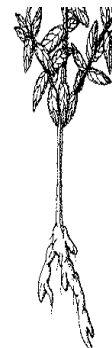


GLOBAL NEWSLETTER ON *UNDERUTILIZED* CROPS



June 2001

Editorial

Welcome to the Sixth issue of Global Newsletter of Underutilised Crops. I would like to thank FAO again for part-sponsorship of this issue and I hope the FAO will continue to help us to publish the Newsletter. You will probably remember that we have separated the GFAR initiative on UC and ICUC as a part of this initiative. I am pleased to inform you that ICUC has been continually taking part in this initiative and detailed information will be found in different sections of this newsletter. We are deeply shocked to report that the Regional Coordinator of ICUC-UTFANET died last May. Dr Tiamzon was with us for over a year, we pray for her soul and our sympathy goes to her bereaved family. Dr Marilyn Roneldo from the Philippines has taken over the position from 1st October. We urge all to contact her for the ICUC-UTFANET project through e-mail on merilyn@ultra.pcarrrd.dost.gov.ph. We are very pleased that FRP-DFID has approved the second plan of our Global Program on Fruits for the Future and a new project on 'Improvement of livelihood through developing products and generating small businesses' that have started for October 2001. The project is also funded by DFID. ICUC is focussing on the product and marketing aspects for the development of UC, along with its programme on the management and supply of plants and marketing, through the community participating in projects in Asia and Africa. I hope we will expand our activities in this area in the near future.

ICUC focuses its activities in three areas:

- **Knowledge based information and dissemination** on under-utilised species.
- **Research and development** - our work is concentrated in the areas of South Asia and Sub-saharan Africa in the context of sustainable livelihoods. .
- **Human resources development** for the promotion and sustainable production of under-utilised crops.

WE WOULD LIKE YOUR NEWS ON UNDER-UTILISED CROPS, OR ON ANY RELATED SUBJECT, WHICH COULD HELP OTHERS TO STRENGTHEN THEIR NATIONAL PROGRAMMES. PLEASE SEND YOUR NEWS FOR THE NEXT ISSUE, WHICH WILL BE PUBLISHED IN DECEMBER 2001.

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Mission Statement

Food Security, improved nutrition and economic welfare of human beings raised through sustainable and increased economic production of food and industrial raw materials. This to be achieved by developing and utilising the untapped biological diversity of under-utilised crops.

This issue of the Global Newsletter on Under-utilised Crops is part-sponsored by FAO (Food and Agriculture Organization).



Preface by the Chairman

Only a few years ago, the international community was concerned about how the growing population of the world is to be fed during this new millennium. Raising agricultural productivity was high on the agendas of most governments and aid agencies. Agriculture was important. What has happened in recent years to change attitudes and agricultural policies? Food supplies in the West and North are more than sufficient, and surpluses are produced and available for export, or as food aid, for the food-short countries. The North and West are also in the position to import what they cannot produce for themselves, particularly products from the warmer parts of the world. This position is however dependant upon a buoyant international economy, which cannot be guaranteed as we move into an uncertain future. The low economic viability of food production in the North and West, exacerbated by problems of foot and mouth disease and mad cow disease (BSE) in Europe, is resulting in swinging changes in the management and use of the countryside, particularly here in the UK. There is increasing concern about environmental issues. Many farmers are going out of business, and turning to other income-earning activities and land-use strategies - nature reserves, leisure pursuits, tourism related activities. Much good farm land has been set aside, or converted to other uses, many of which are irreversible should there be a turn-around in the economic situation and a decline in food availability- as will surely happen. The UK no longer has a Ministry of Agriculture (MAFF), it no longer has an Agricultural Research Council- which was converted into the Biotechnological and Biological Research Council (BBSRC) some years ago. It no longer has an effective advisory service for

farmers. The number of Universities which offer undergraduate courses in Agriculture has fallen to a dangerously low level resulting in a shortage of qualified new farmers, agricultural researchers and advisors. Research capacity in agricultural research institutes has declined as many have closed down, mergers have taken place, and research agendas have changed. In the past, the UK and other countries in the developed world provided training for many students from the third world, and research institutes in the north had the capacity to undertake research in partnership with colleagues in the south, to tackle the constraints facing their farming. This capacity is falling rapidly, and if it continues, will be lost for ever.

Financial allocations for development aid in support of agriculture in the third world are also falling, even though there are increases in the overall size of aid budgets. Aid is now largely aimed at promoting globalisation to encourage good government, law and order, better livelihoods, human health and welfare, education and poverty reduction- addressing social and economic issues at the expense of technical ones. Targets to reduce poverty have been set at over optimistic levels, and recent events show that law and order is still not observed in many countries. Famines still exist in some countries, food aid is having to increase, droughts occur, and global climate change is likely to increase these types of disasters, in spite of the rhetoric voiced, for example at the Kyoto summit on climate change, whose agreement will not be ratified by the world's greatest polluter and agent of climate change, the USA.

The ICUC in its small way remains committed to contribute to raising agricultural productivity, both to increase the availability of affordable and healthy foods for the world's poorest producers and consumers and to produce food and other agricultural products which

can be marketed, generating income for the most needy of peoples. This income will improve the livelihoods of the poor, giving them access to education, health and the consumer goods which are increasingly essential to human well-being.

The ICUC has pledged its support to what is perhaps the single most important recent development in raising agricultural production- the multi-stakeholder Global Forum on Agricultural Research for Development (GFAR) - a forum which is well positioned to influence the policies of the Consultative Group on International Agricultural Research (CGIAR), and of governments and aid agencies. GFAR has established an important programme on Under-utilised and Orphan Commodities (UOC), adopting a commodity chain approach which addresses all aspects from genetic resources and production through to processing, marketing and utilisation. ICUC sits on its steering committee. The programme will have a facilitating mechanism established in IPGRI, in Rome.

We hope that readers of the Newsletter will enjoy reading and derive benefits from this issue. We ask you to pledge your support to the ICUC, to work together as partners, and thus to help produce outputs which will justify the trust placed in us by our supporters, and demonstrate to our critics that we are effective, and thereby encourage them to come over to our way of thinking, and in the case of donors, to increase their support of our activities.

Roger Smith
Chair: ICUC Board of Trustees.

Organisations Concerned with Underutilised Crops

ICUC News

PROJECT NEWS

Improvement of Indigenous Vegetables in South Africa and Tanzania – funded by Community Fund

The annual review was conducted in November/December and the Review felt that the progress was satisfactory. However the reviewer made several suggestions to improve the project on the nutritional assessment and also made suggestions to include more farming sites. These were discussed in detail at the Annual Review meeting and appropriate arrangements were made for the smooth running of the project. It was felt that the progress of UFH was not satisfactory and the project was transferred to the Extension Department of the University from the Agronomy Department. Since then the project is on track and a new plan was devised and agreed by ICUC and the Extension Department for the rest of the project time. Overall, the Annual Report was well taken by NLCB but we were asked to keep monitoring the progress of UFH. The participants of the project agreed to follow the recommendations made by the Reviewer.

A mid-year monitoring visit was made and a comprehensive discussion with the Community has taken place. The Communities views were discussed at the meeting where all partners participated. A new work plan was devised for the next 6 months as the community have accepted the selected types for Amaranths, Cucurbits and *Plectranthus*. The community wanted more planting materials but the project resources is limited for this. All partners felt that a new

project for seed multiplication will be submitted at the end of the project. It was agreed that the Annual review will be carried out either at the end of November or at the beginning of December and a reviewer will be appointed soon.

ICUC – UTFANET Project: Funded by the Community Fund.

The project made significant progress on both research and promotional aspects of under-utilised fruits. Dr Floy Tiamzon the co-ordinator for UTFANET has established and made the Regional office functional. The purpose of this office is to act as a source of information for all participating counties, to co-ordinate regional activities such as training programmes, to publish a bi-annual newsletter and prepare posters, fact sheets, training manuals, WebPages. A computer has been given by ICUC to the Secretariat; a leaflet and Newsletter were produced and distributed. The training for regional scientific staff was completed in the Philippines in September 2000. The co-ordinator also took part at the ADB-IPGRI Annual review meeting held in Thailand. A mid-year monitoring was conducted but because of shortage of funds it was not possible to monitor all 9 participating counties. However, a balance was made through the mid-term and annual evaluation visit and the progress of all 9 countries were covered in the annual review meeting.

An External Reviewer, appointed by ICUC evaluated the project and the Reviewer was happy with the progress made so far. However he pointed out the difficulties with the project because of the nature of project and wider geographical areas with different climatic conditions. The Reviewer, the Regional Co-ordinator will follow up these recommendations in consultation with the national co-ordinators. Unfortunately Dr Tiamzon, died of a stroke at the end of May 2001 and the co-ordinating work slowed down. A new appointment will be

made as soon as the formalities are completed according to the rules of Community.

ICUC has been participating in an ADB-IPGRI project on Tropical Fruits Conservation project through its UTFANET programme. This collaboration has been very useful for both IPGRI and ICUC as well as for the donor agencies to avoid duplications and effective use of funds. When the regional co-ordinator attended the Annual review meeting of the above project she firmly mentioned the need to avoid duplication, particularly in Bangladesh where both projects include jackfruit evaluation and selection for further study.

ICUC has participated actively in the GFAR meeting in Rome to discuss the establishment of Global Facilitation Mechanism and expressed its wish to host the Unit at the ICUC HQ or at any other Regional office of ICUC. (The final decision is that IPGRI will host the GFM and ICUC has been asked to be a member of the Steering Committee. BMZ has agreed to fund this unit for 3 years).

DFID-FRP has extended the Fruits for the Future project until March 2004. The project now includes a new Information Scientist and a postgraduate studentship to be registered at Southampton University. The project will deal with 5 new species.

DFID-EDIF has awarded a new grant and the project will start from October 2001. The project involves training business entrepreneurs for forest fruits and products in Zanzibar and Guyana.

Fruits for the Future

The Fruits for the Future project has continued to make progress since the last newsletter. The Tamarind monograph has been widely distributed and has sparked a lot of interest worldwide. The *Ziziphus* monograph is now in press and should be available by the end of the

year, along with the accompanying extension manuals for Tamarind and *Ziziphus*. The project, though in its final year, has been granted an extension from FRP-DFID until March 2004. A further 5 monographs and extension manuals will be produced (*Artocarpus heterophyllus*, *Ricinodendron heudelotti*, *Strychnos cocculoides*, *Garcinia indica/ cola/ nitida/ mangostana* & *Pouteria campechiana*), in addition to training courses in India and Africa and bibliographical databases on CD ROM.

The Tamarind and *Ziziphus* monographs will be formally launched in Bangkok at the end of January 2002, in addition to extension materials and output from training courses currently underway in India. The *Dacryodes* and *Adansonia* monographs will be launched early next year in Africa, with a final launching of all 5 books from the current project in the UK.

Further information can be obtained from the website, however please note that the site will be undergoing some reconstruction work from January next year.

<http://www.soton.ac.uk/~icuc>

The following is an extract from: **“Global Research on Underutilised crops. An Assessment of Current Activities and Proposals for Enhanced Cooperation,”** prepared by J.T Williams and N. Haq.

SUMMARY OF PROPOSED STRATEGY

Strategy development and appropriate policies are limited to a large extent by a lack of documentation on under-utilised crops. In particular there is a limited knowledge on on-farm conservation and use of particular species especially in relation to what is considered traditional. Frequently this is only viewed in relation to

poor or subsistence farmers. Yet government strategies and policies for food security should take into account the diversity in homestead gardens, mixed crop small-holdings and small plots adjacent to fields. Local systems for plant supplies, or seed flows, keep these agroecosystems dynamic and even permit sophisticated actions by farmers such as the small plots cultivated for drought years and the food gathered from semi-domesticated plants.

Taking into account agroecosystem diversity the NARS needs to take a dual approach: considering some underutilised crops as commodities and at the same time considering an agroecosystem approach. It is well to recall lessons of the past where agricultural modernisation and increased production was often through changed agricultural practices long before the input from plant breeding. In any particular case, a logical framework needs to be defined for research input otherwise the research effort will be spread too thinly. For instance the strategy might define the adaptive potentialities of local varieties and research be put in place to use these to the maximum. This requires a participatory approach because breeding for target agroecosystems requires knowledge of the physical variables and also the socio-economic background.

Decisions to introduce new crops into the traditional agricultural areas also requires adaptive research and assessment of suitable agricultural practices. The oft-quoted example of the failure of the introduction of new crops to southern France in the eighteenth century provides a lesson. The crops were introduced into an agriculture that had hardly changed from Roman times and low yields resulted with decades of poor harvests.

Changes over time in the patterns of traditional agriculture are obvious and any current documentation of agroecosystems with rich diversity is only meaningful in relation to

managing traditional agriculture better and assuring the continued well-being of the communities it supports. Substitution of one crop by another of identical or equivalent use e.g. small millets replaced by maize or *Lagenaria siceraria* replaced by *Cucurbita pepo* is normal and is guided by farmer preference. Changes which cannot be guided by farmer preferences are those caused by economic or practical factors. For instance in the Mediterranean, fenugreek, *Vicia ervilia* and *Vicia monanthes*, part of the traditional agriculture, have fallen to very low levels over the past 60 years. They were largely used for animal feed but two factors caused their decline: first they cannot easily be harvested mechanically, and second, wheat was easier to use in place of them.

Understanding and using to positive advantage these patterns of change is a complex issue. Rightfully, international attention has focused on the need to conserve and better use the genetic diversity in traditional agroecosystems, but support at the national, regional and even local level has rarely been carefully thought out; support in terms of seed supplies, plant conservation, availability of new germplasm etc. For instance it is logical that smallholders in Latin America can have available good planting stock of walnut (*Juglans regia*), but this can accelerate the severe genetic erosion of the gene pool of indigenous *Juglans* species, especially *J. nigra* and even *Carya illinoensis*. Such genetic erosion will continue until practices are well-articulated and take into account the socio-economic well being of farmers and communities, and agricultural policy linked to forestry and export policy which currently provides huge incentives to local people to fell indigenous trees since there is great demand for veneer for the furniture industry.

Information alone on the species being used, on the people involved in the management and use and on their ecological and human contexts

is insufficient. Policies have to address adaptive management in response to change and to adjust incentives and regulations including impact on social harmony; a large agenda with numerous variations in land/resource rights and ownership, and in the human system ranging from producers, consumers to entrepreneurs and local and government controllers/managers.

These comments illustrate why it has proved difficult to wed needs for plant genetic resources collecting, evaluation and conservation with planting material supply systems and research on production in the areas of traditional agriculture. Strategy urgently needs to be developed in this area, and not least by international organisations. In practice, what is happening at present is the continuation of the ethnobotanical listings, which - valuable as they are - are limited in application. Table 1 shows a summary of such listings from two very diverse areas. The sheer number of species can be bewildering to planners let alone scientists.

The value of ethnobotanical data cannot be overstressed. It is more how such data can be gathered and used by researchers that poses problems. For instance, Pearce (1996) points out that frequently the data are gathered without a full understanding and study of the community concerned. In many cases botanists are overly concerned with collecting and identifying the plants, in other cases data gathering is based on attempts to justify traditional life-styles or cultural identity and data can lack the objectiveness necessary in planning research.

A further consideration relating to traditional agroecosystems is that frequently they are inadequate for current needs. This has great implications on the need to conserve diversity in situ in many of these agroecosystems and the urgent needs to change them. For instance in Bangladesh per capita availability of fruits from homestead gardens is low and there is a high prevalence of malnutrition in the country. Also due to limited supply of cultivated land field orchards face serious

competition for land from crops such as rice and wheat, and urbanisation, making it unlikely that the field orchard area will grow substantially to meet increased demand for fruits. The clear policy has to be to upgrade and change the homestead production (Karim & Rahman, 1993). In listing constraints in homestead farming 72% of farmers recorded lack of planting material and 82% lack of knowledge as well as other constraints such as lack of capital. Governments assess situations and develop policies and these vary from country to country. For instance the example of Bangladesh homestead gardens is not applicable to other tropical countries in S and SE Asia. Malaysian policy is to develop commercial fruit production through the development of nuclear fruit estates and rehabilitation of unorganised and dispersed smallholders through group farming projects and mini-estates (Tamin, 1993). Both policies will lead to major changes in the traditional agroecosystems.

Table 1 Summary of diversity in home gardens in Ethiopia

	Number of crop species *	Number of which are underutilised crops
Ethiopia		
Fruits	35	7
Vegetables	31	6
Roots and Tubers	12	3
Pulses	14	6
Cereals	6	1
	Number of crop species *	Number in more than 10% of plots
Vietnam		
Fruits	69	10
Vegetables/salad	142	23
Roots and Tubers	26	5
Medicinals	157	
Ornamentals	198	
Spice	60	
Others (green manure etc.)	45	
Timber	49	

* Note: figures include a number of non-indigenous introduced species that have become traditional over the past 250 years.

Developing a clearer strategy

Focus on priority underutilised crops in traditional agricultural areas and development of procedures for assessing the sustainability of their use - tied to focused research to evaluate the potential and ecological requirements - could go a long way in advancing knowledge and avoid the limited and piecemeal research. In order to help strategy development at the national level it is recommended that a small methodology workshop be convened

by ICUC, FAO and IPGRI to develop guidelines in this area and that funding should be sought to test the guidelines in the context of already- agreed priority underutilised crops. This testing could be within the framework of the active coordinated networks and with participation from suitable experts who have developed the thinking in this area e.g. through the EU Project T53+CT920121 (Life Sciences and Technologies for Developing Countries); see EU, 1998. Methodology will include

assessment of local know-how, socio-economic background, policy framework, development of a scientific and analytical framework to establish the agro-ecological potential (Fig. 1). It should be noted that a 4-year time frame is minimum and for long-lived perennials may be much longer. Even so trials will take a number of years so the time frame in Fig.1 is less important than the methodology.

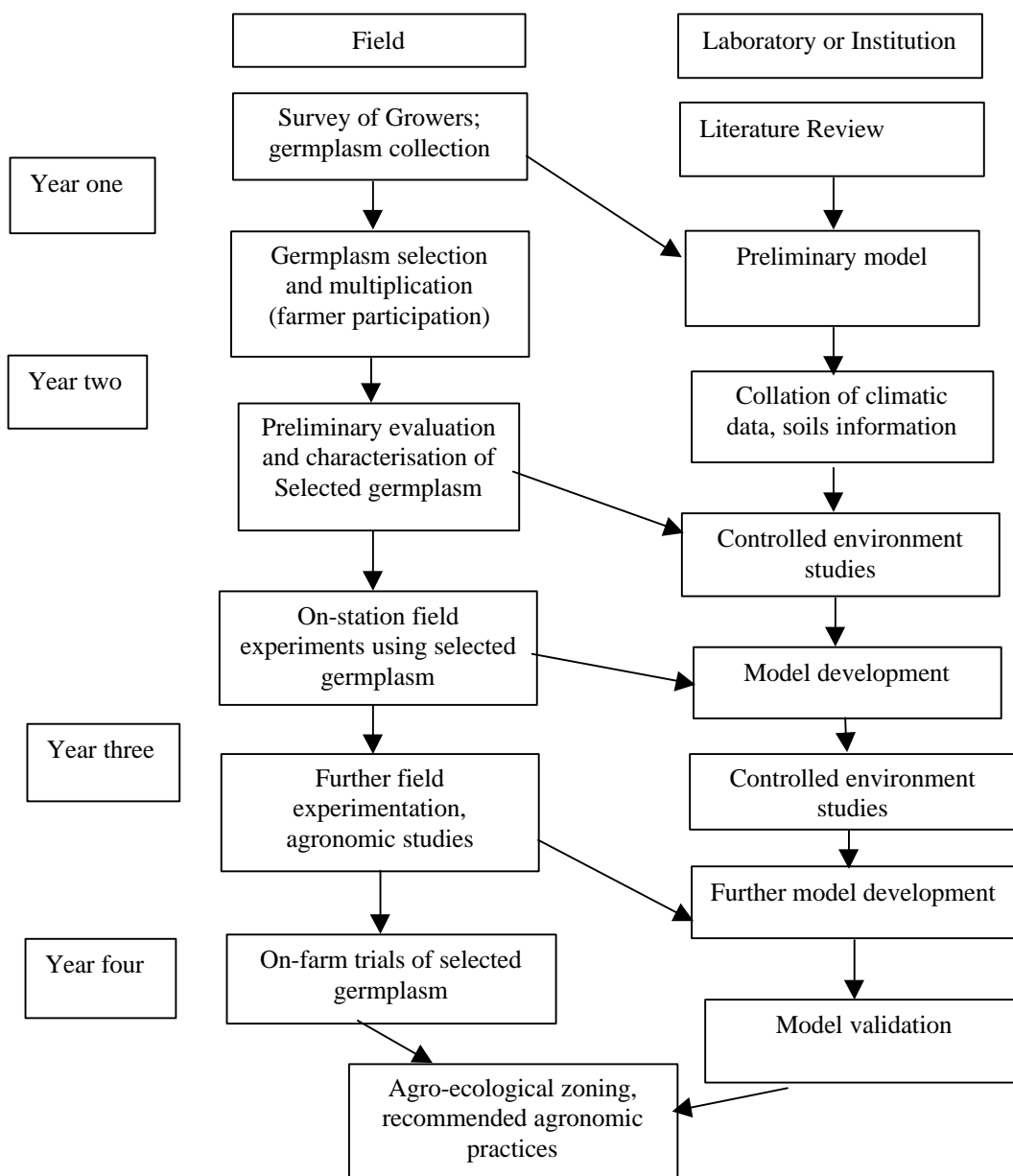


Figure 1 An approach to assess the yield potential and ecological requirements of any underutilised crop

The Need for Information

Slow progress in developing underutilised crops results from a number of constraints outlined and summarised below. They include lack of:

- Available information on production, consumption and utilisation,
- Available genetic materials for testing,
- Coordination of stakeholders from producers to researchers and users,
- Coordination of project formulation at national, regional and international levels,
- Prioritisation for genetic resources and sustainable utilisation,
- Marketing and transport facilities, improved genetic materials,
- Improved agronomic practices,
- Training,
- Promotion of specific underutilised crops, and
- Government policies, initiatives and incentives to producers.

At one time it was felt that compendia of information crop by crop would provide useful starting points for institutions taking up underutilised crop research. The efforts in recent years have produced a number of valuable compendia but there is no evidence to show that they have stimulated major new research efforts. In the future, almost certainly, information will need to be in computerised documentation systems, and constantly adding to these will a major responsibility for the global community. It has been largely ignored to the present, and has not attracted funding.

It is recommended that in the context of the Global Plan of Action, FAO in collaboration with ICUC, initiates such a documentation system and mobilises funding for it.

It should be noted that many misunderstandings are apparent in

terms of recent discussions on sovereign property of plant resources. Better information would go a long way in dispelling some misconceptions, and also inactivity stemming from them.

It is often widely misunderstood that traditional agriculture and production of underutilised crops to mitigate emergency situations is based on rich indigenous diversity. In fact when national priorities are defined to enhance research on underutilised crops many individual crops are exotic introductions. Mal (1995), in listing such priorities for India, includes 8 first priority crops, 10 second priority crops and 4 third priority crops. Of these, 3, 3 and 4 respectively are introductions.

Similarly, the MESFIN Network on fruits of the Mediterranean focuses on 16 crops or crop groups of which only 2 are indigenous to the region, although many have shown secondary diversity in the area. Most of these fruits are of major interest but several are underutilised.

Enhancing research priority setting and cooperation

Research planning and priority setting are closely linked and determined by government policies. Earlier sections of this report have shown that clear government policies in relation to underutilised crops are rare.

In effect what is needed is appropriate policies in association with supportive institutions of the NARS to produce targeted improved technology which aims at sustainability, adequate recognition of women and poverty alleviation. Reaching decisions at the government level on priorities and modalities for action is only logical using mechanisms that are participatory:

- (i) assessment of knowledge on resource use systems

- (ii) developed by farming communities
- (iii) recognition of urgent social and economic needs
- (iii) matching existing resources to enhanced production of commodities and products, and,
- (iv) recognising there are often eco-regional complementarities with neighbouring countries.

In recent years it has become far more widely recognised that research priority setting and strategy development at the national level needs to involve all actors within diverse Ministries. This means that priority setting for underutilised crops requires not only the broad NARS (research institutes, universities, NGOs, user groups, private sector etc.) but also input from agencies involved with environment, Agenda 21, and others.

There is a need for international organisations to facilitate national policy development. This would also greatly enhance regional and subregional cooperation. The Asia Pacific Association of Agricultural Research Institutes (APAARI) met in 1996 and discussed subregional priorities. Discussions on underutilised crops led to different focuses: need to prioritise and integrate research on non conventional or underutilised species (S.Asia), or specific focus on enhanced production and commercialisation of fruits and other underutilised crops (S.E. Asia).

Since subgroupings for research recognise traditional linkages and common and diverse national, economic, social and political differences the research groupings will only be successful when these have been built on a series of the national policies.

Due to the lack of critical mass of researchers on underutilised crops, intercountry cooperation is likely to be needed for quite some time.

It is recommended that in the next 2-3 years, ICUC, GFAR, FAO, and CGIAR should promote national policy development and regional cooperation for underutilised crops. This could be done through the subregional discussions of GFAR.

NETWORKING

SEANUC: Needs SEANUC meeting to develop the research plan for the next 5 years.

UTFANET: The 6th Steering Committee is planned in Bangkok in January 2002.

European Network – ICUC organised a meeting in January and 12 European country representatives attended the meeting. An adhoc European committee to establish a European centre was established. The Committee agreed that the Director and the Chairman of ICUC Board Trustees should push the centre forward.

NEW PUBLICATIONS

Medicinal Plants of Pakistan is now published.
Status Report of Five selected crops of Pakistan – complete.

Food and Agriculture Organisation (FAO)

FAO SUPPORTS GENETICALLY MODIFIED FOOD

Biotechnology and genetically modified organisms (GMOs) can help to increase the supply, diversity and quality of food products and reduce costs of production and environmental degradation, as the world still grapples with the scourge of hunger and malnutrition, according to **Dr. Jacques Diouf**, Director-General of the UN Food and Agriculture Organization (FAO). The environmental risks of biotechnology should, however, be

openly addressed and the new technology should not be allowed to widen the gap between rich and poor nations, he said.

Dr. Diouf was addressing the international conference on 'Genetically Modified Crops, Why? Why not?' organized by the Royal Swedish Academy of Agriculture and Forestry (Stockholm, 14-15 May).

Dr. Diouf said that "each GMO application must be fully analysed on a case-by-case basis". Through complete and transparent assessment of GMO applications, and recognition of their short- and long-term implications, the debate can be less contentious and more constructive. The scientist has a fundamental ethical responsibility in this regard", he added. "widely communicated, accurate and objective assessments of the benefits and risks associated with the use of genetic technologies must be made available to all stakeholders."

Properly harnessed, biotechnology and genetic engineering can help to alleviate food insecurity and malnutrition, Dr. Diouf said.

"We can no longer depend on bringing significant new areas of virgin lands into the food production chain and further expansion of food production must come from increased yields on the lands already farmed by the poorest of small farmers and the larger farms alike. This raises the twin challenges of raising productivity on the more fertile lands farmed by the better-off farmers together with an improvement in the output and range of food crops that can be grown on the less well-endowed fragile marginal lands," he said.

"It is now widely recognised that we are at a post-Green Revolution standstill and that yield ceilings of the main food crops have already been reached in conventional breeding programmes," Dr. Diouf

said. Biotechnology and genetic engineering could help to overcome this problem and increase yield ceilings.

Dr. Diouf called a new variety named Golden Rice' "perhaps the most significant genetic engineering breakthrough which has direct relevance to malnutrition and food insecurity." 'Golden Rice' is a transgenic rice variety that produces pro-vitamin A and has increased levels of iron.

"There is strong and justifiable interest to make this transgenic plant available to farmers in developing countries, especially to combat premature death and blindness arising from Vitamin A deficiency. It is estimated that 180 million people are Vitamin A deficient, and that each year two million of them die, hundreds of thousands of children go blind and a significant number of women suffer from anemia, which is a major cause of death in women of childbearing age," Dr. Diouf said.

Dr. Diouf called for new investments in research systems, for training and technical assistance across the developing world. "Developing countries need assistance, not only in laboratory facilities and know-how to undertake the field testing of GM crops and the other products of biotechnology research; they also need assistance in research policy and management issues pertaining to biotechnology and genetic engineering research."

In this context, governments and the international donor community should strongly support national agricultural research systems, Dr. Diouf said. "The private sector and in particular the large multinational Life Science companies have a very important role to play in this regard, not only in openly sharing the results and products of their research but also in engaging in specific partnerships (research and training) with the national research systems

so as to harness advances in biotechnology and genomic research in the fight against poverty and food insecurity".

Source: D+C Development and Cooperation, Sept/Oct 2001.

ECOPORT

FAO and EcoPort in the Global Forum on Agricultural Research (GFAR) – Orphan and Under-utilised Commodities (UOCs) - Crops.

Following the first UOC meeting held at FAO, Rome in January 2001, the EcoPort team at FAO set up an Internet search profile for UOCs. At the UOC Bonn meeting in July this was presented with 60 species having been described. By the time of publication of this newsletter it is hoped that all the (approximately) 120 species noted in the joint IPGRI/ICUC report ("Global Research on Under-utilised Crops" by Williams and Haq) plus a few others will have been described.

In order to search for the UOCs - in the Home Portal of <http://www.ecoport.org> - "Search Entities" - "By Type" - choose "Plant" -then "Define Search Profile" then tick Use: Level 1 - "Orphan Commodity" either alone (to give the total species) or in combination with other fields in the profile.

Many of these need Editors; please contact peter.griffee@fao.org <<mailto:peter.griffee@fao.org>> should you be interested. You may have noted that Nelson Mandela is now sponsoring EcoPort's Home Portal.

Source: Peter Griffee

INDUSTRIAL APPLICATIONS OF BIOPLASTICS

Bioplastics are increasingly advancing in quality and becoming functionally advanced plastics. Their properties are comparable to several

synthetic plastics but when disposed of in landfills or in composting units, they degrade into low molecular weight products which can be assimilated by the action of naturally occurring micro-organisms. Legislation will dictate that even trace toxic residues are not left behind in the degradation process of disposed of bioplastics, and that "cradle to grave" life cycle analysis concludes that the product does represent an environmental gain. Bioplastics are a group of materials with many inherent properties, which will assist mankind in many ways without adversely affecting the eco-balance.

Sustainable plastics

Quality

Biodegradable industrial plastic materials which are comparable in quality to, or better than (depending on the application) synthetic plastics, have a place in the market. Biodegradable plastics should be considered for market sectors in which recycling is difficult, use is short-lived, biodegradability is a performance requirement or is desirable, or the characteristics are the most suitable for the intended application.

Environment

There is no single, simple solution to waste management but there is a fairly broad range of options comprising either the reduction of the amount of material entering the waste stream (recycling, long-use), and/or dealing with methods of disposal, which is where biodegradability becomes important. Synthetic plastics offer durability and resistance to all forms of degradation including biodegradation. In addition, they offer a large variety of cost effective performance characteristics. However, use of long-lasting plastics for short-lived applications add to the environmental plastic burden, often unjustifiably. Sustainable development means that design, production and consumption of commodity and specialty items

should take into account the most suitable material for the application when viewed in terms of its interactions with the environment.

Legislation

Biodegradable plastics offer energy savings and sound environmental benefits, making the integration of these materials into the waste management policy in Europe worthwhile. Establishment of definitions comprising all possible categories of environmentally degradable plastics, together with suitable standards and testing protocols is required. The nature and the fate of the degradation products constitute a crucial point for the acceptance of plastics. The European test standards for measuring biodegradability under composting conditions are currently under development. The issue to be addressed is if current laboratory tests accurately reflect the biodegradability of a material in a real compost pile. The key issue is whether the biodegradation material is harmful to the environment. In Europe, CEN (European Committee for Standardisation) and DIN (Deutsche Institute für Normung e.V) have proposed composting standards. The CEN standard supports the European Packaging Directive. Successful efforts are underway to harmonize the different methods and definitions for aerobic and anaerobic degradation.

Industrial Applications

Short-lived products: packaging, foams, hygiene products, fast-food packaging and throw-away cutlery and bags, multi-film or food wrapping films, disposable items such as diapers.

Where biodegradability is required or desired: gardening (plant pots), soil sheeting or bags for rubbish disposal.

Performance: Paper lamination, hot melt adhesives, textile fibres, medical devices, controlled release systems.

Challenges Ahead

In theory, bioplastics could substitute for conventional synthetic plastics in many applications. In practice substitution is often feasible but neither wanted nor lucrative. Technical performance must be matched by economic viability. Economic viability depends on the investments needed for material and product development and production, but also on the added value of the bioplastic in the particular application. Only a clear value in terms of performance and environmental impact can justify the consumer choosing these materials, often at a higher price than conventional plastics. As far as the environmental added value of bioplastics is concerned, only adequate legislation will make it possible to fully benefit from them. In summary, acceptance of bioplastics depends mostly on 1) price versus environmental worth, 2) legislation, 3) total biodegradability and 4) development of an infrastructure to collect, accept, and process biodegradable polymers as a generally available option for waste disposal.

In February 2002 ENICA are organising a congress on 'Industrial Applications of Bioplastics'.

Networks

ASANET

Note on African Safou Network (ASANET)

1- Background

Central Africa is a 5,420,000 km² area, with 90 million inhabitants (in 1996). The geography of this region produces many types of climate and a great diversity of plant and animal species.

The socio-economic background is as follows :

-A high population growth-rate with more than 50% under 20 years old.
-A very low standard of life.

The level of industrialisation is very low and restricted to agricultural products and timber processing. Agriculture and mining are the dominant sectors of economic life. Agriculture occupies 70-80% of the population and contributes 25-76% towards PIB, depending on the country.

However, despite their importance at the national or regional level, many plant species that have their origins in Central and West Africa have not so far been subjected to scientific investigation. Despite their importance in the daily life of the population, they are still gathered in the wild, or cultivated on a small scale with traditional techniques. Safou or African plum (*Dacryodes edulis*) and other traditional oil crops are examples of such plant species.

For almost 2 decades, prices of basic agricultural products in the world market have dropped drastically. In this situation, safou and many other non-conventional oil crops were found to play a significant role both as food and a source of income for poor rural populations. Then came the idea to try to persuade farmers, researchers, traders etc. to promote the production of all the *Dacryodes* and other non conventional oil crops and to utilise their products and by-products.

In 1991, Marien Ngouabi, University of Brazzaville (Congo), organised the Brazzaville scientific days including a 2-day workshop on *Dacryodes edulis*. The workshop finished with a strong recommendation to set up a collaboration network on *Dacryodes edulis*.

In 1994, Douala (Cameroon) hosted the 2nd workshop on the improvement of *Dacryodes edulis*. Participants from 4 countries (Cameroon, Gabon, Nigeria and Congo) went a step further by

mandating some IRAD (Cameroon) researchers to prepare a draft constitution for the network.

In 1997, the draft constitution was presented in the Ngaoundéré workshop, amended and adopted by the African safou network (ASANET) General Assembly. In the meantime, the General Assembly decided to extend the network mandate to other traditional oil crops having food or cash value: *Coula edulis*, *Irvingia gabonensis*, *Vitellaria paradoxa*, *Ricinodendron heudelotii* etc...

2-Network Objective

The objective is to promote scientific and technological research on African plum (*Dacryodes edulis*) and other new (non-conventional) sources of vegetable oil, their products and by-products. To this effect, ASANET ought to carry out the following:

- encourage and support research and development aimed at removing constraints on the sustainable exploitation of safou and other non-conventional oil crops;
- facilitate the exchange of plant material among its members, being mindful of legislation in force in the countries concerned;
- encourage dissemination of established results and create conditions for emergence of producers utilising modern techniques,
- initiate short and long term training schemes, and organise conferences and workshops.

3-Achievements

The prior commitment of the ASANET Executive Bureau first mandate was to advertise the network and acquaint all the participants with the advantage of a network approach. The result has been that the number of network members (institutions and physical persons) has increased by more than 30% in three years. To date, the network has 120 members.

The Third International Workshop on the Improvement of Safou and other Non-conventional Oil Crops, held in Yaoundé in October 2000, was a great success regarding the number of participants and the quality of papers presented. This shows that ASANET is promised a bright future.

The newsletter is regularly issued as the main tool of information dissemination for the network.

4-Prospects

The main focus now is to search for funding in order to :

- support the regular issue and distribution of the network newsletter;

- carry out activities on nine research proposals suggested at Yaoundé 2000 workshop;

- create a database on safou and other non-conventional oil crops.

Dr J. Kengue
Executive Secretary

The Carifruit Network

The goal of the Carifruit network is to improve the economic viability and sustainability of the fruit industry in the Caribbean. The specific objective of Carifruit is to improve the quality and yield of fresh fruit and their efficient marketing and processing.

Carifruit publishes its network news in the quarterly publication of the IICA Tropical Fruit Newsletter.

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Africa

THE KULIKA CHARITABLE TRUST

The Kulika Charitable Trust was established in April, 1981 to provide a scholarship resource for students from anywhere in the so-called "developing world". Students were sponsored for studies, mainly in the UK, in fields that would enable them to contribute to the development of their home countries. The Chairman of the Trust, Patricia Brenninkmeyer, had lived in Uganda in the 1960s and 1970s and worked as a social worker in childcare. When the political situation in the country stabilised in the mid-1970s the focus of the Trust's activities shifted to Uganda.

Today the Trust works only in Uganda, and in 1993 a daughter organisation, the Kulika Charitable Trust (Uganda), was established as an autonomous NGO. Kulika Uganda operates a Scholarship Programme for Ugandan students, mainly offering scholarships for in-country study. These provide opportunities to study in a wide variety of areas that are important to the development of the nation. At any one time around 120 students are under Kulika sponsorship. A small number are still sponsored for study in the UK, but only in subjects that are not taught locally and where the student displays considerable potential.

Source: Tropical Agriculture Association UK Newsletter, Sept. 2001

PRESERVING TRADITION

Forests and woodlands cover over a third of the total land area of Tanzania, and are the main source of fuel, timber, fruits and other foods for many rural communities. More than 50 indigenous wild fruits grow in the Miombo woodlands alone, which dominate the west and south of the country. They offer valuable

nutrients to rural families, but less than half the fruit is collected, leaving the rest to rot in the forest or be eaten by monkeys.

The International Centre for Research in Agroforestry (ICRAF) is working with local women's groups and the Tanzanian Women Leaders in Agriculture and Environment (TAWLAE) to increase awareness of the high nutritional value of these indigenous fruits, and enable the women to maximise their potential for income generation through the making and selling of jam, wine and juice. Baobab juice is the best seller, and the simple recipe below uses all natural ingredients and traditional techniques.

JUICE

Ingredients

- 1.5 cups of ripe fruit pulp
- 0.25 kg sugar
- 0.25 cup lemon juice
- 0.25 litre of water

Preparation

- Extract pulp from ripe fruits by using hot water.
- Extract lemon juice
- Prepare rind from lemon fruits (by using a grater).
- Dissolve sugar in the warmed water, add rind and strain through a cheese cotton muslin cloth.
- Add extracted juice to the sugar syrup, mix well and then add the lemon juice and boil for one to five minutes.
- Pasteurise the juice below boiling point for less than a minute. Pour the juice into sterilised jars and heat for five minutes with loose lid and tighten after cooling.

Source: Developments, second quarter, 2001

GROWING POSSIBILITIES FOR REGIONAL TRADE

When your traditional major suppliers and major markets are five or ten thousand kilometres away, it makes sense to see if there are possibilities to develop trade nearer

home, even if your neighbours are one or two days' sailing away.

Such is the reality for producers and traders in the countries and entities of the Indian Ocean: the Comoros Islands, Madagascar, Mauritius, Reunion and Seychelles. Inter-island trade accounts for only 3% of their current commercial exchanges, but there is much to be done to increase it, whilst ensuring that the relevant quality standards conform to those of international trade.

The economies of the Comoros and Madagascar are largely agricultural, with a major focus on the domestic market; for them, many export opportunities remain to be seized. The other three islands are more open to the international market and, partly because of a well-developed up-market tourist trade, they have a heavy dependence on imported foodstuffs. To switch these imports from the traditional sources of China, Europe, India, Kenya, and South Africa to imports from neighbouring islands could reduce costs significantly.

The catch lies in the perennial issue of quality, in both products and the delivery chain, in particular in the sector of processing raw and fresh foods (fish, meats and fruit and vegetables). It was to address the issue of how to develop and strengthen small enterprises in inter-island trade that the CTA, together with the International Labour Organisation and the integrated regional programme for development of trade exchanges (PRIDE), organised a seminar in the Malagasy capital Antananarivo in March 2001. Their painstaking preparations in surveying the state-of-trade, product by product, country by country, provide insights in both end-products and methods that may be of interest to other island groupings.

The thirty participants urged greater harmonisation between countries on food quality and health standards, the removal of tariffs, and

accessibility of market information, the latter being more likely if the various information network initiatives in the region, once operational, were to be more closely integrated and regional mechanism more active. Clearly, by working together to improve exports to each other, the five countries concerned will strengthen their ability to trade on the global market.

PRIDE

BP 34

Antananarivo 101, Madagascar

Fax: +26120 22 64136

Website: www.coi-info.org/pride

Source: SPORE, June 2001

2020 VISION SUPPORTS RESEARCH IN EAST AFRICA

As a way of generating information and strengthening capacity to conduct policy research, the 2020 Vision Network for East Africa is actively supporting research on food, agriculture, and the environment in the network's member countries (Ethiopia, Kenya, Malawi, Mozambique, Tanzania, and Uganda). The network has established a competitive grants program that is currently funding research in several member countries and is now undertaking a second round of grant competition.

Research projects have been funded and launched in Ethiopia (on risk and consumption in farm households and governance of community forestland), Kenya (on animal health services, trade liberalization, and maize marketing systems), and Uganda on agricultural productivity, rice production and food security, irrigation and biodiversity). The network is offering training on research methodologies to researchers involved in the funded projects.

More financial support for research in East Africa is on the way. The network is now seeking proposals for its second round of grant competition and has offered training

on proposal writing in selected countries. Proposals must be received by May 1, 2001. The network has also launched a pilot program to support master's-level students from the six countries whose thesis work 'addresses the agreed-upon policy priorities of their country. Applications for this program must be submitted by July 1st 2001.

For more information on either of these programs, please contact Fred Opio, coordinator of the East Africa network, at E-mail: f.opio@cgiar.org.

Source: News and Views, April, 2001

ARC-GRAIN CROPS INSTITUTE - ANALYSIS OF SWEET LUPIN SEED FOR STOCK FEED

Customer Identification		Anonymous	ARC-Laboratory number	2001-02
Sample size received		2 kg	Sample size analysed	200g
Lupin Species		Lupinus albus		
		Analysis value (g)	Analysis value (%)	Maximum limits (%)
1	Qualitative Bitterness (Alkaloids):			
	a. Bitter Seeds; UV		0	2
	b. Bitter Seed; Dragendorff		3.0	2
These determination are done on clean undamaged seed - see 3a				
2	Quantitative Bitterness			
	a. Alkaloids in flour (Ruiz derived)		0.01-0.03	3
Note: 2a: Quantitative bitterness is a derived value which cannot be warranted.				
3	Seed			
	a. Undamaged seed		100	
	b. Sweet undamaged seed		99.7	
	c. Bitter undamaged seed		3.0	
4	Defective seed (rodents, insects, moulds)		0	5
5	Decoated seed			
	a. Entirely		0	2
	b. Partly		0	
6	Sprouted seed		0	1
7	Foreign matter			
	a. Other lupins		0	
	b. Weed seeds/Other vegetable matter		0	1
	c. Stones (<6,35 mm)		0	1
Note:	4-7 shall be less than 10%, is here:		0	10
8	Discoloured seed		0	10
9	Free from odours		None observed	
10	Free from harmful chemicals		None observed	
Remarks: Sample acceptable for animal usage				

Source: Luptec, ARC-Grain crops Institute

POTENTIAL OILSEED TREES OF AFRICA

The following is a summary of the paper presented at the third International Conference of Oilseed Trees by N. Haq, ICUC, University of Southampton.

Mankind depends on a very limited number of crops to meet the needs of staple diets and on a few major non-food crops to meet associated needs. Among them a small portion of the world's food comes from tree crops. The utilisation of a large

number of species for various products has not been exploited for sustainable livelihood. The International Centre for Underutilised Crops (ICUC), established in 1988 as a non-profit research and development organisation, has initiated a series of programmes on the domestication and utilisation of non-wood products, such as jackfruit, mangosteen and pummelo in Asia and *Vitellaria paradoxa* in Africa.

Africa has a rich heritage of useful indigenous multipurpose tree species. These resources have

played a great role for centuries in feeding people, keeping them healthy and giving them shelter through good years and also through bad years, particularly when drought persisted and crops failed. Many of these multipurpose species are oilseed bearing trees and are part of the forestry ecosystems. People who live with this system protect and use them every day. However, the population pressure along with modern need is causing destruction of this system.

Oilseeds constitute an important group of crops of the total world

cropped area. Vegetable oils account for about 70% of the total availability of all oils and fats. There are two distinct types of vegetable oil yielding crops; 1) perennial and 2) annual crops. In the past vegetable oils, fats and tallow have been utilised for food (80%), animal feed (70% and 13% in the industrial sectors.

There is impressive growth in the consumption of oils and fats worldwide. This will increase further along with the population growth. The increased demand for fats and oils can be met by African heritage as we have seen oil palm's contribution to world production. There are many perennial species, similar to oil palm and coconut which provide vegetable oil, not only for use as cooking oil for marginalised women and men in the world but also for small scale industries, to generate income for their livelihood. The uses of these trees are only known to those who live locally. Several organisations have started to gather information on these species for domestication and for establishing them in agroforestry systems. The present status of some of the under-utilised African oil bearing tree species, their constraints to utilization and marketing are highlighted in the paper. It is hoped that the existing information would provide a consensus to develop an effective regional programme on oilseed tree species for sustainable livelihood and food security. ICUC is willing to take part in developing such a programme for the effective utilization of African resources.

Global

TRADITIONAL FOOD SYSTEMS

The term "traditional food system" (TFS) is here defined as "a complex of production, distribution and processing activities, which have in the past provided the typical way of feeding populations and which

continue, to a varying extent, to contribute to this process". TFSs have connotations of: small scale modes of production; fairly simple storage and processing technologies; high labour intensity and often substantial participation by low income groups, particularly women. They are often also associated with subsistence production and/or largely local trade. However, our definition of TFSs also includes the "traditional" small-scale traders with few fixed assets and limited access to formal financial institutions, who dominate many national, and sometimes cross-border, food markets.

The definition of TFSs adopted here focuses on the socio-economic characteristics of the systems concerned. The crops involved vary from place to place. In much of sub-Saharan Africa, coarse grains (maize, millet or sorghum) would be widely accepted as "traditional" food crops, but not wheat and rice. In South Asia, meanwhile, rice is a central feature of most TFSs. However, modern high yielding varieties, which accounted for three quarters of the area planted to rice in Asia in 1990, might not be considered traditional. In some parts of both sub-continent, various roots and tubers, pulses, bananas and vegetables (especially leafy vegetables) might all be considered traditional food crops. They are grown for home consumption, sold in local markets and, with growing urbanisation, increasingly also sold to urban markets.

It is important to note that the crops associated with particular TFSs may also vary over time. For example, the widespread adoption of maize in Tanzania (as in many other parts of eastern and southern Africa) actually only occurred part-way through this century. Recent CPHP-funded fieldwork showed that producers in Sumbawanga Region of the country were reverting to production of millet, their "traditional" grain crop, following the removal of the final

price supports for maize in the 1990s.

Source: CPHP, (NRI) Issues Paper 2 December 2000

Europe

THE UPS AND DOWNS OF THE HERBAL MARKET

Europe has seen huge variation in the sales of herbal supplements during the year 2000 according to Dr Joerg Gruenwald, President of Phytopharm Consulting. In a recent presentation on the state of the herbal market Gruenwald indicated that while the market has been in decline in places like Germany and France in countries like Poland and Spain it has been growing at more than 8% per year.

Swings and Roundabouts

Germany	-3%
France	-2%
UK	-2%
Poland	+11%
Spain	+10%
Austria	+8%

Adapted from Phytopharm Consulting 2001

The US market is going through a similar upheaval. Gruenwald indicated that while products like St Johns Wort may be in the doldrums with sales declining by more than 40%, sales of other products like Soya and Elderberry have grown by 100% to 200% during the same period.

Ginkgo	-30%
Echinacea	-24%
St Johns Wort	-44%
Soya	+204%
Elderberry	+112%
Valerian	+59%

Adapted from Phytopharm Consulting 2001

ECONOMICS RESEARCH ON AGROBIODIVERSITY IN HUNGARY: THE BIOECON PROJECT

The BIOECON Project is an economics research consortium of European universities and research institutes funded by the European Union. It has three main objectives: advancing economic theory on incentive mechanism design; applying economic analysis in biodiversity conservation case studies; and developing policy implications.

The priorities of BIOECON are to reconcile the conservation of biodiversity with economic development, and to encourage compatibility between international environmental and trade policies. IPGRI is a partner in BIOECON and is carrying out research on the economic values and policies for conservation and use of crop landraces as economies develop and farmer's opportunities change. IPGRI coordinates national case studies investigating farmers' incentives for cultivating landraces and relevant policy options given rapid economic change. The three countries included - Hungary, Morocco and Nepal - provide points of comparison in terms of income and stages of economic development.

TRIALS HAVE SHOWN THAT THE NEW VARIETIES OF LUPINS ARE MORE VIABLE FOR SCOTTISH SOILS

New spring-sown lupin crops have been growing well on a number of farms in various parts of Scotland. Angus Thomson, who farms 300 acres at Whiterow, Forres, has grown almost 20 acres of lupins for the first time this year, forfeiting about £1,500 in arable area payments on his usual cereal crops in an effort to demonstrate that the crop is viable in Scotland. "New lupins have a very similar protein content – and offer an alternative –

to soya, which is increasingly difficult to source in its non-GM form," he said. "The crop can be cut and fed as silage; it can be crimped or it can be cut as a dried crop and put through a bruiser."

Total traceability is a big plus for stock farmers and the returns - £120-£150 per tonne on a yield of 1.5 tonnes per acre- compare well with spring drilled crops.

In trials, the new varieties have been harvested earlier than peas and beans and some farmers on difficult land say they find lupins to be a good biological drill.

Source: Business Scotsman, 29th August 2001

South America

Brazil

CPAA: AGROFORESTRY IN AMAZONIA AND ELSEWHERE

CPAA, (Centro de Pesquisa Agroflorestral da Amazonia Ocidental) is the agroforestry research centre of the Brazilian Agricultural Research Corporation EMBRAPA. It was founded in 1989 with the mission to disseminate scientific knowledge and technologies aimed at the development of the western Amazonian region. Several elements of CPAA's activities could be of interest to ACP countries.

CPAA has launched research programmes on extensive or "part-time" agriculture, processing of regional products, protection and conservation of genetic resources, rehabilitation and maintenance of degraded or abandoned lands, horticultural and fruit crop systems, and sustainable fisheries and agro-industrial development.

CPAA closely collaborates with universities and international organisations, as for its SHIFT

Studies on Human Impact on Forests and Floodplains in the Tropics programme. SHIFT is carried out jointly with the German Max Planck Institut and marine research centre ZMT and their Brazilian partner INPA, the national Amazonian crops institute.

A data bank on specific crops.

CPAA is currently compiling and disseminating a database containing information about specific fruit tree species, seed, and improved plant material. Research focuses on cupuacu (*Theobroma grandiflorum*), a tree with very aromatic and sweet fruit used in jams and syrups; dendzeiro oil palm (*Eleias guineensis* Jacq.); guarana (*Paulinia cupana* var. *sorbilis*), a big liane, whose seeds have medicinal and energetic properties; hevea; and cassava. Another research project is pupunha (*Bactris gassipaes* Kunth), a palm fruit with a very delicate and much appreciated taste; it can be eaten directly, made into flour or pressed for extracting oil. The Pupunha-Net (www.inpa.gov.br/pupunha/) brings together researchers and entrepreneurs; it is a source of theoretical and practical information, including a detailed introduction to the production system of this palm.

CPAA is also a well-stocked centre of information and documentation that can be consulted through Internet:

www.cpea.embrapa.br/biblio/sin.htm

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Source: Spore, August 1999

HOW FARMERS MANAGE TREE GERMPLASM IN THE PERUVIAN AMAZON BASIN

Tree Domestication

Put simply, domestication means bringing a wild species into regular use. Unlike crop plants, most agroforestry trees persist in a wild or semi-domesticated state and are not necessarily adapted to farming systems. Consequently, ICRAF is actively encouraging farmers to domesticate agroforestry trees. In the areas we studied, farmers were already selecting and multiplying several fruit and timber species that promised to yield marketable products in less than 5 years. But this selection strategy may reduce genetic diversity within these species at the farm level, potentially leading to a decline in future production. Indeed, many farmers did not think about the long term, had no idea of the variation that existed within most tree species; and did not realize that their own cultivation practices could have eventual negative consequences.

Source: Agroforestry Today. Volume 12, no 1.

PROCITROPICOS RESULTS 2000

Among the activities executed by the executive Secretariat of PROCITROPICOS during the year 2000, the following can be mentioned:

a) the realization of two important International Seminars: one on the Agribusiness of the Oil Palm, carried out in Belem; PA, Brazil. In that seminar more than 180 technicians belonging to more than 15 institutions of Brazil and from the exterior participated. The other was on Continental Aquaculture in the Amazon Region, carried out in Manaus, AM, Brazil where more than 200 technicians belonging to 15 institutions of Brazil and from the exterior participated.

b) 600 copies of the book: Intellectual Property and Agricultural Research in South America were published and distributed.

c) 500 copies were published and distributed, approximately, 400 of the document: Annals of the International Workshop on development of continental aquaculture, Iquitos, Peru, December, 1999 and 400 copies of the document: International Seminar "Agribusiness of Oil Palm: a social, economic and environmental alternative for the sustainability development of the Amazon" were printed, published and distributed to 1200 specialists and researchers.

d) Other results were the tap of financial resources equivalent to US\$515.300;

e) More than 90 conferences were elaborated and presented in the diverse organized seminars;

f) More that 65 institutions of R & D of the region participated; 41 actions of professional exchange were carried out.

g) The execution of 5 regional projects and elaboration of 4 new regional projects: i) Integrated agropasture project for the recovery and development of degraded areas of savannas; ii) Environmental and socioeconomic risks for agriculture development in the South American tropical savannas; iii) Cooperative of Bank databases of natural resources of the South American tropics; and iv) Development of the cultivation and commercialization of the "*cupuacu*" (*Theobroma grandiflora*) in the Amazon basin. 20 new sustainable technologies of Embrapa were also identified, for the development of the South American tropics, of which 5 are being prepared for distribution to the extension services.

Source: Procitropicos News, March 2001

Crops News

Fertigation Research on Mangosteen in Thailand.

(This report is part of the ICUC-UTFANET project funded by the Community-Fund, UK)

Recently growth of demand for mangosteen among domestic market and foreign market has indicated that mangosteen will be increasingly important as one of economic fruit of Thailand. At present, mangosteen has been planted all over the country covering an area of around 19,200 hectors enhancing yields to 108,000 metric tons/year. Some fruit crops have been exported to foreign markets, especially Hong Kong, Taiwan and Japan. The trend of demand for export is increasingly well developed. However, to access the effectiveness of high yields for export still be restricted relative to 80% of mangosteen's quality regarding fruit size and translucent fruit disorder is lower than the standardize to export.

Thus, the research on mangosteen production will focus on development of new cultural practice technology for high productivity with respect to high quality. Fertigation practice is a technique of supplying dissolved fertilizer to crops through an irrigation system to improve efficiency of fertilizer recovery, minimal losses due to leaching, control of nutrient concentration in soil solution and flexibility in timing of fertilizer application in relation to crop demand based on development and physiological stage of crops.

Chanthaburi Horticultural Research Center has begun fertigation study on enhancing yields and fruit quality of mangosteen (*Garcinia mangostana* L.) at farmer orchard Chanthaburi province, Thailand since 1998 which compared to traditional fertilizer application. Plant growth, yield parameter and yields were

recorded as indicators to fertilizer efficient. It was shown that the fertigation applied at 550-300-1000 gram of N-P₂O₅-K₂O resulted higher yield and tended to promote fruit quality in a reduction of fertilizer cost. Plant leaf tissue and

soil analysis information revealed that the nutrient concentrations were not undergo flux during 2-year period and pronounced very little difference between nutrients in the extent of traditional fertilizer application.

However, fertigation rates and management strategies should be based on judgment of tree nutrient status, crop demand, soil availability and other site-specific variables.

Table 1: Comparison of traditional fertilisation and fertigation on yields and fertigation cost. (average in 2 years)

Treatment	Fertilizer rate/tree N-P ₂ O ₅ -K ₂ O	Number of fruit/tree	Fruit weight (g)	Yield/tree(kg)	Fertilizer cost/ha/year (US \$)
Traditional fertilization	880-1200-1300	228	100	22	422
Fertigation *	550-300-1000	504	92	43	357

* Fertigation rate was based on judgment of tree NPK status, crop removal and soil nutrients availability.

Table 2: Removal of N, P and K by fruit of Mangosteen (g/kg)

Fruit part	N	P	K
Pulp	0.25	0.08	0.25
Aril	1.00	0.47	3.07
Seed	0.04	0.01	0.05
Stalk	0.11	0.01	0.23
Total	1.40	0.57	3.60

Source: Panjaporn Lertrat, 1999. Horticulture Research Institute Newsletter: 12(2-3);4-6.



(a)



(b)

Figure 1: (a) Farmer orchard of 15-year old mangosteen in Chanthaburi province, Thailand. (b) A venturi pump used in fertigation head unit.



Figure 2: A comparison of a traditional fertilizer application (a) and Fertigation (b) on fruit quality.

Source: Panjaporn Lertrat, Chanthaburi Horticultural Research Center, THAILAND

THREATS TO GENETIC RESOURCES OF WILD FRUIT TREES IN EUROPE (EUFORGEN Noble Hardwoods Network)

The genetic resources of *Prunus*, *Avium*, *Malus sylvestris* and *Pyrus pyraeaster* are seriously endangered, mainly for the following reasons:

- Extensive tree felling for commercial purposes.
- Rare occurrence and a narrow genetic base cause genetic drift due to small numbers of mother trees and large distances between adult, reproducing trees.
- Natural regeneration is not guaranteed and, if it occurs, it is endangered by grazing.
- Hybridization with cultivated forms of cherry, apple or pear. The identification of the wild fruit trees is difficult, especially for *M.sylvestris* and *P.pyraeaster*, but suitable identification keys have been developed.
- Uncontrolled seed transfer. In EU countries *P. avium*, *M. sylvestris* and *P.pyraeaster* are not included under national legislation for movement of forest reproductive material. Therefore, seed of unknown origin is used for plantations or for afforestation purposes in the landscape and along highways. Clonal plantations are also established through vegetative

propagation of selected material from unknown origin.

- Several diseases, especially viral diseases, have contaminated the three wild fruit tree species and may endanger their existence in some areas.

Source: IPGRI Newsletter for Europe, December 2000.

INDUCED MUTANT FOR MALE STERILITY IN NIGER

Niger (*Guizotia abyssinica* Cass.), an important oilseed crop of the family Compositae is highly cross-pollinated due to the twin mechanisms of protandry and incompatibility. Studies revealed the functional nature of protandry and the breakdown of incompatibility with alteration in temperature. It has very small flowers (disc florets) arranged in a capitulum that open on 3-4 consecutive days which pose problems in emasculation for cross-breeding. To induce mutations, seeds of variety IGP-76' were irradiated with γ -rays 200 to 1000 Gy. All seeds of M₁ plants were sown separately in individual plant-to progeny rows. The results of screening of M₂ segregating material indicated that γ -ray treatment was effective in induction of male sterility. Frequency of visible mutations were higher in sibbed progeny as compared to open

pollinated population and male sterile plants were observed only in sibbed population (1000 Gy). Male sterile plants could easily be identified at the flowering stage by their altered floral morphology (disc florets transformed into ligulate ray florets) and complete absence or presence of a rudimentary anther column. Seeds were collected following sib-mating with the fertile counterparts. Progeny segregated in a ration of 3 normal: 1 male sterile. Further work on the mechanism of sterility, maintenance and linkage relationships with associated characters is under progress. This is the first report of induction of male sterility in niger through the use of physical mutagens. The availability of this mutant will be of great value for exploitation of heterosis on commercial basis.

Source: Mutation Breeding Newsletter, July 2001

TUBERS

Value addition and product diversification

Enhancing the market prospects of tuber crops through the development of value added diversified products is the key towards sustaining these crops in the cropping system of marginal farmers. The value added products developed include yuca rava and porridge, sweet potato

based jam, pickles, squash and sauce, cold water soluble and modified cassava starch, alcohol, fermented cassava flour etc. Some processing equipment that helps in value addition has also been developed, which includes cassava chipping machines, dryers, mobile starch separation plant, raspers, peeling knives etc. Training programmes are also conducted at the Institute on production and processing technologies.

In situ processing units and export promotional approaches

Awareness about the scope of these crops for *in situ* production of food products through small-scale rural processing units is being done. Many products like wafers, chips, pappads, noodles, rava, dried chips, fried chips etc. can be made from cassava and others like jam, pickles etc. from sweet potatoes, with low technological and financial inputs. Setting up of rural agro-processing units based on tuber crops is a major mandate for the institute, to enhance the market prospects of tuber crops.

Source: ICAR News Jan-Mar 2001

MISCANTHUS AS A MULTI-MARKET CROP FOR UK FARMING

Bical Ltd is sponsoring a research project through WMG (The University of Warwick's Manufacturing Group) Engineering Doctorate programme, to discover new and innovative uses for *Miscanthus* Grass (normally grown for biomass fuel or animal litter) aiming to devise high value uses for the material.

Trials on *Miscanthus* chaff as a polymer filler show early promise. The matrix used in the trials is Mitsui Lacea, a biodegradable polylactic acid resin. The addition of *Miscanthus* was found to increase to increase stiffness without affecting the biodegradability of the material. Other work being performed in the research portfolio includes the use of *Miscanthus* as an exfoliant in soap,

and use in garden candles. Previous work by other research bodies has identified the crop as a potential substitute to wood in paper pulps and particle boards.

Composites

WMG has been working on methods to manufacture hemp and flax reinforced composites by extrusion-compression and compression moulding techniques. Conventional resins such as casein and new resins based on starch and polyhydroxybutyrate have been used to bind fibres together.

Source: ACTIN News, April 2001

THE POTENTIAL FOR PASSION FRUIT

Around 1,000 farmers and labourers in Rwanda have now a stable income, thanks to the Aprojofugi farmers' organisation spotting the potential for passion fruit (*Passiflora edulis*). Their market survey and business plan showed a firm proposition, and with an injection of E30,000 from the Dutch embassy, they set up a small plantation and a factory for making syrup from ripe passion fruits. Currently 35 tonnes of the fruit are being processed and sold monthly.

Source: Spore, Feb. 2001

PASSION FRUIT IN ST. KITTS AND NEVIS

St. Kitts and Nevis does not produce sufficient quantities of fruits to supply the local population and overseas visitors with a regular supply of fresh fruit juices. Activities of the Fruit Crop Committee were therefore initiated to increase the availability of fruits and hence fresh juices on the local market. Chaired by fruit crop personnel of the Department of Agriculture (DOA), the committee comprised: representatives from Extension Division in the DOA and support institutions; Caribbean Agricultural Research and Development Institute (CARDI), the

Republic of China on Taiwan Agricultural Mission and the Inter-American Institute for Cooperation on Agriculture (IICA). The committee targeted passion fruit as a fruit meriting further investigation for possible commercial production. The relatively short time frame required for returns, the steady cash flow after establishment and the versatility of the fruit favoured consideration of the commercial production of passion fruit in St. Kitts.

Origin of the Passion Fruit

Passion fruit (*Passiflora edulis*) belongs to the family Passifloraceae, which contains about 12 genera and approximately 500 species. The genus *Passiflora* contains about 400 species, only a few of them have been determined to be of commercial interest. *P. edulis* is a native of Brazil and was widely distributed throughout the tropics and subtropics in the 19th century. Two forms of *P. edulis* are recognised: *P. edulis f. edulis*, the purple passion fruit and *P. edulis f. flavicarpa*, the yellow passion fruit.

The purple passion fruit has round or egg shaped fruit which is deep purple. When ripe, it is sweeter and more acceptable as a fresh fruit than the yellow fruit. The yellow passion fruit is a deep canary yellow. When ripe the fruit is more acidic and utilized mainly for processing.

The purple passion fruit was introduced to St. Kitts and Nevis from Taiwan within the last decade, and only a few plants are found distributed over the island. Information on the introduction of yellow passion fruit was not available. However, the plant may have been around for the last century. Yellow passion fruit is commonly found in backyards of many households and small farms, growing on perimeter fences and sometimes on trees. Although the yellow passion fruit was cultivated for a long time, the potential for

commercialization of the crop is now being recognised.

Supply of Passion Fruit

The local production of passion fruit has been very small and official records of production are not available. Total production for 1997 was estimated at about 1000 kgs. Small quantities of fruits obtained from backyards and farms are distributed to the municipal market, restaurants and small hotels and are absorbed rather quickly. The local supply of the passion fruit was supplemented with fruits which were brought in by traders from Dominica.

The shortage of data on the consumption of passion fruit and the obvious potential for consumption of the fruit, dictated that a survey be conducted with the users and potential users of the product.

The survey found that the estimated quantity of passion fruit that could be sold at the current market price is 3,885 kg weekly in the high season and 3,120 kg in the low season.

Source: Tropical Fruits Newsletter, September, 1998

BREADFRUIT IN THE CARIBBEAN

The Breadfruit (*Artocarpus altilis* (Parkin) Fosberg), has been in the Caribbean for more than 200 years. It has remained seriously under-exploited, despite being an important source of carbohydrate in the diet of Caribbean peoples. Within the last decade, markets in North America and the United Kingdom have been supplied with fresh and processed fruits mainly from St. Lucia and Jamaica. The sustainability of this trade will depend on the supply of increased quantities of high quality fruits and breadfruit products. Identification of germplasm with commercially important traits such as excellent eating quality, high yield and extended shelf-life are important to

stimulate the development of new plantings.

Source: Tropical Fruits Newsletter, March 1998

PROCESSING AND UTILISATION OF ALMACIGA (*Agathis philippinensis* Warb.) RESIN AS A SOURCE OF INDUSTRIAL CHEMICALS

The specific objectives of this project are to study the technical and economic aspects of refining crude almaciga resin on a pilot scale and to develop industrial chemicals from refined resin. The project will involve the promotion and transfer of improved tapping techniques for almaciga resin and development work for increased and further processing of almaciga resin into higher value-added products in order to promote development opportunities and income in almaciga producing forest communities.

The Implementing Agency for this project is the Forest Products Research and Development Institute (FPRDI). Funding countries are Japan and Switzerland.

PROSPECTS ON NON SWEET POTATO (*Ipomoea batatas*) CULTIVATION IN THE FRENCH WEST INDIES

The sweet potato (*I. batatas*) is grown on a significant scale in tropical countries. This tuber ranks seventh among the rootcrops produced world-wide. Sweet potatoes can be grown at any time during the year. Its cycle of cultivation is short (4-5 months). Its capacity for producing starch is equivalent to the white (Irish potato), but it has a better adaptation to the tropical lowlands.

In the French West Indies, sweet potatoes are cultivated as a subsistence crop (5.130 tonnes in Guadeloupe and 1.840 tonnes in Martinique per annum). The total production is constantly decreasing and this may be attributed to

sociocultural pressure and a demand which is increasingly modeled on the classical Western consumer taste preference. It is also possible that the sweet taste of the tuber is responsible for the present disaffection. However, production of this commodity represents an appreciable asset for families with low incomes.

In 1985, F.W. Martin and S.W. Deshpande conducted studies on clones with a low sugar content. The results can be used to enhance interest in the production of sweet potato and to offer local consumers as well as tourists, a variety with additional health advantages. In this respect the authors undertook a study of the behaviour of different varieties of sweet potato and the biochemical mechanisms that control the characteristic of the non-sweet taste.

The results of the biochemical analyses of soluble sugars of fresh tubers showed that the total sugar content; glucose, fructose and sucrose, was twice higher in the sweet control clones when compared to the non-sweet or less sweet clones.

After cooking, maltose was found to be present in the control clones. This sugar was absent in the non sweet clones. The non sweet characteristics of these new varieties can be explained by the absence of beta-amylase which prevents the hydrolysis of starch to maltose during cooking.

The results confirm the work of F.W. Martin (1985), H. Kurkimura, T. Yoshida and K. Komaki (1988). These authors identified a distinctive characteristic of cultivars; Ninety-nine and Satsumahi rari, that is, the absence of the beta-amy-lase activity in these tubers.

The results of the work presented are very encouraging. Non sweet varieties were developed which can be distinguished from the traditional varieties based on taste. These have been named "Pomme patate".

There is now a need to popularize the best varieties of "Pomme Patate": INRA/PP220, INRA/PP230 and INRA/PP044, which complement potatoes and yam when cooked, except in the production of french fries. Diced clones can however be pan fried.

Source: Tropical Fruits Newsletter, Dec. 1998

Recent Meetings

African Network on Natural Gums and Resins

Nairobi, Kenya, 29 - 31 May, 2000.

The workshop was jointly organised by the Kenya Forestry Research Institute (KEFRI) and FAO's Forest Products and Food and Nutrition Divisions. The workshop was a follow-up to a regional conference on the Conservation, Management and Utilization of Plant Gums, Resins and Essential Oils, held in Nairobi in October 1997, and was attended by representatives of other African and international organisations.

During the workshop, the Network for Gums and Resins in Africa (NGARA) was formally established, with the membership of all the countries attending the workshop. The mission, terms of reference, organisation and management, mechanisms of operation and sustainability of NGARA were discussed and agreed upon.

Ms Laura Russo, Forestry Officer, FAO, made a presentation on the information needs at the local and national levels for the biophysical and socio-economic assessment of NWFPs. She also presented the aims and activities of the NWFP component project GCP/RAF/354/EC: Sustainable Forest Management in African ACP Countries, which has contributed funds to support the organisation of the workshop.

Gums and resins (from species of the genera *Acacia*, *Boswellia* and *Commiphora*) are among the most important NWFP produced in Africa. Consequently, further work for the assessment of the productive capacity of the resource base and of the socio-economic potential and prospects for the development of these products is considered a regional priority.

For more information, please contact:

Kenya Forestry Research Institute, (KEFRI),
Post Box 20412, Nairobi, Kenya.
Fax: +254 514 32844
e-mail: kefri@arce.or.ke

Sustainable Use of Forest Products: Miombo Edible Fungi.

17 July, Zomba, Malawi

The meeting was organised at the Malawi Forestry Research Institute under the framework of the Miombo Edible Fungi Project.

Proceedings are available and can be requested from:

Dr. Eric Boa,
CABI Bioscience, Bakeham Lane,
Egham, Surrey TW20 9TY, UK
Fax: +44 1491 829100
e-mail: e.boa@cabi.org
www.cabi.org/bioscience/index.htm

Forthcoming events

The 10th International Lupin Conference; Iceland, 2002.

19 - 24 June, 2002, Iceland.
This conference will be held at Laugarvatn, a thermal lake two hours south of Reykjavik at the time of the midnight sun.

31 Soybean and 56th Corn & Sorghum Seed Conference and Seed Expo 2001

5-7 December 2001, Chicago, Illinois, USA.

Susanne Nicholas, ASTA, 601, 13th Street NW, Suite 570, South Washington.

Tel: + 1 202 6383128

Fax: + 1 202 6383171

E-mail: snicholas@ix.net.com

Web: www.amseed.com

Industrial Applications of Bioplastics congress and Trade Show

3 - 5 February, 2002

Organised by IENICA and Europoint BV in Central Science Laboratory, York, United Kingdom.

The target groups of the conference are 1) the bioplastics chain, from the feedstock producers, research, raw material producers, processors, end-users to authorities and consumer organisations, and 2) all (synthetic) plastic processor industry and end-users wishing to make acquaintance with the potential of bioplastic materials.

Bioplastics work! They are good for the environment, they have the required quality, they solve social problems, and they are price competitive. With this message IENICA & Europoint plan to close the congress on February 5 2002!

For further information contact:

Mrs. T Lopes, PhD

Programme Manager

Tel: +31 (0)71 5231 391

Fax: +31 (0)71 5231 386

E-mail: lopes@biotop.demon.nl

For more details of events, see

Ienica website:

www.csl.gov.uk/ienica

The future of perennial crops: Investment and sustainability in the humid tropics

5 - 9 November, 2001.
Yamoussoukro, Cote d'Ivoire.

Contact: Mr. Dominique Nicolas,
CIRAD, TA 80/PS3,
Boulevard de la Lironde,
34398 Montpellier cedex 5
Tel: +33 467616569
Fax: +33 467615659
Email: nathalie.mercier@cirad.fr
Web: <http://peren-conf2001.cirad.fr>

Sustaining Food Security and Managing Natural Resources in Southeast Asia: Challenges for the 21st Century

8 -11 January, 2002. Chiang Mai,
Thailand.

International symposium initiated by the "Vater und Sohn Eiseln Stiftung Ulm" (Germany), Chiang Mai University (Thailand) and Kasetsart University (Thailand) in co-operation with the International Centre for Research in Agroforestry (ICRAF) and the International Board for Soil Research and Management (ISBRAM)

Contact: Symposium Secretariat,
Institute of Agricultural Economics
and Social Sciences in the Tropics
and Subtropics,
University of Hohenheim, (490a)
70594 Stuttgart, Germany.

Tel: +49 0711 4593476
Fax: +49 0711 4592582
E-mail: symp2002@uni-hohenheim.de
Homepage: www.uni-hohenheim.de/symposium2002

New Crops and New Uses. 2001 Strength in Diversity

10-13 November, 2001, Omni Hotel
at CNN Center, Atlanta, Georgia.

Invitation for posters for Special International Session

The Fifth New Crops Conference (Strength in Diversity) is having a special plenary session entitled **"International New Crop Development: Incentives, Barriers, Processes and Progress."** Three international speakers will give oral presentations on this topic for their respective country (or region, that is from Australia, the European Union and Canada.) Each speaker will also prepare a manuscript for the proceedings.

Please contact:
Gary D. Jolliff,
Professor of Crop Science,
Crop Science Building,
Oregon State University,
Corvallis, Oregon 97331-3002
E-mail: Gary.D.Jolliff@orst.edu
Tel: (541) 737-5849
Fax: ((541) 737-1589

Intellectual Property Rights to be the main theme of a medicinal plant seminar to be held in The Hague, 2002

Conserve Africa International, the agency that helped organise the first conference of African healers in Nairobi last year is set to launch an even larger meeting to be held alongside COP6, the sixth international meeting related to the Convention on BioDiversity (CBD)

The event, which will be hosted by the Netherlands Government and hopefully supported by organisations such as World Bank, CDE and Norwegian Aid will draw attention to the increasingly important issue of intellectual property rights in relation to traditional medicine and modern drug discovery. Denzil Phillips International will be one of the convenors of the meeting, which will include speakers from all over Africa and Europe.

The objectives of the conference are:

- To contribute to the outcomes of the COP-6 for issues relating to benefit sharing, indigenous health knowledge and protection of intellectual property rights;
- To identify key challenges, experiences and opportunities in promoting natural products business and bio-prospecting for conservation pertaining to medicinal plants;
- Review current status of legal, policy and institutional framework formulated to intellectual property rights, access to medicinal plant genetic resources and benefit sharing.
- Provide an opportunity for participants to gain a clear understanding of alternative financial and technical assistance options available to support their investments in the bioprospecting programmes.

Source: Plantwise Newsletter,
Denzil Phillips International Ltd.
March 2001

China: International Conference on the Development of Agricultural Information Management, Technology and Markets in the 21st Century.

3 - 6 November 2001, Beijing,
China.

This is being jointly organised by the Ministry of Agriculture and the International Association of Agricultural Information Specialists (IAACD). For more information write to Dr. Qiaoqiao Zhang, Project Manager, Information for Development, CAB International, Wallingford, Oxon, OX 108DE

UK Fax +44(0) 1491 833508
Email: Q.zhand@cabi.org

**Green-Tech 2002 and 5th
European Symposium
Industrial Crops and Products
INFORMM - IENICA**

24-26 April, 2002, Amsterdam,
Netherlands.

Publications of Interest

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Symposium held at the
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ISBN 085342687-1. Bangladesh
is rich in genetic diversity of
Jackfruit. An attempt has been
made to characterize and
evaluate this diversity through
field survey and laboratory
analysis carried out during 1997-
98. This catalogue includes
information on 70 accessions
with their passport data and
important morphological
characters such as the fruit pulp
and seed. The study was carried
out with support from the
Department of International
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ICUC, Colorline Printers,
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Pseudocereals.** Chapman &
Hall, London. 280p.

Interesting Books & Publications

**MORINGA (*MORINGA OLEIFERA*)
A MULTIPURPOSE VEGETABLE**

Dr. Preethi Wickremasinghe
Department of Agricultural Biology,
Faculty of Agriculture,
University of Peradeniya
Peradeniya, Sri Lanka
Moringa commonly known as Drumstick is a multipurpose vegetable relished by the Asians and Africans. It is particularly popular in southern India and Sri Lanka. It is cooked as a curry and eaten with rice and other cereals. The leaves are also eaten as salad or added to prawn or crab curries (Sea foods) to counteract any poisonous effects. It also has many other uses. Its medicinal values have been recognized for centuries by the traditional medical practitioners. It is a very popular cure for snake bite in Sri Lanka. The medicinal properties are reported to be due to the presence of two alkaloids, moringine and moringinine, which are present in all parts of the tree. The seed powder could purify water and reports indicate that it is possible to purify highly turbid water within few hours. Therefore it has potential for water purification on domestic scale in rural areas.

In spite of its high value very little research attention has been paid to this under-utilised tree species. Many reports also indicate the existence of wide genetic diversity in the growing countries. Several forms have been identified with variations in growth habit, branching patterns, bearing habits, fruit characteristics, but none of the countries have undertaken systematic germplasm collections. If some action is not initiated early, this species may be lost forever at a great disadvantage to the rural communities.

A major reason contributing to this is the lack of awareness of the value of this species. This publication has been designed to highlight the importance of this species with a

view to create awareness of the scientists. The book covers all aspects of cultivation, origin and distribution, composition and uses, available genetic diversity in the region and economics and future prospects.

From H.P.M. Gunasena
E-mail: gunasena@sltnet.lk

**TWO USEFUL TREES
ABREAST**

Proceedings (in French and English) of an international seminar on the drying and improvement of shea (*karite*) and *canarium* (called abel in Cameroon, aiele in Ivory Coast, elemi in Nigeria, bediwunua or eyere in Ghana and mwafu in Uganda) held from 1-3 December 1999 in Ngaoundere, Cameroon. International workshop on drying and improvement of shea and *canarium*.

Edited by C Kapseu & J Kayem,
Departement de Genie des Procedes,
Ecole nationale superieure des sciences agro-industrielles (ENSA),
2000,
Universite de Ngaoundere,
BP 455, Ngaoundere, Cameroon.
Fax: + 237 25 27 51

**A WILD VEGETABLE ON
YOUR FARM**

A practical guide to everything you need to know about growing eru, the climbing plant found in the rain forests of Cameroon and a highly consumed wild vegetable.

YDC,
PO Box 1321, Limbe, Cameroon.
Fax: +237 33 23 76
Email: Mwene2000@yahoo.com

Newsletters and Journals of Interest

PLANT RESOURCES OF SOUTH-EAST ASIA NO 7, BAMBOOS.

Dransfield, S and E.A. Widjaja
(Eds)

Backhuys Publishers, Leiden. 189 p.
ISBN 979-8316-00-2, ISBN 979-8316-21-5

This publication was jointly brought out by IDRC and PROSEA, and will be very useful for the scientists involved in bamboo research. It contains information regarding origin and geographic distribution, botany, morphology, anatomy, taxonomy, ecology, history of bamboo exploitation and cultivation, properties and uses, propagation, breeding and genetic resources, management of the wild resources, cultivation, post-harvest handling and processing, trade, research priorities and development etc. This is followed by a description, in alphabetical order, of 45 species. A brief description on 26 minor bamboos has also been presented.

PULSE AGNEWS

Periodical distributed by Pulse Australia for the interest of pulse growers and others in the pulse industry.

For further information contact:
Pulse Australia,
P.O. Box R838
Royal Exchange NSW 1225
Tel: 02-9247 2033
Fax: 02-9247 1158

-Or
John Slatter,
Pulse Australia Program Manager
Crop Support,
Tel: 07-4635 0726
Fax: 07-4635 2772

**THE AUSTRALIAN NEW
CROPS NEWSLETTER**

http://www.newcrops.uq.edu.au/new_slett/ncnl11-1.htm

Through this newsletter the editors hope to improve the communications network among new crops workers in Australia.

AGRICULTURE AND RURAL DEVELOPMENT.

ISSN 0343-6462. Published twice a year. Editor Angelika Wilcke, DLG-Verlags-GmbH, Eschborner

Landstrabe 122, 60489 Frankfurt am Main, Germany. Tel: ++49 (0) 69-24788-465. Email: A.Wilcke@DLG-Frankfurt.de

CENTRAL SCIENCE LABORATORY NEWS

Contact: John Houlihan
Central Science Laboratory
Sand Hutton, York. YO41 1LZ, UK
Email: j.houlihan@csl.gov.uk
Tel: 01904 462388
Fax: 01904 462111

FOREST ACTION NEWS

is published quarterly by the Forest Action Network and is a networking tool intended to facilitate information exchange/sharing between different actors in the field of forestry. Forest Action Network, P O Box 21428, Nairobi, Kenya. Tel/fax: 254 2 718398, Email: tropicalbbs@attmail.com

ICRAF UPDATES.

Joan Baxter (Editor), ICRAF, P O Box 30677, Nairobi, Kenya. Tel: +254 2 521 450, Fax: +254 2 521 001, Email: icraf@cgnnet.com

MUTATION BREEDING NEWSLETTER ISSN 1011-260X.

Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf .
International Atomic Energy Agency, Wagramer Strasse 5, P O Box 100, A-1400 Vienna, Austria.

NEW AGRICULTURALIST

Reports on agriculture in the 21st century across the world.
<http://www.new-agri.co.uk/>

PLANTWISE NEWSLETTER

published by Edit UK in collaboration with Denzil Phillips International Ltd, 25 Stanmore Gardens, Kew, Richmond, Surrey, UK. Tel: 44 (0)20 8940 7857, Fax: 44 (0)20 8948 2673, Email: info@denzil.com

RARE FRUIT NEWS ONLINE

This is a bi-monthly e-mail newsletter with world-wide circulation.
<http://www.rarefruit.com/>

Underutilised crops and the Internet

There are a growing number of sites for those working on under-utilised crops, assuming you have access to an internet linked computer. The following is a summary of some sites that may be of interest. This is not an exhaustive list, but many bigger sites have useful links to related pages. Some sites also have interactive databases.

ACTIN (ALTERNATIVE CROPS TECHNOLOGY INTERACTION NETWORK),

<http://www.actin.co.uk/>

The authoritative UK voice of this alternative or non-food crops industry, ACTIN was launched in 1995 and opens up collaborative and networking opportunities throughout Europe and beyond as a founding partner in the permanent European Association, ERRMA. In a separate (1999) development, terms were agreed with MAFF to combine their database of key contacts in the alternative crops arena with ACTIN's database of people and organisations with interests in this field. The enhanced database is now managed as part of the ACTIN Databank.

ASSOCIATION FOR TEMPERATE AGROFORESTRY (AFTA)

<http://web.missouri.edu/~afta/>

The Association for Temperate Agroforestry (AFTA) is a private, nonprofit organization formed in 1991. The mission of AFTA is to promote the wider adoption of agroforestry by landowners in

temperate regions of North America. Agroforestry practices combine trees and shrubs with crops and/or livestock to increase and diversify farm and forest production while conserving natural resources.

AFTA pursues its mission through activities such as networking, information exchange, public education, and policy development. These include 1) the publication of a quarterly newsletter, The Temperate Agroforester, 2) co-sponsorship of the biennial North American Agroforestry Conference series (begun in 1989), 3) preparation of reports on agroforestry development and policy, and 4) serving as a liaison with regional agroforestry groups.

CALIFORNIA RARE FRUIT GROWERS INC (CRFG)

<http://www.crfg.org/index.html>

The CRFG has a general interest in all aspects of fruit growing with a primary focus on semitropical fruits and uncommon fruits and vegetables. Various books and publications are available. They also maintain a database.

Crop ORGANIZATIONS

<http://www.hort.purdue.edu/newcrop/organizations/orgs.html>

NewCROPS' Directory of crop organisations by botanical family, country, and discipline.

INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA)

<http://www.iita.org/about/about.htm>

About IITA

The International Institute of Tropical Agriculture (IITA) was founded in 1967 with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers supported by the Consultative Group

on International Agricultural Research (CGIAR), now known as the Future Harvest Centers. IITA is governed by an international board of trustees and IITA's mission is to enhance the food security, income, and well-being of resource-poor people primarily in the humid and subhumid zones of sub-Saharan Africa by conducting research and related activities to increase agricultural production, improve food systems, and sustainably manage natural resources, in partnership with national and international stakeholders.

PLANTS FOR A FUTURE

<http://www.scs.leeds.ac.uk/pfaf/index.html>

This project, based in Devon and Cornwall seeks to gather together and disseminate information on the many useful properties of plants, particularly rare and unusual plants which have medicinal, edible or other uses. They maintain a database of over 7000 plant species. The project practices vegan-organic permaculture with emphasis on creating an ecologically sustainable environment and perennial plants.

SANCRA (SOUTH AFRICAN NEW CROP RESEARCH ASSOCIATION)

<http://www.uovs.ac.za/lib/agric/sancra/default.asp>

Sancra's mission is to promote the development of potentially novel crops and products derived from them with the aim of enhancing the socio-economic status of South Africa's people.

TROPICAL FRUITS FROM HAWAII

<http://www.aloha.com/~ritt/>

Contains information on how to choose, use and store tropical fruits as well as descriptions.

Useful Databases

AMERICAN INDIAN ETHNOLOGY DATABASE

<http://www.umd.umich.edu/cgi-bin/herb>

This is an electronic database containing food, drug, dye, fiber and other plants used by native North American peoples (a total of over 47,000 items). 291 Native American groups and 3,895 species from 243 different plant families are represented.

CALIFORNIA RARE FRUIT GROWERS, Inc, (CRFG)

<http://www.crfg.org/fg/xref/descr.html>

Database includes descriptions of 250 rare and unusual edible plants.

ILABIB A GROWING BIBLIOGRAPHY FOR LUPIN RESEARCHERS

http://www.agric.wa.gov.au/progser/v/plants/breed/lupin/Web_Page_Notes.htm or
<http://www.agric.wa.gov.au/ris/risweb/eb.isa>

This is a database of lupin references from sources around the world, including the earliest references in the ancient literature of Greece and Rome, the large volume of German research papers from the 1920s and 1930s, to the present day. This is a growing bibliography, which relies on contributions from lupin scientists to remain up to date and accurate. It covers all aspects of lupin research from agronomy and breeding through to utilisation in human food to medicine.

THE INTERNATIONAL ORGANIZATION FOR PLANT INFORMATION (IOPI)

<http://iopi.csu.edu.au/iopi/>

This organisation manages a series of cooperative international projects that aim to create databases of plant taxonomic information.

IOPI projects include:

A Global Plant Checklist, encompassing about 300,000 vascular plant species and over 1,000,000 names, and is the IOPI's first priority. Eventually, the Checklist will also include non-vascular plants (mosses and liverworts, and even lichens and algae if they have not been dealt with elsewhere). This checklist is essential if humanity is to manage plant biodiversity efficiently and sustainably. It will serve as a taxonomic backbone to which users can append their more specialized information. The Checklist will form part of the Species 2000 coverage of all organisms.

LATHYRUS – A BIBLIOGRAPHIC DATABASE FOR THIS GENUS

<http://www.general.uwa.edu.au/u/eneking/Bibintro.htm>

This bibliography provides a thorough coverage of the agricultural, botanical, chemical, biochemical and medicinal literature related to the genus *Lathyrus* and *neurolathyrism*.

TROPICAL GRASSES AND LEGUMES DATABASE FROM THE FAO

<http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPC/doc/GBASE/Default.htm>

This is a searchable catalogue of species which is being further developed. The basic information has been taken from two FAO publications on tropical grasses and tropical legumes. Other material includes species from temperate areas, from the Sahel and other agro-ecological zones.

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