

► archaeology and history departments.

The proposed law on research would also need solid financial backing, say scientists. It designs a system in which researchers in different types of institution and in industry would be able to collaborate easily, administration would be efficient and there would be regular calls for competitive research grants. The law would create a mandatory line for research spending in the state budget for the first time. But parliament would have to approve the actual budget each year, and scientists fear that parliament might not be generous.

Greece does not have a dedicated research funding agency, but that absence is offset by the €0.9 billion (US\$1.14 billion) earmarked for research from the country's 2007–13 European Union (EU) Structural Funds, which are effectively subsidies for poorer regions in the union. After years of providing almost no research funding, the Greek government has in the past year put out a handful of calls for infrastructure and competitive-research grant proposals that would use the EU money. Most calls invite applications from academic networks and industry collaborations, but one, made last May, is aimed at individual researchers. Modelled on grants offered by the European Research Council, the calls are worth up to €1 million each. But competition is harsh: of 1,200 applications, fewer than 200 will be funded.

The money will be a life-saver for established researchers, but the future of the system as a whole remains uncertain. Over the next five years, 30% of current faculty members and researchers will retire from Greek universities and research centres, and replacing them may be difficult. Thanks again to EU funding, Greece produces large numbers of PhDs, but most of those who continue on to postdoctoral research do so abroad. In the past, many have returned to seed competitive research groups at home. The proposed law provides schemes to encourage that, but few believe that it will work, given the very low salaries and uncertain funding that researchers can expect.

Vasso Kostourou, a cell biologist at the Alexander Fleming Biomedical Sciences Research Center in Vari, is an exception. She returned to Greece from London in 2008, and recalls colleagues encouraging her because they thought that project funding was about to resume. Instead, she arrived as the crisis hit. At 37 years old, Kostourou thinks that she may be among the last scientists to return to academia in Greece for the foreseeable future. “That’s

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a shame because the quality of science that can be done here is high,” she says. “It’s only the funding that’s bad.” ■

ECONOMICS

Disaster toll tallied

The soaring cost of natural catastrophes is due more to socio-economic than climatic factors.

BY QUIRIN SCHIERMEIER

Natural disasters around the world last year caused a record US\$380 billion in economic losses. That’s more than twice the tally for 2010, and about \$115 billion more than in the previous record year of 2005, according to a report from Munich Re, a reinsurance group in Germany. But other work emphasizes that it is too soon to blame the economic devastation on climate change.

Almost two-thirds of 2011’s exceptionally high costs are attributable to two disasters unrelated to climate and weather: the magnitude-9.0 earthquake and tsunami that hit Japan in March, and February’s comparatively small but unusually destructive magnitude-6.3 quake in New Zealand.

And the long-term rise in the costs of global disasters is probably due mainly to socio-economic changes, such as population growth and development in vulnerable regions. That conclusion is backed up by a forthcoming study — supported by Munich Re — by economists Fabian Barthel and Eric Neumayer at the London School of Economics. Their analysis of events worldwide between 1990 and 2008 concludes that “the accumulation of wealth in

disaster-prone areas is and will always remain by far the most important driver of future economic disaster damage” (F. Barthel and E. Neumayer *Climatic Change*; in the press). Any major weather event hitting densely populated areas now causes huge losses because the value of the infrastructure has increased tremendously, they note, adding that if the 1926 Great Miami hurricane happened today, for example, it would cause much more damage than it did at the time.

However, weather-related events are generally on the rise. Thanks to a relatively quiet Atlantic hurricane season, damage caused by extreme weather was actually lower in 2011 than in four of the previous five years. But weather accounted for about 90% of the year’s 820 recorded natural disasters, which caused at least 27,000 deaths. These disasters include flooding in Thailand, a series of tornadoes that hit the United States Midwest and southern states last spring, and storms and extreme rainfall over parts of the Mediterranean in November.

Since 1980, the report notes, the number of severe floods has almost tripled, and storms have nearly doubled, which insurance experts link, in part, to the impact of climate change (see ‘Catastrophe count’). “It would not seem



Heavy rains turned roads into rivers last year as Thailand experienced its worst flooding in 50 years.

P. BROWN/PANOS

SOURCE: MUNICH RE

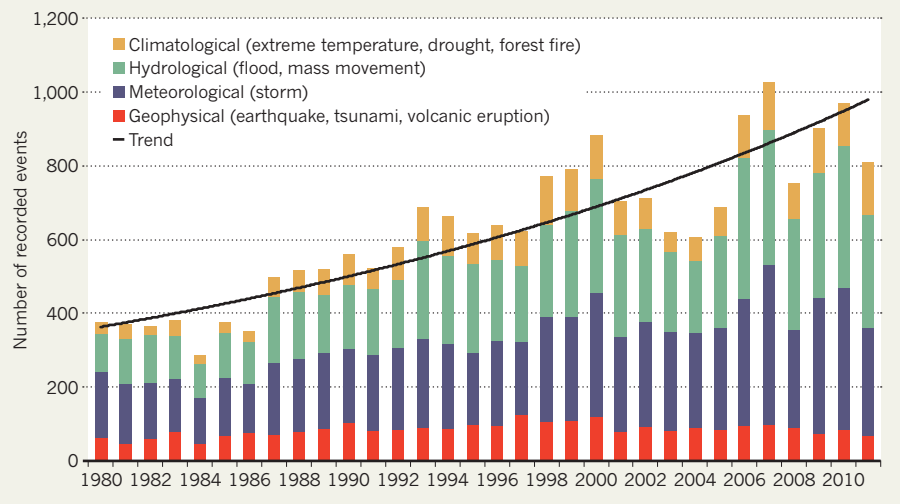
plausible that climate change doesn't play a role in the substantial rise in weather-related disasters," says Ernst Rauch, head of Munich Re's Corporate Climate Centre.

Climate scientists believe that the frequency and severity of extreme-weather events will increase as temperatures continue to rise. The summary of a report published in November by the Intergovernmental Panel on Climate Change supports that view and warns that some areas could even become "increasingly marginal as places to live in".

But attempts to attribute specific events to global warming are in their infancy (see *Nature* 477, 148–149; 2011). "Disasters are a tempting image for advocacy, but the science is just not there to support strong claims," says Roger Pielke Jr, a climate-policy researcher at the University of Colorado in Boulder. "We cannot yet attribute increasing dollar losses to human-caused climate change. Maybe we will one day, but not at present." ■

CATASTROPHE COUNT

An increase in severe storms is helping to drive up the number of recorded disasters, but this cannot be conclusively attributed to climate change.



PUBLIC HEALTH

Rules tighten on use of antibiotics on farms

Clampdown aims to stop spread of drug-resistant microbes.

BY NATASHA GILBERT

Alarmed at signs that the overuse of antibiotics in farm animals is blunting these key weapons against human disease, governments are taking action.

In industrial farming, antimicrobials are commonly given to farm animals to treat infections, and prophylactically to prevent disease or spur growth. But there is growing concern that excessive use on farms is helping to breed antibiotic-resistant microbes, from *Salmonella* (see 'Rising resistance') to *Escherichia coli*, which are harder to treat when they infect people.

The US Food and Drug Administration (FDA) is now moving to protect key antibiotics known as cephalosporins, which are used in humans to treat a range of infections, including pneumonia. On 4 January, the agency said that it would prohibit certain uses of cephalosporins in farm animals including cattle, pigs, chickens and turkeys, because overuse of the drugs is "likely to contribute to cephalosporin-resistant strains of certain bacterial pathogens". If cephalosporins become ineffective in treating human diseases, the FDA said, "doctors may have to use drugs that are not as effective, or that have greater side effects".

The new rules, to come into effect on 5 April,

restrict veterinary surgeons to using the two cephalosporin drugs specifically approved for food-producing animals — ceftiofur and cephapirin — and ban prophylactic use. In animals not listed in the FDA order, such as ducks or rabbits, vets will have more discretion to use the drugs.

Most antibiotic classes are used both in animals and in humans, so the FDA is also considering tightening controls on all classes of antimicrobials used on farms. It is reviewing comments on rules that would prohibit the use of any antimicrobial drug to promote animal growth, a move that would be welcomed by many vets. "We would support greater veterinary oversight of antimicrobial drugs," says

Christine Hoang, assistant director of scientific activities at the American Veterinary Medical Association in Schaumburg, Illinois.

The European Union (EU), which already forbids the use of antimicrobials to promote growth, plans to strengthen its own rules. Its new antibiotic-resistance strategy, published in November 2011, calls on EU countries to ensure that antibiotics are only available on prescription, and to strengthen surveillance systems to track and report cases of resistance (see *Nature* <http://doi.org/cshmhv>; 2011).

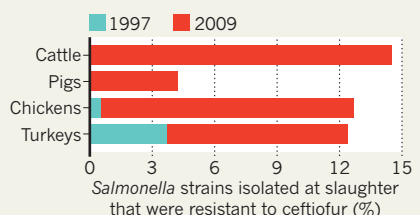
Although it is widely accepted that overusing antibiotics can be a major driver of resistance in microbes, the evidence linking antibiotic use in farm animals with resistance in humans is still controversial (A. E. Mather *et al. Proc. R. Soc. B* <http://doi.org/hj8>; 2011). A research programme coordinated by Europe's Innovative Medicines Initiative could provide some answers: in the next few months it will call for proposals for €350 million (US\$445 million) in grants to understand how resistance arises, and to develop new antimicrobial drugs.

Antimicrobial resistance is also this year's top priority for the intergovernmental World Organisation for Animal Health (OIE), based in Paris. Bernard Vallat, director-general of the OIE, says that it is working with the FDA and the World Health Organization to help developing countries to improve their legislation covering the control, distribution and use of veterinary antimicrobials. The three organizations plan to urge governments to put vets in charge of allocating the drugs and to ban preventative use.

"There are over 100 countries worldwide without legislation. Antibiotics are sold like sweets," Vallat told *Nature*. "There is no control and this is a major risk to animal and human health." ■

RISING RESISTANCE

Farms in the United States have seen an alarming rise in *Salmonella's* resistance to ceftiofur.



SOURCE: NATIONAL ANTIMICROBIAL RESISTANCE MONITORING SYSTEM/FDA