The developing world needs basic research too

The establishment of an agency in Indonesia that will support 'frontier research' is a welcome development, argues **Dyna Rochmyaningsih**.

What use is basic science to the developing world? Why would a nation that cannot feed all its people try to send a spacecraft to Mars? Instead, scientific research in poorer nations is expected to focus on applied problems. Surrounded by poor prospects and infrastructure, institutions in these countries support fast-producing research that can provide direct results to the economy.

Much foreign investment goes the same way. For developing countries to work on pure science is often viewed from outside as indulgent and wasteful. Witness the argument that took place in the United Kingdom last year over India — a recipient of British aid — developing its own space programme.

Applied research certainly has its place, in developing as well as developed countries. Science as a tool to make money and secure a food supply is key to survival. It can target local issues: a notable success is the process developed by Brazil to turn (locally abundant) sugar cane into ethanol as a biofuel resource. In southeast Asia, the science of cassava pests and diseases is a priority, because millions of people here rely on cassava as a staple food and a source of income.

But we should not forget that there is more to life than accumulating resources. Many other factors threaten human existence — from mutating viruses to moving tectonic plates. In the Southern Hemisphere, where most developing countries are located, natural disasters and emerging diseases haunt the lives of billions of people. The Ebola epidemic and the Zika virus, the Ecuador earthquake and the Aceh tsunami are just a few recent examples. And to understand them, we do not just need science that has an economic value. We need science that questions why the world is the way it is.

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Of course, some in the developing world already study pure science problems. In Indonesia, some researchers are analysing the genetics of Indonesian people and their susceptibility to certain diseases — work that also offers insights into human origins. Others are studying the ecology and evolution of non-human primates. But these efforts are dwarfed by the many government-funded projects on applied topics such as agriculture, pharmacy and animal husbandry.

Besides the fact that it has less economic value, basic science is not encouraged in developing countries because it is expensive. Almost all such countries allocate less than 1% of gross domestic product to scientific research. In 2016, the grant from Indonesia's Ministry of Research and Technology for a research project rarely exceeded US$100,000 — not enough to buy cutting-edge laboratory equipment. We see a similar picture in other developing countries, including many in Africa.

Things are starting to change. Earlier this year, President Joko Widodo of Indonesia signed into existence the Indonesian Science Foundation (ISF), an independent funding body for science. The establishment of the ISF is a monumental event. For the first time, Indonesian scientists will have a funding source apart from the national budget (of which the proportion going to science is a very low 0.08%). And, also for the first time, they will get multi-year research grants. The amount will be increased, up to $300,000 per successful research proposal. As a start, the Ministry of Finance has committed to provide $9 million in 2016 for research on life sciences, health and nutrition.

And the most interesting part is that the new funding agency will not support applied science. Instead it will pay for 'frontier research' on the Universe, Earth, climate, the life sciences, health, nutrition, materials and computational science.

The new programme might encourage the best Indonesian scientists scattered across the developed world to come back. It should encourage those in Indonesia to do better science. It will certainly grow scientific excellence in the country. Unlike applied science, the goal is not to use research as a tool, but for it to become a valuable and self-sustaining pursuit in its own right. The ISF is intended to create a system in which scientists can work independently, without the need for international support, to assess the scientific questions of their own land and to contribute to the universal quest for knowledge. It offers an opportunity for our scientists to stand on their own feet.

The importance of basic science in poorer countries is recognized beyond Indonesia. Earlier this year, at a meeting to promote scientific talent in Africa, Mary Teuw Niane, minister of higher education and research in Senegal, spoke of the need for basic science in his and other developing nations.

The African Academy of Science is working with funders including the Wellcome Trust and the Bill & Melinda Gates Foundation to boost basic research in health care. Last month, some £21 million ($31 million) was awarded to scientists from Côte d'Ivoire, Kenya, Senegal and Uganda who are conducting research on emerging infectious diseases, neonatal and population health, and the elimination of malaria.

It is too early to make predictions, but perhaps we can be optimistic that a new focus on basic research will produce a lasting change in science in the global South. Basic science may not give us an instant result but it will give us a deeper understanding about the world that changes all the time. And it will generate knowledge, which as policymakers from across the world insist, is at the heart of the modern economy. ■

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