“Blue Carbon” and “Blue REDD”: Transforming coastal ecosystems into merchandise

(*) “Marine and coastal territories” is used here to refer to territories that include mangrove forests and their area of influence, seagrass meadows and intertidal saltmarshes. The communities that depend on mangrove forests and other coastal ecosystems for survival live in and around these territories.

1.- What is a “Blue Carbon” project?

Finding out more about “Blue Carbon” leads to the discovery that it is closely related to REDD (Reducing Emissions from Deforestation and Forest Degradation, see more information at the WRM website), a proposal that has been promoted for years in terrestrial tropical forests in Latin America, Africa and Asia. Blue Carbon refers to carbon stored in coastal ecosystems, mainly in mangroves. This storage occurs naturally, especially by CO_2 absorption by plants that live in water. According to “Blue Carbon” promoters, coastal ecosystems rich in plants, such as mangrove forests, seagrass meadows and intertidal saltmarshes, sequester large amounts of atmospheric carbon and store it in their sediments and soils.

Blue Carbon projects that are already under way are usually developed within a definite area of mangrove forest, and propose its conservation and/or restoration. As in the REDD projects in terrestrial forests (see WRM Bulletin 184), their supporters seek to show that, with an additional financial incentive, carbon emissions can be reduced or the carbon stored in the project area can be increased. First, an inventory is usually made of the amount of carbon that would be “stored” in the project area over a given period of time. To do this, calculations are carried out to try to predict the amount of carbon in the area at the beginning and at the end of the project. According to REDD logic, it is also necessary to predict how much carbon the project area would hold in the future, in the *absence* of the project. The amount of carbon emissions that the project would presumably “save” - and can sell as“carbon offsets” – is derived from these calculations. The results of these calculations are very inexact (1). Following the logic of the carbon market, the buyer of these “offsets” would have the right to continue to emit the same amount of CO_2 that the project claims to“store.” In practice, there is no reduction of CO_2 emissions because the carbon supposedly “stored” in the mangrove area will be emitted elsewhere by the company that buys the “offsets.”

Promoters of “Blue Carbon” initiatives hope that in future the carbon markets will generate money for their projects. Therefore, they lobby hard for “Blue Carbon” schemes to be included in an international agreement on REDD at the annual United Nations climate conferences in the framework of UNFCCC, known as the climate change COPs. The governments of Costa Rica, Tanzania, Indonesia and Ecuador have already included mangroves in their national REDD policies (2).

2.- Arguments used by promoters of “Blue Carbon” or “REDD Blue” and responses

Promoters of “Blue Carbon” use a series of arguments to defend this idea. Here we present some of the main arguments and try to answer them.

- Argument 1: Coastal ecosystems are capable of absorbing a great deal of carbon, more even than terrestrial forests, and the available scientific knowledgeto measure that is sufficient.

According to the “Blue Carbon” Portalweb site (3), *“The rates of carbon sequestration and storage are comparable to (and often higher than) the sequestration rates in carbon-rich terrestrial ecosystems such as tropical rainforests or peatlands.”* The site also claims that: *“Unlike most terrestrial systems, which reach soil carbon equilibrium within decades, deposition of carbon dioxide in coastal ecosystem sediment can continue over millennia.”*A recent report released by the UNEP, IOC-UNESCO, IUCN and FAO suggests that*“as much as 7% of carbon dioxide (CO_2) reductions required to keep atmospheric concentrations below 450 ppm* [the level that the majority of scientists think will provide a 50% chance of maintaining global warming within the limit of two degrees] *can be achieved by protecting and restoring mangroves, salt marshes and seagrass communities, to the order of half that expected to be achieved by REDD* [in terrestrial forests].Therefore, “Blue Carbon” promoters claim that it is *“a transformational tool in effective global natural carbon management”* (5).

Promoters also state that *“Scientific understanding of carbon sequestration and potential emissions from coastal ecosystems is now sufficient to develop effective carbon policy, management, and conservation incentives for coastal Blue Carbon”* (6).

Response to Argument 1:

In the first place, “Blue Carbon” projects are based on the logic used to calculate the amount of carbon stored (or emissions saved) that is used in REDD projects for terrestrial forests. These calculations are unreliable. Estimates of the amount of carbon at the start of a project are approximate, and estimates of the carbon “stored” at the end of the project are rather subjective. Furthermore, scientists face considerable difficulty in efforts to understand carbon storage mechanisms. According to Gabriel Grimsditch, a programme officer with the United Nations Environment Programme (UNEP) marine and coastal ecosystems branch, *“considerable uncertainty surrounds these estimates and the level of understanding of carbon storage in coastal ecosystems”* (7).

This uncertainty is reflected in the descriptions used in the studies and projects about the amounts of “Blue Carbon”that would be stored. On the one hand, the Blue Carbon Initiative says the rates of carbon sequestration in mangrove forests *“are about two to four times greater than global rates observed in mature tropical forests”* (8), whereas FundaciónNeotrópica, which is developing a pilot “Blue Carbon” project in Costa Rica, says that mangroves *“store up to five times as much carbon as tropical forests”* (9).

At the same time, materials promoting “Blue Carbon” make few references to the way climate change already in progress affects, and will affect, oceans and coastal ecosystems and the vital functions they fulfil. It is known that increasing uptakeof CO_2 - present in the atmosphere at higher levels than previously – by oceans has turned ocean waters more acidic. In the long term the potential impacts of higher carbon levels in the ocean could interfere not only withthe oceans’ capacity to sequester CO_2 but could also triggerthe reverse process, so that the oceans would actually emit carbon. There is still a lack of research and understanding into these processes, indicating far greater uncertainty around what will happen in the future to the places now referred to as “Blue Carbon”. However, all these uncertainties did not prevent some absurd initiatives from

being carried out.

Examples of absurd “Blue Carbon” projects

On the premise that “one of the most promising places to sequester carbon is in the oceans,” the U.S. Department of Energy's Centre for Research on Ocean Carbon Sequestration, in Berkeley, has studied direct injection of carbon dioxide to a depth of 1,000 metres or more, either directly from shore stations or from tankers trailing long pipes at sea. Another technique studied is “fertilisation” of the oceans with iron nanoparticles to stimulate carbon fixation by phytoplankton (10). In 2007, an intergovernmental scientific committee warned that iron fertilisation of ocean surfaces – as an attempt at commercial carbon sequestration - has *“environmental risks and lacks scientific evidence of effectiveness.”* The statement was triggered by news that the company Planktos Inc. was about to dump 100 tons of iron nanoparticles over a 10,000 km² stretch of Pacific Ocean, with the goal of selling carbon offsets (11).

Argument 2: Coastal ecosystems are being rapidly destroyed because of bad management

Due to the allegedly extraordinary capacity of these ecosystems for sequestering and storing carbon, “Blue Carbon” promoters claim that conservation is vital because if they are destroyed, enormous amounts of carbon would be released into the atmosphere. They present data showing that coastal ecosystems are being rapidly destroyed, at an annual rate of up to 7%, which would mean that most could be lost within two decades. Degradation of these ecosystems is attributed to *“unsustainable natural resource use practices, poor watershed management, poor coastal development practices and poor waste management”* (12).

Response to Argument 2:

The first thing that stands out is the “Blue Carbon” promoters’ vague and dubious description of the causes of rapid destruction of coastal ecosystems, like mangrove forests. Their loss is basically attributed to “poor management.” However, RedManglar International – a network of organisations in Latin America that supports communities dependent on mangroves – has a very different analysis. According to the network, most Latin American countries have already lost between 60 and 80% of their mangroves. RedManglarmentionsthe following causes: changes in land use, concentration of land ownership, industrial shrimp farming, the salt production industry, tourism mega-projects, dams, agroindustrial monoculture of African palm and sugarcane, oil and gas extraction and the construction of highways, large ports and naval shipyards (13). Practically all these causes are related to the projects and activities of big corporations in coastal ecosystems, benefiting above all these same groups of companies, and harming the local communities that live in and depend on these ecosystems.



Argument 3: Coastal ecosystems have a high monetary value due to the value of their "ecosystem services," and recognising this can ensure their conservation

The Blue Carbon Portal says that, apart from carbon sequestration, coastal ecosystems *"have a high value because of the number of services they offer."* According to U.N. agencies, the monetary value of these "environmental services" is as high as 25,000 billion dollars a year. Coastal ecosystems, they say, are useful for adapting to climate change, protecting people against *"coastal erosion, storms and flooding."* They also say they *"provide food from fishing, as well as a habitat for fish fry to grow,"* and that these areas can improve water quality, provide income from tourism, and supply construction materials and ingredients for medicines (14).

Response to Argument 3:

In the first place, what stands out is the huge financial value – 25,000 billion dollars a year – attached to "ecosystem services" provided by coastal territories. But if the companies responsible for the destruction of these ecosystems learned of this price tag, would it change their practices?

English author George Monbiot says that the recent phenomenon of putting a price on nature, in this case the mangrove forests, does not imply that their immense value and importance was previously unknown. In his view, profoundly unequal power relations are much more influential in determining the fate of coastal ecosystems:

"Even if we didn't have a number to slap on them, we've known for centuries that mangrove swamps are of great value for coastal protection and as breeding grounds for fish. But this has not stopped people from bullying and bribing politicians to let them turn these forests into shrimp farms. If a hectare of shrimp farms makes USD 1,200 for a rich and well-connected man, that can count for far more than the USD 12,000 it's worth to downtrodden coastal people. Knowing the price does not change this relationship: again, it's about power" (15).

In practice, putting a financial value on forests and transforming "ecosystem services" into assets or titles with financial value, that can be sold on the financial markets, has simply ensured the

continuation of CO_2 emissions by polluting industries, as well as providing benefits to other actors involved in these markets: companies, consultants, certifiers, financial institutions and large conservation NGOs. Many of these, with the support of governments and the United Nations, are involved in “Blue Carbon” promotion initiatives.

The value of mangroves to communities and nature in general

Mangrove ecosystems harbour a great number of fish, snail, shellfish and crab species, which in many cases are the staple foods of the communities and peoples of the mangroves. Medicinal plants are also found there. Channels through the mangroves are a means of transport and communication between people in the communities, who use canoes and boats to get about and transport products without altering or polluting the surroundings.

Mangrove roots form an interwoven tangle that functions as a nursery and natural shelter for a great variety of fish, molluscs and crustaceans. Mangroves are also essential to the spawning, feeding, shelter and reproduction of 75% of tropical species in coastal ecosystems and are habitats for local and migratory bird species. Because of these and other reasons, many mangroves are included in the RAMSAR Convention for the protection of wetlands, as wetlands of international importance.

Mangroves are natural shock-absorbers that take the impact of extreme weather phenomena like storms, tsunamis and hurricanes. Mangrove roots protect coasts and shores of territories subject to tides and flooding. The effects of these natural phenomena are increasing as a result of climate change. Mangroves also have an important role in controlling erosion along the banks of channels and estuaries. Mangrove root systems also function as dykes, retaining the sediments arising from tide action or rivers and contributing to keeping the channels sediment-free. Mangroves are often called the kidneys of the earth, and they definitely act as purifiers of water pollution so that it does not reach the sea.

Mangroves have a direct value for local populations, who have traditionally got their daily sustenance from this ecosystem as artisanal fishers and gatherers of shellfish, crabs and prawns. The mangroves are their source of food security and family maintenance. Moreover, the ecosystem is a vital social and cultural reference for local communities. The mangroves traditionally determined their life, their sense of belonging and their identity. Finally, some communities have developed ecotourism activities, so that national and foreign visitors can enjoy the flora and fauna, scenery and recreational activities in these areas, as well as learn about the ecosystem’s problems.

(*Source: RedManglar International*)

3.- Some “Blue Carbon” initiatives and their promoters

In 2009, a French transnational company, Danone, together with IUCN (16) and the RAMSAR Convention(17), initiated the restoration of 4,700 hectares of mangroves in Casamance and Sine Saloum, Senegal. It also started a mangrove recovery project covering about 6,000 hectares in the Sundarbans, India. The company reported that approximately 23 million euros will be invested to generate between 6 and 11 million tons of carbon offsets a year for a period of 23 years (18). The

company can use the offsets to “compensate” for its own emissions, or can sell them on the carbon markets.

The methodology for calculating mangrove carbon storage was developed by IUCN, RAMSAR and the Dutch consulting firm Sylvestrum. According to Bernard Giraud, Danone’svicepresident for sustainability, *“It will have a very significant impact on local communities and will stimulate companies to make corporate-level investment and grasp new carbon offsetting opportunities in coastal regions.”* Danone, which has annual sales of 17 billion euros and a presence in more than 120 countries, plans to reduce its carbon emissions by 30% and “offset” the rest by what it calls an *“innovative”* strategy. That strategy includes these mangrove restoration projects in coastal areas, because according to the company, these ecosystems are capable of *“sequestering large volumes of carbon”* (19). However, preservation of these areas will not reduce the major pollution caused by this transnational company, which is one of the 10 most polluting companies on the planet (20).

-As early as 2009, UNEP and Grid-Arenal (21), a Norwegian organisation that collaborates with UNEP, together with FAO and the UNESCO international oceanographic commissions, wrote a report on the “critical role” of oceans and ocean ecosystems in maintaining climate, with the goal of stimulating an agenda on the role of oceans in international climate negotiations. The study suggests creating a *“blue carbon fund”* as well as *“mechanisms to allow the future use of carbon credits for marine and coastal ecosystem carbon capture and effective storage as acceptable metrics* [measurement methods] *become available”* (22).

-In 2010/2011 the Blue Carbon Initiative was formed, a global initiative focused on climate change mitigation that works for *“restoration and sustainable use of coastal and marine ecosystems.”* It is an initiative of IUCN, Conservation International and IOC-UNESCO (23). There are two major working groups, one scientific and one for policy.

In 2011, the policy working group of the Blue Carbon Initiative met in Switzerland to draw up a *“Blue Carbon Policy Framework.”* The report of the meeting states that *“The ‘Policy Framework’ aims to facilitate, where possible, full integration of Blue Carbon activities in existing processes of international and financial policies.”* The United Nations Framework Convention on Climate Change (UNFCCC) is mentioned as the foremost international forum, as well as the Convention on Biological Diversity (CBD). The document highlights the importance of *“integrating Blue Carbon activities fully into the international policy and financing processes of the UNFCCC as part of mechanisms for climate change mitigation”* (24). Other participants in the meeting in Switzerland included universities, the World Bank, the governments of the United States and Ecuador, and NGOs like MARES/Forest Trend and Wetlands International (25).

-Another initiative is the Blue Carbon Portal, created by UNEP and Grid Arendal. The web site calls itself a *“home for the international blue carbon community”* and explicitly says that *“it serves as a platform to share experiences and information, helping us to connect and coordinate activities and initiatives. All blue carbon professionals are invited to participate in the Portal’s development”* (26).

-Consulting firms that already certify REDD carbon offsets for terrestrial forests are planning to enter the new market for “Blue REDD” / “Blue Carbon” projects. Verified Carbon Standard (VCS) already has a carbon accounting method, approved in January 2014 under its *“sustainable grassland management”* programme, to quantify *“the greenhouse gas benefits of wetland restoration and creation activities”* (27).

-Several foundations, and even businesses like Total, a French oil transnational company, which has

long financed conservation activities by large environmental NGOs, are also now involved in financing “Blue Carbon” activities. Other financial partners are government and aid agencies in countries that emit large amounts of CO_2 and are seeking efficient ways of “offsetting” these emissions, for example the German government.

It is remarkable that none of the communities that have conserved their coastal ecosystems for generations are included in leading any of these initiatives.

The role of communities in conservation of coastal ecosystems

For centuries, coastal areas and especially mangrove forests have been the traditional territories of communities of artisanal fishers, *campesinos* (small farmers), indigenous peoples and other traditional communities like those of Afro-descendants (in the case of Latin America).

These communities have defended their territories because their physical and cultural survival is rooted in them, and many of their past and present struggles worldwide have been and are against destructive projects imposed from the top down. It is thanks to these struggles that many mangroves are protected areas in the world today, and many others are being restored by the efforts of local communities to reforest them.

The essential role of women in the defence and protection of mangroves deserves to be highlighted. Women, particularly, are involved in the daily activities of fishing, gathering and shucking shellfish, snails and crabs and other species that make up an important part of their families’ diet. The effects of displacement of local populations and the destruction of their coastal ecosystems affect women’s lives disproportionately, because of the loss of the sources and opportunities for maintaining their families. (*Source: RedManglar International*)



4.- Priority activities of “Blue Carbon” promoters

- Research

The Blue Carbon Portal on the internet lists over 30 “Blue Carbon” initiatives worldwide, most of them in Asia and Africa (28). The vast majority are research projects to investigate methods of measuring carbon in mangroves and other coastal ecosystems as well as their capacity for carbon sequestration. This research is focused on supporting and improving methodologies for developing “Blue REDD” projects, in order to integrate “Blue Carbon” into obligatory and voluntary carbon markets. There are also many studies under way on other “ecosystem services.”

Some research examples presented on the Blue Carbon Portal are:

- a research project in Abu Dhabi, United Arab Emirates, that claims its results will serve as a *“feasibility assessment”* for “Blue Carbon” use in the carbon market. Project investigators are also studying the *“potential”* of other “ecosystem services” in coastal areas.

- a research project in Pakistan, Vietnam and Sri Lanka working on a mechanism *“enabling investors to responsibly promote mangrove conservation/restoration, carbon emissions reduction and sustainable development through the provision of funding to local communities.”* Its main aim is to facilitate financing so that small areas of mangrove, considered non-viable, can enter *“obligatory or voluntary markets.”*

- a project in Africa, being conducted in Cameroon, Guinea, Congo and the Democratic Republic of the Congo, is studying *“the economic values of ecosystem services (including carbon) of the mangroves of the western central Africa region”* to make the case for *“the inclusion of mangrove forests in REDD+”* and in voluntary carbon schemes.

- Demonstration projects

“Blue Carbon” promoters also emphasise incentives for demonstration activities, through projects that seek to convince the UNFCCC that “Blue Carbon” should be included in a new climate agreement, or specifically in a REDD agreement. These demonstration projects have different characteristics, but frequently they have a “community” component, intended to show the benefits of “Blue Carbon” for the communities that depend on coastal ecosystems. However, what these projects do not show is that they do not contribute to reductions in the CO_2 emissions that are responsible for global warming. On the contrary, beneath their positive image they hide the fact that these same projects are used to justify companies’ continued CO_2 emissions. One example is the demonstration project carried out by FundaciónNeotrópica in Costa Rica.

The Fundación Neotrópica“Blue Carbon” community programme

The Neotrópica Foundation in Costa Rica is carrying out a “Blue Carbon” community programme. The foundation has succeeded in recruiting sponsors involved in CO_2 emitting activities to invest in the project, for example the Volkswagen and Ford automobile companies. According to available information, the foundation identified suitable communities to participate in the project in the southern region of Costa Rica. They argue that the mangroves there are under a lot of pressure and are therefore at risk of destruction.

Community organisations participating in the project are organised into what are known as “local implementation units,” which carry out the mangrove reforestation work. The project also includes community training and environmental education as part of its activities. About 100,000 seedlings have been planted (29).

COECOCEIBA-Friends of the Earth Costa Rica, an NGO, while not disputing the importance of supporting community activities for the restoration of the mangroves, has questioned this project in terms of the logic behind it. COECOCEIBA explains that Volkswagen invites owners of their vehicles to donate a certain sum towards tree planting, with the goal of restoring and conserving mangroves in the region where the “Blue Carbon” project is being implemented. In this way, through this project Volkswagen would be “offsetting” the CO_2 emissions from the cars it produces. Therefore COECOCEIBA argues that the project ultimately becomes a “greenwash” for transnational companies responsible for global warming, as if Volkswagen cars were now “neutralising” their emissions through the restoration of mangroves (30).

5.- How can coastal ecosystems be conserved?

Mangroves really are among the most threatened tropical forests in the world. What still remains of the world’s mangroves is the fruit of the global presence and struggle of women and men in thousands of communities, who have conserved them because their survival depends on them and coastal ecosystems in general. Their destruction affects women in particular.

With the “Blue Carbon” trend, NGOs, consultants and companies are arriving in these communities with the discourse that mangroves should now be preserved, especially for the carbon they contain. But the new “Blue Carbon” trend is unlikely to save them or mitigate the climate crisis in general. In the first place, “Blue Carbon” promoters do not clearly identify the causes of the destruction of mangroves and coastal ecosystems. Often, these causes are summarised in their analyses as the result of poor management, and therefore they do not prevent large companies from continuing to invade and destroy mangrove areas in the world. In the second place, because of the logic of carbon markets and other “ecosystem services,” every time an area is preserved a company is given the right to continue its CO_2 emissions or destroy another area of comparable biodiversity elsewhere. The market logic of “offsetting” pollution or destruction has no room for communities. Destruction of coastal ecosystems is not remediated and the root causes of the destruction are not dealt with.

Communities are absent from all “Blue Carbon” publicity material. Local people live in the coastal ecosystems, but they were never concerned to know whether their territories contained a lot or a little carbon or whether they offer “ecosystem services,” and they were even less concerned about the price of these services. They do not tend to express in monetary terms the value that the mangroves, on which they depend for their livelihood, have for them: they tend to say that price is incalculable. However, although they are not responsible for the high CO_2 emissions arising from burning oil, gas or coal, which are the main factors responsible for global warming, these communities feel the impacts of climate change in their daily life.

As demonstrated by the experience of REDD projects in terrestrial forests, “Blue Carbon” initiatives which are also imposed from the top down tend to interfere profoundly withthe life of these communities and to cause more problems than benefits. Focused on the issue of carbon, “Blue Carbon” projects necessarily imply the imposition of a series of restrictions on the communities’ way

of life, and loss of control over their territories, in order to assure the financial markets that the carbon – converted into paper “assets” or environmental “titles” – stays “properly stored” in the forests.

In spite of the fact that many pilot projects, carried out by NGOs with the support of large companies, pride themselves on their community component, these same communities had long since discovered, without needing to hear about “Blue Carbon” projects, the importance of defending their fishing and gathering territories. Women and men have worked for years to restore the mangroves destroyed by business activities, in order to guarantee their future and their control over these areas.

The emphasis of demonstration and research projects on putting mangroves on the global carbon markets, only postpones the necessary structural transformations of the production and consumption model based on burning fossil fuels. These changes are essential for humanity to have the opportunity to keep global warming within certain limits, and so ensure the future survival of mangroves and coastal ecosystems in general and that of the communities that depend on them. The new “Blue Carbon” trend, by not proposing these changes, is another false solution to the climate crisis, as well as being a way to maintain and strengthen the power of companies and financial markets, while hiding their responsibility for major environmental destruction and proposing that these companies and markets become part of the supposed “solution.”

This article also shows the importance of fighting for the conservation of coastal ecosystems, but as part of the resistance and struggle of the communities who live there, recognising their fishing and gathering territories. This could be decisive in helping to reverse the present history of invasion and extraction in these areas for the benefit of the large companies that are responsible for the destruction of coastal ecosystems. National governments and international bodies – especially the United Nations – should support the communities and their demands, instead of business interests and “Blue Carbon" initiatives.

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Notes:

(1) http://wrm.org.uy/wp-content/uploads/2013/01/10AlertsREDD-eng.pdf

(2) Conservation International and IUCN, “Blue Carbon Policy Framework”, 2011.

(3) http://bluecarbonportal.org/?page_id=2944

(4) UNEP/FAO/UNESCO/IOC/CSIC/Grid Arendal, “A Blue Carbon Fund: the ocean equivalent of REDD for carbon sequestration in coastal states”. Flyer

(5) Conservation International and IUCN, “Blue Carbon Policy Framework”, 2011.

(6) Ibid

(7)http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1465&context=sdlp

(8) http://thebluecarboninitiative.org/category/about/blue-carbon/

(9)http://www.neotropica.org/article/carbono-azul-comunitario/

(10)http://www.lbl.gov/Science-Articles/Archive/sea-carb-bish.html

(11)http://www.etcgroup.org/fr/node/641

(12)UNEP/FAO/UNESCO/IOC/CSIC/Grid Arendal, “A Blue Carbon Fund: the ocean equivalent of REDD for carbon sequestration in coastal states”. Flyer

(13) Information provided by RedManglar

(14) UNEP/FAO/UNESCO/IOC/CSIC/Grid Arendal, “A Blue Carbon Fund: the ocean equivalent of REDD for carbon sequestration in coastal states”. Flyer

(15) http://www.monbiot.com/2013/09/18/pricing-the-priceless/

(16) IUCN – International Union for Conservation of Nature: an international environmental organisation made up of governments, industries, international bodies and civil society organisations.

(17) The RAMSAR Convention is an intergovernmental treaty established in 1971 that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

(18) http://bluecarbonportal.org/?dt_portfolio=livelihood-fund-reforestation-projects

(19) www.danone.comhttp://downtoearth.danone.com

(21) http://www.grida.no/about/

(22) http://www.grida.no/publications/rr/blue-carbon/

(23) Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organisation.

(24) Conservation International and IUCN, “Blue Carbon Policy Framework”, 2011.

(25) Ibid.

(26) http://bluecarbonportal.org/

(27) http://www.v-c-s.org/methodologies/methodology-coastal-wetland-creation-v10

(28) http://bluecarbonportal.org/?page_id=668#marker29

(29) http://www.neotropica.org/article/carbono-azul-comunitario/

(30) http://coecoceiba.org/se-enojaron-en-casa-presidencial/