

key to world

to improving nutrition and becoming more resilient and ensuring better livelihoods, particularly for smallholder farmers," he said.

The capacity for farmers to grow crops with higher nutritional value is being delivered through biofortified crops – a scientific method to improve the nutritional value of varieties to address hidden hunger.

What does this mean for Australian farmers out in the paddock? The answer lies in whether these micronutrient-enhanced crops can deliver a marketing edge for farmers in Australia.

Conventional breeding is delivering to developing countries rice and wheat varieties with high levels of zinc; beans and pearl millet high in iron; and maize, cassava and sweet potatoes high in vitamin A.

However, like any conventionally bred variety, these take time to develop – up to seven years – and the red tape involved with using genetically modified technology has not been viewed by Dr Bouis as worth the hassle.

At present, researchers are breeding varieties for highest yield, not for nutritional content. Dr Frison says 98 per cent of research into genetically modified crops has been for insecticide and herbicide resistance.

In Australia, GM technology is being used to produce bananas high in vitamin A and iron for export to developing countries. Research is also under way by the University of Melbourne on producing high-iron rice.

CIMMYT Irrigate Bread Wheat Improvement head Ravi Singh says biofortified crops will need to come with other agronomic traits to be of benefit.

"Once we get the germplasm with higher zinc and iron varieties, it should be assessed for Australian soils," he said.

"Whether someone will pay for it is the other issue for Australians. There is no current incentive for farmers to grow high zinc or iron wheat.

"The group of consumers that Australians are targeting do not have nutrient problems."

At present, farmers are growing what is most profitable,



■ HarvestPlus director Howarth Bouis (right) credits the strength of Australian research with getting the organisation up and running.

Australia's big role in ag research

IF IT WAS NOT FOR Australia's world leading capacity in agricultural research, HarvestPlus – an organisation that seeks to breed crops for better nutrition in developing nations – may never have become reality.

This is according to HarvestPlus director Howarth Bouis, based in Washington DC, United States, who spent 10 years trying to get support from research institutions to investigate ways of getting more micronutrients into staple crops of wheat, rice and maize.

The goal of HarvestPlus was for people deficient in micronutrients, mostly in poor countries, to have access to high yielding varieties that, at the same time, could improve nutrition.

Dr Bouis says every research institute he approached was convinced there was a trade-off between nutritional quality and yield or – in short – his goal could not be achieved.

He says he had nearly given up when he encountered University of Adelaide researcher Robin Graham, who was researching ways to get more zinc into seeds to boost yields. He was certain a yield/nutrient trade-off did not exist.

"If I hadn't met Robin Graham, we wouldn't be here today," he said.

which is not necessarily the food that people need wide access to for adequate health and nutrition.

The key to changing this is government policy, according to IFPRI director general Shenggen Fan.

He says producers need incentives to change through governments offering taxes and subsidies to encourage them to grow the food needed by nine billion

people, and to make it as profitable as growing other non-food crops, such as cotton.

But IFPRI believes by incorporating nutrition as a goal, researchers and breeders could provide farmers with a wide range of healthier products.

"Increasing crop productivity is not enough ... agricultural growth (must also) lead to improved nutrition and health," he said.

This connection has led to the development of micronutrient-enhanced staple foods, using conventional breeding techniques.

The program is in its eighth year of 15, operating on \$25 million in funding a year. It has released a sweet potato variety high in vitamin A for Mozambique and Uganda, with the additional agronomic traits of virus resistance and drought tolerance.

Dr Bouis says it is hard to breed high-iron rice with conventional techniques so it is commissioning laboratory work to develop these varieties through the University of Melbourne.

Australia also supports HarvestPlus by helping with analytical assessment of new varieties. Flinders University's James Stangoulis, Adelaide, ensures laboratories have the correct equipment and provides support to developing country scientists.

• Biofortification is a scientific method for improving the nutritional value of foods. It focuses on providing better varieties of crops already consumed, usually by poor people in malnourished communities and can use conventional or genetic modification breeding techniques. When consumed regularly, biofortified foods can contribute to body stores of micronutrients to reduce deficiencies.

"We need to consider if we can make ministers of agriculture accountable for the health and nutrition outcomes of agriculture. We also need community organisation to integrate health and nutrition into their programs."

■ Deanna Lush is in India as a guest of the Crawford Fund, looking at Australia's role in international agricultural research.

Around the globe

Food price spike

AN increase in global food prices last week has sparked speculation on whether another food crisis, similar to that of 2007-08, is on the horizon.

International Food Policy Research Institute research fellow Derek Headey, a former Australian based in Ethiopia, says the spike has been caused by five factors, which would determine the extent of future food price rises.

A very weak United States dollar was making imports of US crops very cheap; demand for coarse grains for biofuels was increasing; and drought and export restrictions, such as wheat from Russia last year, tightened supply. High oil prices, though not as high as the \$140/barrel peaks in 2008, were increasing the costs of inputs and rising inflation in China and India, which was causing an overheating of their economies.

He says the "lack of good news" on these factors was fuelling speculation.

Farming answer

THE world's solution to nutrition problems lies in agriculture and today's farmers, UNESCO's M S Swaminathan says.

Mr Swaminathan, a hero of the Indian green revolution where farmers achieved huge crop production gains through better use of water, says the answer is better coordination of agriculture, health and nutrition – which previously, governments had not done well.

He says for India, this means optimising the value of production from a unit of land for its 120 million farming families farming 0.4-10 hectares.

"While GM technology has opened up new combinations that were not available before, the new technology is good and bad, you can use and abuse it. Technology is very powerful and when you interfere with life it is important to have strong regulatory parameters. For this reason, India is establishing a national biotechnology regulator."

GM reality

GENETIC modification technology will be a worldwide reality within 10 years, says Dyno Keatinge, director general of the Taiwan-based World Vegetable Center.

"If you are sensible with the modification being proposed, then there is nothing to worry about," he said.

Dr Keatinge supports use of genetic modification technology, particularly for use in lifting genes from wild relatives into cultivated varieties. He said the present problem was that many GM varieties that had been released were hardly worth the effort.

His example of a GM variety worthy of release was Bt eggplant.

He said Indian farmers sprayed conventional eggplant varieties up to 50 times but Bt eggplant, which had been developed but was awaiting release, could reduce spraying to only twice.



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