



INTERNATIONAL

Premier Li Keqiang and Dr. Marcia McNutt Meet for a Discussion on Science



Broadly speaking. Premier Li Keqiang and Dr. Marcia McNutt discussed a range of science-related topics, including space exploration, China's scientific cooperation with other developing countries, climate change, education, and environmental protection.

During a visit to the People's Republic of China, *Science* Editor-in-Chief Marcia McNutt had the opportunity to meet with Premier Li Keqiang in Beijing on 13 January 2014. [See the related editorial by Marcia McNutt (www.sciencemag.org/lookup/doi/10.1126/science.1251293). The full transcript is available online (www.sciencemag.org/cgi/content/full/science.1253962/DC1).]

Much of the conversation centered around China's challenge of sustainably developing resources for economic growth while preserving the natural environment and curbing greenhouse gas emissions. There is no precedent for tackling these problems while sup-

porting a population as large as China's 1.3 billion. Furthermore, China has been on an accelerated path to modernization, playing "catch up" since the Cultural Revolution in the late 1960s. Li explained that China has been heavily investing in environmental science and clean energy technologies as part of its strategy to propel the nation into the 21st century.

As further evidence of China's commitment to address environmental problems, Li pointed to efforts under way to tame air and water pollution in China. As more Chinese citizens attain middle-class economic status and find their basic life needs met, they are paying more attention to quality of life.

Although past Chinese leaders declared a war on poverty, and that war continues, the current leadership has now also declared a war on pollution.

As a first step, Li explained that China is using science to address the human contribution to smog in major cities, moving beyond monitoring to take action to treat it. He noted that China has raised fuel standards to cut vehicle exhaust, developed clean technologies for coal use, taken steps to prevent the spread of dust from construction sites, carried out afforestation in arid landscapes, and returned unproductive cultivated land to forests. He said his nation is developing the world's largest wind power capacity, expanding solar energy, and investing in carbon capture and storage technologies and new battery technologies for electric cars that require less palladium, platinum, and other limited resources. China is more than doubling the number of nuclear power plants while setting aggressive targets to lower overall energy consumption. Li believes that developing renewable energy and conserving energy and resources can together contribute to GDP growth while preserving the environment. With all the current policies in place, China's energy-saving and environmental industries will have a market value of 4.5 trillion RMB yuan by 2015 (approximately US\$720 billion at current exchange rates) and will soon approach US\$1 trillion. This is why, he said, many companies and research institutions developing nuclear power, carbon capture, and clean energy have turned their attention to China.

Clean water in China is also a major concern. Contaminated water takes a heavy toll on human health. In rural areas, 100 million to 110 million people still do not have access to safe drinking water. Last year, with the support of central and local budgets and funds raised by individuals, Li said that China began providing clean water to over 60 million people. The plan is to extend that initiative to another 60 million people this year, and the remaining 50 million next year. By then, the drinking water problem will be basically solved. However, highly polluted water still accounts for more than 10% of China's total water resources; a plan is required to resolve this issue.

The following are excerpts from the conversation.

On China's space program, its goals, and the balance between manned and robotic missions

Li Keqiang: "China's manned space and lunar probe missions have a twofold purpose: First, to explore the origin of the universe and mystery of human life; and second, to make peaceful use of outer space. ... peaceful use of outer space is conducive to China's development. China's manned space program has proceeded to the stage of building a space station, and will move forward step by step. ... As human life is precious, we will start with robotic exploration before gradually expanding manned space exploration. Space is all too mysterious. We need to take risks, but not at the cost of human life when conditions are not yet right."

On international science cooperation

LK: "China ... needs to fulfill the responsibility required of a big developing country and do what it can to help other developing countries. At the same time, it also needs to draw experience from them. This is a process of mutual assistance and mutual learning. ... There are three priorities of cooperation: First, development, such as agricultural productivity and poverty alleviation; second, improvement of livelihood, such as disaster prevention and reduction to mitigate losses caused by natural disasters; third, nature and the environment, such as development of clean energy. ... there are bright people even in a poor country. ... Science research needs brilliant ideas, and this requires input from all sources."

On climate change

LK: "Climate change is a common challenge of mankind. ... There is still controversy about whether the main cause of climate change is human activity or the changing dynamics of nature. Nevertheless there is no denying that human activities do impact climate change. To realize modernization, developing countries must overcome the challenges of the environment and resources facing the whole of mankind. These challenges are related to climate change and are pressing tasks for us. China is committed to achieving modernization, but there is no past precedent for us to follow in human history on how to achieve modernization in an energy-conserving and environment-friendly

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—Li Keqiang

way. ... Moreover, coal still accounts for about 66% of China's energy mix, and its emissions have a direct impact on climate change. Hence, we are determined to conserve energy, and this is a top priority. ... China's energy consumption per unit of GDP in 2013 was 3.7% lower than the previous year. ... we are vigorously developing clean energy. For example, China's installed hydropower capacity is 278 million kilowatts, and a total of 70 million kilowatts of wind power has been connected to the grid, larger than any other country in the world."

On building elite institutions versus promoting equal access

LK: "We will continue to build some world-class universities and attract top-notch

professionals. We place greater emphasis on educational fairness. For example, the share of poor students in key Chinese universities was declining. This is unfair for children in China's underdeveloped and poor areas. It also makes all-round and high-end scientific progress unsustainable. Last year, the Chinese government took strong measures to ask key universities to enroll more rural students from the underdeveloped central and western regions, especially poor areas. ... In 2013, the share of rural students in key universities increased by 10% over the previous year. ... Our government has provided 50 billion RMB yuan in scholarships or student loans to finance the higher education of children from poor regions and families."



China's challenges. Premier Li described one of China's major challenges as sustainably developing resources for economic growth while preserving the natural environment and curbing greenhouse gas emissions.

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