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President Ma Ying-jeou said that Taiwan must make further efforts in investing in research and development even though his target for R&D spending of 3 % of GDP has been met. Taiwan has no natural resources, but is successful in “digging brain mines.” In the World Bank’s Knowledge Economic Index rankings for 2012, Taiwan ranked 13th among 146 evaluated countries around the world and was first among Asian countries, he said, attributing the result to the country’s education system. Although Taiwan has been winning many prizes in international invention and design competitions, few of the awarded works have been commercialized or turned into thriving businesses. To take better advantage of the island’s innovative capacity, Ma said, his administration has decided to set “the commercialization of patented inventions” as one of its major priorities.

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1. Academia Sinica urges education, science reform

(Taiwan Today, 08 02 2013)

Academia Sinica, Taiwan's leading research institute, issued a position paper 7 February, calling for policy reforms to improve links among the economy, science and technology, and human resources. Policymaking must be guided by equal attention to the environment, public health and social justice if the country is to move in the direction of sustainable development, the report said. Taiwan's economy faces severe challenges, Academia Sinica said, citing Lausanne-based International Institute for Management Development's 2012 World Competitiveness Yearbook, in which the island's economic performance fell five places from the year before to 13th. The paper attributed this situation to an imbalance in personnel supply and demand, overconcentration in industry accompanied by low added value and the failure of R&D efforts to take account of industry needs. The report made recommendations in five areas to address these problems. With regard to higher education and human resources, it called for a new evaluation system, improved vocational education, regulatory easing to attract foreign professionals for long-term work in Taiwan, and the separation of academic and research institutions from the civil service system. In terms of policies and budgeting for science and technology, the report urged a balance between exploratory and problem-oriented research, with increased funding for the latter, as well as better mechanisms and funding for the training of interdisciplinary talent. It also proposed integrating the powers and responsibilities of separate government agencies in charge of science and technology. The government should establish overarching principles for the evaluation of research plans, to be used by different agencies as they draw up their own guidelines, according to the report. Evaluation should take place at all stages of research, with a mechanism for the termination of ineffectively carried out projects. There should be a national plan for public-academic sector R&D partnerships, along with increased flexibility for academics to work in industry and a mechanism to assist vocational school students and professors in establishing businesses, the paper said. Regarding high-tech industries and patent deployment, the report suggested the need to join the R&D and patent capabilities of academic institutions with those of industry so that research will guide industrial patent development and create a patent industry. In response to the paper, National Science Council Deputy Minister Y. Henry Sun said the same day that the NSC and Academia Sinica are on the same page when it comes to reforms. The NSC unveiled two plans in October promoting R&D cooperation between universities and industry, he pointed out. Eight industry alliances, concentrated in the electronics and high-tech sectors, have applied for the first project, targeted at collaboration on groundbreaking technologies in which "industrialists raise questions for academics to solve," Sun said. More than 400 applications have been received for the second, in which businesses can go through the NSC to access technologies that research institutions have already developed.

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2. New scientific findings could lead to fire ant control: researcher

(Taiwan Today, 19 02 2013)

An international study in which Taiwan participated has identified a chromosome that determines the social behaviors of an invasive species of fire ants, which could help find genetic solutions to controlling the pest. The observable characteristics and behavioral interactions between queens and workers in colonies of the solenopsis invicta fire ant species are regulated by 600 genes, said John Wang, an assistant research fellow from Academia Sinica's Biodiversity Research Center. These genes are locked in a non-recombining "supergene" that has two variants similar in some ways to the human X and Y sex chromosomes, he said. The "social chromosome" variants result in differences in many characteristics of queen and worker ants in different colonies, Wang said. This may explain why some fire ant colonies shelter only one queen while others shelter many, he added. For example, queens from different types of social colonies have different scents, and workers in multiple-queen colonies use the scent to accept daughter queens only from multiple-queen colonies, he said. Future studies may focus on genetic methods to change the scents of the queens so as to confuse the workers and mislead them into killing their queens, which would lead to the demise of their colonies, he said. The solenopsis invicta fire ant is an invasive pest in many parts of the world. An estimated US\$5 billion is spent every year on efforts to control the species. The species was first documented in Taiwan in 2003 and is found in large populations in Greater Taipei, Taoyuan, Chiayi, Miaoli and Hsinchu counties. Efforts to contain or eradicate the fire ant species have been hampered by the difficulty in finding all the colonies in a given location and the high reproductive rate of fire ant colonies. The latest study on the species was published Jan. 17 in the scientific journal Nature.

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3. The NSC's four-year science and technology development plan addresses Taiwan's needs going forward

(Taiwan Today, 23 02 2013)



行政院國家科學委員會
National Science Council

The National Science Council passed a four-year science and technology blueprint on 22 February 2013, outlining goals and guidelines for boosting the country's competitiveness in this regard. "The 2013-2016 National Science and Technology Development Plan is expected to assist in keeping Taiwan ahead of the curve going forward," an NSC official said.

Containing seven goals, which are upgrading academic research, protecting intellectual property rights, promoting sustainable development, strengthening research and industry cooperation, encouraging integrated science projects, boosting scientific and technological innovation, and tackling sector brain drain, the proposal was drafted based on conclusions of the 9th National Science and Technology Conference 17-18 December 2012. It also took into consideration the opinions of Academia Sinica, the scientific and technological research sector, the industrial sector and relevant social organizations. After review and approval by the Cabinet, the blueprint will be implemented by related government agencies, the official said.

Separately, the NSC found that its 2009-2013 National Science Technology Program—Energy project has delivered fruitful results in increasing energy independence, reducing greenhouse gas emissions, promoting energy-use efficiency and structural change, as well as creating energy technology research plans. The NSC said the program has achieved great success especially in energy conservation technologies such as high-efficiency yellow organic light-emitting diodes, variable frequency drive centrifugal chillers, smart electric grids and offshore wind farm development. A total of 10,560 papers, 9,253 doctoral students, 1,007 patents and 1,069 cases of technology transformation were funded under the NT\$25 billion (US\$840 million) program, which also generated NT\$37.26 billion in direct and indirect investment from the private sector.

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4. Sargassum horneri a worthy algae, says local professor

(The Liberty Times, 23 02 2013)

Although a large quantity of *Sargassum horneri* was incinerated by environmental protection authorities in 2012 after they wreaked havoc in the northern coast, the algae that is hated by fishermen is regarded as a multi-purposed treasure by Professor Chen Yean-chang at the National Taiwan Ocean University (NTOU) for its edibility, its being able to be made to be health products, and its being able to generate alcohol fuel. Chen says that the Japanese have drunk juice of the algae to protect the stomach, adding that a Japanese professor at Kyushu University told his audiences at the NTOU that fucoidan extracted from *Sargassum horneri* has been tested for its cancer-resistant nature in a human subject research. He further elaborated that over 210 varieties of algae have economic value, and they have been applied to many fields, including food, feed, food processing, bio-medical, special chemical products, etc., in the past few decades. Chen says that according to his experience in reproducing *Sargassum horneri*, a ton of the algae can grow to 30 tons in three months. Suppose 300,000 tons of it can be dried up to 30,000 tons, and then be turned to produce 6,000 tons of alcohol fuel, the turnover of the energy is NT\$480 million, as it can be sold for NT\$80,000 per ton. President Chang Ching-fong of NTOU says that they have established the Taiwan Algae Research Center under the auspices of the Ministry of Economic Affairs and the National Science Council to lead the country in studying developing the algae industry for Taiwan.

<http://www.taiwanheadlines.gov.tw/ct.asp?xItem=299431&CtNode=9>

5. Taiwanese researchers establish evolutionary tree of ginkgo

(Central News Agency, 27 02 2013)

A biology researcher at Academia Sinica, Taiwan's top research institute, discovered that ginkgo, a Chinese herb, and cycads, an ancient group of seed plants, evolved from sister groups, after spending nearly 16 years studying the herb's evolutionary path. Chaw Shu-miaw, lead researcher and a distinguished research fellow at the Biodiversity Research Center of the Academia Sinica, said it is widely known that ginkgo has existed on Earth for at least 270 million years. Yet the evolutionary relationship between ginkgo and other seed plants has long been controversial and highly debated, she noted. Ginkgo is known as a living fossil because it survived the Quaternary glacial period 1.6 million years ago, while most plants did not. The plant grows in China. The research results, which established the relationship between ginkgo and cycads, helped put to rest the highly debated issue and proved a hypothesis that Chaw proposed 16 years ago. The research was published in the Jan. 12 issue of the *Genome Biology and Evolution* journal.



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