

Indonesia, East Timor and Philippines

Principal Regional Coordinator

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Indonesia

Key statistics	
GDP per capita (US\$)	2,247
Population (millions)	231
Funding	
	\$m
2008–09 actual	11.50
2009–10 budget allocation	11.70
2010–11 budget estimate	9.14

Medium-term strategy

ACIAR's Indonesia program emphasises the application of agricultural policy, agribusiness, and technical R&D to support economic growth from agriculture, forestry and fisheries in six provinces of eastern Indonesia and in parts of Java and Sumatra. The program will contribute to increasing farmers' incomes through research that increases crop, livestock and aquaculture productivity, and through policy and technical research that fosters the development of integrated agribusinesses. The focus will be on high-value commodities for which there is strong market demand. Involvement in the Smallholder Agribusiness Development Initiative (SADI) since 2006, which comprises one-quarter of the program, has wider implications in integrating adaptive research and transformation of the research system with other partners who focus on agribusiness and community development at the subdistrict level. It is expected that a follow-on program, the Australia–Indonesia Partnership for Decentralisation—Adding Value to Agriculture (AIPD-AVA), will be implemented in late 2010.

In addition to supporting research on productivity, ACIAR partnerships will also address related pest and disease management, including shared biosecurity concerns; postharvest processing; and market development issues. Protection of the resource base will be supported through research collaboration on aspects of crop and livestock biosecurity, and sustainable forestry and fisheries management; and through policy research on effective engagement in markets, particularly with respect to domestic agricultural policy settings. The focus will be on the development of well-functioning agricultural commodity markets whereby clearer market signals will enable Indonesia to realise its comparative production and trade advantages. This will also help in directing technical research and extension to areas of higher returns. ACIAR and Indonesian partners involve next users such as extension groups, the private sector and NGOs during the development and implementation

of projects. ACIAR will encourage linkages between the research agencies in agriculture, forestry and fisheries and the policy/implementation directorate-generals, and will support cooperation between central institutes and provincially based adaptive research agencies, planning authorities and local delivery organisations.

ACIAR's approach to capacity building is to support the Indonesian Government's efforts to develop a demand-driven agricultural research system. This will be achieved through partnerships with World Bank-funded programs that support strengthening of the Indonesian agricultural research sector and provide targeted training.

Position

Indonesia is ACIAR's largest partner due to the country's proximity and strategic importance to Australia and the need to support reduction of the large number of its population who live in poverty. ACIAR's program addresses human capacity constraints in adaptive research and extension in a system with strong regional autonomy, challenges of natural resources governance, and the need for Indonesian agriculture, forestry and fisheries to better link with major domestic and international markets. Several current projects focus on the extension of results from ACIAR projects, while broader linkages with other Indonesian Government programs and those supported by AusAID and others provide additional avenues for greater market and community input to the planning and use of research results.

ACIAR's Indonesia program has a strong focus on partnership, using Indonesian systems for the delivery of programs and projects. We work with Indonesian partners to: involve end users during the development of projects, closely involve researchers in project activities at the farming community level, and integrate researchers and policymakers where appropriate. ACIAR will increase its emphasis on communicating the outcomes of ACIAR projects and linking with major Indonesian Government, donor and industry programs. Formal linkages with World Bank programs will continue.

The regional balance of investments is influenced by Indonesian requests for assistance, Australian expertise and alignment with the overall Australian aid program. Continued collaboration with R&D providers and policymakers in Java and parts of Sumatra is important, especially for agricultural policy research, biosecurity collaboration, and horticultural and aquaculture research.



Sampling shrimp from formerly acidic experimental ponds at Maranak, South Sulawesi (Photo: Jes Sammut)

Indonesia is in a strategic position for Australia with respect to trans-boundary plant and animal diseases, given its close proximity. Eastern Indonesia is a high priority for ACIAR in this and other respects, and our program includes activities in East and West Nusa Tenggara, South Sulawesi and South-East Sulawesi provinces under both SADI and the main ACIAR program. In addition, there is an increasing emphasis on Papua and West Papua, and several ACIAR–AusAID co-funded project activities were initiated in 2009–10. Engagement in Aceh has evolved to provide support for increasing farmer incomes from agriculture and aquaculture over the medium term. ACIAR will encourage linkages between the research agencies in agriculture, forestry and fisheries and the policy/implementation directorate-generals in the same ministries, where appropriate, as well as with other ministries such as the Ministry of Trade. ACIAR will support linkages between research institutions in Java and Sumatra and the more adaptive research agencies and planning authorities in eastern Indonesian. In addition, there will be a greater involvement of private sector and other non-government partners in the program.

The importance of increased agricultural productivity in Indonesia has been underlined with recent concerns about global food security. Two large policy analysis projects are underway to assist in the assessment and development of economy-wide and industry-specific policy options. These projects will enhance the scope for farm-level market access opportunities and adjustment

to current regional and global agricultural challenges. In the crops sector the emphasis is on productivity, pest and disease management, postharvest handling and marketing of major fruit, vegetable and key tree crops. Increased cash incomes from commercial crops contribute to food security through increasing the ability of farming families to purchase food. Under the ACIAR-managed component of SADI, work on improving the productivity and marketing of field crops including rice, maize, soybean, mung bean and peanut is carried out.

Increasingly, the impediments to effective disease control are the regulatory and policy environments, particularly development of the cooperation needed to undertake regional initiatives. Animal health projects will develop and test surveillance systems that are applicable for livestock diseases, especially those of current or potential infectivity to humans. Assistance in the development of rapid and appropriate responses once diseases are detected will also be a focus. Targeted research will provide the knowledge base to use tools such as vaccines most effectively. Provincial and central governments will apply the knowledge gained to implement wider control programs. Endemic livestock diseases will also be targeted where there are clear production losses affecting incomes, and a clearly defined pathway to adoption of research results. ACIAR also supports a number of research activities to underpin the Australian aid program's commitment to reduce the threat of highly pathogenic avian influenza in Indonesia and elsewhere in the region. ACIAR will continue to

maintain a large fisheries program in Indonesia with an emphasis on smallholder aquaculture and will continue Australia–Indonesia collaboration on efforts to address illegal, unregulated and unreported (IUU) fishing. In both fisheries and forestry programs there will be an increased emphasis on balancing environmental and employment issues at the regional level.

In forestry, ACIAR will commence further work on community-based agroforestry systems for income generation, and continue an integrated program on improvement of the sustainability and value capture from major plantation species, including acacia and teak. In keeping with the increased emphasis on collaboration on forests and climate change in Indonesia, researchers will build on the previous program that assessed the economic potential of land-use change and forestry for carbon sequestration and poverty reduction, and on policy research to promote sustainable forest management.

Indonesia is an important partner in projects delivered in conjunction with the International Agricultural Research Centres (IARCs), namely the International Food Policy Research Institute (IFPRI), Center for International Forestry Research (CIFOR), the World Agroforestry Centre (ICRAF), the International Potato Center (CIP) and the World Vegetable Center (AVRDC).

The Smallholder Agribusiness Development Initiative (SADI), which concluded in June 2010, aimed to improve incomes and productivity for farmers and agribusinesses in eastern Indonesia, in response to market opportunities, through a process underpinned by improved adaptive R&D capacity. SADI consisted of three subprograms:

- » the enhancement of smallholder production and marketing (implemented by the Ministry of Home Affairs, as part of the National Program for Self-help Community Empowerment, and supported by the World Bank)
- » the strengthening of private sector agribusiness and small-to-medium enterprise development (implemented by the International Finance Corporation)
- » Support for Market-driven Adaptive Research (SMAR) (implemented by ACIAR).

SMAR strengthened province-based agricultural R&D capacity so that it could be more market and client driven. The first component of SMAR funded high-priority demand-driven R&D projects with international technical support. A second component improved linkages and more-effective knowledge transfer processes between R&D providers and extension providers, with new

approaches to assist in dissemination of R&D outcomes being piloted in the field. The third component, on an institutional level, assisted with the development of R&D planning, policies and procedures for human resources development and upgrade of IT equipment.

A mid-term review of SADI held in November 2008 provided input into the design of a new program in eastern Indonesia. AIPD-AVA was to be designed by May 2010, and is intended to pilot models that can unlock growth in agribusiness productivity and profitability from which the rural poor can benefit directly. Through a focus on a small number of key agricultural value chains in eastern Indonesia, AIPD-AVA will develop more-productive farm practices, better functioning markets and business practices, and improved economic governance surrounding the agricultural sector.

Research priorities

Priorities for collaborative agricultural research between Australia and Indonesia were discussed in February 2007 during consultations between ACIAR and representatives of relevant government ministries and agencies, universities, the Indonesia Institute of Sciences (LIPI), the private sector and farmer associations. More-detailed consultations were also held through the SADI in four eastern Indonesian provinces in November 2006 and 2009–10 through the relevant Provincial Technology Commissions. Priorities throughout the program were refined during further consultation in 2009–10. A full list of agreed priorities from the meetings is available at <www.aciar.gov.au> under 'Partner country priorities / Indonesia'.

In eastern Indonesia there are opportunities to capitalise on linkages between central research institutions (mainly based in Java) and institutions undertaking location-specific adaptive research that directly addresses farmers' needs. In 2010–11 the collaborative program will emphasise animal health and production, crop production, protection and postharvest handling (with an emphasis on horticultural and tree crops), forestry, fisheries, and agribusiness and agricultural policy research. Agreed thematic areas for cooperation are as follows:

Subprogram 1: Improved policies to underpin agribusiness development

- » Analysis and piloting of policy changes, including new and competitive trading relationships, to improve access for smallholder farmers into emerging markets



Farmers in South Sulawesi working with an ACIAR project to locally adapt simple rice management practices

- » Addressing policy requirements to support structural adjustment (rural transformation, including impacts of land tenure, farm size and food pricing policies) and agricultural diversification to achieve production change and meet market requirements
- » Analysis of policy requirements to support fisheries production, postharvest management, processing and marketing of fisheries products

Subprogram 2: Livestock production and biosecurity

- » Establishment of effective disease surveillance, control policies and systems
- » Detection and management of risks of disease transfer with movement of livestock
- » Improved understanding of the behaviour of avian influenza virus in village and commercial poultry, with and without vaccination, and the role of ducks in disease transmission
- » Establishment of control options and procedures to control zoonotic diseases including rabies, anthrax, brucellosis and cysticercosis
- » Research to support the development of the smallholder commercial cattle sector, particularly simple effective feeding and management practices, and improved supply-chain linkages with urban markets

Subprogram 3: Research to underpin the development of competitive horticultural and field cropping systems

- » Introduction of technical and policy requirements for the establishment of low-pest areas and capacity development in quarantine of plant products
- » Quality improvement and improved market access in mangoes and mangosteens, including through the management of pests, fungal diseases and physiological disorders
- » Improvement in value-addition and marketability of mangosteen through management of physiological disorders, pest control and better shelf life
- » Implementation of improved management systems for major pests and diseases of bananas
- » Development of clonal rootstocks and postharvest management and packaging systems for avocados
- » Improvement in production and pest management systems for shallots
- » Development of postharvest handling and value-addition for tropical ornamental horticultural crops, spices and indigenous vegetables
- » Restoration of tsunami-affected soils, farming systems and seed supply systems to improve field crop and vegetable production in Aceh

Subprogram 4: Profitable smallholder aquaculture systems

- » Review of policy options to guide expansion and intensification of aquaculture, including development and application of decision-support tools and planning frameworks to assist farmers, planners and policymakers, particularly at the local level
- » Delivery of more-reliable diagnostic services to farmers for viral disease of shrimp through improved application of polymerase chain reaction (PCR) technology
- » Control and management of new or emerging viral threats, including Taura syndrome and marine finfish diseases
- » Establishment of molecular methods for controlling koi herpes virus in carp
- » Development of cost-effective formulated feeds for high-value species, with reduced reliance on fish-based protein
- » Extension by farmer groups of 'better management practices' production packages enhanced to address product quality, food safety and supply chains to increase market performance
- » Establishment of broodstock and husbandry protocols for controlled production of yellowfin tuna

Subprogram 5: Sustainable use and management of fisheries and profitable utilisation of forestry resources

Fisheries resources

- » Alternative, innovative assessment and management frameworks that address the problem of resource data limitations tested in shared and common-interest fisheries



Dr Maria Geong (left) from the Provincial Livestock Service in Kupang, East Nusa Tenggara, researching how smallholder pig producers can benefit from a growing domestic market

- » Establishment of effective co-management arrangements between fishers and the cage aquaculture industry in inland reservoirs and open bodies of water
- » Better management of IUU fishing in seas managed by Indonesia alone, with attention to improving existing reporting and regulation shortcomings; and analysis of institutional and regulatory frameworks and linkages between different levels of government
- » Regional cooperation in the monitoring of sharks and rays landed from the Indian Ocean and of shark fin export–import data, to obtain a better understanding of regional trade flows
- » Quality and food safety improvement of fishery products in relation to catch, handling, processing (and processing facilities) and marketing in order to reduce losses and improve product competitiveness

Forestry resources

- » Review of policy options and economic assessment of smallholder forestry options to address climate change mitigation
- » Improvement in post-decentralisation forest governance and administration through action research at provincial and district levels
- » Application of improved silvicultural strategies and governance arrangements to appropriately sited plantation species
- » Capturing more value from forestry plantation species through improved processing technologies and development of new products matched to appropriate markets
- » Pest and disease management for plantation forests
- » Understanding of incentives for small-scale community plantings, including:
 - policies and institutions for profitable agroforestry and community forestry
 - analysis of systems (including outgrower schemes) and markets that produce intermediate returns for smallholder farmers
- » Matching of community forestry sites to species in variable environments, including:
 - site classification and selection of species combinations and improved planting materials, taking markets and cultural preferences into account
 - selection of silvicultural systems and development of replicable extension models adapted for small-scale plantings



Acehnese project staff taking soil samples as part of field training in pond-survey techniques (Photo: Jes Sammut)

Subprogram 6: Profitable agribusiness systems for eastern Indonesia

This subprogram integrates work on livestock, horticultural crop production and aquaculture, with a geographical focus on eastern Indonesia. The improvement of the capacity of eastern Indonesian providers to support market-driven adaptive research is a cross-cutting theme. There are three focal areas in this program, which covers both SADI-funded and ACIAR-funded projects in South Sulawesi, South-East Sulawesi, and West and East Nusa Tenggara, as well as Papua and West Papua.

Adapting smallholder management practices to reduce vulnerability and improve profitability

- » Improvement in productivity and profitability of field crop systems in seasonally dry areas
- » Improvement in uptake of better crop management technologies in rainfed rice systems and development of other components of the rotation
- » Market development and the fostering of technology uptake in irrigated rice systems
- » Development of more-water-efficient maize and legume cropping systems that are better linked to input and output markets
- » Development of production systems that integrate field crops and livestock into plantation crops

- » Development of locally adapted postharvest technology for field crops

Benefiting from high-value products

- » Management of pests and diseases and development of high-value markets for cashew nut, cocoa and coffee
- » Improvement of culture and marketing systems for mariculture species such as lobster and seaweed
- » Industry development for specialty tropical fruits in eastern Indonesia, including mango, citrus and passionfruit

Increasing demand for animal protein

- » Understanding of policies to increase Indonesian sufficiency in beef production, including factors affecting adoption of improved forages, off-take of productive cows, and improvements in reproduction rates and market linkages
- » Development of sustainable systems that integrate livestock with crops for the dry tropics of eastern Indonesia and smallholder plantation areas
- » Enhancement of Bali cattle and goat productivity to meet market specifications through improved management of feed and reproduction

Current project portfolio

(Possible new projects commencing in 2010–11 shown as 'proposed')

Subprogram 1: Improved policies to underpin agribusiness development

Policy settings in Indonesia continue to be influenced by a protective and interventionist system that may lack incentives for smallholder farmers to participate effectively in marketing-chain adjustments. In addressing these limiting factors, the policy projects will overlay research investments in other subprograms (e.g. work on fruit markets) by designing sustainable and country-relevant policy options and frameworks in which farmers and investors will have more confidence. The concomitant establishment of clearer market signals will help direct research.

ADP/2005/066 (*multilateral*) Markets for high-value commodities in Indonesia: promoting competitiveness and inclusiveness (IFPRI)

ADP/2005/068 (*multilateral*) Plausible futures for economic development and structural adjustment: impacts and policy implications for Indonesia and Australia

Subprogram 2: Livestock production and biosecurity

Policies and systems for better management of animal disease

The role of government at all levels in animal disease control is important for limiting the effect of diseases and also preventing the introduction of new diseases. Since the decentralisation of government services in Indonesia, the district structure has been responsible for delivery of many services including animal health. This has created difficulty in implementing national policies and approaches, especially for rapidly spreading viral diseases. A project will examine ways in which agreement can be reached and funding allocated for the control of the high-priority diseases affecting livestock and people, and this will be captured in an 'Indovetplan'. Livestock movement is an important factor in spreading disease. The patterns and incentives for these movements will be studied in relation to classical swine fever (CSF) and avian influenza in eastern Indonesia. Effective surveillance in remote locations is often difficult, but it is important in detecting early incursions of disease and managing currently existing diseases. Systems are being examined in the more-remote eastern locations. Vaccines for Jembrana disease, which is common in Indonesian cattle, are being commercialised in collaboration with government programs. Diseases affecting both humans

and animals are common in Indonesia, but their relative importance and the research issues for each are unclear. These will be determined to provide a platform for future investment.

AH/2006/156 Livestock movement and managing disease in eastern Indonesia and eastern Australia

AH/2006/166 Improving veterinary service delivery in a decentralised Indonesia

Highly pathogenic avian influenza continues to be a major concern for poultry and human health. A cluster of projects provides some of the necessary research required to implement effective control programs. The economic impacts of the disease were defined by household and enterprise surveys to inform policy decisions on control approaches. Ducks are considered to be a reservoir host of the virus and therefore important when control programs are being implemented. The patterns of disease spread and the response to vaccination in ducks are being investigated. The virus that causes avian influenza is capable of changing its surface structure over time, which can influence the effectiveness of vaccination. This is being monitored, particularly where vaccination takes place in areas with high levels of exposure to the virus. Movement of birds is an important means of virus spread, and knowledge of this spread is critical for implementing regional or island control programs. Effective quarantine procedures for individual enterprises will be tested in collaboration with the commercial poultry sector in Indonesia. These projects are closely aligned to the Indonesian Government's priorities for control of avian influenza and also those of AusAID and other major donors supporting control efforts.

AH/2004/040 The epidemiology, pathogenesis and control of highly pathogenic avian influenza in ducks in Indonesia and Vietnam

AH/2006/050 Control and characterisation of highly pathogenic avian influenza strains in poultry in Indonesia

AH/2006/169 Cost-effective biosecurity for non-industrial commercial poultry operations in Indonesia

Beef production

This subprogram focuses on enabling research (such as plans to link Indonesia into major international activities on cattle genome characterisation) and on developing the smallholder commercial cattle sector. Smallholder fattening enterprises are relatively important in Java, especially in East Java. These enterprises are typically based on fattening of cattle over 150–180 days on crop residues, simple concentrates and some planted forages in relatively simple management systems. The market opportunities for these smallholder fattening enterprises are substantial, but this potential is limited by



A farmer in Lombok trialling new varieties and management systems to make peanut production a less risky farm activity

lack of access to a range of simple, effective feeding and management practices, and to inefficient supply-chain linkages with urban markets.

The major cluster of beef research projects (see subprogram 6) has a focus on eastern Indonesia. The cluster includes several projects emphasising technology development for on-farm application by smallholder farmers, including improvements for better managed and timed reproduction and calf weaning, and use of nutrients (planted fodders and crop by-products). Factors affecting wider adoption of technical interventions are being assessed and on-farm work is being integrated with projects that assess broader characteristics of the beef supply chain.

LPS/2008/038 Improving reproductive performance of cows and performance of fattening cattle in low-input systems of Indonesia and northern Australia

LPS/2009/050 (*proposed*) Sequencing the Bali cattle genome

Subprogram 3: Research to underpin the development of competitive horticultural and field cropping systems

In the tropical fruits area the main recent emphasis has been on management of crippling diseases of banana and citrus fruits, and in the development of better systems for the management of fruit-fly infestation. In 2008 a major new initiative on technical and market development research to support mango

and mangosteen industry development was designed, and implementation was commenced. With vegetables the primary focus has been on improving returns to smallholder farmers for the major commercial crops of potatoes, brassicas and chillies, particularly through developing a more-consistent supply of better quality product and fostering closer linkages to markets.

Two separate approaches are employed in the projects. The first approach is to look at how both abiotic and biotic (such as pests and diseases) factors impact on productivity, fruit quality and markets; and to develop an environmentally friendly and sustainable control strategy based on an integrated pest and disease management systems approach at both pre- and postharvest stages. The second approach is to look at the supply chain of the commodities and address its constraining components and weak linkages, thereby improving the market competitiveness of the industry.

AGB/2005/167 Optimising the productivity of the potato/brassica cropping system in Central and West Java and the potato/brassica/allium system in South Sulawesi and West Nusa Tenggara

AGB/2006/115 (*multilateral*) Linking vegetable farmers to markets in West and Central Java, Indonesia (CIP)

HORT/2003/036 Managing pest fruit flies to enhance quarantine services and upgrade fruit and vegetable production in Indonesia

HORT/2004/048 (*multilateral*) Integrated disease management (IDM) for anthracnose, phytophthora blight and whitefly-transmitted geminiviruses in chilli pepper in Indonesia (AVRDC)

HORT/2006/146 Management of fruit quality and pest infestation on mango and mangosteen to meet technical market-access requirements

HORT/2006/147 Integrated pest management of stem borers and insect vectors of viral diseases of sugarcane in Indonesia

HORT/2008/040 (*multilateral*) Integrated crop production of bananas to manage wilt diseases in Indonesia and Australia (Bioversity)

HORT/2008/041 Area-wide management of pest fruit flies in Indonesian mangoes

HORT/2009/056 (*proposed*) Development of postharvest handling and storage systems for the sustainable production of high-value vegetables in Indonesia and Australia

In 2005 ACIAR commenced a range of training and technical projects to assist in rehabilitation of the provinces of North Sumatra and Aceh, which were affected by the December 2004 tsunami. Research focused on the technical issues that needed to be addressed following the changed physical environment caused by deposition of silt in cropping fields and destruction of brackish-water ponds after the tsunami. A strong emphasis was also placed on rebuilding

human resources in these areas. During 2008 longer term initiatives in the areas of aquaculture, sustainable crop production and improved marketing were initiated in close collaboration with Aceh-based and central agencies.

SMCN/2007/040 Building more-profitable and resilient farming systems in Nanggroe Aceh Darussalam and New South Wales

Subprogram 4: Profitable smallholder aquaculture systems

Shrimp

Shrimp is the most important export product in Indonesia's fishery sector. Projects in this field aim to improve the productivity and profitability of small shrimp farmers along with associated micro-to-small enterprises involved in the shrimp supply chain. This will be achieved by improving planning for aquaculture development, both on-farm and more broadly at district and provincial levels; and by improving the reliability and quality of harvests through on-farm refinement of best-management husbandry packages and their active dissemination using farmer-to-farmer extension pathways.

FIS/2005/169 Improving productivity and profitability of smallholder shrimp aquaculture and related agribusiness in Indonesia

FIS/2007/124 Diversification of smallholder aquaculture in Indonesia

FIS/2009/035 Determinants for white spot disease outbreaks in Indonesian smallholder shrimp ponds—a pilot study of locality factors, white spot syndrome virus genotype distributions and pond factors

Culture of finfish and high-value aquaculture and mariculture species

The marine finfish culture industry is growing strongly in Indonesia. This cluster of projects continues a long-term joint effort to establish robust hatchery production systems for key species of interest. This will be achieved by controlling disease threats and improving the productivity of nursery and grow-out operations through the development and promotion of suitable best-practice husbandry packages. Consistent with the rapid growth profile of the industry, researchers are giving increasing attention to sustainability issues. These include the evolution of better planning tools (site suitability mapping, calculation of environmental carrying capacity); the more-effective management of finfish cage culture in inland and coastal bodies of water, including co-management approaches; and the development and promotion of cost-effective, environmentally friendly formulated feeds.

FIS/2002/111 Culture–capture conflicts: sustaining fish production and livelihoods in Indonesian reservoirs

FIS/2005/137 Control of viral nervous necrosis in finfish broodstock

FIS/2010/016 Application of aquaculture planning tools in Indonesia

Subprogram 5: Sustainable use and management of fisheries and profitable utilisation of forestry resources

Fisheries resources management

A longstanding joint research effort has involved a range of interlinked studies into several commercially important common or cross-border fish stocks between Indonesia and Australia. It has provided a shared and better view of the fishery characteristics and resource status of a number of high-value, high-interest fisheries. This research, initially focused on red snapper in the Arafura and Timor seas, was subsequently extended to study sharks and rays in the same area, and to assess Indonesian tuna resources in the Indian and Pacific oceans. The current project will evaluate innovative approaches to the urgent task of better managing Indonesia's complex local fisheries.

FIS/2006/142 Developing new assessment and policy frameworks for Indonesia's marine fisheries, including the control and management of illegal, unregulated and unreported (IUU) fishing

Forestry resources

The main project cluster focuses on enhancing the realisation of value from Indonesia's extensive forest plantations and natural forests. This includes improving the management of existing plantations (by maintaining productivity and health), stimulating community-based plantations, introducing new products and technologies, and fostering the development of more-effective market linkages. Investigation of carbon sequestration by natural forests as a tradeable product that provides a commercial return without requiring conversion of forests will also be a focus of the subprogram.

FST/2005/177 (*multilateral*) Improving economic outcomes for smallholders growing teak in agroforestry systems in Indonesia (CIFOR)

FST/2006/117 Capturing more value from Indonesian forest plantations through enhanced timber processing and manufacturing options

FST/2007/052 Improving governance, policy and institutional arrangements to reduce emissions from deforestation and degradation

FST/2007/119 (*multilateral*) Mahogany and teak furniture: action research to improve value-chain efficiency and enhance livelihoods (CIFOR)

FST/2008/030 Overcoming constraints to community-based commercial forestry in Indonesia

FST/2009/051 (*proposed*) Optimising productivity and health of acacia plantations in Indonesia, with particular emphasis on smallholder outgrowers

Subprogram 6: Profitable agribusiness systems for eastern Indonesia

There are three focal areas in this subprogram, which covers both SADI-funded and ACIAR-funded projects in South Sulawesi, South-East Sulawesi, and West and East Nusa Tenggara, as well as Papua and West Papua. Projects funded through SADI are shown as SMAR.

Adapting smallholder management practices to reduce vulnerability and improve profitability

One potential benefit of the global rise in food prices is that producers will receive improved returns. However, smallholder farmers need to have the capacity to engage, in a timely manner, with these changing markets. Over the past 5 years costs of inputs have risen by 40%, with key factors being increasing fuel and fertiliser prices and rural labour shortages, while returns to producers have only increased, on average, by 5%. In several staple food crops of eastern Indonesia, uptake of simple improvements in crop management has been patchy, limiting the capacity of smallholder farmers to take advantage of rising food prices. One approach to manage the reduction in terms of trade and take advantage of improving food prices is to improve efficiency of inputs and crop management, thereby improving the productivity and profitability of smallholder farmers engaged in the marketplace. Eastern Indonesia is characterised by high climatic variability, and helping farmers link to markets, diversify farming systems and develop more-robust agricultural options reduces their vulnerability in the face of climate change.

SMAR/2005/074 Improving cocoa production through farmer involvement in demonstration trials of potentially superior and pest/disease-resistant genotypes and integrated management practices

SMAR/2007/068 Productivity and profitability enhancement of tropical pulses in Indonesia and Australia

SMAR/2007/100 Support for development of improved approaches to technology assessment and knowledge exchange

SMAR/2007/216 Improving rice productivity in South Sulawesi and South-East Sulawesi

Benefiting from high-value products

Production of high-value products by smallholder sectors of developing countries is a mechanism for helping smallholder farmers increase cash flow and reduce their livelihood vulnerability. This often involves a transition from staple crops grown for food security to higher value products for particular markets. With market engagement the 'rules' change and smallholder farmers are required to deliver to market specification, despite a range of often unknown factors between production and market. Although potentially beneficial, smallholder engagement with the market is a significant change of practice.

AGB/2010/023 (*proposed*) Enhancing farmer engagement with specialist coffee chains in Papua province, Indonesia

PC/2007/111 (*multilateral*) Incursion prevention and management of coffee berry borer (CBB) in Papua New Guinea and eastern Indonesia (CABI)

SMAR/2007/193 Quality management to enhance effective supply chains for mangoes and rambutans in West Nusa Tenggara

SMAR/2007/196 Market development for citrus in eastern Indonesia

SMAR/2007/203 Integrated tropical passionfruit production systems in South Sulawesi

SMAR/2008/021 Spiny lobster aquaculture development in Indonesia, Vietnam and Australia

SMAR/2008/025 (*proposed*) Improved seaweed culture and postharvest waste utilisation in South-East Asia

Increasing demand for animal protein

Urban populations in Indonesia are growing at a rate of 4.4% per annum, and by 2025 the country is expected to be 61% urbanised. Urbanisation at such a rapid rate and on this scale will inevitably be associated with higher consumption of livestock products. IFPRI predicts a growth rate of almost 6% per annum in meat demand in Indonesia to 2020, with only a 2.5% annual growth rate in domestic production. In addition, while recent increases in food prices worldwide are being blamed primarily on biofuels and climatic variability, the increasing use of staple grain crops as animal feeds rather than for direct human consumption is also a factor. Therefore, understanding the supply and demand dynamics of the animal protein market and improving productivity are critical to fulfilling changing market demands and improving smallholder livestock producer profitability.

AH/2007/106 Improvement and diversification of sweetpotato-pig production systems to support livelihoods in highland Papua and West Papua, Indonesia

LPS/2006/003 Integrating forage legumes into the maize cropping systems of West Timor

Continued on next page

LPS/2006/005 Evaluating strategies to improve calf survival in West Timor villages

LPS/2008/054 (proposed) Improving smallholder cattle fattening systems based on forage tree legume diets in eastern Indonesia and northern Australia

SMAR/2006/061 Building capacity in the knowledge and adoption of Bali cattle improvement technology in South Sulawesi

SMAR/2006/096 Scaling-up herd management strategies in crop–livestock systems in Lombok, Indonesia

SMAR/2007/202 Benchmarking beef supply chains in eastern Indonesia

Key performance indicators (2010–11)

- » Reconstruction and capacity building of Brackishwater Aquaculture Development Centre (BADC) Ujung Batee completed and the centre actively supporting diversification of coastal aquaculture farming in Aceh
- » Extension, by catchment-based sets of farmer groups, of shrimp production packages to address local catchment biosecurity, production consistency, product quality and food safety
- » Improved assessment and management of capture fisheries through innovative policy development and reductions in IUU fishing
- » Analysis of factors affecting competitiveness of key high-valued products of relevance to other R&D projects (e.g. mango and mangosteen)
- » Priorities identified for improving the profitability of small–medium enterprises processing teak and mahogany into furniture in Jepara
- » New initiative designed on enhancement of the productivity of acacia plantations, integrating site selection and management with approaches to disease management
- » Eight representative sites in Aceh established for increasing productivity of rice-based cropping systems
- » Implementation of improvements in production, pest and disease management, quality and marketability for banana, citrus, mango and mangosteen
- » Support provided for the long-term extension needs of Papua and West Papua provinces in sweetpotato–pig production systems
- » A diagnostic test to differentiate poultry infected with highly pathogenic avian influenza from those immunised with commercial vaccines validated in small commercial broiler and layer flocks
- » Constraints to profitability of smallholder beef cattle production and supply systems in East Java characterised
- » Between 5 and 10 forage legume varieties with appropriate traits for inclusion in eastern Indonesian and East Timor farming systems identified and field tested
- » An agricultural value chains research program for eastern Indonesia designed and implemented under the umbrella of AIPD-AVA.
- » Constraints to improved market integration for high-value vegetable production systems in Indonesia analysed and documented

Key program managers

Dr Chris Barlow, Fisheries

Mr Les Baxter, Horticulture

Dr Doug Gray, Animal Health

TBA, Forestry

Dr Gamini Keerthisinghe, Soil Management and Crop Nutrition

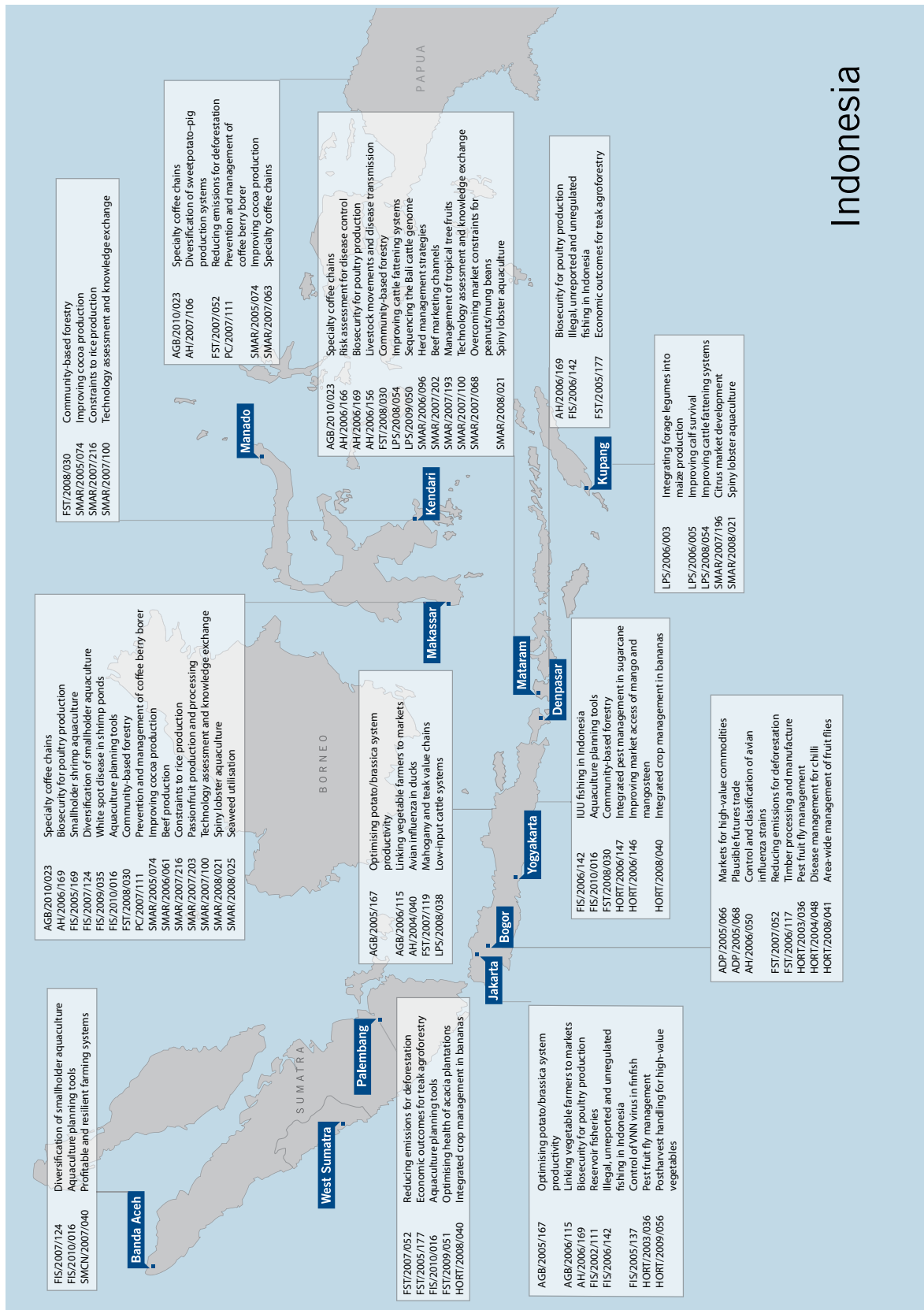
Dr Simon Hearn, Agricultural Development Policy

Dr Peter Horne, Livestock Production Systems

Mr David Shearer, Agribusiness

Country manager

TBA



Indonesia

East Timor

Key statistics	
GDP per capita (US\$)	518
Population (millions)	1.0
Funding	
	\$m
2008–09 actual	2.60
2009–10 budget allocation	2.20
2010–11 budget estimate	5.20

Medium-term strategy

ACIAR's program in East Timor targets food security, poverty reduction and capacity building to support recovery from the 1999 independence struggle and national development. The focus is applied assistance while R&D capacity and infrastructure are developed. The initial projects underpinned the introduction and evaluation of higher yielding staple crops and the rehabilitation of the university's agriculture faculty. The outcomes from these projects are providing a base for further R&D efforts supported by Australia (ACIAR and AusAID) and aligned with the Sector Investment Programs of the East Timor Government. This includes a new strategy for collaborative research in livestock systems.

Position

Agriculture provides livelihoods for more than 80% of the population. The similarities between the environments of East Timor and northern Australia give Australia a comparative advantage in applying research, development and extension skills. ACIAR began collaboration with East Timorese institutions in 2000. Current projects aim to help achieve food security,



Testing and demonstration of improved varieties of staple crops at Quinta Portugal near Aileu, East Timor

reduce poverty and build local agricultural research capacity. Two major ACIAR projects commenced in 2001:

- » Seeds of Life
- » rehabilitation of the Agriculture Faculty at the National University of East Timor.

Under the first phase of the Seeds of Life project, a number of improved varieties of staple food crops were identified in field trials in both lowland and highland settings around East Timor. Suitable varieties of sweetpotato, maize, rice, peanut and cassava were identified.

A major successor program, Seeds of Life 2, is being co-funded by AusAID and ACIAR and delivered in close partnership with the East Timor Ministry of Agriculture and Fisheries (MAF). Significantly, Seeds of Life 2 is an Australian project that is also a program within MAF. This relationship has catalysed strong and effective collaboration. The program commenced in 2005 and concludes in August 2010. It continues the introduction and evaluation of improved crop varieties while devoting more resources to seed production, identification of improved crop management techniques, farmer participatory extension of identified cropping improvements, and training of MAF and other staff in seed production as well as crop research and extension. Promising crop materials from the first phase of Seeds of Life and newer introductions are rigorously and extensively tested through farmer participatory research. Five CGIAR centres and other institutions continue to supply genetic stocks and expertise to maintain the variety pipeline. NGOs are increasingly involved in dissemination of selected and released varieties that are locally well adapted, have tolerance or resistance to pests and diseases, and have demonstrated superior tolerance to drought and soil stresses, combined with high levels of consumer acceptance. Two maize, one peanut, one rice, three sweetpotato and two cassava varieties have been released to date. An adoption survey of 544 farmers involved in on-farm trials showed that 73% had regrown new varieties. Variety adoption has not only increased household food security but often produced surpluses for sale—sometimes for the first time. By project end it is expected that many East Timorese farmers will have adopted improved varieties and cropping technologies, and that the MAF will increasingly manage field crop R&D activities with its own resources. While food aid, especially for rice, continues to risk distorting local markets and hinder incentives for local production, many farmers have adopted Seeds of Life varieties. During early

2010 a successor joint ACIAR–AusAID-funded project to Seeds of Life 2 was designed.

Rehabilitation of the Agriculture Faculty at the National University of East Timor has been important in providing facilities for applied agricultural research, and in training East Timorese in agriculture. The project team has developed a new agriculture curriculum that aims to equip students to identify and solve problems in a farming systems context. Laboratory facilities at the Hera Field Station have been restored to provide practical sessions for science and agriculture students. This facility is the only working agricultural laboratory in East Timor, and a number of foreign donors also use the laboratory in their project activities. In 2006 a small R&D project-funding facility was established to support focused activities addressing high-priority research. In late 2009, building on the concluding mini-projects' activities, ACIAR scoped longer term support for strengthening of livestock research capacity in East Timor, linking MAF and the university.

Relationship to the Australia–East Timor Country Strategy, 2009–14

The strategy has been developed in parallel with the Government of East Timor's medium-term strategic development plan. The program is based on four of the government's key objectives:

1. strengthening basic health and education service delivery
2. increasing employment through investment in increasing agricultural productivity, improving infrastructure, promoting vocational education and developing the private sector
3. improving government accountability, transparency and integrity
4. building the foundations of a safer community.

ACIAR's program in East Timor specifically supports the second objective.

Research priorities

Priorities for collaboration are determined through discussions, interactions and visits between scientists and research managers from East Timor, ACIAR and Australian research institutions. ACIAR will address priorities within the framework of cropping, livestock, fisheries and forestry, where partner capacity will be crucial in determining collaboration. While the program will remain small, further assistance may be considered in special areas of need, particularly in addressing food security, resource protection and capacity development.



A woman selling maize, which remains the staple food of the countryside in East Timor

The program will continue to emphasise applied research and the development of local capacity for applied R&D to increase food security. Within this focal area possible new areas for collaboration include research on addressing constraints on production, the analysis and improvement of market chains for major commodities, development of feed resource and reproductive management strategies for cattle and other livestock, and land capacity assessment and mapping to reduce risk in cropping and grazing.

Current project portfolio

CIM/2003/014 Seeds of Life 2 program
CIM/2005/079 Seeds of Life 2 – Technical Advisory Committee
CIM/2009/049 (<i>proposed</i>) Seeds of Life 3 (ACIAR contribution)
LPS/2009/036 (<i>proposed</i>) Improved productivity and profitability of crop–livestock systems in East Timor

Key performance indicators (2010–11)

A new phase of Seeds of Life (SOL3) designed and commenced with East Timor partners

One research station (Loes) rehabilitated and activated, together with capacity building results

Implementation of 10-year livestock R&D strategy commenced, with initial research project on pig and cattle production systems

Key program managers

Dr Paul Fox, Crop Improvement and Management

Dr Peter Horne, Livestock Production Systems

Philippines

Key statistics	
GDP per capita (US\$)	1,866
Population (millions)	92
Funding	
	\$m
2008–09 actual	3.73
2009–10 budget allocation	3.92
2010–11 budget estimate	3.76

Medium-term strategy

The main aim of ACIAR–Philippines cooperation is to assist in increasing productivity, marketability and international competitiveness for Philippines agricultural products, taking into account the impacts of trade liberalisation. Underlying this competitiveness is the need to improve agricultural productivity through more-effective extension of research results to farmers and processors, and through greater responsiveness to market opportunities. This should result in higher quality commodities being produced more competitively. ACIAR will focus on opportunities through research for development and marketing of products from aquaculture, horticulture and livestock enterprises. The emphasis on higher value products and market competitiveness aims to address food security by supporting research that would provide smallholder farmers and traders with increased cash income, enabling the purchase of staple foods. A significant proportion of Philippines farming is carried out in fragile sloping environments or sensitive watersheds, and it is important that intensification of agricultural productivity does not come at the expense of land degradation. During 2010–11 earlier natural resources management research efforts will be consolidated, both thematically and geographically.

ACIAR's focus is on research; however, to increase the prospects for adoption of research results, the Philippines program increasingly emphasises involvement of local partners (such as local government units, NGOs and farmer community groups) in projects and commercial agribusiness companies. There is a focus on fostering linkages between regionally based delivery organisations and central research organisations and policymakers. There is greater emphasis on the southern Philippines within a limited number of focal provinces in regions 10 and 11 (Mindanao) and regions 6, 7 and 8 (Visayas). The southern Philippines has the greatest development needs and the strongest engagement of Australian interests.

Position

ACIAR's program in the Philippines has been active since 1983. Over the past few years the programs have focused on Mindanao and the Visayas, while maintaining strong links to research expertise in Manila and Los Baños. Improving uptake of research in the Philippines is a major priority. In collaboration with Philippine partners, ACIAR has increased its emphasis on better understanding of extension processes and involving farmer and community groups in projects. There has been encouraging success, with the adaptation of the Landcare approach in Mindanao, the management of catchments on the Visayas island of Bohol and in Laguna de Bay in Luzon, and the uptake of methods for successful tree establishment. New research projects are underpinned by design processes that involve the end users of the research and address their needs. Project design also accommodates additional challenges that have arisen from devolution of the management and governance of extension responsibilities to local government units, and the comparatively weak research–extension linkages that frequently exist. In recognition of the strong research capacity in the Philippines and the ability of Philippines partners to co-invest in programs, there will be continued emphasis on joint program design and monitoring during 2010–11.

Two major horticultural initiatives involving researchers, government, NGOs and industry partners commenced in 2008 with a total investment of approximately \$12 million. Both initiatives focus on the southern Philippines, specifically regions 8 (Leyte), 10 (northern Mindanao / Cagayan de Oro) and 11 (southern Mindanao–Davao). These are described below. Taken together, the initiatives address most of the agreed priorities in subprogram 1. In 2009 a new mariculture program was designed, building on a number of pilot projects. In 2009–10 a new natural resources research program was designed in collaboration with Philippine partners following a major consultation workshop.

One major international agricultural research organisation, the International Rice Research Institute (IRRI), is headquartered in Los Baños in the Philippines. ACIAR provides core funding to IRRI and also supports additional initiatives aimed at maintaining rice productivity. The regional office of the International Network for the Improvement of Banana and Plantain, a Bioversity International network, is also headquartered in the Philippines.



A meeting of the Landcare Foundation of the Philippines with farmers in Lantapan, Bukidnon (Photo: John Oakeshott)

Research priorities

ACIAR has a program of consultations with key partner countries on a rolling basis to establish priorities for research collaboration. The most recent full program consultation with the Philippines was held in March 2006—a record of the consultation is available at <www.aciar.gov.au> under 'Partner country priorities / Philippines'. A horticulture consultation workshop was held in September 2007, and during 2008–09 a number of meetings were held to design a new collaborative mariculture program. Priorities for collaborative research programs on integrated management practices for sustainable agricultural production on sloping lands were discussed in August 2009 at a consultation workshop in Manila. In October 2009 several consultation meetings identified researchable issues confronting the swine (pig) industry in the Philippines.

Agreed priorities for collaborative R&D programs are listed under four thematic areas.

Subprogram 1: Increasing the market competitiveness of Philippines horticultural products

- » Economic analysis of marketing chains and channels for perishables, and building of supply chains to improve alliances between suppliers, processors, institutional buyers and marketers
- » Nutrient and pesticide management to save costs and reduce residues

- » Adoption of protected cropping technologies and reduction of inputs
- » Disease management relating to bacterial wilt and other soil-borne diseases in solanaceous and cruciferous crops; and pest management systems for diamondback moth control in brassicas
- » Efficient production systems for seed potato
- » Germplasm evaluation and development of management packages for native vegetables
- » Improvement in postharvest handling, quality, and sanitary and phytosanitary standards for markets for salad and semi-temperate vegetables
- » Selection and clonal propagation of new high-quality mango germplasm
- » Improved cultural practices and control of major pests and diseases of mango, durian and jackfruit
- » Improvement in postharvest handling, quality, and sanitary and phytosanitary standards for markets for tropical fruit crops

Subprogram 2: Competitive and sustainable fisheries and aquaculture production

- » Adoption of mariculture-based strategies to provide livelihoods and enhance locally managed fisheries

- » Assessment of the impacts of aquaculture and mariculture on the community livelihoods of small fishers, and development of better management tools
- » Research to address opportunities and constraints in the supply chain for key aquaculture products, particularly grouper, mud crab and seaweed
- » Management of viral nervous necrosis of marine finfish
- » Assessment of policy constraints to the control and management of IUU fishing
- changes to soil profiles over time and their implications on soil fertility
- hydrological parameters for better understanding of infiltration, storage, redistribution, drainage, evaporation and transpiration affecting the availability of water to crops
- tools such as GIS (geographic information systems), remote sensing for mapping (soil water, land use, topography etc.) and information management systems to share and update relevant information

Subprogram 3: Land and water resource management for profitable and sustainable agriculture

- » Development of more-comprehensive methods for characterisation of watersheds to assess watershed vulnerability and requirements for developing more-productive and sustainable farming systems in watersheds. Newer data capture and information management systems will improve knowledge on the current status of soil, water, farming practices and socioeconomic conditions. This will require research and synthesis of information on:
 - standard procedures for characterisation of watersheds
- » Analysis of the likely impacts of climate change on watersheds in the southern Philippines, and development of more-resilient and sustainable production
- » Use of biophysical, social and economic information to modify existing cropping systems and identify integrated soil, water, crop and nutrient management practices to make them more sustainable and profitable
- » Assessment of policy, regulatory, social and economic constraints to the adoption of 'best management practices', and analysis of approaches for managing resource use conflicts



A child in the rice fields of Calbayog, Samar (Photo: John Oakeshott)



Mara Faylon and Les Baxter in a durian orchard, Barangay Binaton, Davao del Sur (Photo: John Oakeshott)

Subprogram 4: Addressing policy and technical constraints to achieving improved returns from pig production and marketing

- » Analysis of laboratory and field diagnostic resources to investigate and control respiratory disease of pigs in smallholder and commercial-scale enterprises, and development of new capacity based on surveillance and outbreak investigations
- » Assessment of the marketing, biosecurity and social constraints of the emerging swine industry in Mindanao to supply domestic and international markets with pigs and pig products

Current project portfolio

(Possible new projects commencing in 2010–11 shown as 'proposed'.)

Subprogram 1: Increasing the market competitiveness of Philippines horticultural products

In 2008 two major multidisciplinary horticultural initiatives involving researchers, government, NGOs and industry partners commenced. The first aims to improve smallholder and industry profitability and market competitiveness of selected vegetable industries (including potato, tomato, bell pepper, brassicas, leafy vegetables) in the southern Philippines. It includes technical interventions such as the use of promising management practices for efficient use of available resources to increase crop productivity and improve soil fertility; development of more-profitable off-season production, particularly protected cropping, of high-value vegetables; management of major pests; and identification and management of diseases of

solanaceous and brassicaceous vegetables. In addition, priorities and constraints in key value chains will be identified and analysed, and appropriate interventions developed, tested and implemented, to strengthen linkages between smallholder farmers, the private sector and markets. The second initiative covers mango, papaya, durian and jackfruit. It aims to identify and implement improvements to domestic and export value chains for these fruits through targeted interventions in policy and regulatory analysis, production, disease and pest management, and postharvest handling. During 2010–11 there will be a continued emphasis on expanded engagement of industry partners and farmer groups in these programs.

HORT/2007/066 Enhanced profitability of selected vegetable value chains in the southern Philippines and Australia

HORT/2007/067 Improved domestic profitability and export competitiveness of selected fruit value chains in the southern Philippines

Subprogram 2: Competitive and sustainable fisheries and aquaculture production

In the Philippines, as in many other countries, wild harvest fish catches are declining, in some areas quite quickly, while demand continues to rise. For well over a decade ACIAR has been working with a number of partner research agencies, both national and regional, to develop and refine robust technologies for the culture and grow-out of a number of high-value marine species, including mud crab, grouper and other marine food fish, sea cucumbers and giant clams. A major new initiative under development seeks to promote small–medium enterprise development through the effective transfer of this knowledge to the private sector, in support of the establishment of profitable local aquaculture-based industries in selected areas. In addition, research cooperation will focus on addressing the declining productivity of seaweed, a key source of income for Philippines coastal communities. Sea-ranching and restocking trials will continue with sea cucumbers (sandfish), with the aim of providing new livelihood opportunities for coastal communities and, where conditions permit, rebuilding depleted resources of this valuable commodity. Research has also been initiated to define the extent and impact of a major but informal line fishery targeting marine species in domestic and sometimes international waters, with a view to ascertaining management requirements.

FIS/2003/059 (*multilateral*) Sea-ranching and restocking sandfish (*Holothuria scabra*) in the Asia-Pacific region (WorldFish)

Continued on next page



Dr Anthony Young demonstrating 'planting techniques' to Delmonte research staff at Camp Phillips, Bukidnon, Mindanao
(Photo: John Oakeshott)

FIS/2009/033 Preliminary assessment of the hand-line (banca) fisheries in the Philippines

FIS/2009/054 Refinement and application of the Cage Aquaculture Decision Support Tool for freshwater systems

SMAR/2008/025 (*proposed*) Improved seaweed culture and postharvest waste utilisation in South-East Asia

Subprogram 3: Land and water resource management for profitable and sustainable agriculture

A significant proportion of Philippine farming is carried out in fragile sloping environments or sensitive watersheds. Given current and future population pressures, it will be critical to manage these resource-use conflicts. However, unsustainable farming practices have resulted in accelerated soil erosion and watershed degradation, which adversely affect the livelihoods of the resource-poor farmers living in these watersheds. ACIAR aims to support national watershed R&D programs through targeted research collaboration to identify promising management practices best suited to local conditions. The integrated focus is on research to underpin more-profitable but sustainable production systems at the smallholder level. Research will address the particular vulnerability of the sloping lands to the impacts of inappropriate farming practices and degradation of the resource base. Rather than initiating new field sites, the research will collaborate with major watershed development programs underway

or under design, with the support of national and international funding bodies. The program will synthesise information from previous projects as well as analyse lessons from related initiatives. A scientific evidence-based approach is needed for watershed management, and research supported by ACIAR will emphasise integrated management practices for rehabilitation and conservation of natural resources for selected watersheds, taking into consideration the current status of resources, farming practices and socioeconomic conditions. ACIAR will focus where Australian technical expertise is strong—in assessment of soil, water and nutrient sources at the watershed level—to provide underpinning information that will identify appropriate land-use practices to optimise the available resources for profitable and sustainable crop production with minimal adverse effects to the environment.

The emphasis will be to develop and apply research approaches that are able to be generalised and transferred, to enable more-sustainable resource management across watersheds throughout the Philippines. The partnership will use newer, powerful technologies for data assembly and analysis, and representation to watershed stakeholders. ACIAR-supported work in individual watersheds will be in collaboration with national and international large-scale programs, and will focus on their use as sites for data collection, testing and verification of research approaches. The primary emphasis of collaboration will be at the landscape rather than the plot level.

ASEM/2002/051 Sustaining and growing Landcare systems in the Philippines and Australia

ASEM/2009/044 Philippines Landcare linkages with ACIAR research

SMCN/2004/078 Evaluation and adoption of improved farming practices on soil and water resources, Bohol Island, the Philippines

SMCN/2009/031 Integrated plant nutrient and water management for sloping-land agriculture in the Philippines

Subprogram 4: Addressing policy and technical constraints to achieving improved returns from pig production and marketing

The swine sector in the Philippines is large and complex, with a wide and diverse range of production systems from large-scale commercial to low-input subsistence systems. The 'backyard sector' is a complex and dynamic system that changes as raisers move from piglet production to breeding, in and out of production, and from place to place with variable feed availability and costs. Drivers for change include unstable prices for feed and for pigs. Significant drivers for change in the sector include contract growing by large players and an invigorated backyard sector. The major uncertainties in the system are the impact of the ASEAN Free Trade Area, the instability of feed prices, biosecurity threats and the increasing demands made by importing countries for welfare, environmental standards and traceability. The designation of the Philippines as free of foot-and-mouth disease (FMD) provides the opportunity to export pigs and pork to hitherto closed markets such as Singapore. The initial impetus to commence this subprogram has been the spread of porcine reproductive and respiratory syndrome into the Philippines from mainland Asia, the associated focus on a wide range of viral diseases and the requirements for disease accreditation for the export market.

AH/2009/022 (*proposed*) Improved investigation, diagnosis and technical support for the control of respiratory diseases of pigs in the Philippines and Australia

Other projects

ASEM/2006/091 Enhancing tree seedling supply via economic and policy changes in the Philippine nursery sector

CIM/2006/176 (*multilateral*) Developing molecular markers to enable selection against chalk in rice (IRRI)

Key performance indicators (2010–11)

- » Strategies for the management of key pest, disease and nutrition constraints to mango, papaya, jackfruit and durian production developed and tested in small-scale farmer trials
- » Representative domestic papaya supply chain and domestic and export mango value chains mapped and evaluated using product-based, financial and relational information systems and institutional criteria
- » At least four vegetable and fruit enterprise and gross margin analyses completed and disseminated
- » Fertiliser management strategies with a lower cost, field-specific, fertiliser program tested
- » Commercial-sector protected cropping systems field sites established based on previous R&D trials and activities in Leyte
- » Local-level policy changes trialled and strategies pilot-tested, in conjunction with Department of Environment and Natural Resources, to increase the economic viability of the nursery sector in Leyte
- » Nutrient budgeting evaluated for identification of promising agronomic management practices for vegetable production in southern Philippines
- » An industry-wide forum created for sharing information on pig health problems, outbreaks and opportunities
- » Gaps in laboratory and field diagnostic capacity of pig respiratory diseases identified and reported

Key program managers

Dr Chris Barlow, Fisheries

Mr Les Baxter, Horticulture

Dr Doug Gray, Animal Health

Dr Gamini Keerthisinghe, Soil Management and Crop Nutrition

Dr Caroline Lemerle, Agricultural Systems Management

Country manager

Ms Cecilia Honrado

