based ES management per small-scale site (Y4)</p> <p>BF methodologies incorporated in at least 1 country's relevant national policy</p>
<p>Output 2.2.1: Blue forests methodologies and approaches (for carbon and ecosystem services) incorporated into local and/or national ecosystem management practices.</p>	<p>BF methodologies are included in planning tools for the small-scale interventions</p> <p>AP, ICU and PSC feedback on support provided by PCU</p>	<p>Few ES management tools or practices are currently including BF</p>	<p>The 5 small-scale interventions receive scientific guidance (at least 1 formal on-site OR remote intervention per year) and are capable of applying these in site management and policy formulation</p>	<p>The 5 small-scale interventions receive scientific guidance (at least 1 formal on-site OR remote intervention per year) and are capable of applying these in site management and policy formulation</p>
<p>Activity 2.2.1.5 Output: Blue forests methodologies and approaches incorporated into local and/or national (Abu Dhabi) ecosystem management practices</p>	<p>Training and Capacity Building (on Capacity Building and Knowledge Transfer) reports produced within specified timeframe in and format for each relevant effort</p> <p>Meeting notes for each Policy and Management Engagement effort; PSC and ICU meeting reports</p> <p>1 functioning and accessible online geographic tool is produced</p>	<p>0</p>	<p>Progress update report covering site activities</p>	<p>Completion of all site activities and reports for assimilation into site assessments and overall management approaches</p>
<p>Activity 2.2.1.6 Output: Technical support and coordination for improve ecosystem management is provided in an efficient and coordinated manner</p>	<p>AP, ICU and PSC reports noting received support</p>	<p>0</p>	<p>Technical support for improved knowledge is provided in an efficient and coordinated manner</p>	<p>Technical support for improved knowledge is provided in an efficient and coordinated manner</p>

2.10 Organigram



1. Detailed structure for small-scale intervention 5 - the Abu Dhabi Blue Carbon Demonstration Project.

3 ANNEXES

Annex 1 Small-scale Intervention Logframe

Annex 2 Project partners

Annex 3 Illustrations and Site

Annex 1 Small-scale Intervention Logframe

Component 2e: Small-Scale Intervention – Abu Dhabi Blue Carbon Demonstration Project	Objectively Verifiable Indicators				Verification Methods	Assumptions
	Description of indicator [SMART indicator types]	Baseline level	Mid-term target	End-of-project target		
<p>SUB-COMPONENT: 2.1 Improving the understanding of blue forests carbon storage and sequestration and ecosystem services</p>	Blue forests approaches and methodologies are included in documents and relevant official instruments of the pilots [P]	BF approaches exist, but require on-the-ground application in different BF ecosystems	An integration roadmap is outlined with respect to achieving successful integration of BF tools in management approaches for at least three different BF ecosystem types (≤176,400 ha)	BF tools successfully integrated in management approaches for at least three different BF ecosystem types (≤176,400 ha)	<p>Small-scale intervention reports (ICU reports) and PCU reports</p> <p>National policy instruments</p>	<p>Small-scale interventions are sufficiently resourced to be completed as planned.</p> <p>Institutional stability allows for continued participation of key stakeholders in small-scale interventions</p> <p>Willingness of countries and IW projects to consider replication of BF best practices</p> <p>Mechanisms for feeding information from the interventions to other project components and the PCU are conducive</p>
<p>Activity 2.1.1.5 Small-scale intervention 5 – improved understanding Abu Dhabi (176,400 ha)</p>	BF methodologies incorporated into relevant national policy [P, ES, SR]		at least three different BF ecosystem types (≤176,400 ha)	BF methodologies incorporated in at least 1 country's relevant national policy		
<p>SUB-COMPONENT: 2.2 Improving blue forests capacity and ecosystem management</p>	Ecosystem service management tools applied by the blue forests small-scale interventions lead to an improved state of the targeted ecosystems and are referred to in planning instruments as exemplary for replication [P, ES, SR]	Few ES management tools or practices are currently including BF	The outline and table of contents of at least 1 report and best practice study on BF-based ES management is available	At least 1 report and best practice study on BF-based ES management per pilot site (Y4)		
<p>Activity 2.2.1.5 Small-scale intervention 5 – improved capacity and ecosystem management Abu Dhabi (176,400 ha)</p>	BF methodologies incorporated into relevant national policy [P, ES, SR]			BF methodologies incorporated in at least 1 country's relevant national policy		

Annex 2 Project Partners

The following partners are working collaboratively on this project:

1. AGEDI

Under the guidance and patronage of His Highness Sheikh Khalifa bin Zayed Al Nahyan, President of the United Arab Emirates, the Abu Dhabi Global Environmental Data Initiative (AGEDI) was formed in 2002 to address the local, regional and global responses to the critical need for readily accessible, accurate environmental data and information for all those who need it.

2. GRID-Arendal

GRID-Arendal is a centre collaborating with UNEP, located in Southern Norway. Established by the Norwegian Ministry of Environment, its mission is to provide environmental information, communications and capacity building services for information management and assessment.

UNEP-WCMC is leading the project coordination and communication activities.

3. Baseline Carbon Scientists

Scientists solicited separately from the International Blue Carbon Scientific Working Group (IBCSWG) comprise members of the project's science team. The IBCSWG is managing an international program to coordinate and guide the establishment of coastal Blue Carbon as a conservation and management tool contributing to climate change mitigation and the development of associated conservation financing mechanisms.

The project's science team is responsible for the carbon data collection and analysis activities.

4. Forest Trends

Forest Trends is an international non-profit organization based in Washington D.C. Its mission is four-fold: to expand the value of forests to society; to promote sustainable forest management and conservation by creating and capturing market values for ecosystem services; to support innovative projects and companies that are developing these markets; and to enhance the livelihoods of local communities living in and around those forests. It conducts a Marine Ecosystem Services (MARES) Program to protect crucial marine ecosystem services.

Forest Trends is leading the Ecosystem Services Component and the Carbon Finance Feasibility Component.

5. UNEP-WCMC

The UNEP World Conservation Monitoring Centre (UNEP-WCMC) is a collaboration of the United Nations Environment Programme and WCMC (UK), a UK-based charity. UNEP-WCMC is UNEP's specialist biodiversity assessment arm. It has collated several global datasets on coastal ecosystems, compiled and contributed to by many partners, and continues to host and maintain those datasets, particularly for the blue carbon systems of mangroves, seagrasses, and saltmarshes.

UNEP-WCMC is leading the Geographic Component.

6. UNEP

The United Nations Environment Programme's (UNEP) Marine Ecosystem Unit undertakes marine environmental and resource management related work through the development and provision of tools, guidelines and implementation of demonstration projects, for example through ecosystem-based adaption, climate change vulnerability assessments and adaptive marine spatial planning projects. It houses UNEP's Blue Carbon Initiative.

UNEP's Marine Ecosystem Unit is leading the Policy Component.

Annex 3 Illustrations and Site



Figure 1. Kayaking in the mangroves of the UAE, with Abu Dhabi in the background.



Figure 2. Mangrove afforestation in the UAE.



Figure 3. Discussions with EAD - Abu Dhabi during the Project Inception Workshop.



Figure 4. Capacity building in blue forests during the mangrove carbon baseline carbon assessment.