

## The 'evergreen revolution'

An Indian scientist is making a strong case for a technological approach to world poverty, writes **Dick Ahlstrom**

The gulf that exists between rich and poor nations is largely driven by technology. The goal for scientists must be to help bridge this economic divide by helping to apply technology and knowledge in the developing world. So argues Prof Monkombu Sambasivan Swaminathan, a research scientist from India and advocate for the use of technology to improve the lot of poorer nations.

"You can't refuse a poor person access to technology just because they are poor," he says. "Modern science is really beautiful. The challenge is, how do we ensure science shines for everyone?"

Prof Swaminathan was in Dublin recently to attend a World Food Programme meeting. He is a powerful advocate for the developing world as UNESCO-Cousteau professor in ecotechnology. He was director general of the International Rice Research Institute in the Philippines and is also chairman of a research foundation he founded, dedicated to the advancement food research as a way to alleviate hunger.

Born in 1925 in Tamil Nadu and a graduate of Cambridge, Prof Swaminathan has an extensive CV listing memberships of learned societies, honorary positions and international awards. He is also a scientist with a remarkable research record and is widely accepted as the godfather of the "Green Revolution" - an effort to increase food production while protecting the environment.

In fact, the term revolutionary is one of the best ways to describe this quiet and self-effacing gentleman who has done so much in his native India and elsewhere to improve the lot of the world's hungry. He led India's "wheat revolution" in the 1960s that saved his country from food dependency.

He and his foundation now lead a so-called "evergreen revolution", an attempt to boost crop yields year on year using new technologies. He is also directly involved in a "knowledge revolution" in India, bringing Internet and computer technology into each of India's 600,000 villages.

"Some people say that high tech is not for the poor. This is wrong," says Prof Swaminathan. "We want to bring the best ecotechnology to people." He

describes ecotechnology as advances that create employment, assure equity of access to resources and promote energy efficiency.

"We must ensure economic viability and ecological sustainability. These should be the two pillars of our approach," he says. "My centre's mandate is to be pro nature, pro poor and pro women for the dissemination of technology and knowledge. We must be woman-friendly because there is an increased feminisation of poverty and agriculture."

As a young researcher in the late 1940s and early 1950s while in Britain and the Netherlands, most of his work was on potatoes and his knowledge of the potato famines in Ireland reinforced a view he holds today. "The more you are dependent on a single crop for your food security, the greater the potential for problems."

He returned to India in 1954 to work on rice and wheat. "In those days we didn't have genetic techniques," so new varieties came about only through intensive cross-breeding.

"In India we have grown crops for thousands of years. Archaeological evidence goes back at least 5,000 or 6,000 years. Our soils over a long period of time have got exhausted. We say they are both hungry and thirsty," says Prof Swaminathan.

He cross-bred wheat varieties popular in India because of their "soft gluten" content favoured in the production of Indian flat breads such as chapatti, with a dwarfing wheat variety that produced short stout stems that could hold higher yields.

At the time, most Western governments were ready to "write off" India in terms of food production, says Prof Swaminathan, but his new wheat was a great success. "It became a wheat revolution, not evolution," he says. Production went from 10 million tonnes to 18 million tonnes in just two years. It currently stands at 80 million tonnes.

Research around the world that led to yield increases prompted US scientist William Gaud to refer to the "Green Revolution", but by the late 1960s Prof Swaminathan was calling for an evergreen revolution. "This was based on increased productivity in perpetuity without ecological harm," he says.

"We have to produce more from less, less land, less pesticides, less water. It must be an evergreen revolution to get sustainable agriculture."

He started working on three main areas in support of this revolution, better disease resistance in crops, better soil health and fertility without having to

resort to chemical fertilisers and the use of biological controls to reduce damage caused by pests.

"Farmers used to say farming is a gamble in the monsoon, but now they say it is a gamble in the market," he says. "In the industrial countries they have three advantages: technology, capital and subsidies. We don't have these three."

His answer is to pursue a knowledge revolution by getting information out to the people where it can be combined with local understanding to produce valuable knowledge. He cites as an example how coastal fishermen using small traditional fishing craft are now using wave data from US naval satellites, geopositioning satellite data and fish shoal data from Indian satellites to improve their catch rate.

"Modern information and communications technology (ICT) is a very powerful tool," he says. For this reason, his foundation is deeply involved in the Indian government's "Mission 2007" programme, a scheme to get ICT spread right across India to mark its 60th year of independence on August 15th, 2007.

"We have developed a strategy to take the benefits of ICT to the 600,000 villages in India," he says. "It has become a national alliance involving 45 partners," including the state, NGOs and companies such as IBM and Microsoft.

Part of the programme involves designating "virtual academicians" in the National Virtual Academy for Food Security and Rural Prosperity, he says. "The fellows of the academy are grassroots women and men. They are extraordinarily effective at absorbing information and disseminating it to their neighbours."

Phone, computer and Internet facilities are being made available in every village, which can be used to draw down information about health, and market information for farmers. "This makes generic information into local specific information," he says. "I am substituting knowledge for chemicals and capital. It is a knowledge revolution."

His foundation is also developing a "biovillage" approach to helping farmers to identify new crops. "The biovillages use biological software for sustainable agriculture. At the moment we have no biotechnology crops in these villages. The idea is to use other biological approaches, for example bio fertilizers and bio pesticides," he says.

"We have put up genetic gardens for some of them. You grow a number of varieties of annual plants and trees to see which they might like. It is like a cafeteria approach."

Meanwhile, his foundation is pursuing an "anticipatory research agenda" based on the assumption that climate change will in turn produce sea level rise and pose a disproportionate threat to developing countries. His foundation is working on crops tolerant to salty water and drought.

Salt tolerance genes from the mangrove tree are being spliced into rice, mustard, lentils and other pulses, oil seed and cereals as a way to protect food security in the face of climate change.

"These are very powerful tools for achieving the evergreen revolution. How do you achieve increased productivity in perpetuity given climate change?" Prof Swaminathan asks.

"Technology is neutral to people. It depends whether the technology is relevant," he says. "If you really want to have technology for the poor it has to be done on the basis of public-good research. Social inclusiveness is important if you want to reduce the rich-poor divide."

\*

*More information about Prof M.S. Swaminathan's foundation is available at: [www.mssrf.org](http://www.mssrf.org)*

Dick Ahlstrom, Science Editor

© The Irish Times

24/06/04