

The carbon finance market:

financial mechanisms and potential implications for greenhouse gas (GHG) mitigation in the fishery and aquaculture sector.

Background paper: W Barsley, FAO Feb 2013

The issues

- A common challenge across most sectors is to recognize their respective levels of GHG emissions, find the means to reduce these, and identify incentives to do so.
- Where there are no direct means to promote GHG reduction such as regulation or consumer incentives, a primary approach, created under the Kyoto Protocol in 2005, is through the carbon market and its various financing mechanisms which enable payments to countries, companies and projects to reduce GHG emissions.
- Focus here on the fisheries and aquaculture sector, exploring the potential to use carbon financing mechanisms as an incentive for GHG mitigation.
- To date, the sector has featured relatively little in carbon accounting and financing, and so far does not have access to specific carbon reduction markets
- Although overall GHG levels are small relative to major economic sectors, there is notable potential for GHG reduction along the fisheries supply chain, also including post-harvest processes, distribution and consumption.
- What then are the options?

Concepts and principles

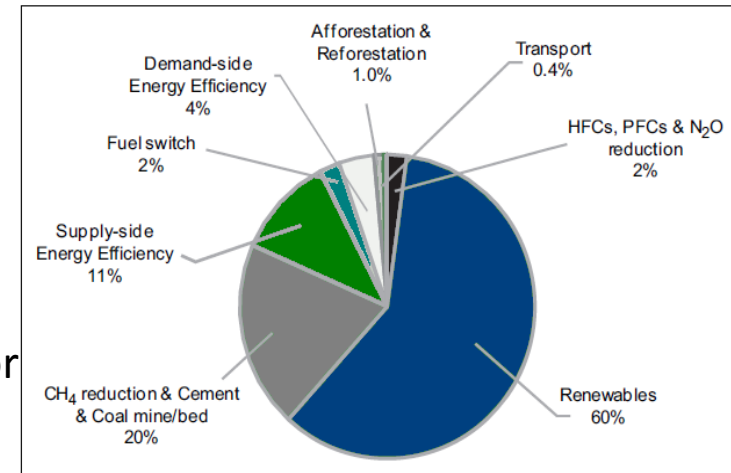
- Under the first commitment phase, countries who have adopted the Kyoto Protocol must collectively reduce GHG emissions by 5.2% below 1990 levels between 2008-2012. The first commitment phase ended in 2012, with a second phase, set to end in 2017.
- The carbon market is split into two main sectors, the **regulatory compliance market** and the **voluntary market**, each having their own targets, size and entry criteria.
- The regulatory market predominately includes countries that have agreed to reduce GHG emissions under the Kyoto Protocol and accepted a level at which to 'cap' emissions. Allowances are provided to participants, which can be traded between them. The traded price of carbon emission allowances will depend on the agreed cap level and the demand by participants for emitting carbon
- By far the largest **cap and trade** system is the European Union Emissions Trading Scheme (EU ETS), whose value has grown to a total of \$148 billion dollars (World Bank, 2012). Other non-Kyoto signatory countries have created their own schemes, such as the New South Wales (NSW) GHG Abatement Scheme adopted in 2003.
- A variant is the **baseline and credit** system, which does not have a finite limit of carbon allowances. New carbon credits can be created through carbon sequestration or reduction projects, offsetting carbon emissions elsewhere, which buyers can use in the cap and trade system. Additionality is a key component in regulating this system, whereby carbon offsets are only legitimised and generate monetary value if the projects and subsequent reductions would not have happened anyway.
- A significant example of a baseline and credit scheme is the Clean Development Mechanism (CDM), established under the Kyoto Protocol and only applicable to developing countries. The CDM aims to not only reduce GHG emissions but also help foster investment within developing countries and strengthen global cooperation (CDM Policy Dialogue, 2012).

Voluntary markets and trading units

- The Voluntary Market predominately uses the baseline and credit system, and provides an alternative market to the regulatory one, often through investments from private investors and companies. The voluntary market is currently much smaller in size and compared to the regulatory market commonly has less stringent entry and operational requirements. The voluntary market has attracted attention for a variety of carbon projects, in particular Reducing Emissions from Deforestation and Forest Degradation (REDD) and a number of agricultural schemes (Peters-Stanley et al, 2011).
- The global carbon market is currently valued at \$176 billion with an average annualised growth of 11%. It has grown to become a recognized method for trading emissions, shown in the total transaction volume for 2011/12 of 10.3 billion tons of CO₂-eq (World Bank, 2012).
- The pricing of carbon is a crucial factor in the functioning of these markets and is connected with the size of the market and the agreed level at which to incentivise investment. Hence the price of carbon may differ between various mechanisms.
- Formally, two types of carbon units are defined for quantifying and valuing markets; allowances, formed under the cap and trade system and; carbon credits, produced in the baseline and credit system (Kollham, 2008). One unit or credit of carbon is equal to one ton of Carbon Dioxide (CO₂) or Carbon Dioxide equivalent (CO₂- eq). As discussed later, the measurement and attribution of carbon reduction in the chosen system or process is a critical issue in the effectiveness of defining and operating an effective carbon market.

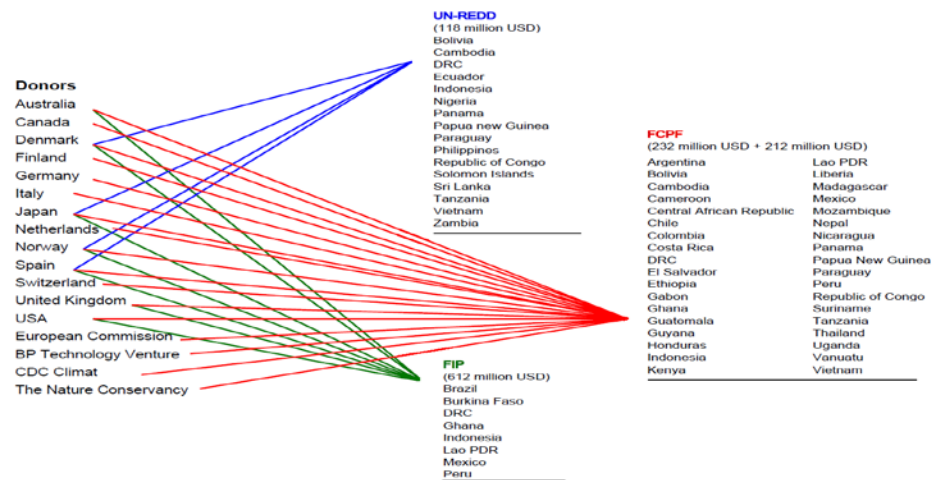
The Clean Development Mechanism

- The CDM is set to have a market value post 2012 of approximately \$2 billion and is heralded as a key component in linking developing countries with developed (World Bank, 2012).
- CDM funds carbon sequestration projects in developing countries through investment from developed countries, who pay to implement GHG reduction projects and thus gain carbon credits or CERs, which they offset against national emissions or sell on the market.
- The CDM and the associated Joint Implementation (JI) scheme can also be used and traded in the EU ETS through the International Linking Directive (ILD).



Reducing Emissions from Deforestation and Forest Degradation – REDD

- Greenhouse gas emissions from deforestation and forest degradation are estimated to account for ~ 20% of the global annual GHG emissions, most located in developing countries .
- Reducing emissions from deforestation and forest degradation (REDD) has gained significant attention and progress under the UNFCCC Bali Action Plan of 2007;
- Under nationally led REDD + programmes goals of ensuring sustainable conservation of forests and community engagement are also pursued (FAO, UNDP and UNEP, 2008).
- Three main multilateral schemes ; the UN-REDD programme (established in 2008), Forest Carbon Partnership Facility (FCPF) and the Forest Investment Program (FIP) established by the World Bank. Figure 4 below shows the distribution of donors and initiatives.



REDD in practice

- A total of \$67.3 million has been approved for national programs under UN-REDD and FCPF readiness programs to develop infrastructure and capacity. The other significant donor is the Norwegian Climate and Forest Initiative, established in 2007 and contributing \$600 million/yr.
- A number of accreditation schemes are also available, such as the Voluntary Carbon Standard (VCS) and the Climate, Community and Biodiversity project standard (CCB).
- REDD accounted for 29% of the total traded volume within the voluntary market in 2010, a result of new crediting standards and potential progress in UNFCCC discussions on REDD. However, since 2010 the REDD market value has fallen to its current level of 9%, due to low market confidence and absence of a binding international climate agreement for all nations.
- The REDD mechanism has received many critiques, due primarily to difficulties of establishing such a large and diverse carbon financing system with many stakeholders and relatively untested institutional functions and processes.
- The issue of developing credible measurements of emissions within deforestation and degradation environments also resulted in concerns surrounding the ability to comply with carbon market regulations, reducing overall trust in the financing mechanism.
- However, confidence is growing with the introduction and development of methods such as remote sensing to measure deforestation.
- A further critique is that of ensuring equitable distribution of benefits, with some arguing that powerful stakeholders may deprive communities of land and their future development aspirations. Finally there is the challenge of reducing carbon leakage within REDD programs, which is often due to displacing deforestation to other areas as a result of community relocation, land availability and changing practices (UN-REDD, 2008).

The agricultural sector

- Agriculture is not only a contributor to climate change through GHG emissions from farming systems and production, but it also provides a sink through which to sequester carbon
- Various methods are available in agricultural schemes to reduce GHG emissions, mainly through carbon sinks, avoided or displaced emissions and reducing overall GHG within the farming system. Changing production practices and adopting technical changes can reduce emissions, such as increasing efficiency, for example using different animal feeds within the livestock sector or changing to organic fertilizers in crop production
- Although 127 agriculture-related projects are so far registered under the UN CDM (predominately focused on waste management and biomass) none so far specifically target land based, (ie production-linked) activities within agriculture, which highlights the emerging yet still limited nature of carbon financing in the sector
- However a number of funds and schemes exist, the main ones of which are highlighted in Table 2. With regards to the geographical distribution of agricultural sector trading schemes within Annex 1 countries, Muller-Lindenlauf (2009) identifies markets around the world such as in New Zealand, Europe, Canada, Japan, Russian Federation and United States. In New Zealand, as of 2012 the agricultural sector is required to present GHG reporting under NZ ETS (World Bank, 2012).

Funding GHG reduction in agriculture

Table 2 Carbon funds potentially available to the agricultural sector,

Carbon Fund	Agricultural element
Climate, Community and Biodiversity Alliance (CCBA)	Includes the IPCC AFOLU (agriculture, forestry and other land use) 2006 standards
Voluntary Carbon Standard (VCS)	Contains cropland and grassland management projects
Chicago Carbon Exchange (CCX)	Includes standards for sustainable rangeland management and conservation tillage

Source: adapted from Elverfeldt, 2010 and Muller-Lindenlauf, 2009

- Similar to the challenges facing REDD mechanisms, the agricultural sector must ensure credible systems of measurement and accounting, in order to reduce leakage and ensure additionality, as required under most financing mechanisms.
- However due to the nature of the agricultural system, difficulty arises when attempting to measure GHG emissions, although significant steps have been made (Elverfeldt and Bistrom, 2010).
- The sector is also limited in its integration with carbon financing mechanisms as shown above, as although a number of schemes currently exist these are not widespread or financed at significant levels.

Blue Carbon

- The concept of Blue Carbon is similar to that related to the management of carbon embodied within terrestrial organisms and ecosystems, but specifically encompasses the vast amount of carbon stored in oceans and wetland biomass and sediments (Lutz, 2011).
- The Blue Carbon sector has been gaining significant momentum for incorporation in the carbon market, due to its potentially very large carbon storage potential.
- As Blue Carbon aims are based on management of aquatic/wetland ecosystems, synergies could exist between financial mechanisms developed for these, and those potentially introduced by the fisheries and aquaculture sector.
- A number of areas could be seen to overlap, especially in regards to ecosystem management and approach. As yet however there are limited mechanisms and funds available for Blue Carbon to include within the carbon market, although REDD + may provide a possible entry route in the coming years (Gordon et al, 2011), and projects have already commenced for management of mangrove-based wetlands.

Lessons for the fisheries and aquaculture sector

- A number of issues and lessons can be drawn. Here in principle, carbon credits could be sought by reducing GHGs associated with various supply chain elements, or traded in some cases to permit high market value production involving large GHG footprints. In other cases, specific management measures could enhance carbon sequestration and thereby qualify for credits within a baseline and credit system.
- While the principles of engaging in carbon markets could be relatively easily definable for the sector, the practical workings of the markets themselves – their size, geographical location, the value of carbon credits, and the longer term trends of market size, structure and competition, would largely determine the ease of entry of the sector into the carbon market.
- The REDD programme highlights important lessons were the sector to be included in carbon markets, including issues of ensuring good measurement, monitoring and reducing potential leakage. However, the REDD example also shows how market confidence can be improved in areas such as carbon measurement, with technical innovation such as use of remote sensing.
- The sector would have to ensure at least similar standards of monitoring and accounting. Experience with the REDD also highlights the importance of communities and stakeholders in carbon financing mechanisms and the challenges that arise in ensuring equitable benefits to those involved. Similar issues would apply in the aquatic sector, with direct or indirect impacts on producers, supply chain participants, their communities and a wider range of stakeholders. Finally, the REDD example shows the need to build capacity and infrastructure in beneficiary countries through developing national strategies and monitoring systems.
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Using the voluntary market

- The voluntary market appears to be the most likely starting point. The example of the agricultural sector provides a relatively close link with the aquatic sector, and could indicate potential entry routes and challenges. Related implications for the aquatic sector are noted:
- Capacity of practices to enhance C storage; definable and scientifically verifiable mechanisms would be required to demonstrate that carbon could be reliably stored in aquatic management processes over definable periods of time. Where C reduction impacts are indirect – eg reducing GHGs associated with fuel or energy consumption, or other significant inputs or processes, definable and measurable levels of GHG change would be required.
- Capacity to adapt and maintain these practices; would apply to relevant fishery sector supply chain participant once the C reduction/storage mechanisms are defined; short –term or temporary changes would rarely merit commitment of market monitoring resources
- Institutional capacity to aggregate C credits; particularly for the small-scale producer/supply chain system; in many cases credits would be built up in small numbers by collective individual actions, and some mechanism would be required to ratify and collate these.
- Ability to monitor C stocks; required to verify storage or C reduction actions; this is potentially more complex in aquatic ecosystems and would require the establishment of standardised procedures and technically accredited measurement agents.
- Access to incentive payments; in the aquatic sector this would potentially apply to any relevant supply chain participant, and would require transparent, timely and cost-effective procedures.

Conclusions

- This review has outlined the key components, mechanisms and trends within the carbon market, to explore its potential for creating incentives for the fisheries and aquaculture sector.
- The World Bank's annual report of 2012 and the CDM review, shows in detail the current difficulties in the carbon market, with a lack of confidence from some investors, low prices and high surplus of credits creating an unfavourable environment for longer term investment.
- However, new developments and mechanisms are being created, enabling a wider geographical distribution of the carbon market. No funds or mechanisms are currently available, but lessons can be drawn from agricultural carbon schemes and REDD, which indicate methods, entry requirements and issues of measurement and verification.
- The formation of credible standards and methods of measurement would be a critical for the sector to engage in carbon markets, and while market confidence is low, options for new and untested sectors, whatever their potential for carbon reduction, may be limited.
- However with an increasing chance that global warming will reach 4° Celsius by 2100 even if current national pledges and commitments are kept (Word Bank, 2012), the imperatives for more targeted action across all sectors are more strongly evident, and if carbon markets prove more generically to become effective incentives and drivers of reducing GHGs, they need to be as inclusive as possible of all sectors.