

# International Centre for Underutilised Crops

■ Annual Report 2005-2006



# Introduction



Our remote ancestors were hunters and gatherers. From the vast diversity of the planet's resources, they came to know the plants that they could use as food and medicines, for shelter and tools, for manufacturing into goods that they could trade and exchange, and for many other uses.

Over the millennia they learned to domesticate the most valuable plants and relied less and less on gathering from the wild. But, in doing so, humans lost a great deal of knowledge about the uses to which the world's vast resources of fibres, leaves, fruits and seeds can be put.

Often, rural communities in developing countries are the sole custodians of remaining knowledge. They still gather and use resources from their environment – sometimes depending on them to survive. Tapping into the potential of these wild, or only partially domesticated underutilised 'crops', could make a huge difference to the rural poor.

The International Centre for Underutilised Crops (ICUC) was set up to do just this. As a non-profit, scientific research and training centre, ICUC promotes the use of underutilised crops for food, medicinal and industrial products, and also for

environmental protection. It does this by providing expertise and working collaboratively for tropical, sub-tropical and temperate crop development.

#### Our Mission

Our mission is to promote the use of underutilised crops for the benefit of humankind and the environment.

#### Our Goal

Reduced poverty and suffering through the improvement and promotion of underutilised crops for food, medicines, fodder and industrial needs, and for environmental protection.

#### Our Milestones

1987	International Conference on New Crops for Food and Industry, Southampton, UK
1989	International Centre for Underutilised Crops (ICUC) founded at Southampton University
1995	Underutilised Tropical Fruit Trees in Asia Network (UTFANET) founded
1998	ICUC secures funding for the Fruits for the Future Project, November 1998-September 2003, from Department for International Development, UK
1998	Southern and East Africa Network for Underutilised Crops (SEANUC) founded
1999	ICUC secures funding for the African Vegetables Project, 1999-2003, from the UK Lottery Fund
2001	ICUC is formally recognised as a 'partner institution' of the Consultative Group on International Agricultural Research
2003	Asian Centre for Underutilised Crops (ACUC) founded as a regional centre of ICUC
2003	ACUC secures funding for Phase II of the Fruits for the Future Project and the Processing and Marketing Project October 2003-March 2006
2004	ICUC secures funding for Manuals for Illiterate Farmers in Africa Project, March 2005-March 2006
June 2005	ICUC moves to Colombo, Sri Lanka, hosted by the International Water Management Institute
October 2005	New director of ICUC appointed
May 2006	First meeting of the ICUC Scientific Advisory Board

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# Message from the Chair of the Scientific Advisory Board



The International Centre for Underutilised Crops was launched in 1989 as a result of the realisation that the main

food crops, important as they are, have limits to their capacity to overcome hunger and malnutrition.

The agricultural research and development community recognised that underutilised crops—including less well-known agricultural and non-timber tree species – can play a major role in filling food baskets in areas inhospitable to conventional farming. Many of these marginal areas are home to the world's poorest people. Less well-known species are attracting mounting attention because of their value in alternative cropping systems, diversifying cropping systems, developing value-added products, protecting the environment and restoring degraded lands. This has been recognised by the inclusion of underutilised crops in the recently adopted system-wide priorities of the Consultative Group on International Agricultural Research (CGIAR).

For over 17 years, ICUC was based at the University of Southampton, UK. In 2005, the ICUC Headquarters moved to Colombo, marking the beginning of a new era for the Centre and the transition to a new role. Here, hosted by the International Water Management Institute, ICUC anticipates building greater synergies and reinforcing its links as a source of expertise and knowledge champion for underutilised species.

The global agricultural research and development community now works in an ever more collaborative mode, guided by the overarching Millennium Development Goals. The international agricultural research centres of the CGIAR, national agricultural research systems and other partners, align their priorities with these Goals. Each has its own comparative advantages and particular role to play. ICUC has a clear vision for its own role – to identify and champion underutilised species in contributing to these overall objectives.

In May 2006, ICUC's newly appointed Scientific Advisory Board met for the first time in Nairobi. The meeting, in conjunction with the Africa Regional Consultation for Strategies for Research and Development of Underutilised Species, provided exciting opportunities to interact with researchers, policymakers and other stakeholders. In the near future, links to industry will be strengthened with the appointment of a fifth member to the Scientific Advisory Board from the private sector.

On behalf of ICUC, I wish to pay tribute to ICUC's founding Director, Dr Nazmul Haq, and those who worked at and with the Centre in its previous location, Southampton University, UK. Their dedication and contributions laid the foundations for the role ICUC is now taking. In recognising the contributions of the ICUC, the Centre for Underutilised Crops (CUC), as it is now known, in Southampton, and its regional centre, the Asian Centre for Underutilised Crops (ACUC), it is important to remember that there is a lot more challenging work ahead in realising the potential of underutilised species for alleviating poverty and improving food security.

George Rothschild  
*Chair, Scientific Advisory Board*

# Introduction by the Director



With underutilised species drawing increasing attention as promising targets for research and

development to alleviate hunger and poverty, multiple initiatives are being launched, and many national and international players are emerging.

ICUC is but one of many organisations with a strong focus on underutilised species. Among these are the Global Facilitation Unit for Underutilized Species, the International Plant Genetic Resources Institute, the World Vegetable Center, and many other organisations in Africa, Asia, Europe, Latin America and the Pacific region. The increase in interest in underutilised species is most welcome but, at the same time, creates a need for greater synergy between players. Scarce resources mean that we need to identify gaps and avoid duplication. Clearly, an overarching strategy for research and development on underutilised species would be a big step forward.

ICUC is spearheading a process to develop and secure buy-in to a global strategic framework for research and development in underutilised species. This framework will catalyse and enhance relationships between partners and create new opportunities for working together collaboratively. Moreover, it will be a strong platform from which to contribute to the emerging policy dialogue on underutilised and novel crops.

Since ICUC moved to Colombo, we have forged ahead, actively leading the consultation on a global strategic framework. ICUC – actively supported by the Global Facilitation Unit for Underutilized Species – organised workshops in Asia and Africa, following up with compiling the workshop proceedings, and writing, editing and coordinating inputs to the draft strategy. After review and endorsement of the strategy we will support implementation through networks and forums, and take it to the highest policy levels.

In parallel, ICUC has made strong progress in collaborative activities focusing on four broad priorities: catalysing action to assess the potential of underutilised crops for improved livelihoods, removing the barriers that prevent or discourage small-scale entrepreneurs from trading underutilised crops, sharing knowledge and deepening partnerships.

ICUC's move to Colombo brings the Centre closer to its clients in the South and the issues that confront them. Co-location with the International Water Management Institute deepens our relationship with the Consultative Group for International Agricultural Research centres and opens up new opportunities for integrated projects.

Underutilised plant species need champions. As ICUC settles into its new location and its new guise, we aim to become a champion and motivator, bringing actors together to address identified research needs and using the results to make a difference for the poor. In this, our first annual report, we set out how we are going about this and what we have achieved so far.

Hannah Jaenicke  
*Director*

# Overview: The International Centre for Underutilised Crops

Traditionally, underutilised crops make a significant contribution to the well-being and livelihoods of rural households. Many form part of subsistence farming systems. Others are valued for their medicinal properties. Although some of these untapped resources are either partly or fully domesticated, most are still wild and unevaluated.

Indigenous plants are, in many cases, more resilient to environmental stresses such as drought, salinity and poor soils than domesticated species. Typically, the highly biodiverse systems that are home to these species provide plant foods that help rural populations survive in hungry periods and prolonged dry seasons.

## What are underutilised crops?

We define underutilised crops as plant species that many communities traditionally use for food, fibre, animal fodder, oil or medicines, but that have further undeveloped potential uses.

Over 50 per cent of our protein and calories come from only three plant species: rice, maize and wheat. Yet, it is estimated that there are over a quarter of a million plant species in the world. Of these, we use and commercialise only a tiny proportion, 150 species, on a global scale.

But poor people gather and use materials from another 7,000 species, for food and medicine, to build homes and to sell. Many of these species grow in areas where conditions for farming are unfavourable – wetlands, arid regions, tropical forests – and

The adoption of imported species, and changes in demography and household structures, mean that farmers increasingly depend on just a few crops. These trends, coupled with the loss of agrobiodiversity, reduce the variety of foods in household diets and threaten rural and urban communities with food and nutrition insecurity and poverty, particularly during droughts and crop failures.

Underutilised crops play a central role in the livelihoods of millions worldwide. Slowly, the role and potential of underutilised species is gaining recognition. But moving forward, capitalising on the benefits, means overcoming a number of constraints.

How can ICUC accelerate progress in overcoming these constraints and bringing the benefits closer? A key element of our approach is to underpin and align with the priorities of the international agricultural research and development community, and the overarching Millennium Development Goals.

opportunities for inhabitants to improve their incomes are few. If we can tap the potential of species which are useful to humans, but which are not yet domesticated or farmed, then we can make a real contribution to eliminating poverty and hunger.

Investigating these species is likely to uncover new ways in which they could be used. They could provide new or additional foods, contributing to food security for groups at risk. They may be rich in minerals or vitamins, and contribute to human nutrition and improving human health. They might be marketed in new ways as novel foods and help raise incomes for those that gather, grow and process them. Or they may enhance environmental services by filtering and processing toxic substances, preventing soil erosion and restoring degraded soils.

## Benefits of underutilised species and constraints in their use

Underutilised species contribute to:

- household livelihoods
- alleviating poverty
- generating income and strengthening local economies
- maintaining biodiversity
- maintaining traditional subsistence farming systems
- sustaining the environment
- saving lives during calamities
- maintaining social structures

The use of underutilised species is hampered by:

- poor information on production, nutritional value, consumption patterns and use
- poor information on economic benefits and market opportunities
- few improved planting materials
- lack of improved production technologies leading to low yields
- post-harvest and transport losses
- lack of marketing channels
- discouraging national policies
- unsupportive extension services
- poor credit and investment services



ABOVE: Traditional African leafy vegetables generate income for small farmers in Kenya

# Underutilised Crops: Benefits for the Poor



Underutilised Crops and the Millennium Development Goals						
<b>MDG 1</b> Eradicate extreme hunger and poverty	<b>MDG 3</b> Promote gender equality and empower women	<b>MDG 4</b> Reduce child mortality	<b>MDG 5</b> Improve maternal health	<b>MDG 6</b> Combat HIV/AIDS, malaria and other diseases	<b>MDG 7</b> Ensure environmental sustainability	<b>MDG 8</b> Develop a global partnership for development
Underutilised species are particularly valuable for the poor during hungry periods and as emergency food	Underutilised species have a large market potential, especially for women, who can set up small processing units	Underutilised species contribute significantly to nutrition of the poor, in particular children	Many underutilised species are particularly high in iron and calcium	Many underutilised plants have medicinal properties and are readily available to the poor	Greater use of underutilised species conserves genetic diversity and contributes to environmental sustainability	Underutilised species play a role in integrated development strategies

The International Agricultural Research System Priorities and ICUC's Actions to Benefit the Poor				
<b>Priority 1B</b> Promote conservation and characterisation of underutilised plant genetic resources to increase the income of the poor	<b>Priority 2C</b> Enhance nutritional quality and safety	<b>Priority 3A</b> Increase income from fruit and vegetables	<b>Priority 3D</b> Generate sustainable income from forests and trees	<b>Priority 5B</b> Make international and domestic markets work for the poor
Characterise priority underutilised species Select and propagate superior germplasm Make improved planting material available to farmers Improve understanding of potential species for industrial use, especially oil and fibre plants	Promote crop diversity to provide nutritional safety and prepare for climate change Develop links with potential users so that the poor will benefit from new developments	Study markets for underutilised fruit species Train entrepreneurs to process fruits, set up and run small enterprises	Develop sustainable harvesting, post-harvest handling and processing methods Develop policy options to facilitate local and cross-border markets for berries, fungi, rattans, medicinal herbs, roots, tubers and other underutilised species	Work with national food standard agencies to brand new products and open up new markets Work with regional networks to stimulate cooperation in public and private sectors

## Improve understanding: conserve and characterise underutilised crops

Conserving, characterising and developing plant genetic resources for the benefit of poor people are at the heart of ICUC's mandate. Hundreds of so-called 'underutilised' species have already been identified and conserved in national genebanks. Now, building on agronomic, horticultural, post-harvest and marketing studies, we need to extend our understanding of potential uses for the most promising of these species and to develop links with potential users so that the poor will benefit.

## Enhance nutrition

By characterising, selecting and propagating underutilised species with high levels of micronutrients or proteins, we can help farmers produce more nutritious crops. As well as contributing to healthier diets and improving

nutrition – the links between a varied diet, better nutrition and better health are well known – new crops also mean that farmers have a wider range of crops to choose from when deciding what to plant. The wider the range of crops farmers grow, the more widely they spread the risk of crop failure due to bad years or climate change. At these times, the new crops help combat hunger and malnutrition. To introduce such crops, ICUC works in tandem with national food standard agencies to brand new products and open up new markets.

## Increase income

In many rural communities in developing countries, fruits, nuts or herbs gathered from indigenous species, as well as being consumed in the home, can represent a significant percentage of household income. To increase income from these resources, producers need to add value and tap

into new markets. This could be done by selecting and domesticating crops to produce higher quality fruit and extend the fruiting season, or by processing to extend shelf life or fill a different market niche.

## Millets: species to fight hunger and malnutrition

Millets are a healthy food. They contain more micronutrients, such as calcium and iron, more vitamins, such as niacin, more sulphur-rich amino acids, and more soluble fibre than rice or wheat. Their glycaemic index is also low. New products using millets as ingredients add nutritive value to foods and help fight hunger and malnutrition. Flour made from a combination of rice and the little millets of South Asia can be made into healthy snacks.

TOP: Indian women learning that combining rice flour with millet flour adds micronutrients to traditional snacks



## Tropical fruits: species for increasing incomes

With the globalisation of trade, mangoes, papayas and star fruit are not uncommon on supermarket shelves in developed countries. Yet the tropics are home to many more little-known and only locally consumed fruits – soursop, sugar apple, beli, wood apple and lapsi, among others. Traditionally, these fruits are eaten fresh or cooked. But now, with training in processing and marketing, households can raise their incomes by setting up small-scale enterprises manufacturing juices, jams, sweets and pickles and selling them through community shops or local supermarkets.

Dharmika Perera earns US\$500 a month – half his family income – from his fruit-processing enterprise, Tharindu Fruit Products, in Kandy, Sri Lanka. In 2004, Dharmika attended a training course on processing and marketing underutilised crops. Now, Dharmika employs 10 staff to meet growing demand for his products. In July 2006, Sri Lanka Standards Institute awarded their quality certificate to his Tharindu brand ready-to-serve drinks. And, because Dharmika's business has increased the demand for fresh beli, wood apple and sugar apple, producers are better off too.

## Make international and domestic markets work for the poor

Marketing and enterprise development is one of the priorities for ICUC's work in the next few years. By developing closer links with the private sector, organic and ethical companies, ICUC believes great benefits can be reaped by the poor. Coupled with this, for the poor to break in to these markets, we need credit schemes, functioning market information systems for a variety of products, and greater understanding of the national and international rules and standards. Lack of capacity and skills seriously impedes progress. Strengthening capacity, for example by helping organise farmer groups and cooperatives, is key to helping the poor benefit from underutilised species.



## Generate sustainable income from forests and trees

Many underutilised species are either trees, or grow in forests; they and their products include fruits and berries, fungi, rattans, medicinal herbs, roots and tubers. Well-adapted to their environment, they may be managed or cared for by those who use them but need few, if any, of the inputs such as fertilisers, required by introduced crops. But our understanding of sustainable harvesting methodologies, post-harvest and processing methods is still sketchy, as is our understanding of how local and cross-border markets for these products work.

## Baobab: sustainable income from trees

Baobab (*Adansonia digitata*) is a familiar tree in African savannahs. Local communities have many uses for almost all parts of the tree. So, among other things, baobab provides food for people and their livestock, medicines, materials for homes and shelters and fibre for clothing. Export markets are beginning to open up and provide new opportunities – particularly for women who often 'own' individual trees.

## *Artemisia annua*: a herbal anti-malarial for local markets

Each year, malaria infects over 500 million people worldwide. Over 900,000 children and 100,000 adults die of the disease.

For over two millennia, Chinese traditional medicine practitioners administered *Artemisia annua*, known for its anti-malarial properties, to sufferers. The rural poor, unable to afford synthetic drugs, still rely on such traditional herbal remedies. Recently, attention from western medical research agencies and the World Health Organization, alerted to the anti-malarial properties of *Artemisia* and other herbs, has led to the release of several products derived from indigenous plants, manufactured locally and sold at affordable prices.

Soon, the effectiveness and risks of products derived from *Artemisia* may be studied in depth. In the first quarter of 2006 alone, the Dutch Royal Tropical Institute moderated a two-month electronic discussion forum dedicated to *Artemisia* and the World Agroforestry Centre held a workshop on herbal anti-malarials.



**ABOVE:** Women often own individual baobab trees and use many parts of the trees in their own homes. Here, they test material for a manual that will help them generate baobab products that will earn them some income

**TOP:** Dharmika Perera employs 10 people in his fruit-processing enterprise

**ABOVE:** Many poor still rely on traditional herbal remedies. Herbal anti-malarial medicines manufactured locally may soon replace expensive synthetic drugs

# The Way Forward

Our activities in moving forward are geared to catalysing collective action, paying heightened attention to the value chain, sharing knowledge and deepening partnerships.

## Catalysing collective action

To achieve impact on the ground, to make a difference to the poor, those of us who share goals and objectives for underutilised species need to work together. Over the decades, the agricultural research and development community has responded to new needs and realities in crop research by rationalising research agendas, sharing tasks, diversifying funding sources, engaging the private sector and pooling resources and knowledge. ICUC aims to build on these tried-and-tested strategies to catalyse and focus collective action on underutilised species.

One of ICUC's first thrusts since its move to Colombo has been to consult widely to develop a framework for research and development of underutilised plant species in Africa and the Asia-Pacific region. Dialogue, discussion and debate are vital to enlist support and buy-in for any strategy. This meant gathering together key players in Asia and Africa for consultations.

The Asia Regional Consultation workshop, held 16-17 March in Colombo, Sri Lanka, assembled a group of 30 partners from Asia, ICUC staff and staff from the Global Facilitation Unit for Underutilized Species to draft a strategy for Asia. The Africa consultation, 24-25 May in Nairobi, co-hosted by the World Agroforestry Centre, involved 33 participants from 12 African countries and international organisations. ICUC, collaborating closely with the Global Facilitation Unit, has published the outcomes of these workshops as proceedings and posted copies on its website.

Prior to the workshops, ICUC invited input from over 200 individuals. This, coupled with distribution of the draft strategy – through the Food and Agriculture Organization Non-Timber Forest Products Newsletter, Forest Information Update, Global Non-Timber Forest Products Partnership Group and the Alternatives to Slash-and-Burn listserver – to more than 5,000 other recipients, ensured that as many stakeholders as possible were given an opportunity to provide inputs and comment. A review panel of 16 volunteers then revised the strategy which will be published and distributed in October 2006.

ICUC is now gearing its efforts to implementing the strategy. Championing less well-known species in global fora, ICUC's Director launched a working group on underutilised plants under the umbrella of the International Society for Horticultural Science (ISHS) during the 27th International Horticultural Congress, 13-19 August, in Seoul, Korea. ISHS requested the Director to convene an international symposium on underutilised plants in early 2008.

This symposium will raise the global profile of underutilised plants, particularly with private-sector interests in the horticulture industry and policy makers.

ICUC further contributes to the scientific agenda for underutilised crops through the Director's appointment to the International Scientific Committee for the international conference on indigenous vegetables and legumes to be held in Hyderabad, India, 12-15 December 2006, organised by the World Vegetable Center and Global Horticulture Initiative. The Scientific Committee will rigorously review papers submitted for presentation at the conference.

Tree species make a variety of contributions to livelihoods. ICUC, as a partner in the Global Non-Timber Forest Products Partnership – a proposed Partnerships Programme of the Global Forum for Agricultural Research – is actively involved in developing a strategy for this group of underutilised species.



**ABOVE:** Participants from 12 African countries and international organisations drafted a strategy for underutilised crops in Africa at the Africa Consultation Workshop, 24-25 May, at the World Agroforestry Centre, Nairobi

**TOP:** Partners from Asia, ICUC staff and staff from the Global Facilitation Unit drafted a strategy for underutilised crops in Asia at the Asia Regional Consultation workshop, 16-17 March, Colombo, Sri Lanka



### Heightened attention to the value chain

Researchers have long recognised the 'chicken and egg' relationship between producing a new crop and marketing it profitably. ICUC initially focused on encouraging national agricultural research systems to include underutilised species in their germplasm collections. This stimulated work on the agronomy and post-harvest management of these species. Over time, ICUC realised the need to go further and engage with NGOs to train local people to grow and sell underutilised species. In turn this meant addressing the processing and marketing sectors of the value chain. So, more recent projects and programmes now look at both the downstream and upstream aspects of taking underutilised species from producer to market.

In May 2006, an ICUC intern began a study to evaluate value chains for underutilised crops in Sri Lanka. This study is a collaboration between ICUC and the Koninklijk Instituut Voor de Tropen (Royal Tropical Institute) Amsterdam, the Netherlands. The bank of knowledge gathered over the years is a starting point for analysing the factors in the value chain that contribute to the failure or success of enterprises. The study will contribute to a decision-support tool that will help trainers and extension workers select crops and products that fit particular markets and take account of other external factors.

Work on this project led to further links with the International Plant Genetic Resources Institute Asia-Pacific Office and the Global Facilitation Unit for Underutilized Species. These organisations are also involved in value chain studies. As a result, ICUC and the Global Facilitation Unit agreed to pool their resources to develop the decision-support guide.

One of the critical issues in the value chain analysis is market access. A previous study in Sri Lanka indicated that small-scale entrepreneurs need long-term business support services and access to micro-credit to allow them to compete successfully

in domestic markets. Following up on this study, ICUC commissioned BAIF Research Development Foundation (formerly Bharatia Agro-Industries Foundation) to study market access for underutilised species in India. This will allow us to compare factors affecting market access in Sri Lanka and India. The results, available in February 2007, will also feed into the decision-support tool.

Another collaborative project being developed with the World Vegetable Center's Regional Office for Africa will look at the development of small-scale businesses based on underutilised species. The aim here is to identify barriers that prevent small-scale entrepreneurs from marketing underutilised vegetable crops and make recommendations to overcome them.

### Championing knowledge sharing

Although underutilised crop species are central in the livelihoods of many rural poor, the knowledge base of detailed data on the actual use and potential of various species in diverse livelihood systems is meagre. The want of data hampers advocacy efforts to remove barriers to the use of underutilised species and their products in international markets, for example, in the European Community Novel Food Crops Directive.

ICUC takes advantage of communication technology to enhance data gathering and knowledge sharing. In December 2005, ICUC launched its website – [www.icuc-iwmi.org](http://www.icuc-iwmi.org) – and by August 2006 the number of unique visitors topped 10,000. The website provides access to a rapidly growing knowledge bank of on-line journals, publications and selected articles. Through this digital library, ICUC shares information on underutilised species with a broad range of interested parties.

ICUC-News, a weekly electronic news flash launched on 23 June 2006, is another mechanism for delivering up-to-date bulletins on meetings,

conferences, publications and other items of interest to subscribers' desktops. The number of subscribers to this new service is expected to grow substantially. The ICUC-News discussion forum, hosted by Google, is as yet in its early days. We are looking at ways to use this facility to catalyse dialogue among stakeholders on key issues.

ICUC exchanges information regularly with members of the Underutilised Tropical Fruits in Asia Network and the Southern and East Africa Network on Underutilised Crops. It does this through posting information on the website and regular email updates, as well as by distributing publications. Old and new partners actively contribute information resources, for example the series of posters, both in English and local languages, that give step-by-step guidance on harvesting, processing and small-scale manufacture of products – candies, pickles, snacks, sauces – from tropical fruit trees. These, and other publications, have been shared with a large audience.

ICUC also generates and disseminates new knowledge resulting from research in ways that farmers can use. For example, manuals showing how to grow and make products for market help illiterate farmers in Malawi and Ghana improve utilisation of tamarind and baobab.

Plus, ICUC supports partners in raising awareness of the importance of underutilised plant species at all levels – policy makers, researchers, farmers, traders and end users. Policies need to adapt to respond to change, just as incentives and regulations need to be adjusted. Other policy considerations include social impact, land/resource rights and ownership, and the linkages between producers, consumers, entrepreneurs and local and government controllers/managers.

**ABOVE:** Jackfruit is rich in vitamins A, B and C, potassium, calcium, iron, proteins and carbohydrates. Processing reduces post-harvest losses, increases shelf life and adds value

# The Way Forward *continued*



## Deepening partnerships and collaboration

ICUC works through partnerships with international, regional and national research and civil society organisations, non-government organisations and the private sector. Our activities stem from priorities identified and set together with our partners and their clients – the eventual beneficiaries – in participatory 'bottom-up' discussions. As a small, efficient, co-ordinating and facilitating Centre we work out how to use available resources to implement the activities we and our stakeholders have agreed on.

In 2006, two interns, funded by BMZ, Germany, began two new studies. The first, in collaboration with the Industrial Technology Institute, Sri Lanka, investigates biocontrol agents for underutilised crops. The second investigates the dispersion of germplasm of underutilised tree crops in Sri Lanka. Preliminary results will be presented at Tropentag, Bonn, Germany, in October 2006.

Further collaborative projects building on comparative advantages are in the pipeline. These include projects with the International Water Management Institute, Winrock International India, the Centre for Research-Information-Action for Development in Africa–Southern African Development and Consulting (Namibia), the International Plant Genetic Resources Institute and other institutions.

Immediately following ICUC's move to Colombo, the Director undertook a full agenda of conferences, workshops, meetings and face-to-face conversations with key stakeholders to communicate the Centre's new direction and strengthen partnerships and collaboration. These included the Asia Pacific Association of Agricultural Research Institutes meeting on Biotechnology, 30 October; the Asian Center for Underutilised Crops Steering Committee meetings, 30 October 2005 and 17 March 2006; the launch of the Global Non-Timber Forest Products Partnership, 30 November-1 December; the Consultative Group on International

Agricultural Research Annual General Meeting, 3-6 December; and the Global Facilitation Unit for Underutilized Species Steering Committee Meeting, 12 December.

## Partnership and collaboration: Pohnpeian traditional food for health

Around 31% of 57 children tested in Mand, a small rural community in Pohnpei, Federated States of Micronesia, are vitamin A deficient. This is twice the cut-off rate of 15% at which vitamin A deficiency becomes a significant public health problem. This level of deficiency causes serious problems of night, partial or total blindness, and decreases resistance to infections, particularly respiratory diseases (pneumonia), diarrhoea and skin infections.

The Island Food Community of Pohnpei advised mothers of vitamin A-deficient children to feed them some of the yellow-fleshed local fruits and vegetables high in pro-vitamin A carotenoids – Karat and Daiwang bananas, giant swamp taro, pandanus, ripe mango, ripe papaya, pumpkin, sweet potato, and the dark leafy greens, pele, kangkong and chaya – every day.

This practical action is among one of several in the nutrition counselling project in the Mand community. Partners and supporting agencies include the Government of the Federated States of Micronesia (FSM) – the Pohnpei Office of Economic Affairs, Department of Health, Department of Education, and Department of Land and Natural Resources; College of Micronesia (FSM) Land Grant Program; Natural Resource Conservation Service; Centre for Indigenous Peoples' Nutrition and Environment; Centers for Disease Control and Prevention; Sight and Life; the Australian, German and New Zealand Embassies; the Global Environment Fund; and the Pacific German Regional Forestry Project.

In 2006, this mission continued with visits to the MS Swaminathan Research Foundation, BAIF Research Development Foundation and Indian Institute for Horticultural Research, 20-25 January; the International Plant Genetic Resources Institute–Convention on Biological Diversity conference on nutrition, 17 February; the launch of the Global Horticultural Initiative, 22-24 March; a meeting with Koninklijk Instituut voor de Tropen (Royal Tropical Institute), Amsterdam, and Plant Resources of Tropical Africa, Wageningen, 6 April; a meeting at Georg-August-University Göttingen, 11 April; a plenary presentation at the Indian National Seminar on Underutilised Fruits, 8-9 June; a further visit to BAIF Research Development Foundation, India, 9-10 June; presenting an invited paper at the International Horticultural Congress 13-19 August; and visiting partner institutions the Research Institute of Fruits and Vegetables and Netherlands Development Organisation in Vietnam, 21-25 August.



TOP: Vitamin A deficiency affects many children in Melanesia.

ABOVE: A diet that includes yellow-fleshed fruits and vegetables, such as Pandanus, helps counteract blindness and raises their resistance to infection

# Networks

ICUC, in the years prior to its move to Colombo, was a key player in creating and coordinating regional networks on underutilised fruit and vegetable crops. Although the move to Colombo signalled changes in the Centre's organisation and role, ICUC regards these networks, together with the other organisations mandated to work on underutilised crops, as essential to implementing a global strategy.

## **Underutilised Tropical Fruits in Asia Network (UTFANET)**

The Underutilised Tropical Fruits in Asia Network, founded in 1995, has nine member countries: Bangladesh, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam.

UTFANET aims to assist collaborative partnerships among countries in the region for conservation of biodiversity, efficient use of genetic resources, expertise and technologies to assist the respective national governments to develop appropriate policies for promoting tropical fruits.

Funding from ICUC, the UK National Lottery Charities Board and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development provided the resources for research on jackfruit, pummelo, mangosteen and other species of regional importance.

## **Southern and East Africa Network on Underutilised Crops (SEANUC)**

The Southern and East Africa Network on Underutilised Crops was founded with a mandate to facilitate research on underutilised vegetables and other crops in Africa. Member countries are Kenya, Malawi, Mozambique, Namibia, South Africa, Tanzania, Uganda, Zambia and Zimbabwe.

Funding from ICUC and the UK National Lottery Charities Board allowed SEANUC members to carry out research on amaranths and cucurbits in Tanzania and South Africa, and organize a planning workshop in Zambia in early 2004.

## **Asian Centre for Underutilised Crops (ACUC)**

The Asian Centre for Underutilised Crops (ACUC), founded in 2004, aims to bring together activities in the South Asian Regional Community. ACUC's member countries are Bangladesh, India, Nepal, Sri Lanka and Vietnam. Currently, the Sri Lanka government hosts ACUC under a Memorandum of Understanding between ICUC and the Council for Agricultural Research Policy. Small grants to national agricultural research institutions contribute to discrete research projects on underutilised crops.



**ABOVE:** Regional networks help countries work together on species of regional importance, such as rambutan and mangosteen in Asia

**TOP:** Mr Thuong is head of an association of pummelo growers in Xu Mai, Vietnam. These groups help improve varieties, cultivation and marketing

# Partner Institutions<sup>1</sup>



## Developing Countries

### Africa

#### Ghana

Agribusiness in Sustainable Natural African Plant Products  
Forum for Agricultural Research in Africa

#### Kenya

International Centre of Insect Physiology and Ecology  
Kenya Agricultural Research Institute  
Plant Resources for Tropical Africa

#### Malawi

Land Resources Centre

#### Mali

L'Association pour le Développement des Activités de Production et de Formation  
Institut d'Economie Rural  
Réseau Ouest et Centre Africain pour la Promotion de la Recherche Participative Agricole

#### Mozambique

Agricultural Research Institute of Mozambique

#### Namibia

Centre for Research-Information-Action for Development in Africa—Southern African Development and Consulting  
Phytotrade (Natural Products Trade Association)

### Nigeria

Abeokuta University  
Obafemi Awolowo University

### South Africa

Agricultural Research Council  
University of the Free State

### Tanzania

National Plant Genetic Resources Centre

### Uganda

National Agricultural Research Organisation

### Zambia

National Institute for Scientific and Industrial Research

### Zimbabwe

Southern Alliance for Indigenous Resources  
Tulimara Speciality Foods of Africa Pvt Ltd

### Asia/Pacific

#### Bangladesh

Bangladesh Agricultural Research Institute

#### China

International Network for Bamboo and Rattan

### Fiji

Secretariat of the Pacific Community

### India

BAIF Research Development Foundation (formerly Bharatia Agro-Industries Foundation)  
Green Foundation  
Indian Council for Agricultural Research  
Indian Institute for Horticulture Research  
MS Swaminathan Research Foundation

### Indonesia

Directorate of Horticulture Production  
Indonesian Fruit Research Institute

### Malaysia

International Tropical Fruits Network

### Nepal

Agro Enterprise Centre  
Alternative Herbal Products (P) Ltd  
International Center for Integrated Mountain Development  
Local Initiatives for Biodiversity, Research and Development  
Nepal Agricultural Research Council

### Pakistan

Pakistan Agricultural Research Council

### Papua New Guinea

National Agricultural Research Institute

### Philippines

Participatory Enhancement of Diversity of Genetic Resources in Asia  
Philippine Council for Agriculture, Forestry and Natural Resources Research and Development

### Sri Lanka

Department of Agriculture  
Gami Sewa Sevana Ltd  
Horticultural Crop Research and Development Institute  
Industrial Technology Institute  
Practical Action, Sri Lanka office  
Rainforest Rescue International  
Sarvodaya Economic Enterprises Development Service  
Sri Lanka Council for Agricultural Research Policy  
The World Conservation Union, Sri Lanka office

### Thailand

Horticulture Research Institute, Department of Agriculture

### Vietnam

Research Institute of Fruits and Vegetables

## Developed Countries

### Europe

#### France

Centre de Coopération Internationale en Recherche Agronomique pour le Développement

#### Germany

Agrobiodiversity and Plant Genetic Resources in the Tropics, Georg-August-University, Göttingen  
University for Applied Sciences, Wiesbaden, Geisenheim

#### Netherlands

European Tropical Forest Research Network  
Royal Tropical Institute

### United Kingdom

University of Nottingham, Division of Agricultural and Environmental Sciences  
University of Southampton, School of Civil and Environmental Engineering

### North America

#### Canada

Commonwealth of Learning

#### United States of America

California Rare Fruit Growers  
Michigan State University  
University of Hawai'i at Manoa

## International Organisations

Center for International Forestry Research  
Centro Internacional de Agricultura Tropical  
Food and Agriculture Organization of the United Nations  
Global Facilitation Unit for Underutilized Species  
International Crops Research Institute for the Semi-Arid Tropics  
International Food Policy Research Institute  
International Plant Genetic Resources Institute  
International Water Management Institute  
World Agroforestry Centre  
The World Vegetable Center

<sup>1</sup> Formal and informal partnerships as of August 2006

**ABOVE:** Books and field manuals in local languages, outputs of the *Fruits for the Future* project funded by the Department for International Development, UK, give farmers step-by-step instructions on gathering and processing a range of underutilized crops for market

# Financial Overview

The Department for International Development, UK, and the German Federal Ministry for Economic Cooperation and Development fund the following ICUC projects.

Funding agency	Project	Duration	Partners	Amount
Department for International Development, UK	Fruits for the Future, Phase II	October 2003-March 2006	Food and Agriculture Organization International Plant Genetic Resources Institute World Agroforestry Centre UTFANET members SEANUC members	GBP292,780
Department for International Development, UK	Processing and marketing of underutilised fruits in Asia	October 2003-March 2006	Asian Centre for Underutilised Crops Partners in Bangladesh, India, Nepal, Sri Lanka and Vietnam	GBP266,775
Department for International Development, UK	Manuals for illiterate farmers in Africa	March 2005-March 2006	Partners in Ghana and Malawi	GBP51,546
Department for International Development, UK	Strengthening Underutilised Crops Research and Development in Africa and Asia	October 2004-June 2007	Global Facilitation Unit for Underutilized Species, Asian Centre for Underutilised Crops and others	GBP325,000
German Federal Ministry for Economic Cooperation and Development	Project to develop biological control mechanisms for post-harvest diseases of tropical fruits	April-September 2006	University of Applied Sciences, Wiesbaden Industrial Technology Institute, Colombo	EUR4,000
German Federal Ministry for Economic Cooperation and Development	MSc research on germplasm movement of selected underutilised multipurpose tree species in Sri Lanka	May-October 2006	University of Göttingen	EUR3,500

The International Water Management Institute hosts ICUC at its Headquarters in Colombo, Sri Lanka, providing facilities and administrative support.

Overheads are paid to the International Water Management Institute in full for administrative services as host organisation.

# Scientific Advisory Board and Staff



## Scientific Advisory Board

George Rothschild, Offham, UK (Chair). Former Director General, International Rice Research Institute and Director, Australian Centre for International Agricultural Research  
 Narayan G. Hegde, President, BAIF Research Development Foundation, Pune, India  
 Ruth Oniang'o, Director, Rural Outreach Programme, Nairobi, Kenya and Member of Parliament, Government of Kenya  
 John Palmer, Georgetown, Guyana. Formerly Manager, DFID Forestry Research Programme, Natural Resources International Limited, UK  
 Frank Rijsberman, Director General, International Water Management Institute (*ex officio*)  
 Hannah Jaenicke, Director, ICUC (*ex officio*)

## Staff

Sushilla Rajamanie	Administrative Officer	Joined April 2005	Sri Lanka
Sampath Abeyrathne	Business Development Specialist	Joined June 2005	Sri Lanka
Hannah Jaenicke	Director	Joined October 2005	Germany
Robert Kunz	Intern	Joined April 2006	Germany
Boris Hillmann	Intern	Joined May 2006	Germany
Ismael Barry	Intern	Joined May 2006	Netherlands



George Rothschild



Narayan G. Hegde



Ruth Oniang'o



John Palmer



Frank Rijsberman

ABOVE: The ICUC team, from left: Sushilla Rajamanie, Robert Kunz, Boris Hillmann, Sampath Abeyrathne, Hannah Jaenicke and Ismael Barry

# Publications



Abeyrathne A.H.M.S.W.B. and Jaenicke H. 2006. Potential for small-scale processing and marketing of tropical fruits in the Kandy, Galle and Horana Divisional Secretariat Divisions of Sri Lanka. Research Report No. 1. International Centre for Underutilised Crops, Colombo, Sri Lanka.

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Jaenicke H., Höschle-Zeledon I. and Manning N. (Eds.) 2006a. Proceedings of regional consultation workshop: Strategies for research and development of underutilised plant species in Asia and the Pacific. Colombo, Sri Lanka, 16 and 17 March 2006. International Centre for Underutilised Crops, Colombo, Sri Lanka and Global Facilitation Unit for Underutilized Species, Rome, Italy. 84 pp. <http://www.icuc-iwmi.org/Consultation/index.htm>

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## Publications in preparation

Abeyrathne A.H.M.S.W.B. and Jaenicke H. The profitability of small-scale processing enterprises for underutilised tropical fruits - a case study in Kandy and Kurunegala districts in Sri Lanka. Submitted to *Urban Agriculture Magazine* 17.

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Höschle-Zeledon I. and Jaenicke H. A Strategic Framework for Research and Development of Underutilized Plant Species with Special Reference to Asia, the Pacific and Sub-Saharan Africa. Submitted to *Acta Horticulturae*.

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Jaenicke H. and Lengkeek A. Marketing the products of underutilised crops - challenges and opportunities for pro-poor economic development. Submitted to *Acta Horticulturae*.

Kunz R., Wijeratnam S.W., Jaenicke H. and Heller J. 2006. Control of post-harvest disease (stem end rot) of rambutan and annona species by using a bio-control agent (*Trichoderma* spp.). Poster presented at Deutscher Tropentag October 11 - 13, 2006, Bonn. Proceedings forthcoming.

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