Editorial & Letters

EDITORIAL

The Challenges Facing ASEAN Science

Science and technology (S&T) are necessary but insufficient factors in achieving social transformation and development. For Southeast Asia, a region in crisis, the development tasks are formidable. There are solutions, but they require a concerted regional effort. One important vehicle for achieving such changes is the Association of Southeast Asian Nations (ASEAN), founded in 1967 to promote regional collaboration. Over the years, ASEAN also has provided a valuable framework for joint activities in S&T.

One challenge that demands the Association's close attention is the region's environmental condition. The 1991 eruption of Mount Pinatubo in the Philippines, last summer's forest fires in East Kalimantan and Sumatra, and the continuing denudation of forest covers throughout Southeast Asia are concerns whose climatic impacts transcend national boundaries. In such cases, ASEAN member countries have freely shared scientific and technical information, allowing for a range of practical solutions for the region and the world.

Member nations have recognized the need to leverage S&T expertise and resources to support economic development imperatives. As a result, our policies and programs are aimed at creating a business environment that fosters investments in advanced technologies and rewards innovation and risk. The rapid growth in new and traditional linkages between industry, government, and academe is the basis of an emerging model for economic development. Subsequent economic growth depends not simply on a new cycle of innovation, but on a new structure for innovation that ties basic and applied research even more closely together.

While S&T cannot be decoupled from its commercial applications, any policy designed to spur commercial innovation must go beyond S&T and include guidelines on competition, regulation, and other related areas. Without delay, the ASEAN science community must address the review and amendment of outdated procedures on intellectual property rights, copyright, and technology transfer laws. Our emphasis should be on speeding the rate of innovation rather than slowing diffusion.

At the same time, the peoples of ASEAN are its most important resource in economic growth and development. Hence, all productive sectors in ASEAN must work together to raise the quality of their work force through training, higher technical education, and research. Labor attitudes must be improved through a shift in emphasis from job creation to labor efficiency. The ensuing reorientation toward greater productivity requires a radical shift in society's focus away from material acquisition and conspicuous consumption and toward a heightened emphasis on self-reliance and quality.

In our rush toward modernization, hectares upon hectares of precious croplands have been cleared to allow construction of roads, factories, and buildings. As a result, the "rice bowl" countries in Southeast Asia were forced to import due to steadily plummeting yields. This makes a significant increase in productivity of the region's remaining farmlands all the more urgent if we hope to stave off food shortage, malnutrition, and starvation. The pressure is on ASEAN scientists to make full and efficient use of the region's land and natural resources through sustainable agricultural practices and environmental conservation.

In defining its vision for the future, ASEAN is guided by the strong need to develop an innovative, technology-driven, and information-intensive economy in Southeast Asia. Although industry must play the central role in inducing and sustaining economic growth and job creation, many other players must contribute to the drive to encourage and sustain innovation. In today's technology-driven global economy, ASEAN scientists are now thrust into the limelight and must assume leadership in critical aspects.

The science we generate and the technology we build should provide a strong foundation that can withstand the shocks caused by globalization. To gird our societies against the storm of financial uncertainty in Asia, we must constantly reengineer our science and technology agencies into more aggressive, entrepreneurial organizations. No effort must be spared in convincing our leaders that innovation—grounded upon our firm grasp of S&T—will help to create jobs, preserve the environment, and enhance the quality of life in Southeast Asia.

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The author is Secretary of the Department of Science and Technology, Republic of the Philippines. The editorial is adapted from a talk delivered at an ASEAN seminar held 8 to 10 December at the Malaysian National Academy of Sciences, Kuala Lumpur.

LETTERS

The scientific "world"

Even deep-ocean vent tubeworms need sunlight, a reader points out. How to conduct AIDS vaccine trials ethically in "resource-poor" countries (right, expectant mothers in Uganda) is discussed by researchers and public health officials from the United States, Thailand, and Uganda. French cancer researchers express their concern about the freedom of young medical investigators to develop their "personal ideas." And a conclusion of a study of memory duration in zebra finches is deemed "premature."

Sunlight and the Deep Ocean

Those deep-ocean vent tubeworms (Random Samples, 30 Jan., p. 663) are indeed most remarkable, but to say that "they don't need sunlight" is a little like saying tapeworms don't need sunlight. The tubeworms do need oxygen, which is there courtesy of sunlight and chlorophyll at the ocean's surface and elsewhere on the surface of the Earth.

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Lost Potential in France?

Michael Balter's recent article about French AIDS research (News & Comment, 16 Jan., p. 312) describes a feudal system with barons, czars, big bosses, and 35-year-old scientists considered as only young wolves. Unfortunately, this is not restricted to the AIDS research field, but is a general phenomenon in science and medicine in France. Thirty-five-year-old medical investigators have the same problems obtaining some independence from their chiefs, called "mandarins" by some. The choice is often between going into private practice or staying in a university position for years without any possibility of developing one's personal ideas. The potential of young French clinical investigators is thus often lost.

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Wheat Domestication: Archaeobotanical Evidence

Genetic evidence of Manfred Heun *et al.* (Reports, 14 Nov, p. 1312) for einkorn wheat domestication in southeast Turkey has been countered by Martin K. Jones *et al.* (Letters, 16 Jan., p. 302). Jones *et al.* cite evidence that agriculture began earlier in the southern Levant and that einkorn was one of the original domesticates there. Recent archaeobotanical work does not support the picture presented by Jones *et al.*

Archaeological plant remains from four pre-pottery Neolithic A (*1*) sites are said by Jones *et al.* to indicate domestication of einkorn, emmer, and barley in the southern Levant at about 8000 to 7700 years B.C. (radiocarbon-dated). Einkorn is absent from all four sites and from the earlier site of Ohalo II (17,000 B.C.) in the same region (*2*). There is no evidence for domesticated plants in the PPNA levels of Jericho, Netiv Hagdud, and Gilgal (*3*). The earliest level (IA) of Aswad (7800 to 7600 B.C.) contains emmer and barley that may be domesticated (*4*). Domesticated einkorn does not appear in the region until the PPNB, at Jericho (7300 B.C.) and level II at Aswad (6900 B.C.).

In contrast, both wild and domesticated einkorn and emmer are present at early agricultural sites in the northern Fertile Crescent of southeast Turkey and northern Syria dating from 7700 to 7500 B.C. (*5*). Wild einkorn is also present in pre-agricultural levels of sites in this region, including Mureybit (8500 B.C.) (*6*), phase 1 of Abu Hureyra (9500 to 8000 B.C.) (*7*), Dja'de (9600 B.C.), and Jerf al Ahmar (9800 BC) (*8*). This fits well with the current-day distribution of wild einkorn, abundant in the northern Fertile Crescent, but virtually absent from the southern Levant (*9*). Study of seeds and charcoal from early Holocene sites in southwest Asia confirms that vegetation at this period was similar to current-day potential vegetation(*10*).

In view of the small number of excavated sites and the large error limits associated with Neolithic radiocarbon dates, current archaeobotanical evidence does not allow localization of agricultural origins to any one subregion within the fertile crescent. However, the genetic evidence for domestication of one crop, einkorn, in southeast Turkey agrees well with archaeobotanical evidence. Whether other crops were domesticated in the same part of the Fertile Crescent remains to be established.

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References and Notes

1. The earliest Neolithic of southwest Asia is divided into the PPNA (8300 to 7600 B.C.) and the PPNB (7600 to 6000 B.C.) periods.
2. M. E. Kislev, D. Nadel, I. Carmi, *Rev. Palaeobot. Palynol.* **73**, 161 (1992).
3. Plant remains from the PPNA levels at Jericho consist of fragmented grains of emmer and barley of undetermined wild or domesticated status, dating to about 7500 B.C. [M. Hopf, in *Jericho*, K. Kenyon and T. A. Holland, Eds. (British School of Archaeology in Jerusalem, London, 1983), vol. 5, pp. 576–621]. The only cereal remains at Netiv Hagdud (7700 to 7400 B.C.) are of wild barley [M. E. Kislev, in *An Early Neolithic Village in the Jordan Valley*, O. Bar-Yosef and A. Gopher, Eds. (Peabody Museum of Archaeology and Ethnology, Harvard Univ., Cambridge, MA, 1997), pp. 209–236]. Plant remains from the nearby site of Gilgal are unpublished and therefore of uncertain status.
4. W. van Zeist and J. A. H. Bakker-Heeres, *Palaeohistoria* **24**, 165 (1982).
5. Domesticated einkorn, emmer, and barley are reported from Cafer Höyük at 7500 BC [D. de Moulins, *Cah. Euphrate* **7**, 191 (1993)] and from Abu Hureyra at 7700 B.C. (phase 2A) [D. de Moulins, *Agricultural Changes at Euphrates and Steppe Sites in the Mid-8th to the 6th Millennium B.C.* (Britsh Archaeological Reports, Int. Ser. 683, Oxford, 1997)].
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7. G. C. Hillman, S. M. Colledge, D. R. Harris, in *Foraging and Farming: The Evolution of Plant Exploitation*, D. R. Harris and G. C. Hillman, Eds. (Unwin Hyman, London, 1989), pp. 240–268.
8. G. Willcox, *Veg. Hist. Archaeobot.* **5**, 143 (1996).
9. D. Zohary and M. Hopf, *Domestication of Plants in the Old World* (Clarendon, Oxford, 1993).
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HIV Vaccine Trials

Barry R. Bloom (*Science*'s Compass, 9 Jan., p. 186) provides an insightful analysis of ethical issues in human immunodeficiency virus (HIV) vaccine trials. The implicit ethical imperative to provide the "best proven preventive" methods to trial participants, however, should include social and behavioral interventions to reduce HIV risk behavior, a topic not covered in Bloom's discussion. The 1997 National Institutes of Health (NIH) Consensus Development Conference on "Interventions to Prevent HIV Risk Behavior" (*1*) can be used as a summary of current "best proven preventive" methods.