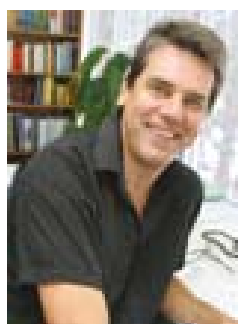


South Asia

South Asia

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ACIAR Regional Coordinator



South Asia:
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Pakistani and Australian citrus growers share their knowledge and expertise

India

GNI per capita (\$US)	720	Bilateral actual 2005–06*	\$2.02 m
Population	1,087.1 million	Bilateral estimate 2006–07*	\$2.02 m
Population 2015/2050	1,260.4/1,592.7 m	Bilateral budget 2007–08**	\$2.20 m
Active bilateral projects	16	Bilateral + multilateral	
Active multilateral projects	4	budget 2007–08	\$2.89 m

**Includes co-funding of projects (\$0.09 m in 2006–07 and \$0.09 m in 2007–08) by the Grains R&D Corporation

Country Manager
Dr. Kuhu Chatterjee, ACIAR Regional
Manager, South Asia



A 'Happy seeder' at work in India

Key program managers

Dr Simon Hearn, Agricultural Development Policy

Dr Paul Fox, Crop Improvement and Management

Dr Christian Roth, Land and Water Resources

Key performance indicators (2007–08)

- An integrated cluster of linked projects designed and implemented around sustainable wheat farming systems in Northwest India
- A new collaborative program on marker-assisted breeding in wheat developed
- Improved soybean-wheat production systems being tested by farmers and propagated by NGOs in Madhya Pradesh
- Economic trade-offs of water allocation scenarios in the Krishna Basin quantified and communicated to water policy decision-making at national and state levels.
- Demonstrated influence of policy research outcomes on trade and water policy decision making processes
- 40% of new projects designed to have significant farmer or policymaker impacts within five years of completion

Medium-term strategy

The emphasis of ACIAR's India program is on maintaining sustainable wheat-based cropping in the more favoured areas of north-western India, achieved through application of better genotypes, better management technologies, and increased linkage of farmers to markets. In the less favoured areas of India's rain-fed Central Plateau, the emphasis is on broad-scale land and water resource management

work, applying technical, economic and policy research approaches to increase water productivity. Both themes will be complemented by more general policy analysis work at the national level. During 2007–08 there will be an increased focus on clustering projects around the two main themes. Project design principles include the involvement of farmers and NGOs, as well as engagement with policy makers with a view to achieving quicker impact. At the same time crop breeding projects will be using new molecular technologies that can hasten the release of better varieties, but these have a longer lead-up to farmer impact. Where relevant, ACIAR will link the projects to the CGIAR-coordinated regional Rice–Wheat Consortium for broader impact.

ICAR-ACIAR Program on Marker Assisted Breeding in Wheat

In discussions with the Indian Council for Agricultural Research, ACIAR has agreed to further focus the current emphasis on sustainable wheat cropping into a subprogram based around the application of marker assisted selection as a tool to achieve greater efficiencies in wheat breeding.

In late 2007, a joint Indo-Australian workshop on marker assisted selection will identify the likely breeding objectives (biotic and abiotic stresses; quality traits) to be targeted, providing the basis from which a focussed five-year program will be formulated and implemented in the course of 2008.

Position

India, the world's largest democracy, faces huge problems in its rural sector even as the overall economy forges ahead. Indeed, the greatest number of poor and undernourished people in any country (approximately 300 million) is found in India and most of these live in rural areas. At the same time India faces trade liberalisation and rapid diversification of diet towards high-value agriculture. Recent analyses by the International Food Policy Research Institute support the long-held assertion that investment in agricultural R&D has powerful impacts on agricultural growth and poverty reduction.

Following changes in 2003, and recent discussions in India, it is expected that ACIAR collaboration with the Indian Council of Agricultural Research (ICAR) and the Council of Scientific and Industrial Research (CSIR) on future projects will involve joint funding and focus on high-priority issues or strategic alliances of mutual interest. The government of India is also encouraging donors to work with independent research organisations and NGOs, and ACIAR has taken up this challenge. This will help the goal of increased emphasis on achieving practical farmer-level impacts, particularly in poorer regions of India.

India was one of the first countries to become involved in collaborative projects commissioned by ACIAR. An earlier project to control wheat rust by identifying the various rust races and by the identification and deployment of resistance genes has helped to keep India free of major rust epidemics, with obvious benefits for poor farmers and consumers alike. A molasses-based nutrient block with medication to supplement diets and control internal parasites of straw-fed dairy animals has been developed. For stored commodities, improved means of managing resistance to the fumigant phosphine and of detecting persistent pesticide residues have been developed. Recent research has boosted the widespread adoption of minimal tillage for seeding wheat in the rice-wheat farming systems. Significant benefits have come from water and fuel saving, timelier sowing, and easier weed management.

India has a large and well-developed national agricultural research system, centred around ICAR, which has collaborated strongly in ACIAR projects. Additional linkages with other groups, such as state agricultural universities, CSIR, Independent Research Organisations and technical NGOs have facilitated technology development and the delivery of benefits. Several significant programs have been recently initiated by ICAR, including the World Bank – funded National Agriculture Innovation Programme and the US–India Agriculture Knowledge Initiative, both of which share many of the same research priorities with the ACIAR program in India. Against this backdrop, ACIAR will emphasise maximising technical collaboration in areas of Australian comparative advantage and in areas where both India and Australia have strong common interests and potential for field-level and trade impacts in both countries.

ACIAR will engage mainly with researchers in the north-west (Punjab, Haryana, with outreach to Rajasthan, Madhya Pradesh and Uttar Pradesh) and the Indian Central Plateau (Andhra Pradesh, with outreach to Karnataka, Maharashtra and West Bengal), with research projects presently under way to enable India to manage scarce water and nutrient resources more efficiently, improve yield and quality of cereals and oilseeds, diversify production and raise farm incomes.

Funding is also available from the Australia–India Strategic Research Fund (administered by the Federal Department of Education, Science and Training) to assist Australian researchers to increase their participation in leading-edge scientific research with Indian scientists, to raise the profile of Australian research, and to support the development of strategic alliances between Australian researchers and Indian researchers and industry. The final implementation details of this three-year A\$20m program, have now been put in place with the government of India (Departments of Science and Technology, and Biotechnology). The initial priority areas are agricultural research, astronomy and astrophysics, environment sciences (including water), micro-electronics devices and materials, nanotechnology, renewable energy, and marine sciences. Application details can be accessed at <https://sciencegrants.dest.gov.au/aisrf/Pages/STFund.aspx>.

The Australian Department of Agriculture, Forestry and Fisheries has an increasing interest in India and its strategy has a strong trade focus, reflecting the increasing importance of India in the World Trade Organisation and as a future market for Australian agricultural commodities. Key areas of interest and interface with ACIAR comprise communication of Indian agriculture to Australian stakeholders and an understanding of the evolution of Indian policy frameworks.

A number of IARCs are also active in India. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is headquartered in Hyderabad. It has strong programs on peanut, sorghum, millet and chickpea, crop–livestock systems (with the International Livestock Research Institute, ILRI) and soil management in the semi-arid tropics. The International Maize and Wheat Improvement Centre (CIMMYT) and the International Rice Research Institute (IRRI) have significant regional activities in India, many connected with the rice–wheat eco-regional initiative. The International Water Management Institute (IWMI) has a joint program on policy issues with an Indian research institute and other biophysical programs in India. ACIAR supports projects with these IARCs.

Relationship to the AusAID South Asia strategy

The AusAID framework for assistance in South Asia over 2003–07 'seeks to maximise the effectiveness of programs reducing vulnerability and increasing the productivity of the poor' with an emphasis on the areas of 'health and sanitation,

education and natural resource management'. It recognises that countries 'are at different stages of development, each with their own development priorities'. In India, AusAID is now solely focusing on HIV Aids and in north-eastern India is operating almost exclusively in multilateral mode (through UN agencies and NGOs).

Indicative priorities

ACIAR has a formal program of consultations with India to establish priorities in research collaboration. The most recent review of priorities was held over the July 2006 – May 2007 period from which several focal areas emerged:

Subprogram 1. Sustainability of wheat-based cropping systems in NW India

- Maintaining productivity and increasing profitability of wheat-based cropping systems
- Dealing with water scarcity in wheat-based irrigated systems
- Application of biotechnology to crop improvement

Subprogram 2. Water management for enhanced livelihoods in rain-fed areas of the Central Plateau, with emphasis on Andhra Pradesh

- Sustainable water harvesting and watershed development
- Informing water resource management and policy making to optimise water productivity
- Improving the water productivity of rain-fed cropping and livestock systems

Subprogram 3. Policy options for trade and market reform to underpin agribusiness development

- Adjusting to the challenges and opportunities of international trade
- Enabling private sector investment in agribusiness and marketing
- Safeguarding smallholder livelihoods in the transition from regulated to market economy

Current project portfolio

(Possible new projects commencing in 2007–08 shown as 'proposed')

Subprogram 1. Sustainability of wheat-based cropping systems in north-west India

CIM/1999/072	Oilseed Brassica improvement in China, India and Australia
CIM/2003/067 (Multilateral)	Ensuring productivity and food security through sustainable control of yellow rust of wheat in Asia (CIMMYT)
CIM/2005/020 (proposed)	Molecular marker technologies for faster wheat breeding
CIM/2006/071	Root system traits to improve grain yield and drought resistance of wheat in Australia and India
CIM/2006/094 (proposed)	Enhancing farm profitability in north-west India and South Australia by improving grain quality of wheat
CIM/2006/177 (proposed)	Wheat improvement for waterlogging, salinity and microelement toxicities in acidic and sodic soils in India and Australia
LWR/2000/089	Permanent beds for irrigated rice–wheat and alternative cropping systems in north-west India and south-east Australia
LWR/2002/032	Integrated manure nutrient management in soybean/wheat cropping systems on vertisols in Madhya Pradesh and Queensland
LWR/2004/033	Zero-tillage rice establishment and crop weed dynamics in rice and wheat cropping systems in India and Australia
LWR/2005/059	Modelling water and solute processes and scenarios for optimization of permanent raised bed systems in China, India, Pakistan and Indonesia
LWR/2006/124 (proposed)	Fine-tuning the Happy Seeder technology for adoption in north-west India
PLIA/2006/132	Happy seeder policy analysis in India and Australia

Subprogram 2. Water management for enhanced livelihoods in rain-fed areas of the Central Plateau, with emphasis on Andhra Pradesh

AH/2002/038	Improved productivity, profitability and sustainability of sheep production in Maharashtra, India, through genetically enhanced prolificacy, growth and parasite resistance
CIM/1999/062 (Multilateral)	Improving the quality of pearl millet residues for livestock (ILRI)
LWR/2001/014	Improving water resource management in India's agriculture: search for effective institutional arrangements and policy frameworks
LWR/2002/100	Water harvesting and better farming systems for benefit of small farmers in watersheds in the East India Plateau

LWR/2003/026 (Multilateral)	Water allocation in the Krishna River Basin to improve water productivity in agriculture (IWMI)
LWR/2006/072 (proposed)	Impacts of watershed development on upstream and downstream hydrologic response and economic benefits
LWR/2006/073 (proposed)	Feasibility of using medium-range seasonal climate forecasting to improve crop production in Andhra Pradesh, India
LWR/2006/158 (proposed)	Enhancing institutional performance in water resource development in Andhra Pradesh, India

Subprogram 3. Policy options for trade and market reform to underpin agribusiness development

ADP/2000/004	International food safety regulation and processed food exports from developing countries: a comparative study of India and Thailand
ADP/2002/089	Agricultural trade liberalisation and domestic market reforms in Indian agriculture
ADP/2004/045 (Multilateral)	Exploring alternative futures for agricultural knowledge, science and technology (IFPRI)
ADP/2006/145	Impact of changing agricultural markets on small-farm participation and poverty: cases from India, Vietnam and Indonesia
PLIA/2006/135 (proposed)	Trends in world agriculture to 2030 in India, China and Indonesia

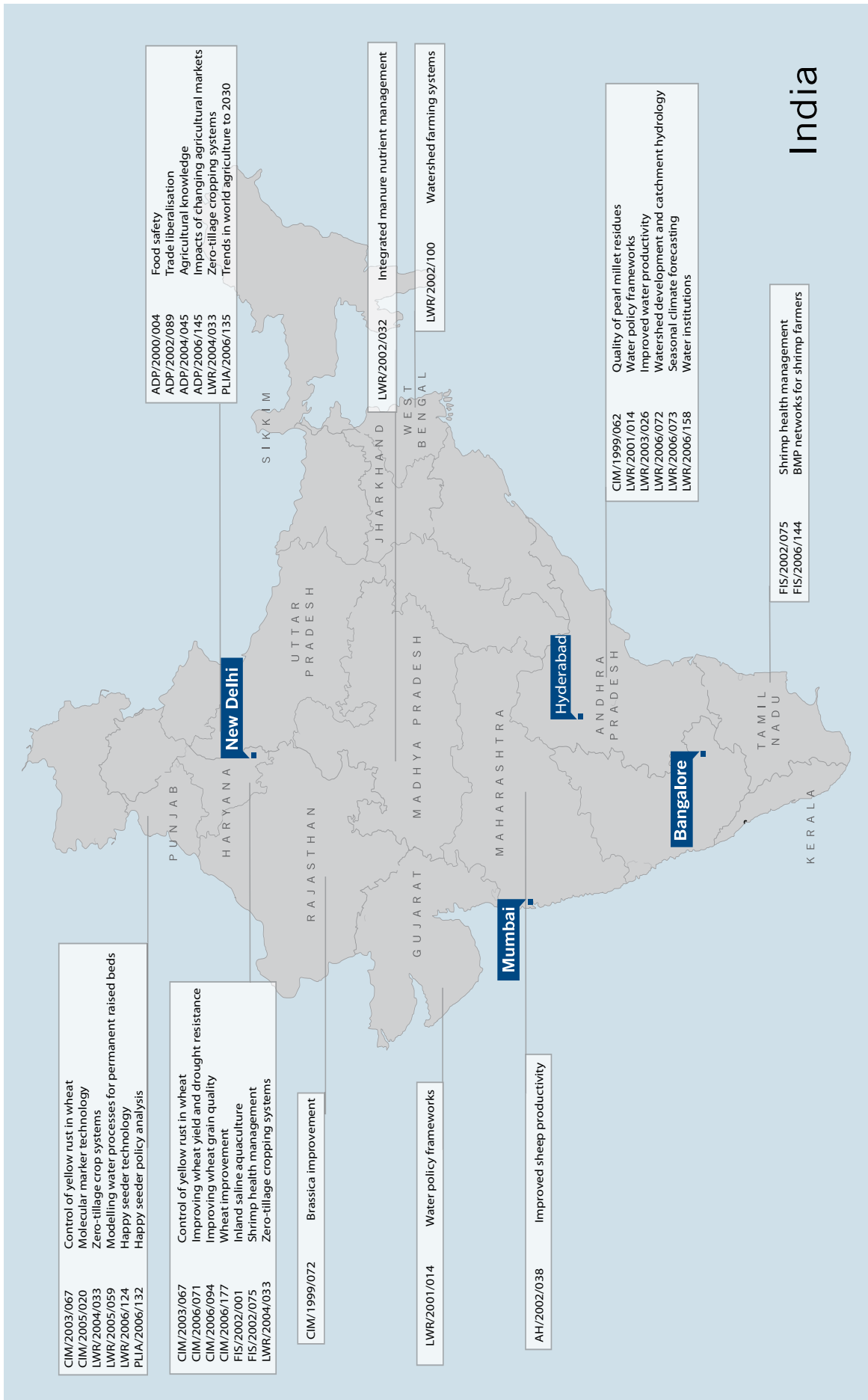
Other projects

FIS/2002/001	Developing aquaculture in degraded inland areas in India and Australia
FIS/2002/075	Application of PCR for improved shrimp health management in the Asian region
FIS/2006/144	Strengthening regional mechanisms to maximise benefits to small-holder shrimp farmer groups adopting better management practices (BMPs)



Indian village dancers

Active projects in India



Pakistan

GNI per capita (\$US)	690	Bilateral actual 2005–06	\$1.05 m
Population	154.8 million	Bilateral estimate 2006–07*	\$2.01 m
Population 2015/2050	193.4/304.7 million	Bilateral budget 2007–08*	\$1.99 m
Active bilateral projects	7	Bilateral + multilateral	
Active multilateral projects	1	budget 2007–08	\$2.04 m

*Includes AusAID-funded projects of \$1.53 m (forecast 2006–07) and \$1.48 m (forecast 2007–08)

Key program managers

Mr Les Baxter, Horticulture
 Dr Jon Tanner, Livestock Production Systems
 Dr Jeff Davis, Policy Linkages and Impact Assessment
 Dr Christian Roth, Land and Water Resources

Country Manager

Dr Kubu Chatterjee, ACIAR Regional Manager, South Asia



Farmers and scientists trialling raised bed cropping systems in Pakistan

Key performance indicators (2007–08)

- Mango supply chains mapped and opportunities to improve value generation identified for selected domestic and export markets
- Significant exposure of Pakistan researchers and extensionists to modern methods of knowledge transfer and agricultural extension in dairy production
- Bed planting and residue management systems using locally manufactured machinery achieving significant savings in irrigation water
- At least 40 % of new projects designed to have components leading to significant farmer or policy

Medium-term strategy

ACIAR has broadened the program of bilateral and multilateral projects in Pakistan to encompass the horticulture and dairy sectors. These build on a longer-term focus on natural resource management issues such as efficient water use, salinity and drainage, and tillage options for irrigated cereal cropping. The broadened focus arises from the Australia–Pakistan Agriculture Sector Linkages Program (ASLP), which ACIAR is implementing on behalf of AusAID.

Position

Pakistan has been an ACIAR partner country since 1984. In Pakistan, there is increasing pressure on availability of water resources for irrigation due to competing demands from urban and industrial uses. Soil and water salinity and drainage problems are placing additional pressure on irrigated agriculture. Given the similarity of some of Australia’s water resource and salinity issues, Australia is very well placed technically to assist Pakistan in addressing

the above issues. As a result, ACIAR’s program continues to focus on irrigation, drainage and salinity management in the major cropping systems. Examples of the technologies developed are the introduction of Australian salt-tolerant forage species into Pakistan and the use of eucalypts to assist in the drainage of shallow water tables.

In addition, there is recognition that Australia also has skills in some of Pakistan’s key horticultural crops: mainly citrus and mangoes, the two most important tree crops. Australia can provide expertise in a whole-of-systems approach to increase the productivity and competitiveness of the mango and citrus industries, encompassing fruit to market strategies.

Pakistan is also one of the world’s largest milk producers, slightly less than half of which is produced from dairy cattle. Unit animal production is very low, although genetic potential is quite good. Major opportunities exist for applying Australian expertise in animal nutrition and integrating forage production into farming systems to assist in improving milk production. This work is viewed as a key to poverty reduction, particularly for some of Pakistan’s landless.

Relationship to the AusAID South Asia strategy

The AusAID framework for assistance in South Asia over 2003–07 ‘seeks to maximise the effectiveness of programs reducing vulnerability and increasing the productivity of the poor’ with an emphasis on the areas of ‘health and sanitation, education and natural resource management’. It recognises that countries ‘are at different stages of development, each with their own development priorities’.

The Australia-Pakistan Agriculture Sector Linkages Program (ASLP)

The main goals of the agriculture linkages component are:

- To transfer Australian knowledge and expertise to key sectors of Pakistan agribusiness to increase profitability and enhance export potential
- To contribute to poverty alleviation of smallholder farmers through collaborative research and development
- To enhance the capacity of the Pakistan research, development and extension system to deliver targeted and practical research outputs to agribusiness and farmers.

It has been agreed to target the following priorities for technical support:

- Increasing mango and citrus production, through diagnosis and control of diseases and orchard management to increase productivity and reduce input costs
- Supply-chain enhancement, including value-adding and marketing for the mango and citrus industries
- In the dairy sector, increasing milk production from individual animals.

To meet the ASLP goals and to ensure the program delivers early impacts, the program will be configured into a flexible suite of short-, medium- and long-term activities, comprising:

- Initial short-term scoping studies and constraints analysis
- Information exchange and exposure to agro-enterprises through visits to Australia
- Technical and scientific workshops
- Tailored training and capacity-building packages delivered in Pakistan and in Australia
- Technical intervention and research and development projects

The main anticipated outcome of the ASLP is to build stronger capacity in Pakistan to exploit agri-business opportunities in the targeted sectors, with the dual purpose of underpinning the current high growth rates in the agricultural sector, as well as contributing to poverty reduction.

The ACIAR program, while emphasising the agricultural sector, has a strong emphasis on reducing vulnerability and increasing productivity of the poor. The Pakistan program also addresses increased productivity in selected agricultural sectors as well as management of the natural resource base.

Indicative priorities

The most recent formal consultations were held in 2005 under the auspices of the Agriculture Sector Linkages Program (ASLP). Two new thematic priorities—horticulture and dairy—emerged from these consultations. Water was also identified as a cross-cutting theme that underpins these new thematic priorities and links the expanded Pakistan program to the past ACIAR focus. Consequently a broader focus on land and water resources, encompassing community-driven water allocation and drainage management as well as irrigated cereal production, will be retained through ACIAR's core program, complementing the ASLP.

In 2007–08 new projects will be considered to underpin irrigation management in the mango and citrus sectors. All new projects in Pakistan will include significant components of capacity building in participatory research and extension methodologies. Indicative priorities are grouped under the following themes:

Subprogram 1: Developing more productive and competitive mango and citrus production and marketing systems

- Diagnosis and control of diseases, especially dieback
- Orchard management to increase productivity and reduce input costs
- Optimising supply chains to increase value-adding and marketing opportunities
- Supporting linkages between farmers and the private agribusiness sector
- Policy analysis underpinning development of the horticultural sector

Subprogram 2: Improving livelihoods of dairy farmers

- Increasing unit animal productivity of dairy cattle through improved nutrition
- Supporting linkages between farmers and the private agribusiness sector
- Policy analysis underpinning development of the dairy sector

Subprogram 3: Management of land and water resources to sustain productive enterprises

- Strategies to optimise the value of limited and variable-quality irrigation water
- Technologies to improve productivity of saline land and water resources
- Resource-conserving technologies for irrigated horticultural and cereal-based farming systems

Current project portfolio

(Possible new projects commencing in 2007–08 shown as 'proposed')

Subprogram 1: Developing more productive and competitive mango and citrus production and marketing systems

HORT/2005/153	Development of integrated crop management practices to increase sustainable yield and quality of mangoes in Pakistan and Australia
HORT/2005/157	Optimising supply chains for more profitable horticultural agro-enterprises in Pakistan and Australia
HORT/2005/160	Increasing citrus productivity in Pakistan through improved orchard management techniques and more efficient use of inputs
PLIA/2006/152 (proposed)	Adoption of technologies in horticulture and policy implications: case study for citrus

Subprogram 2: Improving livelihoods of dairy farmers

LPS 2005/132 (proposed)	Improving dairy production in Pakistan through improved extension systems
PLIA/2006/136 (proposed)	Policy analysis of the dairy industries in Pakistan and implications for adoption of research outcomes

Subprogram 3: Management of land and water resources to sustain productive enterprises

CIM/2003/067 (Multilateral)	Ensuring productivity and food security through sustainable control of yellow rust in wheat in Asia (CIMMYT)
LWR/2000/013	Sustainable agriculture in saline environments through serial biological concentration
LWR/2002/034	Refinement and adoption of permanent raised-bed technology for the irrigated maize–wheat cropping system in Pakistan
LWR/2004/035	Technology for direct drilling into rice and other heavy stubbles in Pakistan and Australia
LWR/2005/059	Modelling water and solute processes and scenarios for optimization of permanent raised bed systems in China, India, Pakistan and Indonesia
LWR/2005/144 (proposed)	Optimising canal and groundwater management to assist water users associations in maximising crop productivity and managing salinisation in Pakistan and Australia



Demonstrating machinery for enhanced crop production

Bangladesh

Key program managers

Dr Christian Roth, Land and Water Resources

Country Manager

Dr Kuhu Chatterjee,
ACIAR Regional Manager, South Asia

GNI per capita (\$US)	470	Bilateral actual 2005–06	\$0.37 m
Population	139.2 million	Bilateral estimate 2006–07	\$0.41 m
Population 2015/2050	168.2/242.9 million	Bilateral budget 2007–08	\$0.46 m
Active bilateral projects	3	Bilateral + multilateral	
Active multilateral projects	1	budget 2007–08	\$0.53 m



Zero till wheat trials

Key performance indicators (2007–08)

- Extent of water resources available for supplementary irrigation to facilitate expansion of rabi cropping in southern Bangladesh determined
- Improved crop establishment techniques for legume planting in north-western Bangladesh designed and tested

Medium-term strategy

ACIAR's strategy in Bangladesh is to focus on agronomic and biotic constraints to the production of broadacre grain crops, especially the 'rabi' or winter season crops, either through bilateral projects or projects led by IARCs that link to existing programs such as the CGIAR-coordinated Rice–Wheat Consortium.

Position

Bangladesh has been a partner country since the mid-1990s. ACIAR's program is small, in view of Australia's relatively limited comparative advantage to deal with Bangladesh's rice-dominated agricultural problems.

Current project portfolio

(Possible new projects commencing in 2007–08 shown as 'proposed')

CIM/2004/003 (Multilateral)	Plant health management for faba bean, chickpea and lentils (ICARDA)
CIM/2006/177 (Multilateral, proposed)	Diversification of cropping systems in Bangladesh by improving and expanding lentil production (ICARDA)
CIM/2007/027	Development of conservation farming implements for two-wheeler tractors (power tillers) in Cambodia and Laos
LWR/2005/001	Addressing constraints to pulses in cereal-based cropping systems, with particular reference to poverty alleviation in north-western Bangladesh
LWR/2005/146	Expanding the area for Rabi-season cropping in southern Bangladesh

Projects have focused on constraints to broadacre crop production (especially the rice–wheat cropping system) and potential for increased inclusion of a legume component in cropping systems. One project addresses diseases of these legumes. An earlier fisheries project now completed studied management of the Hilsa fishery. It led to a series of management recommendations that will require the Bangladeshi Government to make difficult decisions to save the fishery from collapse. Most recently a project analysing the fate of arsenic from groundwater produced useful information that contributed to a larger initiative on the arsenic problem in Bangladesh.

Indicative priorities

Priorities for collaboration are developed through visits of research program managers and other senior staff, meeting with managers and scientists at agricultural R&D institutions and government bodies.

Current collaboration is mainly in the production and management of grain crops. In the medium term, ACIAR will consider projects in the area of agronomic and biotic constraints to the production of broadacre grain crops.

Other South Asian and Middle East countries: Bhutan, Afghanistan and Iraq

Key program managers

Dr Paul Fox, Crop Improvement and Management

Mr Les Baxter, Horticulture

Population	58.8 million	Bilateral actual 2005–06	\$0.07 m
Population 2015/2050	80.6 million	Bilateral estimate 2006–07*	\$0.49 m
Active bilateral projects	3	Bilateral budget 2007–08	\$0.21 m
Active multilateral projects	4	Bilateral + multilateral budget 2007–08	\$0.54 m

Country Manager

Dr Kubu Chatterjee,

ACIAR Regional Manager, South Asia (for Bhutan)

**Includes AusAID funding of projects in Iraq and Afghanistan (\$0.33 m) (estimate 2006–07)*



ACIAR staff are shown around a citrus farm in Bhutan

Key performance indicators (2007–08)

- New project activities initiated in Bhutan supporting the key agricultural export product, citrus
- ‘Best bet’ varieties of a range of suitable crops and technologies identified and being tested in dryland farming areas of northern Iraq
- Dissemination of promising wheat and maize varieties and further training of Afghan scientists and NGOs

Medium-term strategy and priorities

ACIAR is managing one project in Iraq, co-funded by AusAID. It is anticipated that support will be limited to this project in the short- to medium-term as Iraq passes through a critical period of development.

Some activity will continue in Afghanistan through collaboration with CGIAR centres. ACIAR provides both core and project-specific funds to ICARDA (International Centre for Agricultural Research in the Dry Areas, headquartered in Syria). These projects benefit ACIAR partner countries in Asia as well as Australia and developing countries in the Middle East and former Soviet Republics.

Three multilateral projects involving ICARDA are currently active, and ICARDA is also a key partner in the ACIAR-supported project in Iraq. In Bhutan, there is one active, major project and any additional projects would need to be initiated and strongly endorsed at an early stage by the Bhutan Government and closely fit Australia’s skills and expertise.

ACIAR has no formal program of consultations on priorities with these countries. Priorities are developed through visits by research program managers and other senior staff, meeting with leading agricultural R&D institutions and government bodies.

Bhutan

ACIAR’s small program with Bhutan began in 1998. Because of Bhutan’s relative lack of capacity to effect significant change across many agricultural sectors at once, the program will remain small and very tightly focused. Earlier ACIAR research to develop Newcastle disease vaccine for village chickens was extended and adapted for the situation in Bhutan with the help of AusAID funding, and projects were initiated on the management of fruit flies, and on footrot management in ruminants. A major initiative on improvement of citrus production (Bhutan’s largest horticultural export industry) and pest and disease management is being implemented, as well as a smaller study on water and land management.

Afghanistan

Two decades of war coupled with a recent severe drought devastated Afghanistan’s food-production capabilities and depleted critical seed stocks, leaving the nation heavily dependent on food aid from international donors.

ACIAR’s multilateral project in Afghanistan provides support to wheat and maize production. Wheat is by far the most important crop while maize is the third most important. Capacity enhancement is also very important. Activities have been aimed principally at provision of seed from suitable cultivars via import, establishment of on-

farm participatory testing of imported germplasm for the identification of better adapted improved cultivars, and local multiplication and distribution of improved cultivars. Particular attention is being paid to improved rust resistance in wheat and to promoting improved crop management along with improved cultivars of both wheat and maize.

Iraq

The high levels of input subsidies, guaranteed commodity prices and free food distribution have distorted agricultural markets in Iraq and have provided no incentive for innovation by farmers. In addition, scientists have had limited access to international developments in the agricultural sector for over two decades. In concert with other investments by AusAID, the ACIAR project is intended to assist the Iraqi Government in its quest to modernise agricultural markets and production systems.

The project has been shaped by the relevance of Australian expertise to Iraqi conditions and by the constraint of limited access to Iraq by Australian scientists. It is focused on the enhancement of barley, wheat and grain legume production under dryland conditions in northern Iraq through the introduction and evaluation of appropriate modern varieties, coupled with the adaptation of improved management practices, including tillage, fertiliser and weed control techniques.

Significant yield improvements are anticipated, given that current yields of these crops are only about one-third that under similar conditions in developed countries. The project is co-funded by AusAID and ACIAR, managed by ACIAR and executed by ICARDA and Australian research organisations.

Programmatic emphases in these countries are:

Subprogram 1: Field crop germplasm improvement and utilisation

CIM/1999/064	Lentil and Lathyrus in the cropping system of Nepal: improving crop establishment and yield of relay and post-rice sown pulses in the Terai and mid-hills
CIM/2003/067 (Multilateral)	Ensuring productivity and food security through sustainable control of yellow rust of wheat in Asia (India, Pakistan, Afghanistan, Iran, China) (CIMMYT)
CIM/2004/002 (Multilateral)	Wheat and maize productivity improvement in Afghanistan (CIMMYT)
CIM/2004/003 (Multilateral)	Plant health management for faba bean, chickpea and lentils (Bangladesh, Central Asia) (ICARDA)
CIM/2004/024 (Multilateral)	Better crop germplasm and management for improved production of wheat, barley and pulse and forage legumes in Iraq (ICARDA)

Subprogram 2: Horticulture, including pest and disease management

HORT/2005/142	Improving mandarin production in Bhutan and Australia through the implementation of on-farm best management practices
LWR/2007/212	Opportunities to improve land and water management in Bhutan