

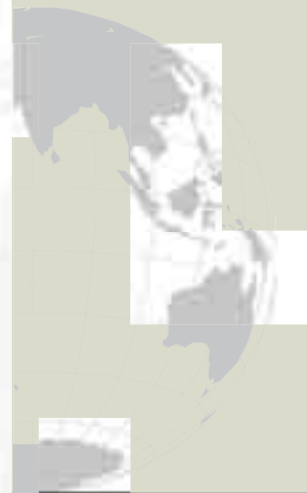
# Southeast Asia

Financial year	Regional expenditure	Percentage of total bilateral expenditure	Board target as percentage of expenditure
2002-03	\$12 713 502	47.8%	50-60%
2001-02	\$12 901 088	52.8%	50-60%
2000-01	\$11 743 438	47.0%	50-60%

ACIAR's programs cover five regions, of which Southeast Asia is the largest, with nine countries involved. Of these nine Indonesia is, and will remain, our largest partner. For the region, the Board and Minister have set an expenditure target of between 50 and 60 per cent of our overall bilateral research expenditure.

In 2002-03 expenditure did not meet this target of 50-60 per cent, expenditure being 47.8 per cent. This was due to security problems in Indonesia that stopped ACIAR and Australian research partners from travelling for significant periods in 2002-03, delaying both project development and implementation, and reduced outlays in Vietnam.

<b>Burma</b>	<b>Page</b> <b>20</b>
<b>Cambodia</b>	<b>21</b>
<b>East Timor</b>	<b>23</b>
<b>Indonesia</b>	<b>25</b>
<b>Laos</b>	<b>30</b>
<b>Malaysia</b>	<b>32</b>
<b>Philippines</b>	<b>33</b>
<b>Thailand</b>	<b>36</b>
<b>Vietnam</b>	<b>38</b>





*Buffalo ploughing*



*Workers in Burma*



# Burma

Active projects in 2002–03	2
Bilateral country expenditure in 2002–03	\$153 903
Bilateral country expenditure in 2001–02	\$0
Bilateral country expenditure in 2000–01	\$0

## Position

After exploratory visits in 2002 to determine the feasibility of collaborative research activities, ACIAR has developed a small program with Burma, the first projects commencing in 2003. Although there has been rather limited international development cooperation in agriculture with Burma since 1988, several trained researchers and some basic facilities are present to allow effective cooperation. Initial projects are focusing on spillovers from related ACIAR projects. Burma has already indirectly benefited through the Food and Agriculture Organisations (FAO) from the spillover of other ACIAR projects in the region, most notably production of vaccines against Newcastle disease in chickens.

## Achievements

ACIAR’s Burma program has only recently begun, with the commencement of projects to extend capabilities in **delivering Newcastle disease vaccines** and for **rodent control** through use of the successful trap barrier system, mid-way through the financial year. Early reports indicate good progress.



*Rat burrows in rice crops*

# Cambodia

Active projects in 2002–03	6
Bilateral country expenditure in 2002–03	\$721 584
Bilateral country expenditure in 2001–02	\$489 597
Bilateral country expenditure in 2000–01	\$291 754

## Position

Cambodia is a relatively new partner country for ACIAR, although Australia has provided significant development assistance over the medium term. A major component of the AusAID assistance in Cambodia continues to be in agriculture, and ACIAR has taken the opportunity to link several of its research projects to AusAID-supported extension, industry development and institutional capacity-building initiatives. Cambodian farming is largely based on rice systems of relatively low productivity. The suite of current, pipeline and completed projects is correspondingly targeted at improving rice production as well as agricultural diversification, and at developing animal health research and development capacity. Cambodia has made good recent progress in developing a group of internationally trained researchers and its infrastructure has improved through other donors. These needs and capacity make it an important partner country for ACIAR.

## Achievements

Drought-screening methods developed in previous ACIAR research projects have been used to identify **rice genotypes that are adapted to drought-prone environments**. The method uses a low-rainfall location, under normal wet season conditions, simulating drought conditions by draining standing water from the crop during the reproductive phase of growth. This method is being integrated into breeding programs. Drought-resistant lines identified are being used to rapidly develop new populations of acceptable, widely adapted cultivars that are also well adapted to rainfed lowland environments and have high potential yields under irrigated conditions. The first extensive multi-location yield trials using 32 rice varieties are underway across a range of soil types. The trials, examining the effects of 'genotype-by-environment' interaction on yield, found a smaller degree of difference than anticipated. As a result, genotypes can be selected for broad adaptation to one main environmental type.

A **rodent control** project is focusing on the common property issues of implementing the successful trap barrier system, developed through ACIAR-supported research, that is used elsewhere in Asia. The main experimental site has been successfully implemented and there has been spontaneous adoption at a second site. There are clear benefits deriving from farmers being involved in the experimental processes, with local farmers having developed strong self-reliance in managing rat problems. Project work on **controlling the parasitic-borne fasciolosis disease**



*Cambodian farmers with ACIAR Director Peter Core*

**Strengthening our partnerships**



*Ms El Sotheary - Allwright Fellow*

in cattle and buffaloes has identified when animals are infected, based on knowledge of the disease host and its role in transmission. This understanding has also benefited the development of control methods suited to different climatic and agricultural conditions. Application of suitable controls to match the systems has successfully increased animal weight and productivity. These results are being more widely disseminated, through both the establishment of a regional network of scientists and the building of capacity in Cambodia and other Southeast Asian countries.

ACIAR is managing the Research Trust Fund component of the AusAID-funded 'Cambodian Agricultural Research and Development Institute Assistance Project', which is aimed at providing an environment of competitive tender for agricultural research. In addition to managing the fund itself, the project provides both formal and one-on-one training in research problem identification, the preparation of research proposals, and scientific report writing. In two rounds in 2002-03, 14 projects were funded, involving a broad range of topics and six different Cambodian research institutes.



# East Timor

Active projects in 2002–03	2
Bilateral country expenditure in 2002–03	\$681 219
Bilateral country expenditure in 2001–02	\$479 366
Bilateral country expenditure in 2000–01	\$893 838

## Position

ACIAR has been involved with East Timor since late 2000. Agriculture provides both a livelihood for more than 80 per cent of East Timorese and through coffee is also one of the main sources of export income. Australia has a comparative advantage in working with East Timorese agriculture in several ways, including proximity, similarity of climatic and production systems to Australia's arid and wet/dry tropics, and relevant experience of Australian agricultural scientists in nearby regions. Current projects aim to build local agricultural research capacity, both in the field and in the laboratory.

## Achievements

The Seeds of Life project which is **introducing staple crop varieties better suited to local growing conditions** conducted planned third-year crop trials successfully at three experimental sites during the December–April wet season. A fourth site failed due to drought. Harvesting has been completed for seven of the eight crops sown, excluding cassava which takes 12–14 months to mature. Some introduced lines of maize, peanut and sweet potato continue to show much higher yields than local varieties. Seed of the better varieties of sweet potato, peanut and maize was distributed to villagers around the trial sites, with villagers excited about the improved yields compared with their local varieties.

A conference 'Agriculture: New Directions for a New Nation', co-sponsored by ACIAR, was held in conjunction with the annual technical meeting of the Seeds of Life project in Dili on 1–3 October 2002. This was the first international conference on agriculture held in the country. A strong focus was placed on technical information and experiences relevant to local development, with strong representation from local speakers, and a broad agenda to cover cropping, fisheries, forestry and livestock. Around 140 scientists and agricultural and extension specialists from 10 countries attended.

Through ACIAR support there has been considerable progress in **capacity development at the National University of East Timor Agriculture Faculty**. The focus of this work has been research and development and teaching, including the completion of the rehabilitation of the University farm and laboratory facilities. Xanana Gusmao, President of East Timor, and Australian Ambassador Mr Paul Foley officially opened the facility on 13 February. It is now being used intensively by students under the supervision of academic and technical staff from the Departments of Agronomy and Animal Science of the Faculty of Agriculture. Eight final-year students are conducting research work at the Hera field station while seven students completed their dissertations, based on work at the station during 2002.



*President of East Timor Xanana Gusmao inspected the newly opened facilities at the Hera Campus of East Timor Agricultural University*

Facilities at the Hera campus of East Timor University that were damaged or destroyed in the country's crisis in 1999 have been restored through an ACIAR project. The newly refurbished experimental station and laboratories were recently reopened.

The ACIAR project has funded a twinning arrangement between the Faculty of Agriculture at the University and agricultural faculties from several Australian universities.

A dedication ceremony of the refurbished buildings took place on 13 February 2003.

## Seeds for a better life

The Seeds of Life project has helped improve food security in the fledgling nation of East Timor, through the introduction of seed germplasm for staple crops. The need for germplasm emerged after the conflict surrounding independence in 1999. Many seed reserves were destroyed, stolen or consumed. ACIAR, together with five CGIAR centres, the Timorese Ministry of Agriculture and Catholic Relief Services, established a project to assess a variety of seed germplasm for its suitability to local growing conditions. Improved varieties of maize, rice, sweet potatoes, beans, cassava and peanuts have been identified, all with the added benefits of years of breeding to improve yields and disease resistance. Maize varieties tested near Baucau in the north have yielded at 6

tonnes per hectare, compared to the average for local varieties of 1.5 tonnes per hectare. The best of these varieties are now being used in on-farm trials involving local farmers. Seed multiplication and the establishment of a seed production/distribution system is in the initial stages of development. Substantial capacity building of the skills of East Timorese field staff in integrated crop management technologies has also been undertaken. Former CSIRO plant breeder Dr Brian Palmer has been instrumental in helping to evaluate the best varieties, through his work during the three years the project has been running.



A project implemented by ACIAR to restore agriculture to the world's newest country:  
**Seeds of Life – Timor-Leste**



Symbol of a new nation:  
 Big labour,  
 Governmental  
 good people  
 right!



Dr Brian Palmer with East Timorese workers

# Indonesia

Active projects in 2002–03	53
Bilateral country expenditure in 2002–03	\$4 062 457
Bilateral country expenditure in 2001–02	\$4 784 157
Bilateral country expenditure in 2000–01	\$3 475 852

## Position

Indonesia is ACIAR's largest bilateral program and has more projects than any other partner country. The country's proximity and strategic importance to Australia, and the large proportion of its population relying on agriculture, mean that its prominence in ACIAR's program will continue. The agreed geographical focus of the collaboration continues to shift towards eastern Indonesia, in line with the emphasis of the Australian aid program. Most research capacity is in Java but ACIAR has made good progress to link this to eastern Indonesian institutions and to regional adaptive research agencies and planning authorities. The majority of projects developed since 1998 have strong eastern Indonesian components. ACIAR also targets Indonesia in its multilateral program, delivered in conjunction with international agricultural research centres such as the Center for International Forestry Research (CIFOR), the International Potato Centre (CIP) and the World Agroforestry Centre.

## Achievements

ACIAR supports collaborative projects in both animal health and production. Diagnostic tests, based on enzyme-linked immunosorbent assay technology (ELISA) were developed for the **detection of the antibody to jembrana disease virus, a significant health problem in Bali** cattle in parts of eastern Indonesia. Training courses were conducted by the Disease Investigation Centre in Denpasar, to transfer the technology to regional laboratories. A vaccine trial demonstrated that immunisation with a recombinant protein vaccine provided immunity against Jembrana disease of cattle. Development of a number of options for control based on knowledge of the epidemiology of fasciolosis, which are appropriate for the farming systems in Southeast Asia, can help minimise the use of expensive anthelmintic drugs. Transfer of control recommendations to extension services is underway. The Research Institute for Animal Health in Bogor is now a reference centre for fasciolosis in Southeast Asia. In work on gumboro, a disease of poultry, a preliminary test to detect the presence of the most virulent form of the disease has been developed. Five strains have been identified including a dominant strain, which will be used in vaccine development.

A simple and practical method of **overcoming the low reproduction rate of Bali cattle** in mixed crop–livestock systems in eastern Indonesia has been demonstrated. After consultation with all farmers in Kelelub village in Lombok, the twin strategies of controlled mating (one bull,



Bali cattle



Rhonda McLellan is our Indonesia Manager



Mud crab fattening pens

three-month mating period) and weaning of calves at six months were adopted. This resulted in cows in better condition that were less costly to feed, and calves growing better when fed appropriately. The controlled seasonal mating has been a further boon, with over 90 per cent of eligible cows producing a calf, compared with about 60 per cent under traditional management. A new project is being developed to scale up this initiative to other villages where the strategies can be applied. Discussions with farmers at Kampung on Sumbawa (one of eastern Indonesia's transmigration areas) identified that a better rice variety for their upland conditions was the highest priority. A dozen accessions were assembled and established for the 2002 wet season and farmers made their selection. Seed was bulked up during the dry season, with the new variety achieving record yields, about 50 per cent higher than from the existing varieties, during the 2003 wet season.

#### **Plant protection remains an important aspect of research activities.**

A project on *Liriomyza huidobrensis*, a new leaf-mining fly devastating many vegetables in parts of Asia, has uncovered much information about various pest leaf miners and their natural enemies. Information gathered through this project was able to help the Northern Australia Quarantine Strategy interpret results from some of their offshore surveys. A project on fungal diseases of significant crops in Indonesia has identified the complex factors causing clove yield decline and vanilla stem rot, and the modes of spread of both diseases. Trials are now underway to design management strategies.

A 'National Rodent Management Program' (Gama Pamati) was developed based on recommendations arising from collaborative work funded by ACIAR in West Java. This program now forms the basis for the national policy on **rodent pest management in Indonesia**. This was based in part on research into ecologically-based rodent management that demonstrated consistent increases in rice yield (range 0.1 to 0.9 t/ha). Chemical usage amongst farmers involved in the project dropped from 98 per cent in 1999 to 46 per cent in 2002. A project to reduce incidences of disease and pest management problems of cocoa is examining resistance traits in cocoa varieties. Cuttings of promising varieties identified throughout Indonesia have been identified and collected, with cuttings grafted to existing trees at the trial site. Additional project work is determining the best methods of grafting cuttings, with preliminary results indicating improvements that can benefit local cocoa farmers, are possible.

Options for **reducing contaminant risks in peanuts** have been enhanced by market chain studies showing that most fungal contamination from aflatoxins occurs during postharvest handling and storage. Excessive contamination was not a problem in freshly harvested nuts, allowing research to focus on finding improvements in postharvest handling and storage systems to reduce risks to consumers. Alternatives to traditional cropping tillage practices on vertisol soils based on permanent raised beds, using vegetables like onions and chillies, are

proving successful. The traditional 'gogorancha' methods produce lower yields and can damage the long-term sustainability of the vertisol soils.

**Fisheries is ACIAR's largest program discipline in Indonesia.** ACIAR and the Indonesian Ministry for Marine Affairs and Fisheries collaborated to present a major showcase of outcomes of almost two decades of jointly sponsored work in capture and culture fisheries. The showcase, held in Jakarta on July 31, attracted almost 400 participants including senior officials from government and industry. Five key project results were highlighted, covering the areas of shared fish stocks; grouper mariculture; illegal, unregulated and unreported fishing; remediation of degraded shrimp ponds; and shrimp disease control and management. All presentations, posters and information products were in Bahasa and English. The showcase generated strong commitment to continuing collaboration, with increased emphasis in future on applications of research and technology transfer.

An effective low-cost technique for the **remediation of ponds** in areas with medium or low levels of acid sulfate in soils has been developed and successfully trialled in southern Sulawesi. When exposed to air through excavation, the acid sulfate is released, leaching into ponds and waterways, significantly reducing productivity. The main cause of this leaching was identified as dyke soils rather than pond bottoms, which are often the focus of management. Modified dyke soil management strategies, using acid- and salt-tolerant species, dramatically reduced soil erosion.

Mono- or polyculture methods to growout shrimp, milkfish and seaweed have also been demonstrated for affected ponds. Geographic information systems (GIS) and remote sensing methods were successfully used to describe relationships between acid sulfate soil distribution and coastal landforms in Indonesia and to classify land suitable for shrimp production. Biological, physical and production indicators were also identified and integrated into simple site assessment techniques for farmers.

Nutrition research has identified many of the **nutritional requirements of several species of high-value grouper**, which has allowed the development of artificial (pellet) diets. Trials are now being undertaken with commercial feed companies to develop commercial grouper feeds. ACIAR also supported a request of the Indonesian Government to address a serious carp disease epidemic (Koi carp herpes) in Java. The outbreak represented a grave threat to common carp, a major food fish and source of cheap protein. ACIAR assisted Indonesian scientists to undertake a detailed disease survey, and provide training on the suite of epidemiological tools developed under a past project. This study will input directly into the development of a national control and management plan for the virus.



*A typical aquaculture set-up, common in coastal areas of Indonesia*



*Drying rice crops*



Preparations for rice crop

Project work in agricultural economics has advanced the development of **a sustainable microfinance system for agricultural producers**. The study showed that successful schemes needed to serve the wider community, not just farmers, and have low transaction costs. Dissemination of the research has included interactions with provincial government committees on the poverty alleviation program, as well as the Ministry of Finance to look at the model being applied nationally. The issue of whether farmers participating in contract farming were better off than those that did not was addressed through project work. The results showed lower transaction costs were a key aspect of the success of the contract under study, which provided a low-cost way for farmers to access the seed corn market. This allowed diversification in production, reducing risk, providing guaranteed prices and enhancing profitability. The involvement of grower groups also provided the contractor with benefits in terms of the costs of drafting, negotiating and enforcing the contracts.

Constraints to the **development of the banana industry** are being analysed, with a focus on markets. A workshop brought together key stakeholders from throughout the industry to develop a picture of the constraints throughout the supply chain. The result is a classification of the roles, resources used and barriers to productivity of the two main groups within the industry, smallholder farmers and larger commercial operations. A suitable model to test several improvements is now under development before application on a small scale to the smallholder sector.

**A suite of forestry projects is underway**, aiming at enhancing the sustainability of forestry resources through improved productivity and management. Domesticating Australian trees offers opportunities to improve the sustainability and profitability of Indonesia's forestry sector. A project focusing on the provision of seeds and technical support and training has supplied seed to 14 countries. Training and technical support have been provided, with a focus on establishing productive seed orchards, many of which are now producing seeds for *Eucalyptus* and *Acacia* species. Heartrot, which occurs when *Acacia mangium* is planted in Indonesia, is a significant barrier to using acacia wood for timber. Surveys of the incidence of heartrot in acacias show it is widespread, but have also revealed that its incidence increases dramatically in trees selected for characteristics associated with thin trunk growth. Some management techniques to increase these traits also increase the likelihood of heartrot. A separate project is using molecular technologies to develop more efficient breeding strategies for *Acacia mangium*. Screening of seed from eight provenances (locations from which the seed is derived) to determine rust susceptibility has been undertaken. Training in the microsatellite technology used has been passed on to the Indonesian project personnel.

Improving the broad-scale management of forests and of productive sectors of the forestry industry is also progressing. A project examining **alternatives to traditional slash-and-burn agriculture** has identified

carbon stock accumulation in soils for the main cropping options practised. Of these options, shade-coffee crops provide the greatest levels of carbon storage in soils, minimising the levels of carbon reaching water supplies. Erosion control measures that suit these options, which also reduce carbon loss to water supplies, have been tested, with initial findings showing that the growth of plants, and even weeds, on these measures have the added value of acting as filters. Potential conservation measures based on local practices have also been identified, with computer modelling used to test the likely benefits on soil conservation. This has allowed various options to be matched to locations for field trials, which are now underway. A separate project focused on the essential oil industry in Indonesia has used seed collected from the Maluku Islands in Indonesia and parts of northern Australia to improve breeding, through screening of oil and growth characteristics. This included the planting of breeding populations and laboratory testing using gas chromatography. Thinning of breeding populations based on the best identified varieties and provenances is underway to allow for scaling up of seed populations for plantation planting throughout Java.

Limiting the **emission of greenhouse gases**, particularly carbon dioxide, with the potential to cause climate change, is the focus of another ACIAR-funded project. Results included demonstrating the ability of land-use change and forestry projects to offset permanent emissions of carbon dioxide from the energy sector, based on accounting approaches for carbon sequestration. Approaches have been proposed, with strongly divergent implications for both landholders and investors. These implications are expected to influence the design of projects and **policies to capture carbon sequestration benefits**.



*We publish in Indonesian*





Lao fish market

# Laos

Active projects in 2002–03	9
Bilateral country expenditure in 2002–03	\$545 329
Bilateral country expenditure in 2001–02	\$613 852
Bilateral country expenditure in 2000–01	\$613 684

## Position

ACIAR has had a program in Laos since 1992, coinciding with a period of expansion of Australia's aid program among the Mekong countries. ACIAR's program with Laos is relatively small, with most projects being components of multi-country projects addressing special research needs and capacity-building. Projects are designed to complement major donor programs on crops, animal health, forages and forestry.

## Achievements

Drought in rainfed lowlands in central-southern Laos and low temperature in irrigated lowlands in northern Laos are limitations to rice production. These problems are being characterised to develop methods and resistant cultivars to minimise climatic impacts. Monthly minimum temperature maps and probabilities for the occurrence of different temperatures have also been calculated and mapped. The temperature maps and accompanying documentation have been published. GIS-based maps of annual rainfall have also been completed, based on rainfall data from 25 meteorological stations and six hydrological stations in Laos and 17 meteorological stations in Thailand. With World Vision involvement, **rice yields in central Laos are being increased by the application of improved varieties and management practices**, such as the use of manures and rotation crops. This has significantly improved food security for farm families in participating districts.

**A rodent taxonomic key specifically for the upland regions of Laos** was developed and issued to four provinces of Laos. The key, the first for rodents in agricultural systems in Laos, allows clear definition of pest and non-pest species and strengthens the ecologically based approach to rodent pest management. An equivalent key is currently being finalised for Vietnam, and work is underway on a comprehensive computer-based key that will cover the entire Southeast Asian rodent fauna.

Salinity, a major problem in areas of Laos and Thailand, is being addressed through the development of management strategies that are raising awareness of the salinity process. Local authorities are now aware of the problem and are beginning to manage and prevent salinity. The project work is **mapping potentially saline areas** and providing villagers and local authorities **with information to prevent salinity**. Strong links have been forged between government departments, increasing awareness of the need to begin managing salinity in coordination with agricultural development.

A project **adapting low-chill temperate fruits to Lao**, Thai and Vietnamese conditions has sent more than 1300 stone-fruit trees with 25 varieties of peach, plum, nectarine and persimmon to Vietnam and Laos for field-planting. Testing at locations in Vietnam and Laos has identified late-season, high-quality, medium-chill plum cultivars to complement early-season production from the lower-chill regions. Local germplasm with breeding potential has also been identified. Five training courses were conducted for local technicians, extension officers and farmers from two provinces in Vietnam and one in Laos. Varieties introduced as part of the project are attracting price premiums when sold with locally produced varieties, because of their higher quality.

A project aimed at building capacity in the identification and management of animal diseases has established a field investigation network and operational virology laboratory. Tests to identify the presence of **foot and mouth disease in cattle** and **classical swine fever in pigs** have been developed and are now in use. Molecular studies of the epidemiology of the two diseases are now underway. These tests, backed by the enhanced skills and infrastructure, have significantly expanded the diagnostic capabilities of Lao authorities involved in monitoring disease outbreaks.



*Lao vegetable market*



*Site visit to Laotian smallholder livestock producers (chickens, goats and cattle)*





Rambutan

# Malaysia

Active projects in 2002–03	10
Bilateral country expenditure in 2002–03	\$296 572
Bilateral country expenditure in 2001–02	\$316 686
Bilateral country expenditure in 2000–01	\$355 148

## Position

Malaysia is a longstanding partner country for ACIAR. It has been engaged in ACIAR projects since the earliest days. However, in recent years ACIAR's program of work with Malaysia has tapered down, reflecting Malaysia's economic progress. Malaysia now has a strong research infrastructure and capability, and the push for privatisation and commercialisation of agriculture is strong. No bilateral project development has been initiated since 1998, with the last project commencing in July 2000. Malaysian organisations are welcome to participate in ACIAR projects as non-funded collaborators. On occasions, ACIAR supports Malaysian scientists as specialist advisers to assist in projects in the region and through multilateral projects that deal with subjects of a regional nature.

## Achievements

A project operating across several Southeast Asian countries (Thailand, Philippines, Vietnam and Malaysia) developing advanced technologies, including biotechnological approaches, to conserve tropical fruit germplasm has developed and refined protocols to study rambutan. Germplasm of calamansi, pummelo, mandarin and lime was collected, established and indexed as virus-free for use in experiments on *in vitro* culture studies. Lychee and longan embryos free of contaminants were also isolated. A long-term conservation strategy has also been achieved for papaya.

Developing resistance to blackheart in pineapples, a serious quality defect, has been addressed through a project using an Agrobacterium method of transformation. Through the method, in which DNA is introduced through the method of Agrobacterium mediation, resistance to black heart has been established under laboratory conditions.



# Philippines

Active projects in 2002–03	35
Bilateral country expenditure in 2002–03	\$2 948 986
Bilateral country expenditure in 2001–02	\$2 471 426
Bilateral country expenditure in 2000–01	\$1 862 018

## Position

ACIAR's program in the Philippines has been underway since 1983. Initially the program focused on soil and land management issues and postharvest technology. During the 1990s research on livestock management and biotechnology was initiated. A shift in project location, to emphasise poorer areas of Mindanao and the Visayas, also occurred. Increasingly ACIAR underpins new research projects with design processes that include the end-users of the research. Project activities that enhance the impact of earlier ACIAR projects are now a particular focus.

## Achievements

**Work to extend the Landcare model** within the Philippines continues, through expansion of project activities to new geographical areas. In Mindanao more than 350 Landcare groups involving 4500 members are operating. Five hundred communal nurseries, providing trees and plants to aid in land regeneration, have also been established. Insights into some of the key resource limitations of smallholder forestry producers have been gained by surveys in the Visayas. Availability of suitable planting material has been identified as one such constraint. A training workshop has been developed and a manual for socioeconomic research techniques in forestry produced.

A separate project on **watershed monitoring** in Bohol involving government researchers and NGOs has developed a database and monitoring program to better inform decision makers. The Provincial Planning and Development Office has already incorporated project-generated GIS image materials into their own planning documentation and planning capacity. The project is developing an image and map database which has already enhanced the capacity of the Bureau of Soil and Water Management to better evaluate its own mapping techniques and accuracy of soil classification and land-slope maps. A team involved in a project on minimising the impacts of pesticides beyond agricultural sites has been trained in risk-based approaches for assessing the impact on local species. This includes the use of ecotoxicological assays. The risk-based approach has been very enthusiastically received by the stakeholders, including natural resource managers, regulatory agencies and others.

**Marketing and agribusiness studies are an important research emphasis.** A survey of 209 farm vegetable-producing households in southern Mindanao, conducted during 2002, revealed a range of



*Philippines landcare projects*



*Cecilia Honrado is our Philippines Manager*



*Philippines model farm project*

reasons for traders not supporting farmers by providing the prices expected for vegetables. Most traders are either unwilling or unable to provide market information or to help the farmer grow better crops by providing technical information or training programs. The University of the Philippines in Mindanao now offers a course in supply chain management. The University is also developing strong links with the regional node of the Department of Agriculture, a USAID-funded project and players along the vegetable supply chain including supermarkets. An overview of production and marketing systems and government policy pertaining to the Philippine poultry industry has been completed.

The Leyte Livestock Improvement Project has established a regional network designed to build the infrastructure and capacity required to achieve continuous improvement and innovation of smallholder livestock enterprises. The network brings together local teams of farmers with clear roles and focuses for action. Project staff and members of the network design and manage research and development services to achieve 5 per cent improvements in profit, environment and efficiency per year every year. **A pig and chicken profit improvement process has been developed** focused on achieving improved gross margins of smallholder pig enterprises.

Surveys of smallholder farms in the Philippines and Indonesia demonstrated that resistant parasites are not yet common in the sheep and goat industry. This finding creates **an opportunity to maintain the effectiveness of chemical dewormers** amongst stock dispersed throughout government farms and the smallholder sector. A diagnostic capability for tick-borne disease has been established at the Philippines Animal Health Centre. A pilot survey of these diseases in Batangas Province indicates that about 20 per cent of cattle have been exposed, but cases of clinical disease in smallholder-owned cattle are rare, suggesting a high degree of innate resistance in local herds. The project has also developed the capability to differentiate between parasite strains, important to identify if Australian or Filipino cattle are the source of disease outbreaks. ACIAR-supported work into the parasitic disease surra has identified the best available treatment option against the strain found in the Philippines. This is a commonly available, effective drug with added preventive benefits. The treatment previously favoured was shown to be ineffective.

**A novel technique has been developed to transplant coconut embryos into surrogate nuts.** The embryos obtained from de-husked nuts were inserted into surrogate nuts under sterile conditions with the transplanted nuts then allowed to germinate and grow. The first transplanted coconuts have germinated and produced healthy seedlings. The technique is still at an early stage of development, but could be used as an alternative to embryo culture for safe germplasm movement and to rescue the embryos of mutant-type coconuts like makapuno and kopyor which cannot germinate in nature. In collaborative research with

the University of the Philippines, Los Baños, the first fruits were harvested from glasshouse-grown transgenic papaya cultivars. Fruit development was somewhat slower than in non-transgenic lines, with delayed ripening characteristics, but the fruit otherwise displayed normal characteristics for the cultivars.

A comprehensive **key to rice disorders** has now been completed, and a pathway version is available for public access on the Internet. Adjusting and testing of the product is now underway, and final versions will shortly be available on both the Internet and CD-ROM.

Following the successful completion of the pilot project working on the identification of researchable options for the **development of policy and management frameworks to combat illegal, unreported and unregulated (IUU) fishing activities**, both the Indonesian and Philippine Governments have expressed high-level support to move ahead with firm agreements on bilateral cooperation to contain IUU fishing. ACIAR has initiated a new project to facilitate the process of developing an IUU management plan for the Sulawesi Sea.

Five companies are now manufacturing **woodwool-cement boards** that can be used to erect rapidly assembled, robust and durable houses to fulfil needs for urgent shelter. The boards were **developed through ACIAR-supported research**. One company has developed an emergency shelter that is being tested for resilience in earthquakes.



*Tree nursery for Philippines Landcare project*



A member of the World Vision supported vegetable grower cooperatives demonstrates his simple tool for cutting holes in which to plant cucumber seedlings



Experimental site at Ubon Research Centre



Chirapom Sunpakit is our overseas Manager for Thailand, Cambodia and Laos

# Thailand

Active projects in 2002–03	23
Bilateral country expenditure in 2002–03	\$1 090 643
Bilateral country expenditure in 2001–02	\$1 148 593
Bilateral country expenditure in 2000–01	\$1 609 973

## Position

Thailand was an early and large collaborator with many projects successfully undertaken. However, as research capacity has increased, its involvement in ACIAR projects has diminished. ACIAR's investment in projects has decreased in line with the increasing ability of Thai partners to co-invest in projects of strong mutual importance. In some cases, there are spillovers to less developed countries from drawing on the development experiences of Thailand. Project investment with Thailand is highly selective, focusing only on implementation of the results of earlier ACIAR projects.

## Achievements

**Through an alliance with World Vision, ACIAR is building on past project results.** The first component of this alliance has established community centres to train local villagers in farming fish and developing feeds based largely on locally available ingredients. More than 550 families have adopted fish farming practices. In a second component, farmer groups near the Thai-Burma border have been trained in temperate fruit production, with a number of orchards established. A third component is extending knowledge to reduce agrochemical use in horticulture and water pollution in southern Thailand. Based on a past ACIAR project the extension work has resulted in the development of farmer cooperatives that are reducing chemical use in vegetable farming, opening up new markets.

A project examining **shrimp viruses** has established a common platform of understanding on the prevalence and importance of the three major viruses attacking shrimp, which is important to future trade-related negotiations on aquatic animals and products. International advances in virology have been achieved with the identification and reclassification of these viruses into a new family.

**The domestication of Australian tree species** through the production of well-adapted seed has focused on *Eucalyptus camaldulensis*. Improved seed from seed orchards established under the project is now being produced in commercial quantities and distributed in Thailand and Cambodia. Villagers in northeast Thailand are working with the Land Development Department to revegetate saline land using species and techniques pioneered in ACIAR-funded work. A flowing saline bore has been capped in one rural area, ending years of saline contamination and enabling rehabilitation to begin. The project has brought together

groundwater, land management, forestry, social geography, economics and computer programming experts to help establish a multi-discipline database, facilitating socioeconomic and environmental approaches to research on salinity management.

**Acidity risk maps have been prepared for northeast Thailand** for rice and cassava cropping systems. These will be used by land managers to better plan for future land uses. One site continues to show that nitrate-based fertilisers have the capacity to rapidly reverse soil acidification, previously caused by ammonia-based fertilisers and crop removal. A decision support system for land use planning has been developed with the Land Development Department, the Royal Irrigation Department and the Royal Forestry Department. A re-specification of the base land unit within the decision support system has added flexibility and power to analysis capabilities. The results of this study are being used in establishing policy and water resources management plans appropriate to the characteristics of each catchment.

Commercial production of the peach variety **Tropic Beauty**, introduced through a project adapting **low-chill temperate fruits**, has commenced in hill tribe villages near Ang Khang. Recently established cool storage facilities and refrigerated transport have ensured that high quality fruit is reaching the Chiang Mai and Bangkok markets. Insect pests cause considerable damage to mango crops. A project investigating the use of green ants as a pest control measure has demonstrated that the use of ants results in higher yields of better quality or similar quality fruits than in trees without ants. The combination of ants and minimal chemical use was also shown to produce better quality fruits without a drop off in yield, than chemical controls alone. Regional awareness and coordination of research and development was enhanced through a major workshop on distribution and control of *Phytophthora* diseases in Southeast Asia in Chiang Mai during November 2002. Serious losses in cocoa, pepper, durian, citrus and other crops were discussed and priorities for future research and development identified.

A study of the *Effects of globalisation and economic development on the Asian livestock sector* confirmed **the growing demand for livestock products** in the five Asian case study countries (Thailand, Indonesia, Philippines, Vietnam and China). The model took into account a range of factors and identified that seafood, pork and poultry are the major livestock products consumed. Demand for these products, and for the lesser consumed beef, are anticipated to grow at 2.5–7 per cent per annum to 2020, depending on country and commodity. The study determined that improvements are needed on the supply side for these countries to remain competitive as protection diminishes with trade reform. The relationships between grain prices and smallholder and commercial sectoral advantages were also determined.



Temperate fruit orchards in Thailand



# Vietnam

Active projects in 2002–03	36
Bilateral country expenditure in 2002–03	\$2 212 809
Bilateral country expenditure in 2001–02	\$2 597 411
Bilateral country expenditure in 2000–01	\$2 641 171

## Position

Since the initiation of ACIAR's Vietnam program in 1993 a significant program in forestry, land and water resources, animal sciences, crop sciences, fisheries and postharvest technology has emerged. There has been an evolution from an emphasis on capacity-building to practical farmer and policy impact. Some new projects focus on extension or adaptation of outputs from earlier ACIAR projects in Vietnam and elsewhere in the region. Appropriate technologies arising from these projects are also being applied and capacity developed in R&D through the AusAID Capacity-building for Agriculture and Rural Development (CARD) program. ACIAR is also seeking greater involvement of the private sector and NGOs in projects, linkages with other donors and development of closer linkages between Vietnamese research and extension organisations.

## Achievements

Many research activities in Vietnam have a strong emphasis on agricultural and natural resource policy. A project with the Hanoi Agricultural University is examining impacts of alternative agricultural policies on Vietnamese farmers. The research undertaken was drawn on by both sides in the recent Vietnam–US catfish anti-dumping debate. Investigations into **the economics of developing reservoir aquaculture** are examining a range of factors in the viability of this emerging industry. The extent of markets, impacts on prices, management to improve incomes, the best species economically, appropriate institutions and socioeconomic impacts are being examined, with the early data revealing this methodology should be appropriate to fish and other commodities.

A strategy for including environmental benefits and costs of **alternative water allocation scenarios in the Mekong Delta region** within an economic-hydrological model is being developed in conjunction with the International Food Policy Research Institute (IFPRI). In a separate project the application of irrigation main system operation modelling frameworks at three different sites improved operational rules for physically controlling water. This overcame existing system-specific constraints to achieve a more efficient use of water. At one site at Cu Chi a reduction in annual water use of about 98 MCM is possible, allowing excess supply to be diverted to Ho Chi Minh City with minimal impact on the supply security of the system. Subsequent field trials at other sites improved equitable supply to farmers.



*Shrimp-rice farming systems research site in Soc Trang province*



*Jo Leong is our Vietnam Manager*

The successful **improvement of soybean varieties** and their adaptation to Vietnamese conditions has moved a step closer through a project to identify suitable varieties. Two varieties with improved drought tolerance, through greater leaf survival in severe water stress, have been identified. A third variety has shown a 75 per cent increase in grain yield in the spring season, with increased yields also demonstrated in the summer and winter growing seasons. This variety has great potential for wide adoption in Vietnam.

Demonstrations with smallholder farmers provided evidence that agricultural by-products, particularly molasses, supported effective production from local cattle at a lower cost than other energy sources. The application of this knowledge and its transfer to a wider group of farmers is an objective of a new project to intensify smallholder beef production in central Vietnam.

ACIAR's work to adapt **better pig varieties** continues to deliver benefits to smallholder farmers. A fourth artificial insemination facility, jointly funded by ACIAR, AusAID and the Vietnamese Government, was opened in Quang Ngai in early 2003. This facility houses boars of Australian genetic origin, with semen distributed by facility staff and on-sold to private sector inseminators. The skills and knowledge developed in this project are now being widely applied in the commercial feedmill sector through the formulation of least cost rations.

Management of pest fruit flies has lacked an **up-to-date survey of fly species of economic importance**. Nine species have been identified as having pest status, and data on the hosts, ranges and distributions of these flies have been compiled. A large-scale plant for conversion of brewery waste to bait to attract and kill fruit fly has been installed at the Fosters Brewery at Tien Giang, with support from Fosters and Aventis. Pilot-scale batches are being produced and field tested in order to evaluate the best processing technique, and full-scale production for sale to farmers should commence soon. Field management research will commence as soon as the bait supply is available. A project developing crop disease management capacity has been working with farmers' advisers to provide plant disease information. This will strengthen advisory capacity, allowing farmers to better identify and manage diseases. An ACIAR/World Vision project led to strong adoption of community-based management of rodents in Binh Thuan province, Vietnam. An AusAID capacity-building project on rodent management in the Mekong Delta, based on outputs from ACIAR-funded research, has seen widespread adoption in five provinces in the delta.

Research has commenced in the northern mid-highland region to provide relevant advice and inputs in support of government development planning aimed at **significantly increasing the fish yield from reservoirs**. This would contribute to the availability of fish supplies at a price affordable to the rural poor, and provide income generation opportunities for communities living in the vicinity of the reservoirs. The project involves two distinct components: one focused on the culture-



*Mr Ho Van Chien, extension specialist in Vietnam, explains the concept of a community rodent trap barrier system*



based fishery of 'farmer-managed reservoirs' and the other on reservoir capture fisheries in Vietnam. A survey of the supply and uses of feed fish (trash fish) in aquaculture activities has been completed in Vietnam. This completes the first step towards a larger, regional study on the uses of and problems associated with feed fish in aquaculture.

An *Acacia mangium* – *A. auriculiformis* hybrid has been shown to have superior growth characteristics to both parent species on many sites in Southeast Asia. The hybrid was artificially created as part of the project and methods developed for its vegetative propagation. **The hybrid is now being widely spread throughout Vietnam, with almost 40 000 ha planted to date and a target planting of 150 000 hectares.** Glasshouse trials in Australia of the mangrove *Avicennia marina* from different provenances have shown that plants maintain differences in morphological and growth characters when grown in the same environment. This demonstrates that these traits are genetically determined. It still needs to be determined what characteristics are considered desirable for reestablishment of new plantations in specific locations, and the extent to which these can be sought out in natural populations.

Assessment of the benefits and risks associated with use of composted green wastes, biosolids (sewage sludge) and organic wastes has begun to quantify and highlight benefits and potential **food quality issues relating to heavy metals**. Skills development for assessing nutritional and detrimental effects has emphasised quality control. Cost-effective contaminant monitoring of produce has been enhanced with the development of prototype residue test kits for aflatoxin B1, cyclodienes and DDT. Preliminary evaluation of the test kits commenced in laboratories and feed mills. Using skills acquired through ACIAR support, the Vietnamese team is developing test kits for other contaminant risks such as *Salmonella* in seafood and processed meats and shrimp virus diseases. Grain storage pest losses are being reduced as a result of surveys, demonstration trials and training which have addressed the different requirements for farmer storage, central grain stores and the animal feed industry. The commercial sector extensively uses the grain fumigant phosphine; however, work is examining methods that farmers can also safely apply.



Project site for assessing impact of heavy metals on fertilisation and waste recycling in Vietnam