

Solomon is winner of the BBVA Foundation Frontiers of Knowledge Award in Climate Change. Lubchenco, in Ecology and Conservation Biology

## **Susan Solomon and Jane Lubchenco call for investment in clean technologies and a commitment to healthy oceans**

- Solomon: "The future is in our hands, and investing in low-carbon technologies to make them cheaper seems obvious to me."
- Lubchenco: "Sustainable fisheries are achievable, but getting there will be tough."
- The two women will collect their awards at ceremony to take place on Thursday, June 20 in the BBVA Foundation, Madrid.

**Madrid, June 19 2013.-** BBVA Foundation Frontiers of Knowledge laureates Susan Solomon and Jane Lubchenco are not in the business of softening the hard truth: the environmental problems that make up their areas of study are now at a critical stage. Solomon, winner in the Climate Change category, fears that if carbon emissions keep on growing the Earth's average temperature will stand from 2°C to 6°C higher by the end of this century, and sea levels will rise by up to one meter. Lubchenco, the winner in Ecology and Conservation Biology, warns that our oceans are being plundered and that fishing is no longer a sustainable activity.

Both, however, see some grounds for optimism. Solomon, for whom the solution to climate change lies in technological innovation, emphasizes the progress made in developing clean technologies. Lubchenco, meantime, takes encouragement from the recent reform of European fisheries policy, which sets out to end overfishing by 2020 by banning catches of any species above levels that do not endanger the reproduction of stocks.

Susan Solomon, of Massachusetts Institute of Technology (MIT), was granted the award for her contributions to understanding how human activity causes changes in atmospheric composition which affect Earth's climate. In the late 1980s, aged barely thirty, Solomon discovered why the ozone layer over Antarctica was being destroyed, and her work was vital in reducing the use of the gases that caused

the problem. Already an acknowledged leader in atmospheric chemistry, she co-chaired the scientific group of the IPCC (Intergovernmental Panel on Climate Change) responsible for the 2007 report that was the first to attribute climate change to human action.

Jane Lubchenco, of Oregon State University, laid the scientific foundations for the design of marine reserves. Her experimental work was also instrumental in elucidating the functioning of marine ecosystems and, in the last instance, fisheries, an area where Lubchenco has also held political responsibilities: from 2009 to 2013 – she stepped down in February this year – she headed the NOAA, the U.S. National Oceanic and Atmospheric Administration, with powers over national fishing policy.

The two women are in Madrid to pick up their awards at a ceremony this Thursday in the BBVA Foundation headquarters, and appeared this morning at a joint press conference. The BBVA Foundation numbers the environment among its priority work areas, and reserves specific categories in its Frontiers of Knowledge Awards family for two clearly differentiated fields of environmental research: Climate Change and Ecology and Conservation Biology.

### **The summers of the 21st century**

"If we keep emitting carbon at a growing rate, the planet is likely to get very hot indeed," Susan Solomon warns. "The best estimates are on the order of 2°C to 6°C by the end of the 21st century. Sea levels will rise as temperatures increase, and will keep rising for many centuries even after we stop emitting, because the deep ocean will keep taking up heat and expanding, and ice will continue to melt." It is hard to be precise – we still don't understand exactly what is happening with the Greenland and Antarctic ice sheets – but scientists believe that sea levels could rise by 0.5-1 meter before the end of this century, and as much as 2-3 meters in the next few hundred years after that. "Many islands," Solomon says, "would disappear entirely."

She has also examined how these changes will impact on different world regions. The overriding picture, she explains, is that "in a warming world wet areas will get wetter and dry areas will get drier." This is "particularly likely" in the Mediterranean area, so it seems that countries in southern Europe and northern Africa are "going to be hit hard."

In fact "there is already a trend toward drier conditions," Solomon relates. And this means that certain aspects of today's weather can be attributed to ongoing climate change; the case, for instance, with very hot summers: "Looking at the statistics, it's pretty easy to show that extreme hot summers are on the rise around the world. This doesn't mean that every summer will be hot in every place, but the frequency of hot ones will increase as the climate warms. If you are about 40, and think of the hottest summer you've experienced in your adult life, by the time you are 80 if the planet is warmer by 2C, then almost every summer will be like that. It's going to be a different planet at 2C warming."

## **The ethics of climate change**

One issue that troubles Solomon, and where she believes a social debate is warranted, is the fact that the communities who will suffer most from climate change are also the least prepared to deal with it – and also those who have done the least to cause it: “The one billion of us who are lucky enough to live in the developed world on average emit about five times more carbon per person than the six billion in the developing world.” Also, the poverty belt coincides in part with the tropics, a region where warming, as Solomon's work shows, is already taking temperatures outside the range of past variability. “These are the communities least able to adapt, because most adaptation costs money, such as improving irrigation systems or building dams.”

Paradoxically, the problem cannot be solved just by giving more of the world's poor access to wealth: “In the developing world, people are beginning to become richer, which is great. But if they develop with a carbon footprint like ours, that will mean a lot more carbon emission for decades to come.”

So what is to be done? For Solomon, “it is pretty clear that without changes to cleaner energy systems, we'll all be facing a very hot planet.” So “I really think we can only say the future is in our hands, and investing in low-carbon technologies to make them cheaper seems obvious to me. I don't think we can pick winning technologies right now. It is better to 'let a thousand flowers' bloom'.” Progress is being made, and I think a lot more can happen.”

## **Sustainable fisheries: a real hope**

Jane Lubchenco is clear about the urgency of measures to protect our oceans: “At the global scale, fisheries are a disaster, and that means big problems for food security, human health, peace and economic prosperity. Over three billion people depend on seafood for their primary source of protein, but depletion of oceans is happening at unprecedented rates,” she affirms. “The types of systemic reforms made by the EU recently and by the U.S. earlier are needed everywhere.”

She is referring here to the recent reform of Europe's Common Fisheries Policy: “Make no mistake: the decision to end overfishing by 2015 for most fish stocks and by 2020 for all stocks is a historic and very significant accomplishment that should bring long-term benefit to all Europeans. The European Union has taken wise and courageous action with this reform. After decades of overfishing that resulted in declining fish stocks and revenues, there is now hope that fishing can return to sustainability.”

In her opinion, this goal is realistic, though it will need “a continued commitment”: “Sustainable fisheries are achievable, but getting there is tough.” The conflict, in essence, is one of near- or far-sightedness, Lubchenco explains: with traditional fisheries the goal is to maximize profits without thinking about tomorrow; with sustainable fisheries, fishermen have to think about the coming generations. The solution lies in aligning short-term and long-term incentives, and this can be done by ensuring fishermen their future catches. In this way “fishermen have a

guaranteed fraction of the catch, not just for this year, but for future years. As a consequence, they have a stake in the future, not just the present, and strong incentives to ensure the fishery is well managed."

### **The challenge of aquaculture**

Lubchenco stresses that this kind of management is indispensable, and should go hand in hand with the creation of marine reserves: "Both are needed. No-take areas are powerful tools to help recover depleted fisheries, protect biodiversity, and hedge against unexpected environmental changes, but they are not a substitute for good fishery management."

The ecology laureate also talks about aquaculture, which has some way to go to attain sustainability: "Aquaculture is an essential component of food security, but there are currently very real environmental and social problems that must be addressed for it to be sustainable." Farming of mussels and oysters is easier, she explains, because these bivalve species obtain their food from the surrounding water. The farming of predators like cod is extremely difficult if you want its impact to be less than the fishing itself.

---

**Fundación BBVA**

For further information, contact the BBVA Foundation Communication Department (+34 91 374 52 10/ +34 91 537 37 69 or [comunicacion@fbbva.es](mailto:comunicacion@fbbva.es)) or visit the website [www.fbbva.es](http://www.fbbva.es)