



# Postharvest Newsletter

A Publication of the Australian Centre for International Agricultural Research Postharvest Technology Program

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## PROJECT 9437 NEWS

### Introducing two-stage drying to China

China grows three main grain crops: rice, wheat, and maize. In their effort to cut losses after harvest, currently estimated at 10% of material production, Chinese grain handling and storage specialists are looking to introduce modern drying systems, particularly mechanical aeration, to reduce sun-drying needs, increase throughputs, and improve grain quality in storage.

Since the beginning of 1997, the Chinese Ministry of Internal Trade, the Grain and Oil Bureau of Heilongjiang Province, Chengdu Grain Storage Research Institute, and the Department of Food Science and Technology of the University of New South Wales have been collaborating in research in this area under the aegis of ACIAR project PHT/94/37. One of the objectives of the project is to introduce two-stage drying. This will be a

challenge under the continental climatic conditions of northeastern China, particularly implementation of the second, in-store drying stage.



(L-R) Professor Zhou Zu'e, Professor Cao Chong, and Dr Niu Xinghe in the drying laboratory at the China Agricultural University.

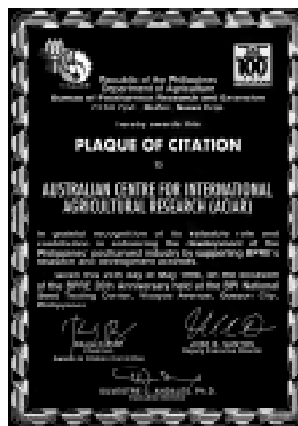
Over the past 15 years, Australian grain drying specialists, in collaboration with local research teams in several countries of Southeast Asia, have been involved in research and development of drying systems for a wide range of climatic conditions. Starting with considerable practical experience gained in the Australian rice industry, detailed research into climatic conditions, grain thermo-physical properties, and computer-based heat and mass transfer simulations has resulted in sophisticated research tools that have been extensively tested in developing safe drying systems throughout Southeast Asia and Australia. These tools are now becoming available to the Chinese research teams through the ACIAR project.

Initial training on the use of computer simulation in grain drying was conducted at the University of New South Wales in Sydney in September 1997 (see *PH Newsletter* No. 42).

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### BPRE award to ACIAR

ACIAR was presented with an Award during the 20th anniversary celebrations of the Philippines' Bureau of Postharvest Research and Extension (BPRE, formerly NAPHIRE) in May. The award was made in recognition of the Centre's valuable role and contribution, through its Postharvest Technology Program, in enhancing the development of the Philippines' postharvest industry by supporting BPRE's research and development activities.



The award, recorded in a "Plaque of Citation", was accepted for ACIAR by Ms Susan Hilario, ACIAR Assistant Country Manager, at a ceremony in Quezon City on 25 May. ■

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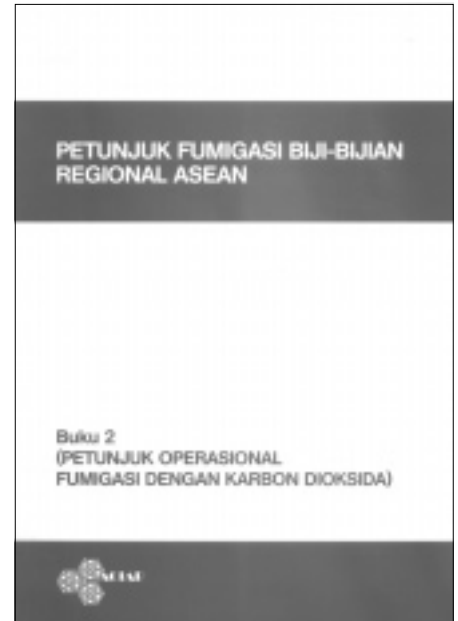
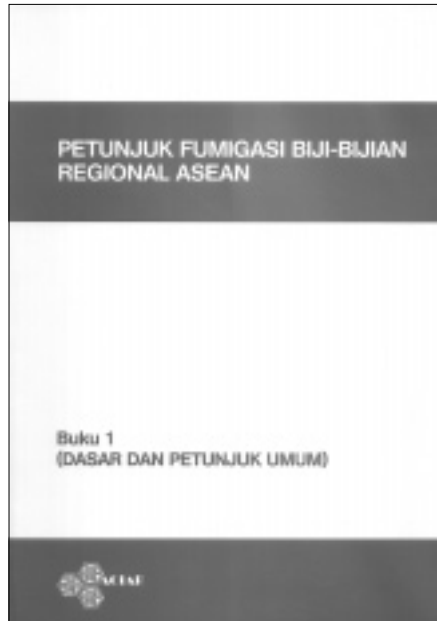
NEW PUBLICATION FROM ACIAR

## Petunjuk Fumigasi Biji-Bijian Regional ASEAN

ACIAR has published Bahasa Indonesia language versions of Parts 1 and 2 of the ACIAR/AFHB "Suggested Recommendations for the Fumigation of Grain in the ASEAN Region".

Copies are available from (Kopi lembaran penerbitan ini bisa diminta langsung ke):

Publications Manager  
ACIAR  
GPO Box 1571  
Canberra ACT 2601  
Australia  
Fax: +61 2 6217 0501.



### Introducing two-stage drying to China...from page 1.

Project research is now under way in China. Current activities include the determination of thermophysical properties for the main grain varieties of commercial importance, and pilot-scale field trials under the climatic conditions of northeastern China. Measurements of grain thermo-physical properties such as specific heat, thermal conductivity, sorption isotherms and thin-layer drying curves provide the data needed for computer simulation of the drying process. This work is being done in

the drying laboratory of the China Agricultural University in Beijing (see page 1 photo). Concurrently, field trials are being conducted at the Sifang Grain Depot in the city of Zhaodong (Heilongjiang Province). Field trials on in-store drying of rice were conducted during March 1998 in six brick and concrete silos with a holding capacity of 220 tonnes fitted with 4 kW centrifugal fans and a heating system using an oil burner (see adjacent photos). The first-stage drying was carried out in a mixed-flow dryer at the depot. This has 3 drying stages and 1 cooling stage.



In-store drying experiment at the Sifang Grain depot in Zhaodong, Heilongjiang Province: Dr Niu Xinghe inspects the grain silo.



In-store drying experiment at the Sifang Grain depot in Zhaodong, Heilongjiang Province: Mr Liu Fang Jiu (R) and Dr George Srzednicki inspect the heating unit.

The results from the field trials will be compared with those from the drying simulation in order to optimise the process for future use.

For further information about the project contact Dr George Srzednicki, Department of Food Science and Technology, The University of New South Wales, Sydney NSW 2052 Australia; fax: +61 2 9385 5931; email: <g.srzednicki@unsw.edu.au>. ■

# Thai Agriculture Minister visits projects in Queensland

His Excellency Mr Pongpol Adireksarn, Minister of Agriculture and Cooperatives in the Government of the Kingdom of Thailand visited the Queensland Horticulture Institute (QHI) in Brisbane on 17 June 1998. Following a welcome to the Institute by its Director, Dr Kathryn Adams, Mr Pongpol heard something about a number of QHI projects that are conducted jointly with Thailand, with support from ACIAR.

Presentations were made by the QHI scientists involved in collaborative research with colleagues in Thailand. Two projects of the Postharvest Technology Program were among the presentations.

Mr Bob Corcoran outlined for the Minister activities under way and proposed in project PHT/93/877, "Low cost disinfection systems for fruit", which began recently. Mr Corcoran summarised the benefits of the project to Thailand, including upgraded facilities for training in disinfection research, and safer and more effective methods for treating high priority fruits such as rambutan, longan, and mangosteen. The research is being done in partnership with Thai Department of Agriculture scientists.

Dr Lindy Coates reported on project PHT/93/13, a major activity to research and develop better



His Excellency Mr Pongpol Adireksarn with Queensland Horticulture Institute Director Dr Kathryn Adams.

methods for disease control in tropical fruit, which wound up at the end of 1997. Scientists at Kasetsart University in Bangkok, Chiang Mai University, and the Department of Agriculture in Chiang Rai Province had worked with Australian researchers making a number of important advances, including:

- selection of agents with potential for biocontrol of anthracnose and



Mr Sanchai Tontyaporn, Minister-Councillor (Agriculture) in the Royal Thai Embassy, Canberra discusses research activities with Dr Lindy Coates, Queensland Department of Primary Industries.



Members of the Thai delegation heard presentations on ACIAR projects in Thailand.

other postharvest diseases of tropical fruit;

- identification of preharvest factors such as bagging and nutrition on postharvest diseases and shelf-life;
- development of strategies that will help identify optimum modified atmosphere storage conditions for mangoes; and
- collection of information on the causes and control of rambutan and mangosteen fruit rots. ■

## Crawford Fund favourably reviewed

The Crawford Fund for International Agricultural Research provides short-term hands-on training for people from developing countries engaged in agricultural research and development. Trainees are selected from, and are expected to return to, projects in which Australian firms, institutions, agencies, or scientists play a significant role or are planning to do so.

The activities of the Crawford Fund were recently reviewed by a committee chaired by Emeritus Professor Alec Lazenby. In handing down its findings, the review committee noted that "Support for the Crawford Fund is overwhelming", and that it had "no

hesitation in recommending that the Crawford Fund be continued. This continuation should be for a 5-year period from 1 July 1999, with a review held before the expiry of that period."

The Fund is an activity of the Australian Academy of Technological Sciences and Engineering. Its income includes grants and donations from governments, private companies, corporations, charitable trusts, and individual Australians. It also has established partnerships with agencies and organisations in Australia, Thailand, and the Philippines, and is negotiating with other countries. ACIAR is a significant contributor to the Fund.

In the postharvest arena, the Crawford Fund has run courses in Australia on the handling of fruit and vegetables after harvest, and more are planned in the future in Southeast Asia. The Fund's Executive Director, Dr Alex Buchanan, says that proposals for additional courses on related subjects will be considered on their merits. Preference will be given to initiatives in which developing countries benefit and there are also significant benefits to, and contributions from Australian partners.

For further information contact Dr Buchanan at the Crawford Fund, 1 Leonard Street, Parkville, Vic. 3052, Australia; fax: +61 3 9347 3224; email: <crawford@werple.net.au>. ■

# Country consultations set research priorities

Regular consultations between Australian and developing country researchers and officials are a prime strategy used by ACIAR to ensure that the research it supports is targeting the agricultural problems identified by its research partners as having highest priority.

Over the past year, country consultations have included those with India (July 1997) and the Philippines (March 1998). Postharvest issues were prominent during discussions at both consultations.

## India

At the ACIAR-India consultation, research priorities were initially explored through several commodity papers, one of which dealt directly with postharvest issues and identified the following as major problem areas:

- Systems for village processing of sugar and "jaggery"
- Sugar harvesters suited to variable row spacing and small plot size
- Introduction of bulk handling technology
- Solar energy use in agriculture
- Baling, storage and handling of fodder

Postharvest matters also loomed large in the "Crops" paper presented at the consultation. Quality of produce was a key theme in this paper, whose list of priorities included the following:

- Genetic engineering for manipulation of nutrient content and quality parameters such as aroma and flavour in rice, fatty acid composition and glucosinolates in rapeseed, protein quality and quantity in cereals and grain legumes.
- Seed health care and seed technology innovation especially rapid tests for varietal verification.

- Systems research on the production-consumption continuum.
- Delayed senescence and control of postharvest related metabolic processes for enhancing shelf life and quality, especially of produce for export.
- Strengthening process engineering through development of transgenic microorganisms.
- Biochemical and physiological basis of quality traits, e.g. aroma in rice.

In the "Horticulture" paper, postproduction topics were again prominent, high priority being accorded to research in on-farm storage, pre-treatments and packaging to reduce transport losses, standardisation of packing line operations for major fruits, pesticide residue management, and product development and value-adding to produce.

Presentation and discussion of the topics and issues raised in the commodity papers led to designation of the following topics as priorities for potential ACIAR-India collaboration:

- Feasibility studies on bulk handling and storage systems for grain, including socioeconomic aspects
- Postharvest technologies for meat, wool, fish products, fresh grapes, and mangoes, including increased cooling efficiency of low-cost environmentally friendly cool chambers
- Storage pest management for pulses
- Drying, testing, processing, and storing seeds for sowing by farmers, including pre- and postharvest seed quality aspects
- Postharvest technology for cotton (ginning, cottonseed oil)

- Disinfestation and postharvest technology for tropical fruit, including quarantine aspects.
- Mycotoxins

## Philippines

At the ACIAR-Philippines consultation in March 1998 priorities in postharvest technology were raised in several papers presented by Philippines' research and development specialists.

An overview paper on postharvest technology (PHT) by Dr Silvestre Andales, Executive Director of the Bureau for Postharvest Research and Extension (formerly NAPHIRE) listed a number of issues as persistent impediments to progress in the postharvest sector in the Philippines. These included:

- the wide financial and technological gap between farmers on the one hand, and business, traders, and processors on the other;
- low adoption levels of improved postharvest technology (e.g. mechanical versus sun drying of grain);
- lack of standards applying to agricultural products and machinery; and
- a policy environment not conducive to development of the postharvest subsector.

A PHT working group was formed to assess the range of priorities raised during subsequent discussions. It identified the following as key priorities for PHT research in the Philippines:

1. Innovative approaches to improve shelf-life and *intrinsic* pests, disease, and disorder resistance (genetic modification, defence elicitors)
  - pests in grain, pulses, tubers (link to IARC's)
  - ripening, disease resistance in fruit
  - mycotoxins
2. Improvement of application and uptake of technology through quality assurance (QA) standards, systems analysis, economics and sociology of target groups:
  - grain PHT—mycotoxins, pesticides, drying
  - computer-aided learning (CAL) for training
  - workshop on QA
3. Pesticide risk reduction strategy
  - analysis and development of national strategy in consultation with stake-holders, considering

Continued on page 6.

### Goals of ACIAR's Postharvest Technology strategy:

- to improve application and efficiency of postharvest systems for food, wood and fibre products and animal feeds;
- to optimise the quality and suitability of produce for market requirements;
- to assure food security and improve trade and market access; and
- to minimise losses or undesirable health, environmental and social impacts of the products or technologies in developing countries and Australia.

# Farmer education reduces residues in vegetables

In Ho Chi Minh City, Vietnam there are nearly 10,000 farming households which produce around 300,000 tonnes of vegetables annually, equal to 70% of the vegetable needs of the city's seven million people.

There has been, unfortunately, serious contamination of this produce by highly toxic pesticide residues in recent times. Marketplace monitoring of vegetables by the University of Agriculture and Forestry (UAF) showed levels of residues many times higher than the maximum residue limits recommended by the UN Food and Agriculture Organization and the World Health Organization.

The situation was of obvious concern to the Plant Protection Department (PPD) of Ho Chi Minh City. A paper by Drs Nguyen Thien, Bui Van Thin and Nguyen Duy Duc presented at the recent ACIAR-sponsored international workshop on pesticide residues in agricultural produce (see *PH Newsletter* No. 44) reports the very encouraging results of a community education campaign undertaken to tackle this problem.

## Incorrect use of pesticides by farmers

Investigations carried out by the PPD and by the UAF during 1994-1995 showed that farmers growing vegetables were using pesticides inappropriately. Several reasons were identified for the problem. Firstly, the farmers were unaware that there were alternatives to their current practices. They usually chose to use pesticides that are persistent and highly toxic to non-target organisms. These included the organophosphate, organochlorine, and carbamate compounds.

Particular insecticides were in use for long periods without rotation, resulting in the development of resistance of insects to those chemicals. This meant that farmers had to increase the dosage of pesticide to many times the recommended dosage to protect their crops. In addition, growers were applying the chemicals very close to harvest time and not observing the correct withholding period.

Lastly, farmers were unaware of a regulation brought into effect five years ago by the Ministry of Agriculture and Rural Development banning the use on vegetables of several very

toxic substances, such as methamidophos, monocrotophos, carbofuran, and endosulfan. These chemicals were still being widely used, primarily because they cost less than the recommended compounds and had a broad spectrum of effectiveness. Interestingly, they had not been withdrawn from the marketplace upon their prohibition.

## Objectives of the campaign

In response to this alarming situation, in June 1996 the PPD introduced a campaign for guiding and encouraging farmers to produce safe vegetables. This program aimed to help producers understand the dangers of incorrect use of pesticides—to themselves, to consumers of their products, and to the environment. It also aimed to show growers that incorrect use of pesticides might actually lead to pest outbreaks, rather than controlling pests.

The PPD hoped that these messages would make farmers more receptive to exploring integrated pest management and reduced use of the most harmful chemicals. Farmers would be encouraged to use insecticides with lower toxicity and short-lived residues, such as microorganisms, insect growth regulators, and pyrethroid group chemicals. They would be taught how to use pesticides more wisely by applying them in accurate dosages and rotating the

use of different pesticides. Producers would be provided with an up-to-date list of pesticides which had been banned from use on vegetables and educated as to the health risks to consumers of applying chemicals to vegetables close to harvesting.

## Implementation of the program

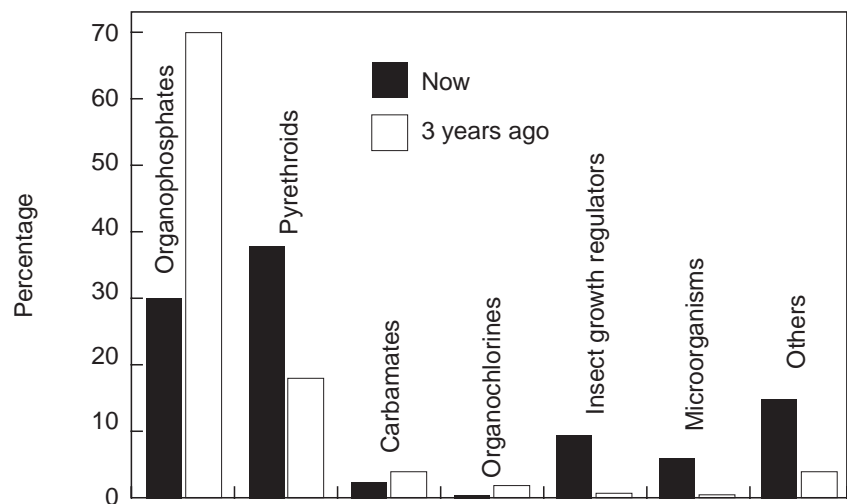
The program disseminated the information on proper use of pesticides in four ways:

1. Instruction sessions were provided for almost all farmers growing vegetables in suburban areas of Ho Chi Minh City, to show them how to use insecticides correctly in their fields.
2. Numerous trial fields were established to demonstrate correct use of 'traditional' pesticides and their alternatives. Field workshops were run to reinforce campaign messages and give practical advice.
3. Copies of a leaflet about the effective and safe use of pesticides were distributed to almost all farmers growing vegetables in the area.
4. The Ho Chi Minh City radio station was used to broadcast sessions on these issues as it was known that many of the target audience were avid radio listeners.

## Campaign success

After 18 months of activity, the PPD evaluated the program by interviewing 150 farmers. They found that there had been a very encouraging change in pesticide choice by farmers (see graph below).

Concluded at foot of page 7



Proportions of pesticide groups now in use in Ho Chi Minh City compared with the situation three years ago.

Country consultations set research priorities...from page 4.

- policy, regulation, monitoring, and remediation of chemical residues,
- Develop strategies for implementation, and link research priorities through 1 and 2.
- 4. Drying process technology for smallholders:
  - multi-purpose dryers—fruit and vegetables (mutual interest in Vietnam)
- 5. Market access and quarantine, disinfestation, pest risk analysis
  - low-cost technology for disinfestation with link to crops program work on fruit fly. ■

PRELIMINARY ANNOUNCEMENT

ASEAN Postharvest Technical Seminar, November 1999

*Quality Assurance in Agricultural Produce*

- Plans are under way to hold the next ASEAN Postharvest Technical Seminar in Ho Chi Minh City, Vietnam in November 1999. This will be the 19th ASEAN seminar, the next in line from the seminar held in Manila in March 1997.
- The theme of the seminar will be “Quality Assurance in Agricultural Produce”.
- The meeting will be held over three days, and its coverage will extend to QA fruit and vegetables as well as grains.
- It is expected that the Post Harvest Technology Institute and the University of Agriculture and Forestry in Ho Chi Minh City will organise the meeting, and that ACIAR will help with sponsorship.

Projects in the ACIAR Postharvest Technology Program\*

Perishable food

Durable food/beverage crops

Non-food

1 Germplasm enhancement and breeding (including genetic transformation)

*PHT/94/07* Pineapple quality improvement (Malaysia)

*PHT/95/136* Cocoa fermentation, drying and genotype assessment (Papua New Guinea)

*PHT/94/45* Control of ripening in papayas and mango by genetic engineering (Malaysia, Philippines)

2 Production systems development and management

2a Improved technology/management system

*PHT/93/877* Simplified quarantine treatments of fruit for South East Asian and Oriental Fruit Fly — 50% MoU (Thailand, Vietnam)

*PHT/97/131* Computer assisted learning as a tool to improve grain storage pest management (Indonesia, Philippines, Vietnam)

*PHT/96/152* Postharvest handling and disease control in melons (China)

*PHT/94/37* In-store grain drying in northeast China (China)

*PHT/95/136* Cocoa fermentation and drying and genotype assessment (Papua New Guinea)

2b Product protection

*PHT/95/34* Management of *Phytophthora* diseases of durian (Thailand, Vietnam)

*PHT/94/15* Phosphine resistance in insect pests of stored grain (China, India)

*PHT/94/06* Replacements for methyl bromide in timber for quarantine fumigation (Malaysia, Papua New Guinea)

*PHT/96/04* Monitoring mycotoxins and pesticides in grain and food production systems for risk management in Vietnam (Vietnam)

2c Product quality/value adding

*PHT/94/16* Minimal processing of leafy vegetables (China)

\* Projects under development in italics.

# Report on 1998 meeting and seminar

The annual executive meeting and seminar of the Group for Assistance on Systems relating to Grain After harvest (GASGA) was held during June, this year at FAO in Rome. ACIAR represents Australia on GASGA. Dr Greg Johnson was chair of GASGA during 1997-98, and was elected for a further term at the latest meeting.

## Seminar

The topic for the 1998 seminar was "CGIAR postharvest research and GASGA: working for effective postharvest systems", and several papers were presented on the first day, while the issues raised were

considered by three working groups on day 2. Abstracts of some of the papers are given on the next two pages.

The seminar was opened by Dr John Monyo, Director of FAO's agricultural systems division. Dr Monyo welcomed the participation by several partner countries and CGIAR centres (CIAT, CIP, IITA, IFPRI, and IRRD), by Canada's IDRC and Kansas State University in the USA, by GASGA members, and by FAO staff.

Participants in the seminar, recognising that the impact of postharvest interventions needed to be more widely and coherently promoted, both globally in agricultural development and within the programs of CGIAR

(Consultative Group for International Agricultural Research), agreed to presentation of a paper on the impact and importance of the postharvest sector at a breakfast meeting at the next International Centres' Week in October 1998. The paper will be prepared by Dr Rupert Best (CIAT) and Dr F. Goletti (IFPRI), and presented to the meeting in consultation with other CGIAR representatives.

## Discussion of INPhO

Participants in both the seminar and the executive meeting expressed strong support for INPhO, the Information Network on Post-harvest Operations, an FAO-led initiative in conjunction with CIRAD and GTZ. They agreed to encourage continued support to ensure INPhO's sustainability in 1999 and beyond. A trial CD ROM demonstrating INPhO (see item on next page) was distributed to members at the meeting.

## Should GASGA expand?

Another important outcome of the meeting was the in-principle agreement that GASGA members should continue to strengthen links with CGIAR centres with significant postharvest interests and activities, with other donor organisations involved in postharvest development, and with other agencies active on postharvest issues. The Chairman, Dr Greg Johnson, welcomed participation in the meeting of the Japan International Research Centre for Agricultural Sciences (JIRCAS), represented by Dr Akinori Noguchi. Noting the cost and difficulty for agencies and partner countries to attend seminars annually, it was agreed that invitations should be extended to the agricultural attachés in the local embassies of those organisations from which GASGA is seeking representation.

Other membership possibilities will be discussed by the GASGA executive in relation to the mode of operation of the core members and the possible need to re-launch the Group under a changed name to reflect its already-wider remit.

## The next seminar

GASGA will encourage participation by CGIAR centres and developing country participants in the next seminar, which will be convened by NRI. CIRAD proposed "How improvement in postharvest techniques could help match the quality (sanitary) requirements for grain and processed products" as a tentative topic for the seminar.

Continued on next page.



Some of the participants in the 10th GASGA Seminar, held at the headquarters of FAO in Rome during June.

## Farmer education reduces residues in vegetables... from page 5.

There was a reduction in the use of highly toxic pesticides from 76% to 11% during the three years since the first survey of pesticide use by vegetable farmers and an increase in the use of pesticides with lower toxicities and persistence (pyrethroids, microorganisms, insect growth regulators) from 20% to 53% during the time. The percentage of farmers still using the banned insecticides is now 11% compared with 50% three years ago. Farmers continuing to use the most hazardous pesticides cited their low cost as the main reason for doing so. Those who had changed

their ways as a result of the campaign felt compelled to do so after becoming aware of the significant human health risks involved and out of concern for the environment.

Although the problem has not been completely solved, the results are very encouraging, and it will be interesting to compare the results of residue analyses made before and after the campaign. Further improvement will be achieved only by implementing regulations to ensure that vegetables are not contaminated with pesticide residues at the time of marketing. Farmers would be more likely to adopt safer practices if there were additional pressure from the vegetable wholesalers for them to do so. ■

## Abstracts of seminar papers presented

### Increasing the impact of engineering in rural and agricultural development

*M.A. Bell, IRRI*

Does agricultural engineering (AE) have a role in meeting the emerging challenges of food production, and if so how can the impact of the discipline be increased? Such were the questions raised and discussed at a Think-Tank held at IRRI on 26–27 February 1998. Twenty representatives of the private, public, national, and international sectors met to address concerns and develop a vision for engineering. While the group acknowledged the contributions of AE to agriculture in the past, they also highlighted the need for change. Clearly, engineering contributes at almost every point along the production to consumption chain. The challenge, however, is to identify the appropriate roles of the various public and private sectors. The group concluded that the focus of the public sector could and should be broadened (beyond what has often been a focus on hardware development). Such a limited focus has often resulted in lost opportunities to the detriment of the discipline. In the pursuit of 'more and better rice', it was felt that engineering needed to adopt a problem-solving focus utilising an integrated-participatory systems approach. The group highlighted the critical need to develop strategic alliances between well-focused private and public sectors. All too often these roles have been confused and the discipline has lost by it. Appropriate targeted alliances would take advantage of the significant synergies offered. The think-tank confirmed the approach already initiated at the Agricultural Engineering Division (AED) of IRRI—both at Headquarters and in its Cambodia project. In particular, AED is developing methodologies to help national programs undertake better analyses of their production to consumption chains and thus better identify the intervention points for improving rice quality.

### Policy issues and policy analysis for postharvest research

*Francesco Goletti, IFPRI*

This paper discusses some policy issues emerging from the development of postharvest systems in developing countries, with particular emphasis to the challenges emerging during the process of market reform. The paper gives an overview of some of the methods most commonly used in the economic and policy analysis of postharvest systems. It includes a case study of research on starch industry development in Vietnam that IFPRI is currently implementing in collaboration with CIAT and the Postharvest Technology Research Institute in Hanoi.

### Pilot testing of postharvest technologies through the NARS-IRRI-GTZ technology verification network

*M. Gummert, GTZ*

Several postproduction technologies for irrigated rice have been developed in Southeast Asia by International Agricultural Research Systems (IARS), National Agricultural Research Systems (NARS), and by the private sector. However commercialisation has been low for various reasons: technically inappropriate equipment, lack of a systems approach, high cost of usage of new technologies, lack of understanding of the needs of the target groups (users), lack of collaboration between the individual players, and inappropriate or missing dissemination and promotion strategies are some of the constraints to a wider adoption.

In order to increase the effectiveness and efficiency of pilot testing of new postharvest technologies, a technology verification network consisting of six NARS in Indonesia, Vietnam, Thailand, and the Philippines, the International Rice Research

Institute (IRRI), Hohenheim University, and some informal members was initiated at IRRI. The network proved to be suitable for testing and adapting knowledge on intensive engineering technologies (stripper harvester, in-store dryer, thresher), and after termination of the project it was partially integrated into IRRI's Crops and Resources Management Network (CREMNET).

This paper describes the network, the roles of the institutions involved, and the instruments used in pilot testing technologies. It elaborates on the technologies included and the impact achieved in terms of establishing local production and machinery sales. Lessons learned are included in the form of an assessment on the effectiveness of the individual instruments used. Reasons for success or failure are identified.

### Implementation of the DFID Renewable Natural Resources Research Strategy (RNRRS): the Crop Post-Harvest Programme

*Chris Haines, NRI*

In the past decade, the UK's Department for International Development (DFID, formerly the Overseas Development Administration) has sought to improve the applicability and uptake of its research and development effort in the natural resources sector, by defining strategies and frameworks more rigorously, and by using systematic and systems approaches to categorise and prioritise inputs.

A Renewable Natural Resources Research Strategy (RNRRS) was instituted in 1989, and it included a Food Science and Crop Utilization Strategy Area. The RNRRS was reviewed in the early 1990s and a revised RNRRS was re-launched in 1995; this revised Strategy included a

Continued on page 9.

## INPhO CD-ROM

FAO has produced a CD-ROM containing a pilot version of the forthcoming INPhO databank. It has done so to:

- request comments and ideas for further development;
- request contributions from knowledgeable and interested CD-ROM recipients;
- spread the idea of INPhO and the concept of postharvest systems; and
- provide the already available virtual library to a large group of users.



For further information and copies of the disk contact Veronique Le Vavasseur: < veronique.levavasseur@fao.org > . ■

## Abstracts from GASGA seminar .. from page 8.

Crop Post-Harvest Programme (CPHP). In the postharvest sector, in which the Natural Resources Institute is a key player, the 1989 Strategy and its 1995 revision have engendered major changes in the focus of research and in the planning of research-uptake pathways.

This paper outlines—from the point of view of an Institute undertaking research projects for DFID's Crop Post-Harvest Programme and providing programme development services to the Programme Manager—the main changes and improvements that have resulted from the initial introduction and subsequent revision of the RNRRS. As one might expect from any radically new strategy, there were some initial problems in implementation, but the overall verdict from stakeholders (both implementers and beneficiaries) is that the CPH Programme of the RNRRS is fully achieving its key aims and delivering research outputs that are both practicable and sustainable.

Among the items discussed are: the RNRRS's Production System approach (and its relationship to marketing systems); the use of interlocking logical frameworks for objective setting, stakeholder co-ordination, and project planning, monitoring and evaluation; the CPHP's Commodity System (*filière*) approach to post-harvest needs-assessment and prioritisation to develop demand-led research; the DFID target-country focus for bilateral inputs to research and development on renewable natural resources; linkages with post-harvest activities at CGIAR Centres; and new or modified approaches to ensure that the CPHP's research has sustainable impact on development.

### Implementing postharvest systems development

*Christian Henckes, GTZ*

For the implementation of post-harvest systems the author proposes the establishment of a secretariat for the co-ordination of all programs and projects aiming to improve postharvest operations. Representatives of different organisations and public service departments should be members, to reflect the various disciplines and interests of involved stakeholders. The secretariat should be organised at the lowest level of decision-making especially in decentralised political structures. Three models for the organisational set-up of such a secretariat are presented:

1. The secretariat is mandated by the overall planning and development authority of a given country, region, or district (policy model).
2. The secretariat is mandated by all concerned sector departments, e.g. agriculture, science, transport, trade (commodity model).
3. The secretariat is mandated by the Ministry of Agriculture (farmer model).

The tasks of the secretariat are mainly the development of postharvest profiles of crops, prioritisation of intervention areas, the monitoring and assessment of existing and planned intervention measures, the establishment of a data bank and the advising of public authorities and stakeholders on all issues related to postharvest and marketing systems.

### Postharvest technology In Asia: ACIAR's framework for collaborative research and development

*G.I. Johnson, ACIAR*

As we enter the 21st century, the need to become more effective in bringing home the harvest of the green revolution has become increasingly apparent.

The Strategic Plan of the Australian Centre for International Agricultural Research (ACIAR) for 1997–2001 states, *inter alia*:

“Recognising the urgent need to reduce losses and maintain acceptable quality of harvested agricultural products, ACIAR will increase its investment in research on postharvest technology relevant to crops, livestock, aquatic resources and forest products. Resources will be diverted from research on production aspects of these commodities if necessary.”

In seeking to implement this part of the Strategic Plan, ACIAR has devoted a considerable effort to defining the rationale for this investment and developing a framework for collaborative research and development in postharvest technology with partner countries.

This paper outlines the rationale and framework for the plan, and indicates the opportunities for interface between our developing country partners and other agencies involved in international agricultural research for development.

Collaboration and co-operation can maximise effective use of those agri-research resources that postharvest scientists and marketing specialists glean from the production specialists!

### Strategy for improving the efficiency of the post harvest system. The CIRAD experience

*F. Troude, CIRAD*

Due to changes occurring in the economic and institutional environments of small-scale farming systems in developing countries (i.e. agricultural market liberalisation and globalisation, rapid increase of urban population, changes in eating habits), postharvest systems management and enhancement have become a critical issue for the improvement of the efficiency of national food systems. Accordingly, this field has received increasing attention from CIRAD researchers from various disciplines (food technology and processing, economics, sociology, etc.) within both research and development projects. Taking advantage of its reorganisation, CIRAD has established a Food Crop Programme, which, among other objectives, aims at supporting this multidisciplinary approach.

In terms of methodology, there seems to be no standard method that can be universally applied across products or locations. Although there is a need to support exchange of experiences in the field of methodology assessment, the experience of CIRAD researchers is that there is always a need for tailoring a method to local conditions, the degree of urgency, the resources available, level of detail needed, and existing information.

However, there are several basic principles common to the different methods followed. These include the need for an analytical approach based on the contributions of different disciplines. They also show that a comprehensive understanding of the postharvest system must integrate the different steps of the commodity/food chains, while interventions must be focused on crucial steps or component of these systems. A continuous feedback with the principal economic operators (stakeholders) in the selected commodity system is important for success. In addition, there is a strong need to systematically include in the analytical framework a socioeconomic assessment of the current situation and the proposed solutions to ensure the sustainability of any intervention in the field of postharvest systems. Furthermore, a major underlying approach to these activities is participation, which aims to optimise the appropriateness of both needs and solutions through an improved co-ownership of the research. ■

# Project to set up pesticide residue testing stations

A one-year project to set up pesticide residue testing stations in major regions of the Philippines and Thailand began recently. The project, to be implemented in two stages, seeks to introduce use of rapid test kits for the detection of pesticide residues in fruits and vegetables.

The first step is to identify test kits and extraction methods that are reliable and cost effective under field conditions in the Philippines and Thailand and to prepare standard methodologies for their use. Organophosphorus and carbamate insecticides will be targeted initially, and standard analytical techniques will be used to confirm the reliability of the kits.

During the second stage in the project, ten or eleven testing stations will be established in each of the two countries. At these, the protocols developed during the first stage will be used to monitor residues in fruits and vegetables at the market and distribution stages.

By placing the emphasis on the use of rapid test kits, the results can

be available before contaminated foods are sold, and the low costs of the test should ensure that testing is not confined to high-value markets. It also means that growers and distributors will not be burdened with excessive additional costs.

The project should be completed by April 1999, at which time responsibility for the testing activities and regulatory responses to pesticide contamination will pass to the appropriate government departments and agencies of the partner countries.

The main outcomes of the project should be a reduction in the number of postharvest and late preharvest sprays of fruits and vegetables, and the elimination of pesticides leaving residues with high mammalian toxicity. The range of pesticides tested will need to increase, in order to monitor residues of newer chemicals used by the food industry or older and more persistent chemicals, such as DDT, which may continue to be used in public health programs such as those to control mosquito vectors of malaria.

The testing stations will be well placed to increase the range of

foodstuffs monitored and might even extend their work to include environmental testing of, for example, herbicide residues in ground water and DDT contamination of surface water used for drinking or irrigation. The hope too is that the network of stations will expand to include other countries in the region.

We plan to report the results of this important new project in a later issue of the newsletter. The work was initiated by Dr Amelia Tejada, Associate Professor at the National Crop Protection Center, University of the Philippines at Los Baños, and is funded by the governments of Australia, the Philippines, and Thailand. The Australian component of the project, managed by Dr Clive Price of Cadec International, is provided under the ASEAN-Australia Economic Cooperation Programme (AAECP) Linkages Stream, administered by AusAID. Dr Nuansari Tayaputch, Director of the Division of Agricultural Toxic Substances, Department of Agriculture, is in charge of project activities in Thailand.

The contact for further information is Dr C.E. Price, Box 96, Littlehampton, South Australia 5250; fax: 618 8398 2909; email: <cprice@arcom.com.au>. ■

## CONFERENCE REPORT

# APTC 98 identifies key industry issues\*

The first Australian Postharvest Technical Conference (APTC), sponsored by GRDC and CSIRO, was held in Canberra in May. It attracted 150 participants from all sectors of the grain industry.

Over 70 oral and poster presentations were made at the conference. The following were among the major industry issues identified in presentations and during subsequent discussions.

- The conference noted a significant increase in on-farm grain storage in Australia. It is now estimated that farmers have the capacity to store about 18 million tonnes of grain on farms (more than half of the nation's average annual



Dr Deirdre Davis  
GRDC's Stored  
Grain Program  
Consultant

production of all grains) with this capacity increasing by as much as 500,000 tonnes annually. The principal reason for the swing to on-farm storage is the marketing flexibility it gives growers. The best time to sell grain is not necessarily straight from the

harvest: with on-farm storage farmers can hold their grain until the best marketing opportunity arises.

- Given the surge in on-farm storage and the increasing levels of chemical resistance being identified in grain insects, the conference acknowledged the need for additional extension to promote good storage practices throughout Australia.
- Levels of resistance to phosphine of economic significance have been detected and confirmed in grain insects in Queensland and northern New South Wales. Phosphine is used to treat about 75% of the grain grown in Australia.

Until very recently, phosphine resistance levels in Asia, as determined in ACIAR-supported studies, have been higher than in Australia, but recommended application rates here now require revision.

Also highlighted in the presentations at APTC was the considerable research investment being made by

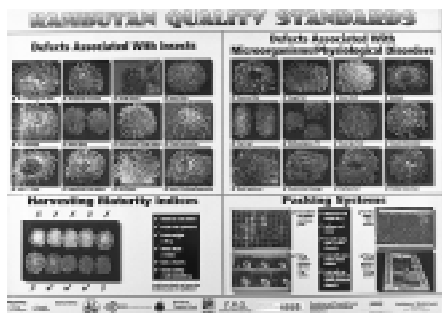
\* Thanks are due to Deirdre Davis, Stored Grain Program Consultant, Grains Research and Development Corporation (GRDC) for this report on APTC 98.

# CURRENT AWARENESS

## POSTHARVEST PUBLICATIONS

### Fruit quality posters

Two, large, full-colour posters illustrating market quality standards for mangosteen and rambutan have been prepared by T.K. Lim, Y. Diczbalis, M. Landrigan, and G. McMahon. For details of availability, contact Dr T.K. Lim; fax: (08) 8999 2049; email: < tk.lim@dpif.nt.gov.au >.

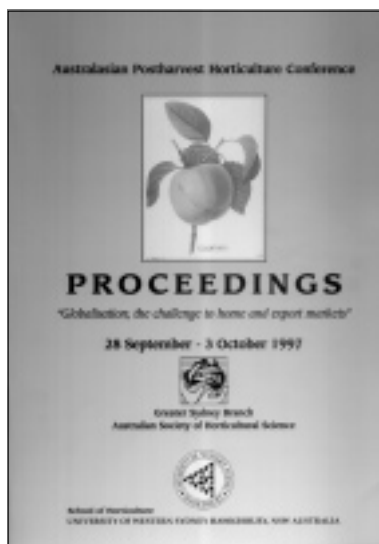


### Australian Postharvest Horticulture Conference

Recently published were the proceedings of the Australian Postharvest Horticulture Conference held at the University of Western Sydney-Hawkesbury on 28 September-3 October 1997. "Globalisation; the challenge to home and export markets" was the conference theme.

The proceedings, of over 400 pages, contain extended abstracts of

the 130 or so oral and poster presentations made at the conference, and summaries of issues raised in discussions at the oral sessions. Copies are available at a cost of \$AU50 each, from The Professional Development Centre, University of Western Sydney-Hawkesbury, PO Box 415, Richmond NSW 2753, Australia.



The proceedings contain a wealth of contemporary information. We plan to summarise some of the research papers in future issues of the *PH Newsletter*. In the interim, we mention an interesting abstract by Professor Jingtair Siripanich of Kasetsart University in Thailand on the subject of research cooperation.

Professor Jingtair notes that cooperation between postharvest scientists in Australia and Asian countries has been going on for many years. Tremendous expertises and technical information have been transferred, to the benefit both parties. Asian critics are still arguing against this cooperation, by reasoning that Australia benefits more from the

cooperation because scientific knowledge or information could be obtained more cheaply using Asian scientists who get lower salaries than their more expensive Australian counterparts.\* However, Jingtair stresses that, as a result of previous research cooperation, much technical information has passed into commercial application. Millions of dollars of foreign currency have been so gained by Asian countries. Asian scientists in the program become more experienced and are able to handle their countries postharvest problems with quality research. The use of SO<sub>2</sub> for exporting Thai longans is a good example.

It is up to the Asians themselves to take advantage of the cooperation, Professor Jingtair concludes, to benefit their own people, or leave it to the Australians.

### Development, testing, and use of pesticide test kits

The latest issue (No. 11, May 1998) of ACIAR's flagship magazine 'Partners in Research for Development' contains a comprehensive overview by project leader Dr John Skerritt of the work leading to and completed in ACIAR project PHT/ 93/ 09, 'Development and application of simple tests kits for pesticide residues in plant-derived foods'. In his article entitled 'Pesticide monitoring becomes a practical reality', he describes how inexpensive and sensitive new techniques for detecting and measuring pesticides in food will enable developing countries to set up effective residue monitoring systems. Copies of 'Partners' are available free of charge from ACIAR. ■

\*It may be of added interest to readers to note that there remain a few groups in Australia, primary producers among them, that argue against cooperation with Asian researchers who, they say, stand to benefit more than their Australian counterparts! Ed.]

### APTC 98 identifies key industry issues... from page 10.

growers through GRDC and the work under way by research organisations such as CSIRO Entomology's Stored Grain Research Laboratory in Canberra.

Ms Fleur Winter summarised GRDC's research in progress as follows:

- The Chemical Strategies Project which supports the industry's use

of grain protectants and fumigants. It includes R&D components to develop grain protectants and fumigants, investigate resistance management strategies, and ensure that chemical usage is maintained through coordination of registration activities. The intention is to have an alternative fumigant to phosphine by 2002.

- The Physical and Biological Strategies Project which aims to develop non-chemical methods to protect grain in storage, including improved aeration control systems and heat disinfestation of grain.

- The Safe Use of Fumigants Project, which includes work on the use of fumigants in integrated pest management programs, the mechanisms of toxicity of fumigants, and responses of new grain storage pests to phosphine fumigation.

For further information about the conference contact Ms Katherine Damcevski, CSIRO Stored Grain Research Laboratory; fax: +61 2 6246 4202; email: < kathd@ento.csiro.au >, or visit < http://www.ento.csiro.au/research/storpod/techws/htm >. ■

# CURRENT AWARENESS

## PHTP to meet in Brisbane

The 1998 annual meeting of the ACIAR Postharvest Technology Program will be held at the laboratories of the Queensland Department of Primary Industries (QDPI), Indooroopilly, Brisbane on 2-3 November. QDPI is the commissioned organisation for ACIAR postharvest technology projects PHT/94/07, PHT/95/136, PHT/93/877, and PHT/94/16 (see Box on Page 5 for further details of PHT projects).

## ACIAR Associate Director departs

Mr Chris Thurlow, Associate Director of ACIAR, has announced his resignation from the Centre, with effect from close-of-business on 17 July 1998. Chris has accepted an offer of appointment to a newly created position of Business and Operations Manager, CSIRO Land and Water, Canberra.

## New IRRI Director General

Dr Ronald P. Cantrell, currently Professor of Plant Breeding and Head of the Agronomy Department of Iowa State University in the United States, and President of the Crop Science Society of America, has been appointed to the position of Director General of the International Rice Research Institute at Los Baños in the Philippines.

Dr Cantrell takes over at IRRI from Dr Robert D. Havener, who has been Director General (Interim) since January this year, following the resignation of the previous incumbent, Dr George Rothschild.

## Review of ACIAR

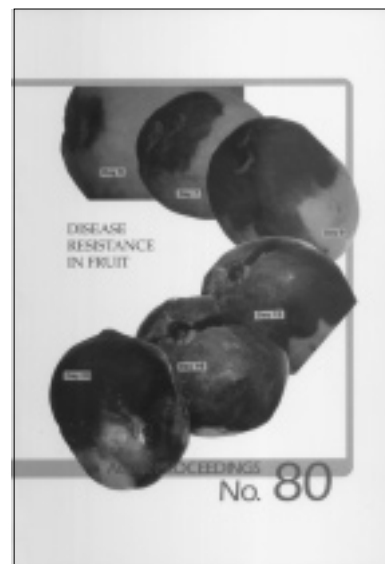
ACIAR has commissioned a review to evaluate its activities. A review team comprising Emeritus Professor Malcom Nairn (Australia), Dr Bob Dun (Secretariat to the Pacific Community), and Professor Gelia Castillo (University of the Philippines) is currently considering submissions made following a public announcement at the end of May. The review follows the publication in the second part of 1997 of an independent assessment of the whole Australian aid program. The report of that review (the "Simons' Report"), and the Australian Government's response to it, confirmed ACIAR's ongoing role as the primary facilitator and funder of agricultural R&D within the context of the aid program.

The ACIAR review team is charged with assessing the Centre's performance, identifying weaknesses, and suggesting strategies for improvement, without being prescriptive about research goals and priorities. It is to report to ACIAR's Board of Management by 31 October 1998. The deadline for submissions was 30 June. Requests for further information about the review should be directed to Dr Christine Moore, Secretary to the Review; fax: +61 2 6217 0501; email: <moore@aciarc.gov.au>.

## POSTHARVEST PUBLICATIONS

### Disease resistance in fruit

ACIAR has published the proceedings of the international workshop on disease resistance in fruit held at Chiang Mai, Thailand in May 1997.



The proceedings contain the 25 oral and 5 poster presentations made at the meeting. These are prefaced by a workshop summary and conclusions addressing "Considerations and future directions for 'exploitation' of natural disease resistance in fruit".

Copies of the proceedings\* are available at \$AU25 per copy plus postage and packaging charges from Bibliotech, GPO Box 4, Canberra ACT 2601, Australia. Publications can be ordered online via the ACIAR home page: <<http://www.aciarc.gov.au>> .

ACIAR's distribution policy is to provide complimentary copies of its publications to developing country libraries, institutions, researchers, and administrators with an involvement in agriculture, and to any scientists involved in an ACIAR project. Please write to the Communications Coordinator, ACIAR, GPO Box 1571, Canberra ACT 2601, Australia if you believe that you are eligible to receive a complimentary copy.

## New newsletter

The Australia New Zealand Food Authority (ANZFA) began publishing a monthly newsletter, *ANZFA News*, in May 1998. ANZFA is responsible for developing, varying, and reviewing standards for food in Australia and New Zealand, and for a range of other functions including coordinating national food surveillance and recall systems, and assessing policies about imported food. To get on the mailing list, contact the Information Officer, ANZFA, P.O. Box 7186, Canberra Mail Centre, ACT 2610, Australia; fax: +61 2 6271 2278. ■

\* Johnson, G.I., Highley, E., and Joyce, D.C., ed. 1998. Disease Resistance in Fruit. Proceedings of an International Workshop held at Chiang Mai, Thailand, 18-21 May 1997. Canberra, ACIAR Proceedings No. 80, xiii + 233p.

## ACIAR Postharvest Newsletter

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The Australian Centre for International Agricultural Research was established in June 1982 by an ACT of the Australian Parliament. The Centre encourages research aimed at identifying agricultural problems in developing countries and finding solutions to such problems. It is empowered both to commission research and to communicate the results of such research to interested persons and institutions.



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