



Postharvest Newsletter

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TRAINING PROJECT NEWS

Second CAL course held in Indonesia

To teach participants how to use the computer as a tool to improve grain storage pest management, was the overall objective of the second training course on "Computer Assisted Learning (CAL) as a Tool to Improve Grain Storage Pest Management", held at SEAMEO BIOTROP, Bogor on 3–11 April 2000. Participants were trained in the use of various computer modules covering various aspects of storage management.

The first training course, which was conducted in Bahasa Indonesia, was held in March 1999, with participation by staff from BULOG/DOLOG and SEAMEO BIOTROP. The latest activity, which was conducted in English, was organised by a SEAMEO BIOTROP team led by Dr Okky S. Dharmaputra.

There were 13 participants, 8 from Indonesia and one from each of



Participants from Cambodia and Vietnam work on the CAL module covering moulds and mycotoxins

Cambodia, Lao PDR, Malaysia, Thailand, and Vietnam. They came from government departments and agencies, universities, research organisations, and the grains industries.

The resource persons for the course included scientists from SEAMEO BIOTROP; the Faculty of Agricultural

Technology, Bogor Agricultural University (Dr Hadi K. Purwadaria); BULOG (Dr Mulyo Sidik and Dr Hariyadi Halid); CSIRO Division of Entomology, Canberra (Dr Barry C. Longstaff and Mr Jan van S. Graver); and the University of New South Wales, Australia (Dr George S. Srzednicki).

The lectures and practical sessions covered postharvest pest problems in Southeast Asia, insect pest biology and identification, grain drying, storage moulds and mycotoxins, integrated commodity management, and fumigation and controlled atmosphere storage.

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Resource persons and participants: second CAL course in Indonesia

The view from the cornfields*



Everybody wants to increase corn production in the face of the exploding demand in Asia in the next two decades. Everybody wants increased supply with the expected increase in domestic consumption in the formerly corn-exporting countries of Thailand and China and the wide variability of yield in the US.

Everybody ... except the corn farmer! He is worried whenever there is a bumper crop. He uses few expensive inputs in the face of uncertain prices. His psychology is "flight" to other crops if he can cope with their market requirements.

What should we do? In the case of the Philippines at least.

First, there should be a floor price of 5.0–6.0 pesos per kg. This will remove the fear of a bumper crop, which brings low prices. A low price discourages the use of inputs, which cost the small farmer 15–20% per month in interest charges. Without

fear, the farmer could then focus on what he knows best: production. At 5.0 pesos, the efficient farmer of southern Bukidnon could earn 9,000 pesos per hectare, but at 3.5 pesos, the same farmer will barely break even.

Second, have in place all the dryers and related facilities needed to save the 20–30% that is currently lost because they are not there. With the present system of farmers planting at the same time as when rain comes, harvesting is done within a two-month period, making drying an unprofitable business. But without the dryers, not only is supply lost; farm income as well as lost income results in frustration and further reduction in the area planted.

Third, the users — the integrator, the hog raiser, and the industrial user — must change their opportunistic view of the "lowest price syndrome" to a one that looks for a reliable year-long supply of corn. The Toyotas and the Walmarts of the world get reliable supply through their close working relationship with their suppliers and not by accepting any Tom, Dick, or Harry's low-priced supply. With great optimism and a floor price (and a 1.0 peso premium for low aflatoxin) we endorse the contract growing of the Cabanglasan farmers (in Bukidnon) and Cargill. ■



* This article was first published as the guest editorial in the June 1999 issue (Vol. 4, No. 2) of the *AgroIndustry Bulletin*, a quarterly publication of the Agro-Industrial Development Program (AIDP) of the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA), Los Baños, Philippines. The author is Mr Ed Layug, Regional Agriculture and Fisheries Council (RAFC) Chairman for Region X and Overall Chairman, Philippines; Associate Professor, Xavier University; and President, FX Foundation. Note that his views and those of ACIAR are not necessarily concurrent.

World Congress of Food Science and Technology

The 11th World Congress of Food Science and Technology will be held in Seoul, Korea on 22–27 April 2001. The theme will be, intriguingly, "Paradigm shift — harmonisation of eastern and western food systems".

The tentative scientific program includes:

- a plenary lecture;
- symposia on
 - Asian foods,
 - food product development and marketing,
 - non-nutritive health factors,
 - diet, nutrition, and health,
 - food biotechnology,
 - advances in food science and technology, and
 - food safety;
- poster presentations;
- round-table discussions on R&D cooperation strategies, education on food science and technology, and genetically engineered food materials and safety; and
- several short courses.

Further details can be found at <www.congress2001.or.kr> or by contacting the congress secretariat at fax +82 2 553 8453 or email <congress_2001@seoul.kosfost.or.kr>. ■

Second CAL course held in Indonesia...from page 1.

Most of the sessions entailed practical work using the computer, since the training was designed to use various modules of grain pest management which were developed under the cooperative project* between CSIRO/ACIAR and BULOG.

A visit to PT Sang Hyang Sen in Sukamandi was conducted to obtain information on various grain drying facilities, while practical work on fumigation and controlled atmosphere, insect monitoring and evaluation system were carried out at Sub Dolog warehouse, Darmaga, Bogor. ■

* ACIAR project PHT/1997/131, which also received funding support from the Australian Agency for International Development (AusAID).

Grain drying research yields more, and better, rice*

The production of rice for home consumption and for export is a vital part of the economy of many Asian countries and Australia, too, has a valuable rice crop, though on a much smaller scale. Three recently concluded ACIAR projects have helped to improve the quality and quantity of rice available and to reduce the costs of getting it to market.

Moisture

Freshly harvested rice (paddy) has to be milled, but it has a high moisture content and must be dried before milling, especially if it is to be kept for any length of time. Without the drying, the grain will swiftly deteriorate and may be attacked by fungi and other dangerous organisms. This can mean a costly loss to the miller.

The traditional method of drying rice was to harvest it in the dry season and spread it out on any convenient flat surface to let the sun reduce the moisture content. Nowadays, with new strains of rice producing two or more crops per year, sun-drying is no longer practical, because at least one crop will be harvested during the wet season. In any case it is highly labour-intensive and relatively inefficient since a sudden storm can undo all the hard work.

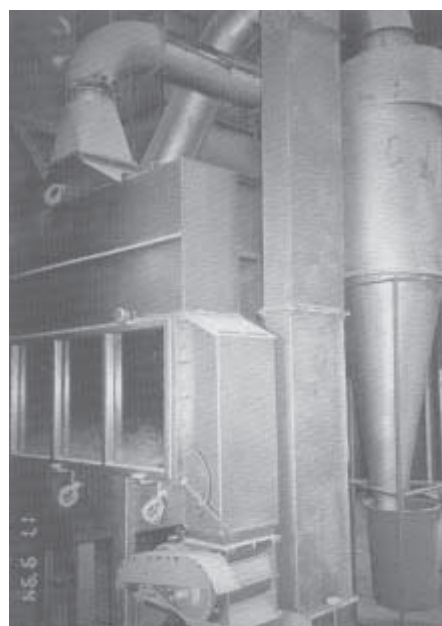
In rice-growing areas where the conditions are almost invariably hot and humid, a great deal of rice is lost after harvesting. Sometimes the drying processes are unreliable and damage a substantial proportion of the grain. In other cases, while initial drying may be satisfactory, the grain cannot be kept dry enough to store for any length of time. When rice is to be held for export, or for bulk sale domestically, this can mean that much of it deteriorates to the point where it cannot be sold, with consequent financial loss.

The three projects of ACIAR, which covered a period of fourteen years, set out to study this problem of moisture in the grain, starting with an investigation into the behaviour of paddy during drying and storage. One project studied the various means of drying grain under hot and humid conditions. The other two looked at grain in bulk storage: what happens to its moisture content, what organisms are likely to attack it, and what methods can be applied to improve the situation at reasonable cost.

Collaboration

The study of bulk storage in particular required wide international collaboration. As well as ACIAR, the contributors included the University of New South Wales, the Ricegrowers' Co-operative Limited, the National Post Harvest Institute for Research and Extension in the Philippines, King Mongkut's University of Technology Thonburi in Thailand and several Malaysian research organisations.

In Australia, the University of New South Wales and its collaborators developed principles of grain storage over the life of the projects and these were implemented by the Ricegrowers' Co-operative so that they could be thoroughly tested and examined.



The prototype of a 1 t/hour fluidised-bed dryer developed in Thailand

First-stage drying

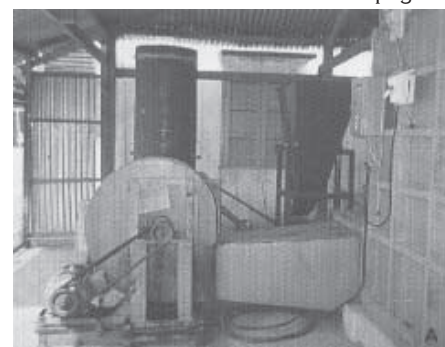
Where hot and humid conditions prevail, about half of the region's rice producers use sun-drying and the other half have access to drying facilities such as the American LSU-type column dryers. Unfortunately, these processes do not entirely solve the problem, especially when the rice is to be stored. The grain can crack or break during or after the drying; so it was important for the research projects to find out exactly what happens to the moisture content of the grain and what effects the various drying, heating and cooling processes had.

The researchers looked for ways of drying the rice that would largely eliminate the problems and as a result the fluidised-bed dryer was developed. This essentially dries rice with hot air passed through the paddy in such a way that the grains behave as if they were particles in a fluid. This process is rapid but can reduce the moisture content only to about 18%, which is still too high for storage.

Second-stage drying

A solution to that problem is to carry out a second stage of drying within the storage area. While the first stage of drying is fast, the second stage is one of slow drying, using ambient air. Where this is done by spreading out the rice and turning it by hand, the labour cost is high and the mills need large concrete drying aprons for the purpose.

Continued at foot of page 4.



An 80 t in-store dryer (upper) and a fluidised-bed dryer (lower) both at Song-Ha Farm, Vietnam

* This article draws on information in "Improved drying of high moisture grains. An economic evaluation of ACIAR projects PHT/1983/008, PHT/1986/008, and PHT/1990/008, by R. McLeod, S. Isvilanonda, and S. Wattanuchariya, ACIAR Impact Assessment Series No. 14, copies of which can be obtained from ACIAR.

Reducing the environmental impact of wool processing

Wool scouring is a postharvest process that produces a great deal of waste. Until recently, in many countries this was usually discharged from the processing facility by the most economical means and route available, invariably at a cost to the surrounding environment and people.

CSIRO Australia has developed a revolutionary wool scouring process that turns waste into valuable by-products. The process may soon be helping regional areas in India and China whose industrial development depends to some degree on the purchase and processing of Australian raw wool.

Commissioned and funded by ACIAR*, a group of CSIRO scientists has embarked on a three-year project to help reduce the environmental impacts of wool processing and improve economic outcomes in textile processing regions of the two countries. During the project they will be working with researchers from the

* ACIAR project AS1/1997/069, "The treatment of wool scouring effluents in Australia, China, and India".

Ministry of Water Resources, Haidong, China and the Ahmedabad Textile Industries Research Association in India, and with the Woolmark Company in Australia.

"Early stage wool processing creates waste in the form of wool wax, organic salts from sweat and dirt," says Dr Jock Christoe of CSIRO Textile and Fibre Technology. "Wool mills discharge this waste water into rivers, causing pollution. In sufficient quantities this causes problems for people living along or near the river. Our main message is that contaminants on the fibre are *resources* not a waste problem".

Dr Christoe says that the scientists will first compare and develop an understanding of wool scouring and effluent treatment systems in India, China, and Australia. They will then carry out environmental audits at mills in India and China to determine compliance with local regulations. "We are hoping then to reduce the environmental impact of waste waters from scouring by testing the 'Sirolan SWIMS' (Scour Waste Integrated Management Systems) technology developed by CSIRO."

Sirolan recycles waste products so that they can be returned to fertilise soils. It converts the waste solids from the scouring process into clean, non-offensive by-products which can be disposed of in landfill or, if composted with green waste, can be used as a broad-area soil conditioner. The converted waste products can even be used to produce a high-grade potting mix.

The benefits of the project will be improved quality of watercourses through the reduction of early stage processing waste, and improved living environment for communities — especially farming communities — around wool processing plants. Wool factory workers should also benefit, through the creation of a safer, healthier workplace.

Dr Christoe says that India and China are collaborators because of their developing industrial growth and their use of Australian wool. The three-year collaborative project will permit an interchange of ideas to assist in further research, will include training of technical personnel and, in the longer term, will improve economic outcomes in these textile processing regions. ■

Grain drying research yields more, and better, rice...from page 3.

Australian rice millers have been using mechanical aeration for in-store drying, so the ACIAR projects examined the feasibility and costs of installing such systems in Thailand.

Innovation is always slow to take on, but the success of its introduction in Thailand and the financial savings that result from this suggest that more Thai rice millers will be keen to adopt it. In 1999 Thailand produced 23 million tonnes of paddy and exported about one third of its crop (making that country the world's biggest rice exporter), so reducing production costs, increasing milling yields, and minimising the loss of produce will clearly have major effects on that country's economy.

Yields and costs

The research results have shown that fluidised-bed dryers can more

than pay for themselves. When compared with sun drying, the use of such dryers can increase the milling yield of paddy by as much as 4.8%. The effects of such an improvement can be imagined in view of the estimate that in Vietnam alone the value of postharvest paddy losses during drying and cleaning is some \$45 million. As an extra benefit, the dryers can also be used with advantage for maize and soybeans.

Although the development of these dryers was not one of the original objectives of the ACIAR projects, it was an important spin-off of the basic research into the postharvest characteristics and treatment of paddy, and the conditions under which it has to be dried, in Southeast Asia. Their development was catalysed by the project findings, and their introduction was a significant factor in persuading mills to try the new methods of in-store drying pioneered by the projects.

In money terms, the Australian rice producers have, to date at least, benefitted most from the greater

knowledge of paddy and the consequently improved technology, particularly the improved methods of in-store aeration drying. The value of this, over the period 1983–1999, has been estimated at \$4.2 million, even though Australia's annual production of paddy is only around 1 million tonnes. Thai producers are estimated to have gained \$1.1 million in the four years since the commercialisation of fluidised-bed dryers in 1995; and other countries, notably Vietnam, are likely to enjoy similar gains in the foreseeable future.

In the longer term, however, the potential gains to Asian rice producers are likely to far outstrip those to Australia. It has been estimated that the production of rice using in-store aeration of paddy will cost 30 cents per tonne less than traditional paddy storage. That may not sound much, but when it is multiplied by millions of tonnes, and the higher yield is counted in, the savings to the rice-producers of Asia could be huge. ■

The postharvest scene in Vietnam*

During the past 10 years, thanks to policy changes and the application of science and technology to production, the economy of Vietnam has grown rapidly, especially in agriculture. The total value of agro-forestry and fishery products now accounts for over 25% of GDP.

Exports of agroforestry and fishery products represent around 40% by value of Vietnam's total exports, but are mainly of raw commodities.

From a rice-importing country, Vietnam has become the world's second-largest exporter of rice (after Thailand) and the third-largest exporter of robusta coffee. Those are proud achievements, but there are still many challenges to deal with. Though productivity and yields of rice increased steadily during 1996–99, the acceleration of both agriculture and industry has been slowing. Foreign investment and growth in GDP also fell during the period. GDP per capita is rising slowly, while the inflation rate, after rocketing in 1998, fell in 1999. The population continues to increase.

These data suggest that it will be very difficult to expand the current cultivated area to increase agricultural production. Also, there has been serious deforestation throughout the country. Coffee is gradually replacing forests in the Central Highlands. As a consequence, supplies of groundwater have been severely reduced, causing shortages of water in the dry season and floods in the delta in the wet season.

Through experience in Vietnam and many countries in the world, it is clear that producing agro-products represents completion of just one part of a three-part process. To obtain real economic efficiency in production, two other parts must also be fulfilled. These are the application of postharvest technologies, including storage and processing, to improve quality of products, and the development of an adequate marketing strategy.

* This is an abridged version of a paper prepared by Dr Le Van To, Director of the Post-Harvest Technology Institute, Ho Chi Minh City (PHTI HCMC) for the ACIAR/Vietnam Consultation held in Hanoi on 29–30 March 2000.

Overview of the main postharvest problems

Rice

Unlike in the United States where there are 60 large mills operating, Vietnam has about 80,000 small rice mills, mainly owned by private individuals, with capacities of 0.5–2 t/hour. These meet 90% of the milling demand of the whole country. Where mills are not available, milling services are possible from small mobile mills put on trailers or trucks. Large mills run by the State, equipped with good machines, usually do not receive paddy as raw material but collect rice from small, private enterprises through traders for re-processing for export. Reprocessing of rice has become a particular feature and an established solution to improve the quality of export rice in Vietnam during the last 10 years.

As rice is of different varieties, has high moisture content, and is milled in small, incomplete lines of production, the end-product contains plenty of small brokens, foreign matter, unmilled paddy etc. and so cannot meet export standard. This type of rice instead of paddy is then used by large mills to produce rice of export quality. As a result of this reprocessing strategy, Vietnamese rice for export has been increasing in quantity and improving in quality during the past 9 years (see table below).

Though reprocessing has helped to improve the quality of export rice in Vietnam in the past ten years, we should still be aiming to get uniform paddy with adequate moisture content as input at mills for high-quality rice. Paddy of high moisture content is the reason for poor quality milled rice with a short storage life.

A question here is why reprocessing has become established. One of the reasons is that the rubber roller mills imported from Japan are durable but they require a homogeneous raw material with low moisture content. Importation of rubber rollers leads to a high cost in rice milling while the cost of low-capacity milling and reprocessing in Vietnam is rather low: US\$7/t compared with US\$36/t in the United States. This is a challenge for rice-processing technologies in Vietnam, as low-capacity milling, non-uniform material, and sun drying result in a return rate (whole kernels and brokens) of 60–66%, of which 40–48% are whole kernels. There is also high rate of loss in milling. In contrast, high-capacity mills using a standard milling process can achieve 68% and 52–54%, respectively, and so a much higher grade rice can be obtained (rice of 5% brokens requires that the ratio of whole kernels over the whole weight must be not less than 60%).

Coffee

Coffee has been grown in Vietnam for over 140 years, but up to 1975, the whole country had only 14,000 hectares of coffee with an output of about 5,000 t/year. During the past 8 years, the output has been increasing and coffee has become one of the top 10 export products of Vietnam.

In spite of having obtained some good results from postharvest studies of rice, Vietnam still has to deal with many problems in postharvest technologies to improve economic efficiency and the quality of coffee produced.

Though coffee is grown intensively in Daklak Province, the main producers are small households with poor facilities for drying. Coffee is normally dried in the sun on roads or in yards before hulling.

Continued on next page.

Rice exports from Vietnam 1991–1999 ('000 t)

Year	Rice grade (% brokens)						Total*
	0–5	10	15	20	25	35	
1991	60	289	55	85	279	227	1,015
1992	354	284	167	60	282	449	1,765
1993	478	344	209	57	100	230	1,575
1994	847	437	96	180	180	130	1,882
1995	569	455	241	149	439	66	1,921
1996	681	431	146	27	84	132	2,953
1997	492	564	226	62	1,266	163	3,270
1998	957	931	468	11	1,033	21	3,421
1999	971	667	1,064	52	1,625	10	4,389

* Total of all grades from 100% whole kernels to 5–45% brokens

The postharvest scene in Vietnam...from page 5.

Thus, it is usually of low quality, and often gets musty and fermented in the wet season, resulting in a high rates of postharvest losses in both quality and quantity.

There are some advantages in the wet-processing method, by which the quality of coffee is improved and so export value thereby increased. Unfortunately, this method is used only in large enterprises that have a capacity of 3–4 t/hour and is not suitable for individual households. When the wet-processing method is applied on a large scale, attention must be given to preventing environmental pollution. In future, it will be necessary to extend 500–600 kg/hour-scale wet-processing technology to coffee growers.

Although large processors and joint venture enterprises have invested in warehouses (for coffee storage), and have installed classifiers, polishers, and colour sorters, it is currently possible to meet just a small part of processing demands.

Lack of market information and capital are the reasons why Vietnamese exporters sell coffee at low prices. For instance, in May–June 1997, Vietnamese exporters sold

most of the coffee they had in stock for US\$1,300/t, while the price of the same coffee in the world market reached US\$2,400–2,500/t.

Customers usually complain about moisture content, screen size, defects, foreign matter, and mould in Vietnamese coffee. Unfortunately, the rapid increase in production was not matched by a corresponding increase in drying, processing, and storage facilities. This structural deficit was made worse by adverse climatic conditions. A wet season combined with insufficient drying capacity leads to an abnormal proportion of mouldy and fermented beans, resulting in rejections and cup quality problems. Currently, PHTI HCMC is detecting moulds in coffee. Initial results show that Vietnamese coffee is contaminated by mycotoxins. This is one of many activities under ACIAR project PHT/1996/04.

Fruits and vegetables

After a long period of focusing on only rice production to overcome shortages, Vietnam is now able not only to satisfy its internal consumption but also to export large volumes of rice. Vegetables and fruits are thus being paid greater attention but currently investment is in fruit growing only.

At present, there are about 370,000 hectares devoted to growing fruits of various types, with a total output of about 3–4 million tonnes per year. Some 75% of the area is in the Mekong Delta, but the other 25% is made up of small orchards scattered throughout the country in which fruits are grown opportunistically. Thus, the fruits produced are of many different kinds and varieties, which creates difficulties in postharvest processing and export.

Some fruit processing mills have been operating for 20–30 years. Others are newly built, applying new technologies (these include two joint-venture units), but there has still been no investment in creating intensive fruit growing areas. This is why Vietnamese fruits, though of good potential, remain under-exploited.

In Vietnam, there are some special fruits that do not exist in other Asian countries, e.g. “Thanh Long” (English name: dragon fruit and scientific name: *Hylocereus undatus*), and “vũ sôôa” (English name: milk fruit and scientific name: *Chrysophyllum cainito*). In 1997, the production of dragon fruit was about 25,000–30,000 t and was exported mainly to Taiwan, Hong Kong, and Singapore where it fetched US\$800–1,200/t.

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PROJECT NEWS

ACIAR postharvest projects in Vietnam

There are four ACIAR Postharvest Technology projects currently operating in Vietnam:

- Low cost disinfestation systems for fruit (PHT/1993/161).
- Management of *Phytophthora* diseases in durian (PHT/1995/134);
- Monitoring mycotoxins and pesticides in grain and food production systems for risk management in Vietnam and Australia (PHT/1996/004); and
- Computer-assisted learning as a tool to improve grain storage pest management in key ASEAN countries (PHT/1997/131).

There is also a small project (PHT/1997/065) on the development of spouted-bed grain dryers.

We present here short reports on the mycotoxin and computer-assisted



There were some 120 participants in a training course on grain storage management.

learning projects, based on material provided by Dr Le Van To, PHTI HCM. Although both began relatively recently, they have already yielded benefits.

PHT/1997/131

Early experimental work in this project showed that phosphine gas

losses during fumigation could be reduced by over 30% by the simple expedient of using two sand snakes rather than just one to seal the base of the fumigation sheet covering the stack.

PHTI HCM has organised training courses to demonstrate the new technique to key staff in food companies and warehouses throughout southern Vietnam, including at the warehouses of the Southern Food Corporation. The improvement gives big cost savings, and might also contribute to a safer workplace environment.

In cooperation with Australia, Indonesia, and the Philippines, the project has set up a training program and prepared a CD-ROM on grain storage pest management. The training materials have been translated into Vietnamese and used for teaching food enterprise personnel.

PHTI HCMC says that if funds become available, it will have the information it has assembled on common insects of stored food products in Vietnam and on storage of grains published to assist food enterprises.

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The postharvest scene in Vietnam...from page 5.

While Vietnam has made good progress in postharvest technologies for rice, fruit and vegetable growers still seem to have no knowledge on the technologies needed to maintain or increase the value of their products. The serious postharvest losses of fruit and vegetables that occur in Vietnam (25–40%) can be attributed to a lack of packing houses, and of systems for transporting, classifying, handling, and preserving the commodities. Realising that lack of postharvest technologies for fruits in Vietnam is a weakness that needs to be overcome, PHTI HCMC has organised training courses for people from universities, institutes, and provincial extension centres, and has invested in equipment and instruments for pilot studies and production improvement. The occurrence of pesticide residues in fruits and vegetables is also a challenge for agriculture in Vietnam.

Aquaculture

Aqua-products and seafood are 1 of 3 main export commodities of Vietnam. Their export value has been increasing during the past 5 years but losses after harvest are a problem that needs attention. The loss rate is estimated to be 15–20%.

Until now, aqua-products and seafood have been exported mainly minimally processed or frozen (frozen shrimp 60–70%, frozen fish 10–12%, frozen squid 5–7%, dried seafood 11–12%). The export value achieved is therefore low. In 1996, there were 170 aqua-product/seafood processing enterprises in Vietnam. They operated 21 IQF production lines with a total freezing capacity of 830 t/day, cold rooms of 23,000 t capacity and had an ice production capacity of 3,300 t/day. The purity of the ice produced by some plants needs to be improved.

As aquaculture is very profitable, around 300,000 labourers have been spontaneously engaged in it along the coastline. As a consequence, mangrove forests are being destroyed, with serious ecological consequences. This is also a challenge for Vietnam, to balance increasing production and environmental conservation.

Shrimp feed is also a problem that needs attention. Imported shrimp feed is of high quality but is expensive. The feed produced by farmers themselves is of poor quality and pollutes the environment.

Meat production and processing

The Vietnamese prefer fresh, unfrozen meat, so the meat-process-

ing industry is still poorly developed. Meat for processing accounts for only 3–5% of total production. Most private slaughterhouses are small scale. It is therefore necessary to give due attention to hygiene and quarantine.

Overall priorities for postharvest research

It is clear that the low quality of agro-products in Vietnam is a direct outcome of poor postharvest technology and processing practices. Pesticide residues, mycotoxins in food, and food hygiene are the main problems that Vietnam has to deal with. PHTI HCMC sees the following five activities as having highest priority in current collaborative activities supported by ACIAR.

- Extension of storage life in fruits and vegetables, including packing house studies
- On-farm, small-scale processing (including mobile units), in combination with training women and farmers
- Development of animal/especially shrimp feed formulation
- Livestock and seafood — reduction of spoilage, value adding
- Postharvest technology transfer. ■

ACIAR postharvest projects in Vietnam...from page 6.

PHT/1996/004

This project, which began in July 1999, continues fundamental studies on contamination by fungi, aflatoxin, and ochratoxin in Vietnamese agricultural products, and on pesticide residues in fruits and vegetables, that PHTI HCMC has been conducting since 1996. The new collaborative work involving both Vietnamese and Australian scientists will enhance research efficiency and progress.

With the assistance of Dr Dee Carter of the University of Sydney, PHTI has successfully used coconut cream agar to detect aflatoxins and ochratoxins secreted from toxigenic *Aspergillus flavus* and *A. parasiticus* fungi. The method will help farmers and collectors to more readily recognise toxigenic strains of fungi.

PHTI HCMC and the Food Control Centre are currently using the ELISA to analyse for aflatoxin and salmonella. As an interim measure until the ELISA kits to be developed in the joint program become available, the Institute



Computer-aided learning in Vietnamese

has made its own kits. Immunoaffinity columns have been supplied to enterprises for analysis of aflatoxin. Also, a method based on the enzyme acetylcholinesterase is currently being used to detect organophosphate and carbamate pesticide residues in vegetables, as part of a campaign to provide safer vegetables for Ho Chi Minh City markets and for export.

Research and training have been running in parallel. As part of project activities, PHTI HCMC has successfully organised, in conjunction with the University of Sydney and CSIRO Plant Industry, an ELISA training course for people from eight enter-



ELISA workshop

prises in Vietnam and five foreign trainees. The focus was on using the ELISA method for aflatoxin and pesticide residue analyses.

New links

Some of ACIAR's existing publications have been translated into Vietnamese, so that the research results they contain can be more readily applied. This has led, for example, to the uptake in Vietnam of the results of earlier ACIAR-supported studies in Thailand on storage and handling of lychee and longan. ■

Australian Postharvest Technical Conference

A wide range of papers covering the state of the art in all areas of the grains postharvest subsector will be presented during APTC 2000, to be held in Adelaide, South Australia on 1–4 August 2000.

Topics to be covered include marketing, regulation, quality, and hygiene, fumigants and protectants, occupational health and safety, aeration and drying, and pests. As usual, a comprehensive proceedings volume will be published.

For further information and copies of a Circular and Registration Form, contact the conference secretariat at Australian Convention & Travel Services; fax: (02) [int'l + 61 2] 6257 3299; email: <aptc2000@ausconvservices.com.au>.

Asian Plant Pathology Conference

The 1st Asian Conference on Plant Pathology will be held in Beijing, China on 25–28 August 2000, organised by the Chinese Society for Plant Pathology with support from The Phytopathological Society of Japan and the Korean Society of Plant Pathology.

A call was been made earlier in the year for titles and abstracts of papers to be offered for presentation at the conference.

The program for the conference has 14 sessions, as follows:

1. Host-parasite interactions
2. Host-nematode interactions
3. Integrated disease management
4. Epidemiology and crop-loss assessment
5. Resistance of plants and resistance breeding
6. Etiology and new diseases
7. Ecology and biological control
8. New approaches to chemical control

Food, water and war

Each year, the Crawford Fund for International Agricultural Research holds a seminar to enhance support for international research in agriculture and natural resources. The theme for the 2000 seminar, to be held on Tuesday 15 August at Parliament House, Canberra, is "Food, water and war: security in a world of conflict".

An aim of the seminar is to stimulate debate among policymakers in foreign affairs, defence, aid, agriculture, science, the environment, and non-government agencies about the underlying causes of conflict in developing countries. Are they rooted in hunger, poverty, and diminishing access to food, land and water, and other basic human needs?

The Crawford Fund believes that international agricultural research and development should be seen as a sound global investment that has the potential to become the defence spending of the 21st century. The seminar will emphasise that food, agriculture, and the environment are fundamental to protecting, achieving, and sustaining peace within and between nations, especially in countries where "security" is thought of in terms outside the military dimension.

It is expected that, as in past years, the seminar will attract participants from a broad cross-section of government and private sector agencies and individuals with an interest in development assistance and international affairs. For further information, contact Heather Slater, Public Awareness Coordinator; fax: +61 2 6251 9044; email: <crawfpac@ozemail.com.au>. ■

9. Seed pathology and quarantine
10. Strategies for reducing the cost of disease control
11. Postharvest diseases
12. Forest pathology
13. Control of diseases in tropical crops
14. Media workshop

For further information, go to <<http://www.ciccst.org.cn/acpp>>.

Enquiries about the technical program can also be directed to: Prof. Tang Wenhua, Plant Protection Bldg. No. 313, China Agricultural University, Beijing 100094, China. Fax: 86-10-62891025; Email: <baucibe@public.bta.net.cn>; web site: <<http://www.chinaspp.com>>.

Feeding Asian cities

A regional seminar on this topic will be held in Bangkok, Thailand on 27–30 November 2000. It is being organised under the aegis of the FAO Divisional Project "Meeting Urban Food Needs" and in collaboration with the Municipality of Bangkok, FAO Regional Office for Asia and the Pacific, the Association of Food Marketing Agencies (AFMA),

CITYNET, the International Union of Local Authorities (IULA).

This seminar is part of the information and sensitisation effort, carried out by FAO and other partners, on the consequences of the rapid growth of Asian cities and the associated increase in the number of urban households living in poverty. The issue is then the food insecurity of the urban poor. The extent of urban food insecurity and possible interventions to alleviate this are often not sufficiently appreciated by central and local government institutions, and by the international community. City and Local Authorities (CLAs) can play an important role in reducing urban food insecurity and should be supported technically and financially.

The objectives of this seminar are:

- identify major food security challenges in feeding Asian cities and the role that CLAs can play;
- prepare a plan of action for the next ten years to strengthen the capacity of CLAs in enhancing urban food security; and
- facilitate collaboration and technical assistance partnerships between CLAs in different regions, to address specific urban food supply and distribution constraints.

Continued at foot of page 9.

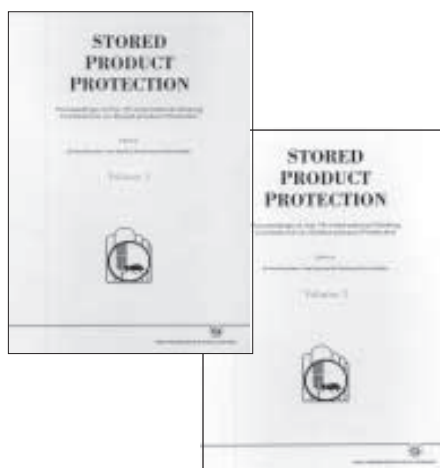
Proceedings of the 7th IWCSPP

Participants in the 7th International Working Conference on Stored-product Protection held in Beijing in October 1998 have begun to receive the proceedings of the conference. It has been rather a long wait, but I think we all appreciate the problems faced by our Chinese colleagues and I think too that most will agree that patience has been well rewarded.

The Proceedings of the 7th IWCSPP are in two volumes which together total over 2000 pages. My estimate is that we have here somewhere between 1 and 1.5 million words — truly a monumental effort by the editors, printers, and publishers.

In these latest IWCSPP proceedings we have a new mine of information on most aspects of research on, and technology for, the handling and storage of durable agricultural commodities. There are over 300 papers in the two volumes, together with reports on the various workshops and discussions that were part of the program. The main sessions and numbers of papers presented were as follows, with the numbers of papers presented by Chinese participants in brackets:

• Biology and ecology of insects and mites	31 (19)
• Stored product fungi and mycotoxins	21 (5)



• Fumigation and controlled atmospheres	66 (26)
• Grain protectants	44 (17)
• Physical methods for grain quality maintenance	29 (16)
• Biological control of storage pests	14 (6)
• Postharvest technological management	19 (6)
• Sampling and trapping	21 (9)
• Storage engineering	11 (8)
• Stored-product quality and standards	24 (10)
• Quarantine and quarantine treatment	27 (19)
• Information transfer and adoption	17 (8)

Overall then, some 150, or 46%, of all papers presented were from local researchers, technicians, and industry people — an impressive contribution.

Professor Jin Zuxun, President, Nanjing University of Economics, who was chairman of both the organising committee for the 7th IWCSPP and the editorial board for the proceedings, notes in his gracious preface to the proceedings:

Since China is a non-English-speaking country, many scholars encountered certain difficulty in writing papers in English. Although the authors and the examiners have made great efforts, some papers are not without problems. But limited by time, it is difficult to make much more amendment in language. Please accept my apology.

If any apology were needed it would be accepted with equivalent graciousness. As it is, the standard of these proceedings is very good indeed, and the editors, referees, typesetters, printers, and binders can be proud of the product, which is a just reward for what clearly reflects a very special effort from all those involved.

I am not sure if copies of the proceedings are available for purchase, but a good starting point for inquiries in that regard might be the Storage Speciality Branch of the Chinese Cereals and Oils Association, Chengdu; fax: +86 28 766 3533; email: <iwcspp@public.cd.sc.cn>.

Ed Highley

Forthcoming meetings ... from page 8.

This event is aimed at mayors, city executives and senior staff of municipalities and local authorities as well as for Central Government Institutions which are directly or indirectly concerned with urban food security: Ministries of Agriculture, Commerce, Health. It should also be of interest to Chambers of Commerce, Industry and Agriculture and private sector associations.

Details of this event (agenda, types of papers, conditions for sponsorships etc.) can be found at: <<http://www.fao.org/waicent/faoinfo/agricult/ags/agsm/sada/asia/index.htm>>. Alternatively, contact:

AGS-Divisional Project:
Meeting Urban Food Needs
Marketing and Rural Finance Service (AGSM)

Agricultural Support Systems Division (AGS)
FAO
Viale delle Terme di Caracalla
00100 Rome – Italy
Fax: (+39) 06 5705 6850
Email: <asian-cities@fao.org>.

Controlled atmosphere research

The 8th International Controlled Atmosphere Research Conference will be held in Rotterdam, The Netherlands on 8–13 July 2001.

It will aim to present the latest results in postharvest handling of fresh agricultural produce, and to facilitate discussion and communica-

tion between researchers and industry people.

The main topics to be covered are:

- quality control in the supply chain for fruits, vegetables, mushrooms, ornamentals, and fresh cut perishables;
- postharvest physiology, biochemistry, and molecular biology;
- modelling product quality;
- controlled atmosphere technology;
- modified atmosphere packaging;
- insect pest and infestation control; and
- intermodal operations.

For further information, go to <www.ato.wageningen-ur.nl/CA2001> or contact the conference secretariat (fax: +31 20 673 7306; email: CA2001@eurocongress.com). ■

“Grain Storage Tutor” goes multilingual

“Grain Storage Tutor” is a multilingual, multimedia, computer-assisted learning package that contains tutorials on insect pest control, mould control, and grain drying.

Versions of the tutor have been developed in four different languages — Indonesian, Vietnamese, Thai, and Filipino — so as to be able to communicate effectively with a larger range of potential users of the package.

The Indonesian, Vietnamese, and Thai versions are bilingual — in English and translated into the national language. The Filipino version is in English only, but includes some topics, such as outdoor storage, that apply specifically to the Philippines.

Funding for production of these training materials was provided by ACIAR (PHT/1997/131) and the AusAID–APEC support scheme. “Grain Storage Tutor” has been developed over the past four years by a team drawn from CSIRO, the University of



Mrs Bussara Chankaewmanee (Department of Agriculture) explaining the details of the insect identification module at the training course in Bangkok

New South Wales (INNSW), and the University of Queensland. The organisations listed below have also provided material for the program, and have made the translations into the national languages.

- National Logistics Agency [BULOG] (Indonesia)
- SEAMEO BIOTROP (Indonesia)
- Bureau of Postharvest Research and Extension [BPRE] (Philippines)
- Department of Agriculture in Bangkok (Thailand)
- King Mongkut’s University of Technology Thonburi [KMUTT] (Thailand)

- Plant Protection Department, Southern Regional Plant Quarantine Service (Vietnam)
- Post-Harvest Technology Institute [PHTI], Ho Chi Minh City Branch (Vietnam)
- University of Agriculture and Forestry [UAF], Ho Chi Minh City (Vietnam)

The first two bilingual training courses were conducted in March (Bogor, Indonesia) and November 1999 (Ho Chi Minh City, Vietnam) (see *PH Newsletters* 49 and 51).

The Thai and Filipino versions were completed earlier this year, following which a further three training courses were conducted:

- 21–23 March 2000 at the Department of Agriculture, Entomology and Zoology Division, Bangkok, Thailand (Thai version) for participants from Thailand and Laos. The organisers of the training course acknowledge the financial support of the Crawford Fund for the participation of the Lao delegation.
- 28–30 March 2000 at the Bureau of Soils and Water Management (BSWM), Information Technology Center for Agriculture and Fisheries (ITCAF) and National Food Authority (NFA) in Diliman, Quezon City, Philippines (English version with contents specific to the Philippines) for the participants from that country.
- 3–11 April 2000 at SEAMEO BIOTROP in Bogor, Indonesia

Continued at top of page 11.

Computer-assisted learning (CAL)

Although there are various methods available for effective pest management of stored grains, they are not always used in the most efficient way. For example, it often seems that technical, economic, and management matters are not fully integrated. To help decision-making about storage management, various types of tools have been developed. These can help to resolve difficulties by providing a clearer picture of the problem, the resources available to solve it, and how these should be best employed. So called “expert systems” attempted to address part of this problem but were designed primarily to facilitate the decision-making. Specific computer-assisted learning packages go further. They offer the potential for much more effective communication of complex concepts to trainees. Such systems allow students to explore, either individually or in small groups, alternative pest-management options. They can observe the consequences of their actions. ■



Practical session during the training in Manila. Second and third from the right: Mr Rolando Tiongson (BPRE) and Mr Jan van Graver (CSIRO)

“Grain Storage Tutor” goes multilingual ... from page 10.

(English version) for participants from six ASEAN countries involved in the SEAMEO scheme. There were participants from Cambodia, Indonesia, Lao PDR, Malaysia, Thailand and Vietnam (see page 1 story). This course was also financially supported by the Crawford Fund.

The participants of all three courses represented the various sectors involved in postharvest activities:

- The training course in Thailand was attended by 30 participants. Among them, 12 came from the government services, 15 from the private sector, and 3 from universities. Female participants accounted for nearly 30% of the total number.
- The course in the Philippines attracted 22 participants. There were 12 participants from government services, 5 from private industry, 4 from universities, and one from an international organisation (IRRI). Female participants accounted for about 40% of the total number.



Inspection of a fumigated stack during the practical session at the training course in Bangkok. Second, third and fourth from left: Dr Phoudalay Lathvilaywong (Thasano Rice Research and Seed Multiplication Center, Savannakhet, Lao PDR), Dr Barry Longstaff (CSIRO) and Ms Saranya Wattananon (RIL Lampang, Thailand)



Demonstration of seed packaging during the practical session of the training course in Indonesia at the Sukamandi Seed Multiplication Farm. At the right is Mr Dinh Son Quang from the Hanoi Agricultural University (Vietnam)

- Finally, the training course in Indonesia was attended by 13 participants, 8 from government services, 3 from the private industry, and 2 from the university sector. Female participants accounted for about 25% of the total.

The courses were conducted jointly by the scientists involved in the preparation of the contents and translations in the participating countries and the Australian team. The local teams were as follows:

- Thailand: Mrs Bussara Chankaewmanee, Mr Suparut Kosicharoenkul (Department of Agriculture Bangkok), and Mr Thanit Srivastevi (KMUTT, Bangkok).
- The Philippines: Mrs Raquel Bermundo, Ms Vicky Lumba, Ms Miriam Acda, Mr Ricardo Cachuela, and Mr Rolando Tiongson (BPRE, Muñoz).
- Indonesia: Dr Mulyo Sidik and Dr Hariyadi Halid (BULOG), Dr Okky Dharmaputra, Mr Iwan Setiawan,

and Mr Sunjaya (SEAMEO BIOTROP), and Prof. Dr Hadi Purwadaria (IPB, Bogor).

The Australian team was Dr Barry Longstaff, Mr Jan van Graver (CSIRO Entomology), and Dr George Szrednicki (UNSW).

At the conclusion of the training courses, the participants were given the full version of the course on a CD-ROM. All training courses were assessed jointly by the participants and trainers so as to provide feedback on usefulness and how the training materials and presentation might be improved. The participants found the training courses useful for their professional activities, especially those involved in teaching and training. There is interest in further courses in all of the countries so far involved, particularly in areas with significant grain production. ■

Mycotoxins training video

A training video “Analysis of mycotoxins in food” produced by the UK Ministry of Fisheries and Food Central Science Laboratories covers the analysis, using immunity column cleanup, of:

- aflatoxins in peanut butter, pistachios, figs, and paprika;
- aflatoxin M₁ in liquid milk;
- ochratoxin A in barley and roasted coffee; and
- patulin in apple juice and apple puree.

The video was produced within a project sponsored by the EU SMT Programme. For further details, contact Elke Anklam (fax: +39 0332 785 930; email: elke.anklam@jrc.it) or John Gilbert (fax: +44 1904 462 426; email: j.gilbert@csl.gov.uk). ■

Current Awareness...from page 12.

Protecting farm-stored maize in Africa

“From Biological Control to a Systems Approach in the Post-Harvest Sector — Stored Product Protection of On-Farm Maize in Sub-Saharan Africa” publishes the papers presented at an IITA/GTZ meeting on “Integrated control of insect pests in rural maize stores, with particular reference to the larger grain borer *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae) and the future development of the post-

harvest sector in sub-Saharan Africa”, held in Benin in October 1997. The proceedings is divided into two main sections, one containing 12 papers reporting on biological control and IPM work against the larger grain borer, the other a collection of 9 papers on the general theme “Systems analysis in post-harvest” in a wider context than the larger grain borer program. The full proceedings can be found in the virtual library at www.fao.org/inpho. Alternatively, further information can be obtained from Mr Albert Bell, GTZ, PO Box 5180, D-65726 Eschborn, Germany; fax: +49 6196 79 6554; email: albert.bell@gtz.de. ■

CURRENT AWARENESS

Professor Beth Woods new chair of ACIAR

Professor Beth Woods (BAgrSc (Hons), DPhil (Oxon)) OAM, Suncorp Metway Professor of Agribusiness at University of Queensland, Gatton and chair of Australia's Rural Industries Research and Development Corporation has been appointed chair of the ACIAR Board of Management. She succeeds Professor Ross Garnaut of the Australian National University who was chair of the Board for six years.

Prof. Woods worked in north Queensland before completing her doctorate in agricultural economics. She worked with the Department of Primary Industries (QDPI) as an agricultural extension officer in south-eastern and northern Queensland in the dairy, broad-acre cropping and potato industries. She was the inaugural director of the Rural Extension Centre (University of Queensland) and became the inaugural Queensland Industry Development Corporation Professor of Agribusiness at the University of Queensland in 1997.

Prof. Woods has served on committees of the Grains Research and Development Corporation, the Policy Advisory Council of ACIAR, the CSIRO Board, the Gatton College Council, and the Rural Adjustment Scheme Advisory Council. Her long term interests are the processes of change, innovation and learning in relation to agribusiness, agriculture, and natural resource management. Her current interest is the potential of the concept of supply chain management as a tool to improve the competitiveness of

agribusiness and the relevance of rural R&D. She presented a paper on this topic at the 1999 annual meeting of the Postharvest Technology program in Canberra.

Prof. Woods is one of the research partners in forthcoming small project on banana supply chain management led by Dr Peter Hofman of QDPI and in partnership with the Central Research Institute for Horticulture in Indonesia.

Other recent appointments include Dr Paul Wellings, Deputy Chief Executive, Environment and Natural Resources, CSIRO to the ACIAR Board and Sir Anthony Siaguru KBE legal consultant and Chair of the Port Moresby Stock Exchange from Papua New Guinea as member of the ACIAR Policy Advisory Council.

New managers of ACIAR business in Vietnam and China

Dr Greg Bavonva is the new ACIAR Manager in Vietnam. He replaced Ms Teresa Scott and took up his appointment on 25 May 2000. Greg joined ACIAR from the Australian Physiotherapy Association national office in Melbourne. Before that he worked at the University of Melbourne in the faculties of Law and Engineering. He holds BA(Hons) and PhD degrees. His partner is also taking up a position in Hanoi, as an AusAID posted officer.

Mr Chris Brittenden is ACIAR's new country manager for China. He officially took over from Anita Dalakoti at the end of June.

Mr Brittenden comes to ACIAR from the Li Mai School, a private school in Beijing, where he was an English language teacher. He has a Graduate Diploma in Education and a Bachelor of Arts degree (Asian Studies), majoring in the Chinese language, from Murdoch University in Western Australia.

Vale Ron Edwards

We note with regret the death of Emeritus Professor Ron Edwards (BSc, PhD, FTSE, FAIFST) in April 2000. Professor Edwards was formerly Head of the School of Food Technology (1976–85), of the School of Food Science and Technology (1985–86), of the School of Biological Technologies (1986–88), of the School of Applied Bioscience (1988–89) and of the Department of Food Science and Technology (1989–90) in the University of New South Wales. Professor Edwards' contribution to the development of food technology at the UNSW and in Australia was immense. He will be remembered too by the many overseas students who studied in his department.

POSTHARVEST PUBLICATIONS

Analysis of post-production systems

"Guidelines for the Analysis of Post-production Systems", by A. Bell, F. Mazaud, and O. Mück is a recent FAO/GTZ publication containing methods and procedures for analysing post-production systems. The rationale for the publication is that postharvest systems can be made more efficient and effective by taking a holistic view of the postproduction system with all its players and processes. The holistic approach promoted by the authors grew, they say, out of a realisation that individual measures such as drying, storing, pest control etc. can be of optimal benefit only when "embedded in a view of the system as a whole". The approach seems to have strong similarities to the perhaps more recent concept of "supply chain management". The book describes methods for analysing the system to identify weaknesses and potential improvements and to maximise the latter. The full text can be found in the virtual library at <www.fao.org/inpho>. Alternatively, further information can be obtained from Mr Albert Bell, GTZ, PO Box 5180, D-65726 Eschborn, Germany; fax: +49 6196 79 6554; email: <albert.bell@gtz.de>.

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