

# Learning Agrobiodiversity

## The importance of agricultural biodiversity and the role of universities

Per Rudebjer, Boudy Van Schagen, Margarita Baena, Henry Kamau and Leocadio Sebastian

**Agrobiodiversity – the biological diversity of agricultural systems – is an important area of science and policy, yet it rarely features in university curricula. We discuss the need to build human and institutional capacity in the subject.**

### What is agrobiodiversity and why is it important?

Agrobiodiversity includes all the components of biological diversity relevant to food and agriculture, including agricultural ecosystems. It has an essential role in sustainable development:

- For providing food, fibre, fuel, fodder, medicines and other products for subsistence or sale
- For sustaining ecosystem services such as watershed functions, nutrient cycling, soil health and pollination
- For supplying raw genetic material for breeding new varieties of plants and animals

### Agricultural biodiversity is in rapid decline – why?

New plant and animal varieties and high-input agriculture systems have dramatically increased food output but they have also had an alarming impact on many traditional varieties of crops and animals.

Changes in land use, land degradation, deforestation and habitat loss also have severe impacts on agrobiodiversity. Climate change is expected to speed the loss of agrobiodiversity.

The market plays an important role too, through changing food habits and globalization.

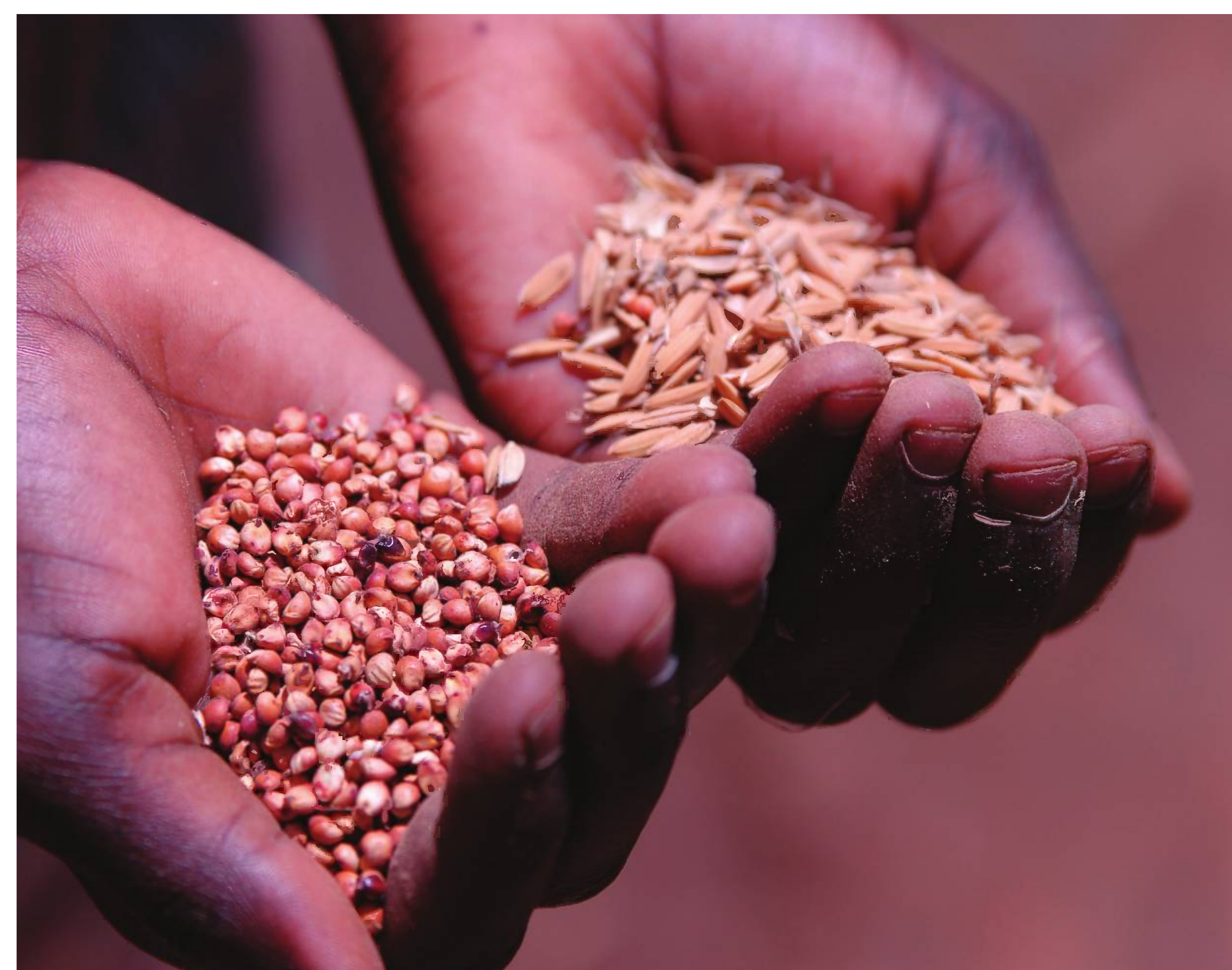
### How are universities responding?

Bioversity International recently reviewed the situation in academic institutions in Africa, Latin America and Asia-Pacific.

### Eastern and Southern Africa

Ten universities were surveyed in Kenya, Malawi, Uganda, Zambia and Zimbabwe in 2007. None offered agrobiodiversity as a full programme at any level.

The lack of agrobiodiversity programmes was mirrored in the absence of dedicated courses on agrobiodiversity. Yet some aspects of agrobiodiversity were included in other courses such



John Gyovai

as ethnobotany, biodiversity conservation and traditional vegetable production.

### Latin America

In 2006, surveys were conducted among 15 universities in seven countries – Chile, Colombia, Costa Rica, Bolivia, Brazil, Mexico, and Peru. As in Africa, none of the surveyed universities offered a dedicated course or programme on agrobiodiversity.

### Asia

Since 1997, Bioversity International has collaborated with universities in the Philippines, Sri Lanka, Malaysia and India to establish MSc programmes in plant genetic resources management. Nepal's Tribhuvan University is in the process of designing a postgraduate programme on agrobiodiversity management.

### What are the emerging gaps and challenges?

Drawing on the above lessons, and a 2009 workshop in Kenya, a global picture emerges regarding the teaching and learning of agrobiodiversity:

- Agrobiodiversity is rarely a stand-alone course or full programme. Partly this reflects a lack of career opportunities for graduates
- Many courses contain elements of agrobiodiversity, but may not cover the dynamic, multi-disciplinary dimensions of the subject
- The concept of agrobiodiversity is often not well understood among students or even educators, and there are few clear definitions
- There is a lack of integration of agrobiodiversity across sectors, or integration of indigenous knowledge with scientific knowledge
- Existing curriculum structures may hinder the absorption of a new discipline such as agrobiodiversity, and few subject-specific learning resources are available
- National and international policies on agrobiodiversity are still unclear

### Entry points for teaching agrobiodiversity

Integrating agrobiodiversity content into existing courses is likely to be the preferred option for most universities. Bioversity International has identified a number of entry points (see Box).

Similarly, the next curriculum review is an opportunity to introduce a new course on agrobiodiversity in a variety of educational programmes. Some universities may opt to introduce a full programme on agrobiodiversity.

A partnership for strengthening agrobiodiversity education in sub-Saharan Africa was recently formed between Bioversity International, the African Network on Agriculture, Agroforestry and Natural Resources Education (ANAFE), the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) and the Technical Centre for Agricultural and Rural Cooperation (CTA). A stakeholder workshop was convened in January 2009, and a task force was established to implement the action plan, including the development of a curriculum framework for agrobiodiversity.

A key information resource for both students and faculty is the Platform for Agrobiodiversity Research ([www.agrobiodiversityplatform.org](http://www.agrobiodiversityplatform.org)). PAR is an initiative for sharing knowledge, identifying research needs and stimulating research partnerships around agrobiodiversity.

### Entry points for teaching agrobiodiversity

Entry point	Example content
Adaptation to climate change	<ul style="list-style-type: none"> <li>• Matching crop varieties to new climates</li> <li>• Breeding for adaptation to climate variability and change</li> <li>• Farmer resilience and adaptability</li> </ul>
Agricultural economics	<ul style="list-style-type: none"> <li>• Value chains for neglected or underutilized species</li> <li>• Marketing of speciality foods</li> </ul>
Agricultural policy	<ul style="list-style-type: none"> <li>• The International Treaty on Plant Genetic Resources for Food and Agriculture</li> <li>• The Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture</li> <li>• The FAO "State of the World" reports on plant, animal and forest genetic resources</li> </ul>
Agronomy	<ul style="list-style-type: none"> <li>• Farmers' seed systems</li> <li>• The use of diversity to mitigate risk</li> </ul>
Crop science and plant breeding	<ul style="list-style-type: none"> <li>• Gene bank management</li> <li>• Participatory plant breeding</li> <li>• Pre-breeding</li> <li>• Wild relatives of crop species</li> </ul>
Ecosystems conservation	<ul style="list-style-type: none"> <li>• Pollination</li> <li>• Payment for environmental services</li> <li>• <i>In-situ</i> and on-farm conservation, eg, of cultivars or non-timber forest products</li> </ul>
Ethnobotany	<ul style="list-style-type: none"> <li>• Selection and management of wild plants</li> <li>• The cultural significance of crops and wild plants</li> <li>• Pharmacologically active plants</li> </ul>
Health and nutrition	<ul style="list-style-type: none"> <li>• Food diversity and food composition</li> <li>• Nutrition and traditional foods</li> <li>• Agrobiodiversity and traditional medicine</li> </ul>
Soil and water management	<ul style="list-style-type: none"> <li>• Resilience in agro-ecosystems</li> <li>• Microbial biodiversity</li> </ul>