

North Asia

Financial year	Regional expenditure	Percentage of total bilateral expenditure	Board target as percentage of expenditure
2002-03	\$4 158 518	15.7%	10-20%
2001-02	\$3 838 370	15.7%	10-20%
2000-01	\$4 329 770	17.3%	10-20%

Expenditure for North Asia has remained within the range defined by the Board. A small program has been underway in Democratic People's Republic of Korea (DPRK) for two years. The focus of activities in China has been shifting to the less developed western regions of that country.



Chris Brittenden manages our North Asia Program

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Canola harvesting in Tibet, China





China

Active projects in 2002–03	38
Bilateral country expenditure in 2002–03	\$3 951 287
Bilateral country expenditure in 2001–02	\$3 723 944
Bilateral country expenditure in 2000–01	\$4 329 770

Position

The focus of ACIAR's program, which began in 1984, is shifting towards western China in line with the poverty-reduction emphasis of the Australian aid program and China's own priorities. There is also an increasing emphasis on sustainability aspects of agricultural production. In view of the significant human and financial resources available within the Chinese national agricultural research system and the strong mutual benefits to Australia, ACIAR projects in China usually have significant sharing of costs by Chinese and Australian research providers. Collaborative research on aspects of agricultural development policy continues, while some other current projects in eastern China aim at increasing the impacts of earlier projects.

Achievements

Policy options for the Chinese grain sector have been furthered through a household survey and follow-up seminar in which options for reform of the domestic marketing system were discussed by Government policy makers. The implications of World Trade Organisation (WTO) accession for achieving food security were examined and presented at a series of seminars and forums. Institutions and policies for improving water allocation and management in the Yellow River Basin are being analysed, drawing on relevant modelling and research undertaken by ABARE on the Murray River Basin in Australia. The research is focusing on the impacts of varying levels of likely water availability on future Chinese agricultural production.

A wool mill management model was developed which helps mills manage information and make decisions in a systematic way in areas such as pricing, input purchases, inventories and cost controls. The project has successfully linked mill buyers with wool producers, and has educated Chinese mill managers on detailed, reliable and publicly available sources of information on Australian wool prices. The introduction of objective measurements into processing of Chinese wool is clarifying issues relating to the quality required by mills. A reduction in wool sorting operations indicates that large savings in the costs of processing wools can be expected. Benchmarking during the project of Chinese and Indian wool mills against world's best practice revealed the gap between current quality and that required for best commercial practice. Staff at the Xi'an Institute of Science and Technology have established a well-equipped, conditioned textile and functional testing laboratory, and are developing expertise in processing prediction software leading to the development



John Skerritt, Dr Zhang Zhibin and Chinese scientist at the Institute of Biology, CAS

of their own prediction models. In joint research between China, India and Australia to treat effluent resulting from wool scouring, audits have determined the elements causing pollution. Key factors influencing both the profitability of operation and potential pollutants were identified, with links between the two demonstrating that good management both benefits profitability and reduces pollution.

Collaboration in crop production, management and processing continues on several fronts. Testing has been completed for doubled haploid populations developed from Chinese breeding lines showing useful preharvest sprouting tolerance, as part of **a project to improve wheat** in Sichuan Province. Analysis using microsatellite markers in genetic mapping indicates that Sichuan breeders have available, in Chinese breeding lines, sources of sprouting tolerance that are similar to those currently used in Australia. **Hybrids of improved sugarcane germplasm** produced by the Guangzhou Sugar Industry Research Institute using *Erianthus* germplasm were assessed using molecular markers and verified as being fertile. These results are significant for sugarcane breeding because it is believed to be the first time fertile hybrids of this kind have been produced. This opens the door for sugarcane breeders in Australia and China to use clones, utilising a number of traits of potential value to sugarcane improvement such as disease resistance. Work has commenced on genetic characterisation of nearly 1000 clones from China and Australia for future use in breeding programs. Laboratories in the Yunnan and Guangzhou Sugar Industry Research Institutes have been equipped for undertaking molecular marker characterisation.

Legumes are widely used in China and Thailand to increase nitrogen levels in soils, boosting productivity. Poor management of these legumes, however, can result in raised levels of soil acidity, the accumulation of which reverses productivity gains and results in a net productivity loss. A project examining this problem identified the reduction of soil organic matter as the main driver of diminishing soil productivity. A simple, computer-based means of estimating the time taken for soil to decline to dangerous levels was developed. A study of soil management practices to reduce acidity without losing the benefits of nitrogen fixing offered by legume crops has identified strategic burning of dry matter as a potential tool. A project examining **the use of lucerne to enhance environmental stabilisation** and increase animal productivity has identified a variety of germplasm possibilities. Suitable varieties are being multiplied and trialled at two sites in China. Soil characterisation and screening of chosen varieties demonstrated some early indicators of both waterlogging and salinity tolerance.

Economic analysis of **different storage options for leafy vegetables**, together with training workshops for farmers and agricultural technicians, has resulted in improved returns to growers and supermarket cooperatives in the Beijing and Zhengjiang regions. National fumigation standards have been established for grain pest control in China's



Local seeder



Corn field at Hexi



Corn

modern grain stores, and more than 2500 personnel have been trained in fumigation practice. A CD-ROM based training system was developed for domestic quarantine in China in a previous project. Subsequent project work is now tackling the more complex situation of international quarantine.

Project work in China continues to have a strong natural resources management emphasis. The rapid expansion of eucalypt plantations in southern China has raised **concerns about the depletion of groundwater reserves essential for crop irrigation during the dry season**. Research showed that under the climatic conditions in southern China eucalypt plantations do not prevent the recharge of groundwater and use no more water than agricultural crops such as sugarcane. This information is now being regularly used in negotiations between forest developers and farmers for planning and establishing new plantations.

Research identified that ammonia volatilisation was the main pathway of **fertiliser nitrogen loss** when applied to grain crops **using the traditional surface broadcast method**. The losses were reduced to 18 per cent when urea was applied by the broadcast method followed by irrigation, and to 11 per cent when urea was applied with deep placement. Site demonstrations and an effective extension program by research staff in the Fengqiu experimental station, with strong support from the Fengqiu County Government, have seen these methods widely adopted. A village-based survey revealed 40 per cent of farmers used the deep placement method and 30 per cent used the surface/irrigation method. This represented an estimated cost saving on nitrogen fertiliser for the year of A\$260 000 for the county. This lowered the average expenditure per farmer on fertiliser from 50 per cent of total capital input to 32–37 per cent. The proposed application methods are gradually being adopted across Henan province. ACIAR Monograph 84, *Regional water and soil assessment for managing sustainable agriculture in China and Australia*, is an English-Chinese summary of the results of a successful project to improve agricultural water use efficiency and thereby increase agricultural productivity and sustainability in China and Australia.



Fruit stand - Dingxi

The cause of **deteriorating water quality**, polluting groundwater in the Yinchuan Plain in the west of Jilin Province, has been identified as **agricultural pesticides and fertilisers**. The area is part of the Yellow River catchment and the project's findings have helped improve water quality through the introduction of strict control measures. The degree of salinity in wasteland of the Yinchuan Plain is also being decreased. Early studies of water saving for rice in China have focused on improving water use efficiency by examining the use of aerobic rice instead of paddy rice to cope with water shortages. Research is confirming that farmers can reduce water input without affecting rice yield, by alternate wetting and drying. This finding is allowing water system managers to divert more water from agriculture to other users. Water-saving irrigation systems by themselves, or when combined with the use of aerobic rice, decrease

seepage from paddy fields, which in turn reduces fertiliser losses.

Through farmer networks **substantial interest** has been generated in **conservation tillage technology**. The first crop of conservation tillage wheat grown at one site outyielded the conventionally sown wheat by 20 per cent, with a similar result also reported for pea crops. Progress towards developing viable beef-production systems in the degraded red soils of China's western provinces has been furthered through identification and testing of grasses palatable for cattle. Data characterising feed resources based on availability and dry-matter yield have underpinned this process. Testing of dietary components has demonstrated that the quantity of forages can be increased without affecting growth rates.



ACIAR's Tony Fischer with researchers in Chinese corn field

An example: Agricultural research—poverty reduction

Increased yields of 30 per cent and productivity increases valued at \$US145M annually have been obtained from sweet potato production in Shandong Province, China. These increases have been achieved from the introduction of a new method of propagating virus free sweet potato seed roots and vines developed by the International Potato Centre (CIP). The seven million sweet potato growers, mostly poor households, have increased their incomes by 3–4 per cent. Virus-free seed programs are being extended to major seed potato producing producers with potential benefits to all China of around \$US 1600 M a year.

ACIAR is a funder of the International Potato Centre

Dr Luis Salazar from the CIP was awarded the ATSE Crawford Fund Derek Tribe Award for 2003 for this work



Chinese villagers will benefit from increased yields of sweet potato



Democratic People's Republic of Korea

Active projects in 2002–03	1
Bilateral country expenditure in 2002–03	\$207 232
Bilateral country expenditure in 2001–02	\$114 426
Bilateral country expenditure in 2000–01	\$0

Position

ACIAR's small collaborative research program addresses the Democratic People's Republic of Korea's pressing problems of food insecurity. Food shortages have been severe since the mid-1990s. Staple crops are low in productivity, in major part due to low soil fertility. Most agriculture is conducted by farmer cooperatives or state-owned farms. ACIAR began in 2001 by training DPRK scientists in Australia, to ensure that their isolation from developments elsewhere in the world was no longer a barrier to research. ACIAR commenced its first project in DPRK in early 2002.

Achievements

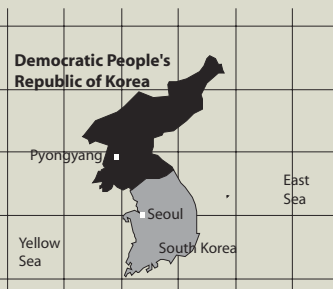
Progress was delayed with ACIAR and Australian project staff being unable to visit the country for significant parts of the year. However, the project **to improve soil fertility** through reduced tillage practices and the **use of legumes** in maize and rice cropping rotations was able to achieve some useful progress. Equipment, instruments and fertilisers have been delivered, and the first yields of maize and rice from the plantings that were provided have been harvested.



Maize project



Family returning home



Dr Tony Fischer and Korean officials checking a crop