Research



Farmers in Limpopo, South Africa, are taking part in an ACIAR project to develop higherquality branded beef products based on indigenous Nguni cattle. Here, they catch up with ACIAR's Dr Simon Hearn and Mr Ephraim Matjuda (centre) from South Africa's Agricultural Research Council, which is working with Australian researchers on the project. Percy Maddivibandia/SAARC

Redefining our agricultural future

Global agricultural practices must change if we are to reduce hunger, poverty and environmental degradation, say a set of comprehensive international reports released by the International Assessment of Agricultural Science and Technology for Development¹ (IAASTD) in April.

According to the reports, while modern agricultural practices have been incredibly successful in boosting many staple food crop yields, the benefits have not been shared evenly and have come at a cost – most notably, land degradation.

In some developing countries, particularly South Asia and sub-Saharan Africa, complete implementation of the modern agricultural 'package' was not feasible, given socio-economic and policy constraints, leaving farmers trapped in a spiral of poverty and hunger (see box). Such countries now face further demands on their food-production capabilities wrought by, for example, loss of environmental services, rising food and oil prices, demand for biofuels, population growth, trade regulations and climate change. Through the IAASTD, a multidisciplinary and 'geographically and gender-balanced' group of more than 400 experts from governments and international, private sector and civil

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society organisations has concluded that 'business as usual' farming practices are no longer an option.

Over four years the group assessed the role and impacts of agricultural knowledge, science and technology in reducing hunger, malnutrition and poverty. The authors produced a global assessment report and five regional reports. These reports present a new paradigm for agriculture that represents an evolution of the concept of agriculture – focusing only on food production – to one that also enhances rural livelihoods while ensuring environmentally, socially and economically sustainable development.

The authors did not make specific recommendations, but rather broad-ranging 'options for action'.

Professor Roger Leakey, Australia's coordinating lead author of the global report, says the key actions identified in the global and regional reports can be summarised as:

- re-direction of agricultural science and technology – moving away from processes that have profited primarily large-scale enterprises, to processes that address the basic needs of the world's 900 million small farmers and lessen environmental impacts;
- innovation initiatives that allow local communities to set the agenda alongside scientists and policy-makers;
- investment in rural infrastructure, local governance and education.

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However, the IAASTD authors' conclusions - particularly on aspects of trade and genetically modified crops were not universally agreed upon. Dr Simon Hearn, Senior Adviser at the Australian Centre for International Agricultural Research (ACIAR) and a member of the coordinating IAASTD Bureau,² says that while Australia agreed the reports were useful and comprehensive, some of the views expressed were not consistent with the Australian experience or knowledge, and the broadranging policy options were sometimes contradictory and lacked sufficient evidence-based analysis.

'Given the number of authors and countries the work was trying to capture, it is not surprising that there were inconsistencies in the messages. For example, on the theme of trade liberalisation, there were conflicting discussions about how it was beneficial

¹ http://www.agassessment.org/

² The IAASTD has a governance structure similar to the Intergovernmental Panel on Climate Change (IPCC), but containing a Bureau similar to the Millennium Ecosystem Assessment. The Bureau comprises representatives from 30 government and 30 non-government organisations from around the world who help elect and coordinate the work of the 400 authors of the IAASTD report.

Releasing farmers from poverty

The Green Revolution of the 1960s and '70s, which saw the spread of modern agricultural technologies such as fertilisers, pesticides and seed technology around the world, delivered the promised boost in crop yields in many countries, but not all. In sub-Saharan Africa, for example, loss of soil fertility has resulted in maize yields as low as half to one tonne per hectare, compared to the potential yield of 10 t/ha.

Professor Roger Leakey, former Director of James Cook University's Agroforestry and Novel Crops Unit, says poor farmers are unable to buy the fertiliser

3 http://www.aciar.gov.au/project/FST/2002/010

required to reap the benefits of the Green Revolution. As a result, they are barely able to feed their families and become trapped in poverty.

'To redress this situation, improved short-term fallows using nitrogen-fixing trees and shrubs can raise maize yields to about 4 t/ha,' Professor Leakey says.

'This then frees up some land for the reintroduction into the farming system of the traditional fruit and nut trees that people used to harvest before the forests were cleared.

These trees are being domesticated as new crops. They have a high nutritional value, existing markets, and

are well understood by the local people."

Money derived from the sale of the tree products can then be used to buy fertiliser, which will further increase maize yields and free up more land, offering farmers a way out of poverty and hunger.

James Cook University is engaged in similar initiatives, such as the domestication of the indigenous Galip Nut in the Solomon Islands and Papua New Guinea,³ with ACIAR funding.

Professor Leakey says these sorts of locally tailored initiatives form the backbone of the IAASTD's new concept of agriculture.

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for developing countries and how these countries needed tariffs,' says Dr Hearn.

Australia, Canada and the US did not fully approve the reports in their entirety - given the diverse observations and views - and recorded their separate 'reservations' in an Annex. Despite these reservations, Dr Hearn says the reports contained timely and useful information that highlighted issues that all countries could address in progressing future priorities, the scope of science and technology, and suitable partnerships and investments for alleviating hunger and poverty.

'Australia will have a role in assisting other countries to address these issues through collaborative agricultural research, extension and training, given that many developing countries experience similar agricultural production and environmental challenges as Australia,' he says. Wendy Pyper

More information:

Kiers ET, Leakey RRB, Izac A et al. (2008) Agriculture at a crossroads. Science 320, 320 - 21

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