BETTER POLICIES FOR BETTER LIVES

The Director
TRADE AND AGRICULTURE DIRECTORATE

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Dear Mr. Mathias

I am referring to your letter of 12 December 2012 (LOS/OC report/2013) requesting information regarding work carried out in the OECD related to ocean acidification.

At present, OECD does not have any activities underway related to ocean acidification.

The OECD's Fisheries Committee and the Korean Government hosted in 2010 a workshop on the Economics of Adapting Fisheries to Climate Change. One presentation entitled "Fisheries Management and Governance Challenges in a Climate change" by Dulvy and Reynolds given at this workshop discussed explicitly the issue of acidification.

The relevant text of that presentation [taken from *Economics of Adapting Fisheries to Climate Change* (OECD, 2010), pp45-46] reads:

"Ocean acidification

Rising atmospheric CO2 concentrations over the past two centuries have driven the oceans to absorb CO2 at unprecedented rates. In the past few decades, only half of the CO2 released by human activity has remained in the atmosphere; of the remainder, about 30% has been taken up by the ocean and 20% by the terrestrial biosphere. Based on the Intergovernmental Panel on Climate Change estimates of future atmospheric pCO2 (Meehl et al., 2007), oceanographic models for the oceans indicate that surface-water dissolved inorganic carbon (DIC) could probably increase by more than 10% and the carbonate ion concentration would decrease by almost 60%, resulting in a corresponding pH drop of about 0.35 pH units. Surface waters by 2100 (Caldeira and Wickett, 2003). Ocean pH was about 0.1 units higher during the last ice age, and it is about 0.1 units lower in the industrial era (when CO2 in the atmosphere amounted to around 280 parts per million). Today it is now 5% higher atmospheric CO2 concentration of around 380 parts per million (ppm). This is more acidic than the ocean has been for hundreds of millennia, and the rate of change is estimated to be 100 times faster than at any other time during the past 100 000 years. A key consequence is that the degree of saturation of seawater with aragonite and calcite, which is largely governed by bicarbonate concentration (CO3 2-).

Undersaturation, particularly of aragonite, is predicted in near surface waters between 200-1000 m in the North Pacific, north Indian and east Atlantic Oceans within the next few decades (Feely et al., 2004). The calcification rate of organisms across multiple taxa – from single-celled protists to reef-building corals – is expected to decrease in response to CO2-induced reductions in saturation state (Feeley et al., 2004). Coral reef calcification depends on the aragonite saturation state of surface waters. By

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the middle of the next century, an increased concentration of carbon dioxide will decrease the aragonite saturation state in the tropics by 30% (Kleypas et al., 1999). Acidification is likely to favour some phytoplankton species over others, with cascading effects in the Southern Ocean, which may in turn influence the community structure of the higher trophic levels that are reliant upon phytoplankton as food and will also influence the cycling of elements, since processes and mechanisms differ between phytoplankton species (Hays et al., 2005). High pCO2 and lower pH will also affect the growth and reproduction of many benthic invertebrate species (see Fabry et al. 2008), including echinoderms, bivalve molluscs and some crustaceans. While understanding the effects of acidification on components of the life history of organisms has been the focus of laboratory scientists, the real question is: what are the population and community effects of acidification? Whole ecosystems may be most in the acidified deep water below the aragonite saturation horizon; the question is who will be the winners and losers as the undersaturated acidic waters shoal and influence shallower waters. Ecosystems that support commercial fisheries and aquaculture."

For your perusal I have included a copy of the publication "The Economics of Adapting Fisheries to Climate Change".

In light of your interest, should work be initiated by the OECD's Fisheries Committee addressing issues of ocean acidification, we would of course be happy to share this with you.

In the meantime, we would be interested in receiving information on the results of your analysis, if possible.

Please do not hesitate to contact Carl-Christian Schmidt, Head of Fisheries, should the need arise.

Yours sincerely,

Ken Ash

Attachment: The Economics of Adapting Fisheries to Climate Change

cc: Carl-Christian Schmidt, Head of Fisheries, OECD