Submission No 41

Inquiry into Australia's Relations with Indonesia

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Building Australia's relationship with Indonesia

An Inquiry by the Joint Standing Committee on Foreign Affairs, Defence and Trade

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Terms of reference

Building Australia's relationship with Indonesia

The Joint Standing Committee on Foreign Affairs, Defence and Trade shall inquire into and report on Australia's relationship with the Republic of Indonesia, focussing in particular on building a relationship that is positive and mutually beneficial.

The Committee shall review the political, strategic, economic (including trade and investment), social and cultural aspects of the bilateral relationship considering both the current nature of our relationship and opportunities for it to develop.

Referred by the Minister for Foreign Affairs, 22 August 2002

List of acronyms

AAHL	Australian Animal Health Laboratories
ADAB	Australian Development Assistance Bureau (predecessor of AusAID)
ACIAR	Australian Centre for International Agricultural Research
AFFA	Agriculture, Fisheries and Forestry – Australia
ATSE	Australian Tree Seed Centre
AQIS	Australian Quarantine and Inspection Service
AusAID	Australian Agency for International Development
Balivet	Indonesian National veterinary laboratory
BPPT	Agency for the Assessment and Application of Technology, Indonesia
BOM	Bureau of Meteorology
BMRC	Bureau of Meteorology Research Centre
BRKP	Indonesian Agency for Ocean Research and Fisheries
CCSBT	Commission for the Conservation of Southern Blue Fin Tuna
CIFOR	Centre for International Forestry Research
CLI	CSIRO Division of Livestock Industries
COSTAI	Committee on Science and Technology, Australia Indonesia
CSF	Classical swine fever
CRIFC	Indonesian Central Research Institute for Food Crops
CRIFI	Indonesian Central Research Institute for Fisheries
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVAP	Climate Variability in Agriculture Program
DEST	Department of Education, Science and Training
DGF	Directorate General for Capture Fisheries
FMD	Foot and mouth disease
FORDA	Indonesian Agency for Forest Research and Development
GOOS	Global Ocean Observing system
GSLP	Government Sector Linkage Program
iivBDV	infections bursal disease virus
IPB	Indonesian Institute of Agricultural Sciences
IOTC	Indian Ocean Tuna Commission
LDEO	Lamont Doherty Earth Observatory

LIPI	Indonesian Institute for Sciences
NAQS	North Australia Quarantine Strategy
ONR	Office of Naval Research
RAN	Royal Australian Navy
RCCF	Research Centre for Capture Fisheries
RIMF	Indonesian Agency for Marine and Fisheries Research
TOGA	Tropical Oceans Global Atmosphere
SBT	Southern Blue Fin Tuna
SIO	Scripps Institute of Oceanography
USDA	United States Department of Agriculture
WOCE	World Ocean Circulation Experiment

Executive summary

CSIRO has developed long lasting relationships with its counterpart agencies in Indonesia over the past thirty years that will continue to (and most recently have) weather the political, financial and economic crises affecting Indonesia. The basis of this relationship has developed as a result of the pursuit of knowledge by scientists in both countries. The investment in science has a direct link to the development (and modernisation) of industries and productivity.

Australia through its aid program, has invested in the training of tens of thousands of Indonesian postgraduate students since the 1960s. To complement this, CSIRO has also provided short-term training to many hundreds, possibly thousands of scientific personnel from the agencies with which it works.

It is through these types of arrangements that a cadre of highly qualified and in many instances well positioned, personnel who are knowledgeable about Australia and its people are able to promote the benefits of the bilateral relationship. Australians also benefit from such exposure to people from a different culture and background.

CSIRO's excellent record with its research counterparts has been as a direct result of our participation in projects funded by the Australian aid program. More recently through World Bank funding we have been able to build on the previous relationship developed through work undertaken through AusAID's predecessors. It is as a result of our past activities with Indonesian science agencies that CSIRO is hoping to move forward to work with Indonesia's private sector.

CSIRO as well has been investing its own funds in the development of Indonesian research staff. A special postdoctoral fellowship scheme was introduced for a period of three years in the late 1990s to enable young 'high fliers' from research institutes to work in CSIRO for periods up to 6 months getting to know CSIRO and the Australian system. The majority of the Indonesians who took advantage of this scheme were from the Ministry of Energy and Mineral Resources and this has had the consequences of positioning CSIRO well with staff within this Ministry.

At the completion of a five-year World Bank project with LIPI, CSIRO recognised the benefits of continuing the relationship and commenced a five-year study award scheme to enable LIPI and CSIRO to undertake exchange visits for periods of up to three months.

However the economic realities within Indonesia and CSIRO will mean that the level of continued interaction will be a challenge. With the trend for Australian aid programs to require recipients to meet salary and on-costs, means that any future aid-type activity will need to be closely assessed.

In the future areas where CSIRO may best provide assistance for Indonesia lie with the minerals, forestry and agriculture sectors. We look to the Australian government to consider ways whereby funds can be provided to maintain and develop the relationships we have enjoyed with our Indonesian counterparts in the past. If this can be done then the benefits will be enormous.

1. Background

At this time of national mourning in both Indonesia and Australia, the strength of the bilateral relationship will be critical in overcoming tensions that will again inevitably arise. Indonesia, as one of our nearest neighbours, and also one of the most populated countries in the world, will require Australia to be a good and tolerant neighbour in order to assist them in maintaining the security of the region.

Security in this instance can mean personal and physical security, security of the economic resource base and security of systems.

Since the early 1970s, CSIRO has had good collaborative relationships with its counterpart agencies in Indonesia. The maintenance of these relationships has been and still is vital to enable CSIRO to work on issues of importance to both countries. The similarity of our countries' flora, fauna, and climate, and the common sea boundaries mean that we have had to work together in order to understand our environment and prevent future threats. An example of the type of work that has been undertaken in the past is the eradication of the foot and mouth disease (FMD) virus from Indonesia. This had the effect of creating a buffer zone between northern Australia and mainland Asia, where FMD is endemic. Current areas of importance include the management of our internationally shared fisheries resources, which if handled incorrectly could mean the depletion of many of our important fishing stocks, many of which have their spawning grounds in Indonesian waters. The Indonesian seas also have direct social and economic impact to both Australia and Indonesia especially in relation to global warming.

In the mid 1990's the CSIRO Executive made a commitment to develop a strategic relationship with CSIRO's counterpart research agencies in Indonesia. The CSIRO Chief Executive committed the Organisation to assisting with the development of Indonesia's research capacity and infrastructure for both national and neighbourly reasons. With a population of over 211 million people, Indonesia will become a large market for our exports[1]. It will also eventually become a powerhouse in Asia and it will be to Australia's detriment if we don't handle the relationship carefully. We need to continue to look at maintaining a set of arrangements to benefit Australia's longer-term relationship.

Organisations such as CSIRO have traditionally been very important in maintaining these relationships even when times are difficult at a governmental level – collaboration between scientists transcends national borders and their inherent political encumbrances.

2. Historical relationship

CSIRO has worked with research institutions in Indonesia since the early 1970's when it was awarded an Australian aid project to establish a research institute for animal production in Bogor. Over the next decade CSIRO's assistance to Indonesia was aid based and its focus expanded to include assistance in the forestry sector through the provision of seeds of Australian trees to assist Indonesia in meeting its needs for additional sources of timber, fuel and woodchips, as well as providing advice, information and training for the establishment of an Indonesian metrology laboratory.

With the establishment in 1983 of the Australian Centre for International Agricultural Research (ACIAR), large amounts of aid funds were devoted towards international agricultural research which meant that collaboration between Indonesian research agencies and CSIRO focussed mainly on agribusiness activities until the early 1990s.

Following an ASEAN-Australian Forum held in Canberra in January 1984, the ASEAN Committee on Science and Technology established a program to upgrade ASEAN capabilities in the management of science and technology. ADAB (the predecessor of AusAID) agreed to fund two

[1] Indonesia Fact Sheet Department of Foreign Affairs [http://www.dfat.gov.au/geo/fs/indo.pdf]

projects, one on S&T Policy Development and Program Management and the second on the Management of Research and Development. CSIRO managed the latter project that involved training for three levels of R&D managers from ASEAN institutions – senior managers who were directors of institutes, middle managers, and human resource trainers.

Under the Chairmanship of the then Minister for Research, Professor Habibi, the Indonesian Institute for the Assessment and Application of Technology (BPPT) became the major research agency from about 1990. There were thousands of staff sent abroad for postdoctoral fellowships as well as funds available for collaborative activities. As a consequence CSIRO expanded its collaborative research activities to include the non-agricultural sector. The time coincided with a series of high level visits to Australia by senior BPPT staff and the establishment of the bilateral science and technology agreement. It also marked a time when the World Bank recognised the importance of research agencies in Indonesia for the development of the nation, through the funding of major projects to develop BPPT and the Indonesian Institute of Sciences (LIPI).

With the establishment of the Australian Indonesian Ministerial Forum in the early 90s, the formal bilateral relationship was strengthened through the development of Ministerial Working Groups. This had the flow on effect of increasing the number of research agencies in Indonesia with which CSIRO collaborated. The Australian Government through AusAID's Government Sector Linkage Program (GSLP), provided funds to Australian government bodies to encourage the collaboration with their counterpart Indonesian agencies under the Ministerial Forum process. New relationships were developed between CSIRO and the Indonesian Ministry for Energy and Mineral Resources and latterly, the Ministry for Marine Affairs and Fisheries.

In the mid 1990s CSIRO bid to manage both World Bank projects to assist the development of BPPT and LIPI and in March 1997, was awarded a five year contract to the value of $A7.2 million to advise and assist LIPI in developing an enhanced capability to deliver and manage contract research with special emphasis on providing services to the private sector.

The CSIRO postdoctoral fellowship scheme was introduced in 1999 for a period of 3 years and a number of Indonesian officials from the Directorate General for Geology and Mining (DGGMR) completed programs within CSIRO, helping to cement the relationship.

In early 2000 CSIRO started to focus its attention on collaboration with the Research and Development Centre for Oil and Gas, under the Ministry of Energy and Mineral Resources, previously the research arm of Pertamina. This also involved working with private industry in both Indonesia and Australia.

With the completion of the World Bank project within LIPI in June 2001, CSIRO agreed to maintain its relationship with the Indonesian Institute of Sciences and announced a five-year program of study awards that would encourage further collaboration and understanding of processes, through a series of visits to each other's institutions.

3. Agreements with Indonesian agencies

As a reflection of the active program CSIRO has developed over the past 30 years with Indonesia, the Organisation has entered into many corporate and divisional agreements or Memoranda of Understanding with Indonesian ministries and agencies. However many interactions occur without the aid of formal agreements.

The Corporate agreements that currently exist are as follows:

- CSIRO and LIPI (the Indonesian Institute of Sciences) first signed in June 1983 and renewed in November 2000
- CSIRO and Ministry of Forestry signed in October 1996 (this is currently being renewed)

- CSIRO and the Ministry of Marine Affairs and Fisheries entered into on 6th November 2000
- CSIRO and LIPI Study Awards signed 8 November 2000 to enable staff of each organisation to undertake visits to their reciprocal organisation for periods of up to three months
- CSIRO and the Research and Development Agency for Energy and Mineral Resources, Department of Energy and Mineral Resources signed in July 2001

Most of these agreements are umbrella agreements to encourage the conduct of applied research and development activities in various research fields; and the transfer of related scientific knowledge and technologies to practical applications for private industry and government agencies.

To supplement these agreements, collaborative research is also undertaken under formal agreements negotiated by other Australian government agencies such as the Australian Centre for International Agricultural Research (ACIAR), AFFA and DEST.

4. Working Groups under the Australia Indonesia Ministerial Forum

Due to the wide range of research interests CSIRO has developed with Indonesia, the Organisation participates in many of the Working Groups that have been established under the Australia Indonesia Ministerial Forum process either as members or observers of the Working Groups. The Working Groups that CSIRO has been associated with include, the Working Groups on:

- Agriculture and Food Cooperation
- Energy and Mineral Resources
- Science & Technology (COSTAI)
- Housing & Public Works
- Environment
- Marine Affairs & Fisheries

During the visit to Australia by the then Minister for Forestry, Dr Marzuki Usman in July 2001, discussions were held between the Minister, his delegation and CSIRO Division of Forestry and Forest Products about the possibility of establishing a similar Working Group for Forestry, or expanding the present Working Group on Agriculture and Food Cooperation, so that it might include forestry. This was raised with the Australian Minister for Agriculture, Fisheries and Forestry at the time however shortly after the return to Indonesia by Dr Usman, there was a Ministerial reshuffle in Jakarta and this idea didn't progress. CSIRO would be very keen to promote the establishment of either a new working group or a task force within the Agriculture and Food Cooperation Working Group due to the importance of the forestry sector and the assistance Australia could play in building Australia's relationships with Indonesia.

With the many problems Indonesia has experienced over the past five years, and also the hiccups that have been experienced in the bilateral relationship, many of the Ministerial meetings and the Working Group meetings have not occurred. This has meant that priorities have not been established for some of these Groups.

Some Working Groups have been more successful than others eg the Agriculture and Food Cooperation Working Group has been particularly active over the past five years. However the Working Groups on Science and Technology, Energy and Mineral Resources and Housing and Public Works have not met since early 1999. It is our understanding that the Public Works Group is now defunct.

For CSIRO the ability to contribute to these Working Groups depends on the availability of funds from AusAID's GSLP. However these funds are harder to access due to the criteria that is set by AusAID. Not only do proposals need to be related to the priorities determined under the

Ministerial Forum process but they should also "contribute to one or more of the six priority areas targeted by the Australia Indonesia Development Cooperation Program viz., governance; health; water supply and sanitation; natural resource management/rural development; education and training; and conflict prevention, peace building and disaster management"[2]. Very few of these areas relate to the Working Groups with which CSIRO is associated.

As well, funds available under GSLP do not cover salary or salary on costs, which must be met through CSIRO's appropriation funds. Given other demands placed on CSIRO's appropriation it is not always possible for CSIRO Divisions to take advantage of the GSLP.

5. Research activities with Indonesia

CSIRO is currently undertaking the annual review of activities the Organisation implements internationally. This update will be completed in late November 2002 and can be provided to the Parliamentary Review Committee at that time if required. In the interim, the information obtained last year relating to CSIRO activities in Indonesia that began in 2001, or continued from 2000 included:

Agribusiness

- technology transfer of bovine disease diagnostics
- sustainable parasite control strategies by improving host genetic resistance, grazing management and strategic nutritional supplementation
- improving livestock productivity from thornless acacias
- management of whiteflies as pests and vectors of plant viruses in Asia
- evaluation of new vaccines for classical swine fever
- management of rodent pests in rice-based farming systems (5 partners)
- transfer of a diagnostic capability for the identification of duck viral enteritis
- equip and train staff at the Indonesian Research Institute for Veterinary Science to safely handle and test specimens where Nipah virus may be suspected
- comparison of cattle & pigs as sentinel animals for Japanese Encephalitis (JE) virus in endemic areas
- evaluation of medicated urea-molasses blocks
- control of bee mites
- improved integration of high quality forages in the crop-livestock systems of Sulawesi
- optimising crop livestock systems in West Nusa Tenggara Province
- developing effective pest management for strategies to control the leaf miner

Environment and natural resources

- biodiversity collections and information management
- collaborative research to interface software platforms to an airborne radiometric spectrophotometer
- management and conservation of the Terubuk fishery in Riau Province, Sumatra
- productivity of tropical timber plantations (7 partners)
- taxonomy of the shoot borer, *Hypsipyla robusta*, a serious timber pest, and allied species in the Asian/Australian region
- biological and ecological features of the shared snapper stocks of northern Australia and eastern Indonesia, and the social and financial structure of the fishery
- modelling smoke transport from Indonesian biomass burning
- provision of air pollution meteorological modelling studies
- building a comprehensive ocean observing network from an array of autonomous profiling floats – part of the global Cooperative Ocean Observing Experiment
- artisanal shark and ray fisheries in Eastern Indonesia: their fisheries characteristics and socioeconomics

[2] Australia – Indonesia Government Sector Linkage Program Guidelines p 2

- monitoring the long line catch of Southern bluefin tuna landed in Indonesia
- improved hatchery and grow-out technology for grouper aquaculture in the Asia-Pacific region
- application of molecular marker technologies for genetic improvement of forest plantation species
- Heart rots in plantation hardwoods

Radioastronomy

- a CSIRO postdoctoral fellowship at ATNF for an Indonesian scientists to study radio properties and stellar winds of massive stars

Manufacturing and construction

- international recognition of Indonesian physical standards
- strengthening KIM-LIPI and the Indonesian National Calibration Network
- harmonisation of standards in loadings for structural design
- harmonisation of durability standards (5 partners)
- alignment of performance criteria for concrete infrastructure in the Asia-Pacific region
- Asia Pacific Metrology Programme (APMP)
- provision of technical training to assist participation in the Global MRA

Minerals and energy

- strontium isotope chronostratigraphy for petroleum exploration
- expanding Indonesia's capacity to assess sea-floor mineral resources
- a geoscience data production strategy for eastern Indonesia
- the application of Australian technologies to the study of Indonesian ore deposits
- petroleum systems analysis for the NE Java Basin
- fluid migration study
- two postdoctoral fellowships for staff of the R&D Centre for Oil & Gas

Detailed submissions from several CSIRO divisions are also included as Attachments to this document.

6. Effects on CSIRO as a consequence of the changes in the political, social and economic landscape in Indonesia

Over the past five years CSIRO's total number of interactions with Indonesia has ranked third behind the USA and Japan for CSIRO's overall international interactions. Given the political and economic landscape over this period this provides proof of the extent of the good relationships developed between CSIRO and our research counterparts. However it is likely that this number of interactions will drop this year due to the continued unsettled environment in Indonesia.

CSIRO was to have opened an office for the Centre for Sustainable Urban Regional Development in Jakarta in 1997. This office was to help the Australian building and construction industry, especially the SMEs, with accessing parts of the market where S&T components would be an advantage, and also to provide a high-speed communications link through CAD conferencing. However as a result of the financial crisis in Indonesia and the virtual cessation of major building activities the Australian building sector decided not to proceed with this initiative and it was never reactivated.

Several planned activities that were to be conducted over the period from 1997 had to be deferred due to the unsettled situation in Indonesia, however they all eventually were undertaken. For example one activity funded under AusAID's Government Sector Linkage Program in 1998/1999 had extreme difficulties. The project was to create within Indonesia an advanced capability to employ its *Baruna Jaya* fleet for locating and assessing polymetallic sulfide

mineral deposits in Indonesian territorial waters, in order to encourage more detailed exploration and potential exploitation by private enterprise. It was originally scheduled to take place in November 1998 but was deferred due to problems with Indonesian counterpart funding. It was then rescheduled for September 1999. A day before the research vessel was to have departed Jakarta, the international peacekeeping force arrived in East Timor and it was recommended that the activity be delayed a further six months. Eventually, three years after it was scheduled to commence, the research project was completed extremely successfully and with formal requests for CSIRO to participate in further similar collaborative activities. It should be noted that Antara recently reported that a domestic investment company, PT INTAN, plans to conduct an exploration of oil and gas reserves in the North Sulawesi waters.[3] This exploration is most likely a direct result of the GSLP activity.

Regretfully the activities that CSIRO had begun to develop with industry partners have almost disappeared due to uncertainties in the Indonesian market place. This particularly applies to the minerals sector where the introduction of regional autonomy laws and the subsequent 'confusion' about the regulations has meant the large downturn in foreign investment by the mining companies into Indonesia.

As well, the constant change within the various Ministries and departments has had impact on the work we had commenced with the R&D Centre for Oil and Gas. Whilst there was strong interest the level of collaboration did not grow significantly. Recently CSIRO Petroleum reviewed its business development effort in Indonesia and decided to restrict further marketing expenditure pending an upturn in the Indonesian economy. The Division is still active in the region mostly through repeat business with existing customers (both multi-national oil companies and service companies). The latter business is estimated to be in the order of $2-300,000 per annum for the foreseeable future.

The introduction of regional autonomy also has affected the 'aid funded' activities that CSIRO has developed. As detailed in Attachment 3 the CSIRO Division of Livestock Industries reports that "the defining of national priorities has become less focussed recently, and that where national priorities can be agreed, it is often difficult to secure adequate funding as resources must be negotiated from provincial budgets rather than from a central pool and thus must compete directly with provincial priorities. These concerns are mirrored at the provincial level, where some of the laboratories previously involved in collaboration with Australia are reporting difficulty in performing their functions owing to a lack of funding. There is a concern that some of the capability that has been developed over the past 2-3 decades may be rapidly lost"[4].

Since the downfall of the Suharto Government Indonesia has increased the number of conservation parks. This has meant that the revenue obtained from private sector logging in the state owned forests has decreased. As the flow on from this, the Indonesian Agency for Forest Research and Development (FORDA) has had its operating budget reduced by 60%. This will have implications on their ability to meet their counterpart responsibilities for any future collaborative project that may be undertaken. This may of course have a positive effect in forcing them to work more closely with industry. Recently CSIRO has worked with FORDA to help them plan and prioritise their programs, focussing on where the need is most great and how to connect with industry.

7. Government Sector Linkage Program

As indicated above CSIRO has participated in the GSLP activities since its establishment in 1998/1999. The contribution AusAID has made to the projects carried out by CSIRO exceeds $1.3 million with CSIRO making a similar contribution. The projects that have been supported are:

[3] Friday, 4 October 2002, LKBN Antara
[4] CLI submission - Review of Australia's relations with Indonesia October 2002 p 4

- Assessment of the Environmental Impact of Illegal Gold Mining Activities – CSIRO Energy Technology
- Expanding Indonesian Capability to Assess Sea-Floor Mineral Resources – CSIRO Exploration & Mining
- *Zoonotic Disease Control and Prevention: Transfer of diagnostic tests for Nipah virus in Animals* – CSIRO Livestock Industries
- Application of Australian technologies to the study of Indonesia ore deposits – CSIRO Exploration & Mining
- Integrated application of Australian exploration technologies to the Nusa Tengarra region – CSIRO Exploration and Mining
- Diagnosis and control of very virulent infectious bursal disease virus of poultry – CSIRO Livestock Industries
- Air pollution from Indonesian biomass fires
- Study of the Mineral Resource Potential of Eastern Indonesia
- Extension of the AIMResNet (Australia Indonesia Mineral Resource Research Network) to include the Directorate General of Geology and Mineral Resources
- AAHL-BALITVET National veterinary laboratory linkage development: Collaboration on Porcine diagnosis – CSIRO Livestock Industries
- Establishment of an Australia Indonesia Mineral Resource Research Network – CSIRO Exploration & Mining
- Establishment of genetic base populations of *Melaleuca cajuputi* subsp. *Cjuputi* for improving production of essential oils – CSIRO Forestry & Forest Products
- Sustained productivity of *Acacia* plantations in Indonesia for commercial and community benefit – CSIRO Forestry & Forest Products
- Program development in reducing anaemia of female adolescents in Indonesia – CSIRO Health Sciences & Nutrition

As indicated above CSIRO needs to meet the salary and on costs from its own appropriation. Therefore it has not always been possible for CSIRO's Divisions to participate in GSLP even though there is great interest from Indonesian government agencies and individual scientists.

8. ACIAR

CSIRO's mainly agribusiness and natural resource divisions have had a very close relationship with ACIAR since its establishment in 1983. Many of the projects undertaken by CSIRO each year in Asia and the Pacific are funded under the auspices of ACIAR. At present, CSIRO is the commissioned agent for 12 projects in Indonesia. The investment by ACIAR towards these projects is $7,233,456 however depending on the project, CSIRO can contribute on a dollar for dollar basis from its appropriation, to cover salaries of its staff. As well as acting as the commissioned agent, CSIRO staff also participate in other Australian research agencies' commissioned projects.

9. New opportunities

CSIRO Exploration & Mining has developed a very close relationship with the Ministry of Energy and Mineral Resources since 1998. This has been established as a direct result of funding provided initially by the Australian Government through the GSLP. Over the years 'partnerships' have been developed between CSIRO Exploration & Mining and their counterparts in the Agency for Research and Development for Energy & Mineral Resources and ideas developed as to where most benefit for limited expense can be gained by the Ministry, the industry and Indonesia. CSIRO and the Ministry have developed a project, "Promoting Mineral Resource Governance in the Era of Regional Autonomy" (MINERA) designed to assist the central government in assessing its inventory of geoscience data, and to coordinate the transfer of this information to the regional governments in Indonesia. Much of this inventory, which was obtained as a result of aid funding, was collected over decades but not processed or put into a central databank. Once the surveys were completed and handed over to the Indonesian authorities, no further action was taken to assess the results.

Armed with reliable information about their mineral resources and appropriate technologies to assess and manage their natural wealth, the regional governments will be in a better position to plan and implement economic development. Australia is a global leader in the mineral exploration and mining sector, and this project will transfer this capability to participating Indonesian regions through institutional strengthening, infrastructure improvements, technology transfer and human resource/management development programs.

We are currently seeking funds to assist with the implementation of this project which, if carried out successfully, would encourage industry back to Indonesia, enable the country to learn about the wealth it has and train staff to recognise how best to utilise the information it already has obtained. This would also have a knock on effect of supporting Australian mining suppliers, products and services.

CSIRO Livestock Industries have a strong desire to partner in projects that will deliver real benefits to Indonesian rural industries and communities particularly in the area of animal health. The new generation vaccines and matching diagnostic tests developed by CSIRO could be of great importance in assisting with the total eradication of diseases. They are also concerned about the 'historically low state of preparedness for FMD detection and prevention."[5]

The Attachment from CSIRO Forestry and Forest Products highlights the fact that Indonesia is "planning to expand its plantation resource very significantly during the next two or three decades, which will require basic and applied research on all aspects of forest management, on methods of site selection and site-species matching, on silviculture, on forest utilisation and on many other topics."[6]

As well there are benefits for Australian scientists and hence for the Australian community if increased cooperation and collaborative research were to be initiated with Indonesia. Examples referred to by Mr Lyn Craven in Annex 6 include joint studies into surveying the phytochemistry of wild species of plants for novel compounds, "bioprospecting", which could lead to the discovery and development of valuable new drugs and other products.

Numerous other examples exist about how CSIRO can assist Indonesia in its development over the decades to come. However to enable this to happen CSIRO relies on the generous support of the Australian government's aid budget, implemented through ACIAR and AusAID.

CSIRO is currently examining the concept of developing a broad ranging strategic alliance with the Indonesian government to cover many areas over the longer term. At this stage this concept is still in its infancy and so no further information can be provided. However if this precedes it will undoubtedly lead to many new areas of potential partnership and collaboration with Indonesian government and private sector bodies.

10. Possible hindrances

Indonesia will have difficult times ahead given the problems that exist today. The economy that was just beginning to turn around is now experiencing a rapid downturn due to the Bali bombings. Donor countries, Australian included, are more likely to make funds available to areas outside the science and technology sphere. Indonesia itself will need to prioritise its limited funds for the development of the country and history teaches us that funds are not generally available for science and technology projects.

This is very short sighted as now more than ever Indonesia needs to be able to add value to their extensive resource rich country. The application of science and technology, together with human resource training will assist the country to start down this road. Indonesia needs to be able to

[5] ibid p 5
[6] A summary of Scientific Collaboration in Forestry between CSIRO Forestry and Forest Products and Forestry Agencies in Indonesia October 2002 p 1

replace its imports with locally sourced items. Recently introduced labour laws mean that Indonesia is no longer a country to source cheap labour and therefore industries are moving their factories elsewhere within the region where cheaper labour can be found. It is imperative that Indonesia joins the new economy.

The implications of regional autonomy in Indonesia are still being assessed. The staff within the various regions do not have the capacity to undertake what will be required of them unless further training is conducted. This will delay many of the projects traditionally conducted under the management of the Central Government. It also is having implications on funding of the research laboratories in the region. In some instances the resource rich districts may even establish their own research agencies in direct competition with the Central Government laboratories.

President Megawati Sukarnoputri has to seek re-election in 2004. As a consequence the everyday activities associated with the Government will start to slow down due to political lobbying. It has already commenced. As well, criticism of the President is becoming more vocal and with Indonesia's recent history 20 months is a long time to wait until the next election.

CSIRO has recently introduced a new co-investment policy that requires the Organisation to enter into projects when the activities are fully funded or, at the very least funded on a 50:50 basis. In some instances when we work with the Australian government agencies this does not apply and therefore we will need to carefully assess our involvement in the future.

Traditionally AusAID funds accessed under the GSLP scheme are 'one off' projects that provide seed funds. If anything develops as a result of the project, funds must be obtained elsewhere. In today's environment the sourcing of funds elsewhere is becoming more difficult.

11. In conclusion

As most people who will provide submissions to this Review will comment, it takes many years of interaction to develop long lasting friendships in Indonesia. The funds the Australian government has provided in the past through projects like those undertaken by CSIRO and also the scholarships provided since the Columbo Plan days are perfect illustrations of how Australian government funds can set the seed for future good relations. The seed takes time to germinate. Of the Indonesian participants in these activities, many hold extremely high appointments within their respective agencies, or Directors of major companies and they continue to maintain links with Australia.

Australia and CSIRO need to make more use of its alumni in Indonesia to continue to foster the bilateral relationship, for both aid and commercial purposes.

(Extract)

CSIRO International

Annual Report 2001

Indonesia

The economic and political situation in Indonesia remained uncertain during 2001, however with the appointment of a new President in late July, international confidence for a brighter and more stable future rose. Ministerial reshuffles and departmental structural changes stopped once President Megawati announced her new Ministry.

Throughout 2001 CSIRO's activities were maintained and, following on from the successful visit to Indonesia by several CSIRO Executive members in November 2000, new initiatives commenced. The CSIRO postdoctoral fellowship scheme that was introduced in 1999 came to an end in June 2001 and made way for a new LIPI CSIRO Award scheme. This new Scheme was introduced to maintain links with LIPI following the completion of a CSIRO managed World Bank project, the 'Management and Systems Strengthening Project', in June 2001.

A number of senior Indonesian officials visited CSIRO during the year including:

- Minister A Hikam, Minister for Research and Technology together with Dr Ashwin Sasongko, Vice-Chairman for BPPT (the Agency for the Assessment and Application of Technology)
- Dr Rokhmin Dahuri, the then Director General of Coastal and Small Island Affairs. (Note: Dr Dahuri was appointed Minister for Marine Affairs and Fisheries on his return to Indonesia)
- Minister Marzuki Usman, Minister for Forestry and Dr Wahjudi Wardojo, Director General of Forest Protection and Nature Conservation
- Dr Simon Sembering, Head of the Energy & Mineral Resources Research & Development Agency; Dr Lobo Balia, Director, R&D Centre for Mineral and Coal Technology; Mr Bambang Dwiyanto, Director, Geological Research and Development Centre; Dr Maizar Rahman, Director, R&D Centre for Oil & Gas; Dr Evita Legowo, Director, R&D Centre for Energy and Electricity Technology
- Dr Indroyono Soesilo, Chairman for the Marine Affairs and Fisheries Research Agency; Dr Safri Burhanuddin, Director for the Research Centre for Marine Territories and Non Living Resources; and Dr Edi Utomo, R&D Centre for Geotechnology, LIPI
- Dr Arjuno Brojonegoro, Secretary; Dr Lukman Hikam, Deputy Chairman for Scientific Services; Dr Syairul Aiman, Head Scientific & Technical Services Division, LIPI

CSIRO participated in the first Indonesia Australia Marine Resources Cooperation conference held in Jakarta in May 2001, a major event that brought together government and industry interests in the marine sector, to determine potential areas for future collaboration.

The majority of activities with Indonesia continue to be funded primarily through Australia government sources such as AusAID or ACIAR. During 2001 a new three yearly cycle of ACIAR funded projects commenced.

For the past five years Indonesia has been a priority country for the Organisation. CSIRO International continues to support Divisions in maintaining the relationship in several ways, including the maintenance of an internal e-mail list for exchange of news and

information, representing CSIRO on a number Intergovernmental committees relating to Indonesia and developing links with senior staff of Indonesian ministries.

IASSHA 2001

A major event that occurred during 2001 was the highly successful Indonesia Australia Search for Submarine Hydrothermal Activity (IASSHA-2001) expedition. The objective of this activity, funded under AusAID's Government Sector Linkage Program, was to create within Indonesia an advanced capability to employ its *Baruna Jaya* fleet for locating and assessing polymetallic sulfide mineral deposits in Indonesian territorial waters, in order to encourage more detailed exploration and potential exploitation by private enterprise. IASSHA 2001 was conducted on the LIPI research vessel *Baruna Jaya VIII* during June 2001. The vessel departed from and returned to Jakarta, and visited two areas in northeastern Sulawesi. Seven Australians (four from CSIRO) and 28 Indonesian scientists and technicians took part in one or both legs of the expedition. The Indonesian scientists, from LIPI, the Ministry of Marine Affairs and Fisheries, the Marine Geology Institute (Bandung) and several Indonesian universities, received intensive training in shipboard procedures and operations. The ship's officers and crew also gained experience in new kinds of activities. Several items of minor equipment were also contributed to the vessel's inventory.

The expedition was followed up in November with visits to CSIRO Exploration and Mining by two teams of Indonesian scientists who undertook training in processing the data they obtained during the cruise. During the training period, a senior delegation, headed by Dr Indroyono Soesilo, Chairman of the Marine and Fisheries Research Agency, also visited to review the success of IASSHA and to discuss further collaborative activities in the field of submarine hydrothermal research.

Management and Systems Strengthening – LIPI Project

CSIRO's largest undertaking in Indonesia, the Management and Systems Strengthening Project at the Indonesian Institute of Sciences (LIPI), concluded in June 2001. The World Bank Project was critical to the long-term existence of LIPI. It was designed to bring LIPI's business relationships and management processes into the 21st century. At the end of the Project it was believed that LIPI had the tools and know-how to be the major research agency in Indonesia – for both the private and public sectors.

Over the lifetime of the Project 47 LIPI staff graduated from the internal Leadership Development Program providing them with a LIPI-wide view, something that had not been known previously. Many of these graduates are now members of the LIPI Executive and Directors of LIPI's research centres. LIPI is planning to conduct a similar Leadership Development Program in 2002 and will open places to staff of other Indonesian research agencies.

CSIRO expertise assisted LIPI to develop an integrated business development plan. As well the Project provided hands on training in the drafting of patents by using personnel from the Indonesian Patent office and also the CSIRO patent attorney. The new Centre for Innovation that has been established by LIPI will continue this work.

As a result of the Project the LIPI senior management became fully committed to LIPI becoming a fully computerised organisation. However this was not achieved in practical

terms by June 2001. There is every indication that the new managers in charge of this aspect of the work are making significant progress.

In its final assessment of the Project, the World Bank Review Team noted with satisfaction the overall progress made by LIPI, which they noted as a result of the 'good continuity and commitment as well as a good change management with proactive strategies'.

CSIRO LIPI Awards

As indicated last year, CSIRO agreed to maintain its close relationship with LIPI for a further five-year period, through the provision of a CSIRO LIPI study award scheme. This scheme will enable LIPI staff to study and/or carry out research jointly with CSIRO in Australia, or CSIRO staff to spend time working alongside LIPI research or management staff in Indonesia.

A joint selection committee comprising senior staff in CSIRO and LIPI was set up and in July 2001 nine awards were announced for the 2001/2002 financial year. These awards have led to collaboration with CSIRO Manufacturing Science & Technology; CSIRO Information Management, Plant Industry; and CSIRO Head Office. A further call for proposals will be made in early 2002 for the next year's selection.

Government Sector Linkages Program

During 2001 CSIRO was again successful in being awarded $A84 440 under the AusAID Government Sector Linkages Program for the project to 'Expand Indonesia's capability to assess its sea-floor mineral resources', conducted by CSIRO Exploration and Mining with the Ministry of Marine Affairs and Fisheries, the Directorate General for Geology and Mineral Resources, LIPI and several universities. (IASSHA)

Proposal for the next GSLP round were submitted to AusAID in late November 2001 and a decision is expected early in 2002.

Australia Indonesia Ministerial Working Groups

The last Australia Indonesia Ministerial Forum (AIMF) was conducted in Canberra during December 2000. At that time a number of the Working Groups, established under the AIMF process, met. CSIRO participates, formally or informally, in a number of these Groups including:

- COSTAI (Working group on S&T)
- Agriculture and Food Cooperation
- Environment

During the AIMF it was agreed that consideration be given to establishing a Working Group on Marine Affairs and during 2001, this Working Group was formally established. As well, during a visit by the Indonesian Minister for Forestry to CSIRO Forestry and Forest Products in mid 2001, he indicated that he had discussed the possibility of establishing a Working Group on Forestry with his Australian counterpart. With the

changes in both the Indonesian and Australian Ministers since that time, no further information has been received about this possibility.

Australia Indonesia Business Council (AIBC)

CSIRO has been an active member of the ACT Branch of the AIBC and currently chairs the Branch. Through this involvement CSIRO staff have had a number of opportunities to meet with senior Indonesian representatives that would not normally have been possible.

Postdoctoral Fellowships Scheme

As indicated earlier the Scheme established in 1999 came to an end in mid 2001. During the reporting period a further three postdoctoral fellows undertook training at CSIRO Exploration and Mining and CSIRO Petroleum. Over the lifetime of the activity a total of 10 fellows participated in the scheme.

ATTACHMENT 2

A Summary of Scientific Collaboration in Forestry between CSIRO Forestry and Forest Products and Forestry Agencies in INDONESIA

CSIRO Forestry and Forest Products

Revised Oct 2002

A Summary of Scientific Collaboration in Forestry between CSIRO Forestry and Forest Products and Forestry Agencies in INDONESIA[7]

1. INTRODUCTION

Scientific collaboration between Indonesia and Australia has taken many forms in many fields over recent years. Some of the most satisfying and fruitful relationships have been developed between CSIRO Forestry and Forest Products and various agencies in Indonesia. Some of the ways in which these relationships have been nurtured are described in this brief review.

In the future these relationships must be further strengthened for the mutual benefit of both Indonesia and Australia. There are many research and development topics in forestry which can be explored together, with the background and experience gained during past collaborative work. In particular, Indonesia is planning to expand its plantation resource very significantly during the next two or three decades, which will require basic and applied research on all aspects of forest management, on methods of site selection and site-species matching, on silviculture, on forest utilisation and on many other topics. Many of the plantations will be of *Acacia mangium*, which grows naturally in both Indonesia and Australia. CSIRO Forestry and Forest Products has developed considerable expertise in the domestication and management of this important species, and is well placed to continue its collaborative research on this, and other genera and species, which have shown considerable promise for productive plantations.

2. GOVERNMENT TO GOVERNMENT LINKAGES

Some of the collaboration between the two countries has been undertaken within the framework of several formal protocols, but there have also been many informal relationships between individual scientists.

A Record of Discussion on scientific and technological cooperation between the Indonesian Institute of Science (LIPI) and CSIRO was signed on 3 June 1993, in which it was agreed that LIPI and CSIRO would work together on topics of mutual interest.

An Agreement between the two Governments for cooperation in scientific research and technological development was signed in Canberra on 24 August 1994.

The Indonesian Ministry of Forestry and CSIRO signed an MOU concerning forestry and forest products research in the presence of the then Indonesian Minister of Forestry Ir Djamaludin Suryohadikusumo at Parliament House on Wednesday 30 October 1996. Mr Peter McGauran, the Australian Minister for Science and Technology at that time also witnessed the signing of the MOU. This Memorandum of Understanding suggests three main fields of research cooperation:

- Scientific research on the tree genera shared by both countries;
- Scientific research on sustained productivity of repeatedly cropped forest plantations;
- Scientific research relating to forest products and related technologies;

A Committee on Science and Technology, Australia, Indonesia (COSTAI) has been established and has funded several projects, especially on improving the production of cajuput oil from *Melaleuca cajuputi*.

Under the Memorandum of Understanding on Cooperation in Education and Training between Indonesia and Australia about 200 scholarships are offered to Indonesians to study in Australia under the Scholarship Training Award Scheme. In 1996 forestry has been emphasised in the award of these Scholarships.

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[7] Compiled by Kron Aken 1995. Updated August 1997, Sept 1998, May 2000, June 2001.

3. FORMAL AND INFORMAL VISITS

There have been numerous formal and informal visits of scientists from Indonesia and Australia to each other's countries. In June 1994 the Chief of CSIRO Forestry and Forest Products visited Indonesia to assess forestry practices, and prospects for furthering links with FORDA, LIPI and other research organisations. Other Australian forest scientists have visited Indonesia, sometimes under the "Seeds of Australian Trees" project advisory visit program. The Centre for International Forestry Research (CIFOR) is based at Bogor in Indonesia and among the staff are several Australians with considerable experience in forestry research in both countries. The results of past research are now starting to be utilised by Indonesian forestry companies which are undertaking massive investments in forest plantations, and this is stimulating recent visits of scientists to Indonesia and plans for further research.

4. TRAINING

Indonesia has been a major recipient of training under consecutive "Seeds of Australian Trees" projects, and other research projects sponsored by the Australian Centre for International Agricultural Research (ACIAR). Training programs have included training in tree seed technology, tree breeding and tree improvement, database management and experimental design and analysis. Several Indonesian scientists have been attached for lengthy periods to the Australian Tree Seed Centre (ATSC) for professional development, and many have participated in workshops and conferences in both Indonesia and Australia. In March 1997, the Australian Tree Seed Centre organised a two-week course in Yogyakarta to teach about experimental analysis and design. Three CSIRO resource people went to Indonesia to conduct the course.

Several postgraduate scholarships have been awarded to scientists from the Forest Research and Development Centre in Indonesia. Two staff members from the LIPI Research and Development Centre for Biotechnology have been trained in database management and tree seed technology at the ATSC.

In Sept 1999, ATSC organised a two study tours for the Indonesian Forest Tree Seed project to look at tree seed technology and tree improvement activities in Australia. The senior-level officers visited Canberra, Melbourne and Mount Gambier, while the mid-level officers visited Canberra, Deniliquin, Gympie and Cardwell.

Appendix 1 includes the names of training programs, and the recipients of training, in 17 programs undertaken between 1986 and 2001.

5. SEED COLLECTION AND DISTRIBUTION

Many species in the genera *Eucalyptus, Acacia, Melaleuca* and *Casuarina* are endemic to both Indonesia and Australia. Research on these species has to sample the whole geographical range of occurrence, and numerous seed collecting trips have been jointly undertaken by CSIRO and the Indonesian Forestry Department. The seed collected has been shared equally between them. There have been seven major collecting trips between 1963 and 1995, in Timor, Adonara, Flores, Alor, Pantar, Wetar, Ambon, Aru, Buru, Ceram, Kai and Tanimbar. These have provided materials and data for more than twenty scientific publications, and have made valuable additions to the seed collections held in both countries. The seed has been used for further research on the characteristics of the species, and for establishing commercial plantations.

Indonesia received a lot of seed from Australia. For example in the period 1 July 1988 to 30 June 98, a total of 6,287 consignments of tree seeds comprising 834 seedlots from 99 species were sent to over 59 organisations in Indonesia. Because access to high quality seed is

frequently a serious constraint to establishing highly productive plantations of *Acacia mangium*, the Australian Agency for International Development (AusAID) has supported the supply of 100 kg of seed worth A$90,000 from several selected provenances in Papua New Guinea and Northern Australia to the Indonesian Agency for Forest Research and Development. About 20 Government and private industry research stations received equal quantities of each seedlot, which is being used to build genetically broadly-based populations of this species for future selection and tree improvement. The ATSC has provided technical assistance on establishment of seed production areas, so that in due course Indonesian forestry companies will become self-sufficient in seed for new plantations.

6. RESEARCH PROJECTS

There have been numerous collaborative research projects by Indonesian and Australian forest scientists. Some of these are described below.

6.1 Screening of DNA markers in Acacia mangium

An Indonesian Post-Doctoral Fellow, Dr. Anto Rimbawanto, from the Forest Tree Improvement Research and Development Institute at Yogyakarta was attached to the Molecular Biology Laboratory at CSIRO Forestry and Forest Products to assist with the development of molecular markers in the *Acacia mangium* genome. Over 200 RFLP markers have been characterised and a subset of 40 markers used to compare the level of genetic diversity in natural populations of *A. mangium* with that in the Subanjeriji seed orchard. Seedlings from this seed orchard have shown consistently poor performance in plantations. Only two thirds of the variation detected in the natural populations was represented in the seed orchard. There was also evidence of inbreeding associated with the establishment of the breeding population from a narrow genetic base. Results from the study have led to improvements in breeding programs in Indonesia focussing on the inclusion of material from populations in New Guinea. These populations had the highest level of genetic diversity and the highest growth rates in plantations.

The RFLP markers are now being used to construct a genetic linkage map for *Acacia mangium*. Markers can then be located which are linked to quantitative traits such wood density and disease resistance. This will allow selection at the nursery stage, improving the efficiency of tree breeding programs.

Miss Instaina from Forest Tree Improvement Research and Development Institute at Yogyakarta was attached to the Divisional molecular genetics laboratory for three weeks in June 2001 to learn about micro-satellite analysis of *Acacia mangium* using the ABI310 DNA fragment machine.

6.2 Analysis of Indonesia's climate to predict tree performance

Reliable climatic data are essential for evaluating the suitability of land for alternative uses such as agriculture, horticulture, forestry and conservation. A collaborative project, funded by AusAID and undertaken by CSIRO Forestry and Forest Products and the Institut Pertanian Bogor, prepared a climatic database for Indonesia from 234 temperature and 970 precipitation recording stations. The data was analysed using the ANUSPLIN computer program to develop relationships for interpolating monthly mean values of maximum and minimum temperatures, and precipitation. Latitude, longitude and altitude for 26,000 locations in Indonesia were derived from a digital terrain model. The project developed two mapping programs (INDOZONE and INDO) to analyse the databases and to identify areas climatically suitable for particular species. A Workshop attended by 80 Indonesian forest scientists was held at Bogor to demonstrate the use

of the techniques, together with another CSIRO program (PLANTGRO) which uses soil and climatic data to predict plant growth. The proceedings were published as "Evaluation of Climatic and Soil Data for Agriculture, Forestry and Conservation".

6.3 *Improving tree productivity for environmental conservation in South-East Asia*

This project, which was sponsored by AusAID and undertaken with the collaboration of the Agency for Research and Development in Indonesia and the Western Australian Department of Conservation and Land Management, established trials to demonstrate the use of Australian dry zone Acacias for land rehabilitation, food and wood production in dry zones on Nusa Tenggara Timor. Trials were established on two sites. *Acacia ampliceps* was the best performer on an alkaline clay Pellusturt soil, while *A. holosericea* performed best on a red loam Rhodostalf. Inoculation with selected strains of Rhizobium in the nursery produced a substantial increase in growth rate of several acacia species on the first, but not the second, soil type. A full report of the trial is published in a paper by Setiadi, D., McKinnell, F.H., Harwood, C.E., Dart, P. (1998). Survival and growth of Australian Acacia species and their response to Rhizobium inoculation in field trials on two contrasting soil types in Nusa Tengara Timor, Indonesia. Forest, Farm and Community Tree Research Reports 2, 29-34.

6.4 *Multipurpose tree and sandalwood silviculture in East Indonesia*

The aim of this project, which is managed by the Department of Conservation and Land Management in Western Australia, is to study the use of multipurpose tree species to develop more robust farming systems in Nusa Tenggara Timor, East Indonesia. ATSC was involved in the collection and supply of tree seed, and provided technical assistance. Twenty five species with fodder and fuelwood potential were planted in trials which, among other results, have demonstrated the excellent growth of *Eucalyptus tereticornis, E. camaldulensis, Acacia crassicarpa, A. auriculiformis, A. ampliceps,* and *A. holosericea* under the difficult climatic conditions in the region.

6.5 *Improved management for honey production and pollination of tropical forests by bees in Indonesia*

In Indonesia, *Eucalyptus* and *Acacia* seed orchards are being established to provide a reliable source of genetically improved seed for reforestation. Yield of seed from some orchards has been low and a lack of appropriate pollinators has been suggested as a possible cause. CSIRO Forestry and Forest Products carried out a project in Indonesia to determine the causes of the limited seed production. The study found that the number of seeds formed per capsule through natural open pollination was low in relation to the number of ovules in the flower. Controlled pollination generally increased the number of seeds per capsule, indicating that the amount of pollen reaching the stigma under open pollination may be a limiting factor in seed production. Placing hives in seed production areas increased seed quantity and quality (outcrossing rate) at the same time producing useful amounts of honey.

6.6 *Studies on fungal pathogens of tropical Acacias*

A series of collaborative studies by CSIRO Forestry and Forest Products the Indonesian Agency for Forest Research and Development (FORDA) with support from ACIAR and CIFOR is assessing the impact of diseases on plantations of tropical acacias. These

species are being widely used for establishing very large areas of plantations in several South-East Asian countries, and their present and potential economic importance is therefore considerable. Future productivity of acacia plantations is likely to be affected by fungal diseases including leaf rust, shoot blights, stem cankers, heart rot, and root rots. During 1995-97, the Division coordinated an international project undertaken by forest pathologists to survey diseases in native stands, research trials, and operational and social forestry plantings of tropical acacias in Indonesia and four other participating countries. In April 28-May 3 1996, the project scientists presented their results at a workshop held at the Base Camp of PT Musi Hutan Persada, Subanjeriji in Southern Sumatra. The proceedings of this meeting entitled 'Diseases of Tropical Acacias' was been published by CIFOR in 1997. Further surveys were carried out with staff of FORDA in Sumatra and Kalimantan. The current knowledge of diseases of tropical acacias in SE Asia has been collated by staff of CSIRO, the Forest Research Institute of Malaysia and the Kerala Forest Research Institute India and has been published recently as *A Manual of Diseases of tropical Acacias in Australia, South-East Asia and India.*

A new ACIAR project commenced January 2001 to examine the causes and consequences of stem infection of acacias (especially *Acacia mangium*) by decay fungi. The project will assess whether this problem can be minimised selection of species, hybrids or provenances with improved form and enhanced resistance to invasion by heart rot fungi. The commissioned organisation is the University of Tasmania, with CSIRO Forestry and Forest Products as the main Australian collaborating organisation.

6.7 Studies on shared flora

Indonesia and Australia share a tree flora that has considerable national, regional and international significance. Species of *Acacia, Eucalyptus, Melaleuca* and *Casuarina* occur in both Northern Australia and the eastern islands of Indonesia. Scientists from both countries are involved in a range of studies of the occurrence, productivity and management of these species. The project includes collaborative seed collections from *Eucalyptus urophylla* and *Melaleuca cajuputi.*

6.8 Establishment of base breeding populations of Melaleuca cajuputi for production of cajuput oil

The extraction of essential oils from *Melaleuca cajuputi* is a very important industry in Indonesia. Demand for oil exceeds supply, but the industry faces problems from the use of seed which produces low yields. The aim of this project, which is presently funded by AusAID under a Government Sector Linkages Program (July 1997 to Dec 1998), is to select and breed *M. cajuputi* to produce seed lines and cultivars with improved oil qualities and oil yielding capacities. The project has previously received support from Collaboration on Science and Technology Australia–Indonesia (COSTAI). The aims of the project are :

1. collect seed and leaf samples from trees in natural and planted populations of *M. cajuputi* in Indonesia and Australia;
2. screen these trees for foliar oil concentration and quality;
3. prepare a breeding strategy for improving oil quality and yields;
4. establish progeny trials/breeding populations which will later be converted to seed orchards; and
5. develop protocols for vegetative propagation of *M. cajuputi.*

Related to this project, and with funding from Crawford Fund, an Indonesian scientist Mr Mudji Susanto visited the Division to learn about essential oil extraction and trial data analysis using DataPlus and Genstat.

6.9 CIFOR-Management of Productivity of tropical Plantations Forests.

Dr Sadanandan Nambiar is a scientific advisor to this international network project sponsored by CIFOR in collaboration and partnership with several national organisations in nine countries. The scientific foundation of this work is based on long term research by CSIRO in Australia and USDA Forest Services.

Dr Nambiar has been directly assisting Indonesian partners since 1996 in planning, implementing and reviewing comprehensive studies in Sumatra. These studies are sponsored by two major Indonesian forest companies Riau Andalan Pulp and Paper, and PT Musi Hutan Presada who manage large scale plantations. The projects are focused on short rotation *Acacia mangium*. The project aims to provide guidelines for sustainable management based on a sound scientific understanding of the soil resource factors which underpin productivity and how different management practices influence site productivity. On going interaction with forest managers and application of results operationally are important considerations. This international project is providing a unique opportunity for Indonesia to share the knowledge and experience with international partners.

Appendix 1. Training programs provided to Indonesia

1. Training in Tree Seed Technology 10 Feb to 2 May 1986

Mr Kusmintardjo
Balai Teknoloji Perbenihan
Direktorat Jeneral Reboisasi dan
Rehabilitasi Lahan
P O Box 6
Bogor
INDONESIA

Mr Atok Subiakto
Forest Research and Development
Centre
Agency for Research and Development
P O Box 66
Bogor
INDONESIA

2. Training in Tree Seed Technology 30 Aug to 31 Oct 1989

Mr Sudirman
Balai Teknoloji Perbenihan
Direktorat Jeneral Reboisasi dan
Rehabilitasi Lahan
P O Box 6
Bogor
INDONESIA

Mrs Sukaesih Pradjadinata
Forest Research and Development
Centre
Agency for Research and Development
P O Box 66
Bogor
INDONESIA

3. IUFRO Seed Problems Symposium, Gympie, Qld, Australia 19 August to 31 August 1989

Mr Masano
Forest Research and Development
Centre
Agency for Research and Development
Jln Gunung Batu
P O Box 66 Bogor
INDONESIA

Mr Dayanto Indro Utomo
Balai Teknoloji Perbenihan
Direktorat Jeneral Reboisasi dan
Rehabilitasi Lahan
P O Box 6 Bogor
INDONESIA

4. Seed Radiography Workshop, Canberra 1 to 7 September 1989

Mr Masano
Forest Research and Development
Centre
Agency for Research and Development
Jln Gunung Batu
P O Box 66 Bogor
INDONESIA

Mr Dayanto Indro Utomo
Balai Teknoloji Perbenihan
Direktorat Jeneral Reboisasi dan
Rehabilitasi Lahan
P O Box 6 Bogor
INDONESIA

Mr Sudirman
Balai Teknoloji Perbenihan
Direktorat Jeneral Reboisasi dan
Rehabilitasi Lahan
P O Box 6
Bogor
INDONESIA

Mrs Sukaesih Pradjadinata
Forest Research and Development
Centre
Agency for Research and Development
P O Box 66
Bogor
INDONESIA

5. Training in Tree Seed Technology 14 October to 5 Dec 1991

Ahnaf Arfah
Perum Perhutani Unit 1
Jawa Tengah
Jl. Pahlawan 151 Semarang
INDONESIA

Mohammad Muslich Sophie
Jl. Gatot Subroto
Senayan
Jakarta Pusat
INDONESIA

6. Workshop on Hybridisation and Vegetative Propagation of Australian Tropical Acacias. Tawau Sabah, Malaysia July 1-4 1992

Mr Wong Ching Yong
P T Indah Kiat Pulp & Paper Corporation
P O Box 75
Pekanbaru
INDONESIA

Mr. Anto Rimbawanto
Forest Tree Improvement Research and Development Institute
Jln. Palagan Tentera Pelajar Km 15
Purwobinangun
Jogyakarta 55582
INDONESIA

7. Tree Breeding Course Gympie and Study Tour of North Queensland 22 June to 17 July 1993

Mr. Tjuk Sasmito Hadi
Reforestation and Natural Forest Management Project
c/o Balai Teknologi Reboisasi
Jl. Sei Ulin 28B
Banjarbaru 70711
Kalimantan Selatan
INDONESIA

Mr. Anto Rimbawanto
Forest Tree Improvement Research and Development Institute
Agency for Forestry Research and Development
Ministry of Forestry
Jln. Palagan Tentera Pelajar Km 15
Purwobinangun
Jogyakarta 55582
INDONESIA

8. Post-doctoral attachment with CSIRO DNA Laboratory, April-Dec 1993

Mr. Anto Rimbawanto
Forest Tree Improvement Research and Development Institute
Agency for Forestry Research and Development
Ministry of Forestry
Jln. Palagan Tentera Pelajar Km 15
Purwobinangun
Jogjakarta 55582
INDONESIA

9. Training in Computerised Database Maintenance, 28 March to 22 April 1994

Mr. Endi Rochandi Rasmadi
Research & Development Centre for Biotechnology
Indonesian Institute of Sciences
Jalan Raya Bogor KM 46
Cibinong, Bogor 16911
INDONESIA

10. Forest Tree Improvement Course Gympie and Study Tour of North Queensland, 24 April to 18 May 1995

Mr. Budi Leksono
Forest Tree Improvement Research and Development Institute
Agency for Forestry Research and Development
Ministry of Forestry
Jln. Palagan Tentera Pelajar Km 15
Purwobinangun
Jogjakarta 55582
INDONESIA

11. Visiting Scientist Program, 13 April to 29 December 1995

Mr. Novizar Nazir
Faculty of Agriculture
Andalas University Padang
Kampung Limau Manis
Padang 25163
INDONESIA

12. Professional Attachment Program, 17 Sept to 18 Oct 1995

Dr. Eko B. Hardiyanto
Faculty of Forestry
Gadjah Mada University
Bulaksumur Yogyakarta 55281
INDONESIA

13. FRIM-CSIRO Short Course in Experimental Design and Analysis for Forest Tree Improvement, Kuala Lumpur, Malaysia, 15-20 April, 1996

Mr. Catur Dian Mirzada
PT. Indah Kiat Pulp & Paper
Jl. Tenku Umar 5/A
Pekanbaru – Riau
INDONESIA

Mr. Sri Danarto
Faculty of Forestry
Gadjah Mada University
Bulaksumur-Yogyakarta 55281
INDONESIA

Mrs. Suswati
PT. Wirakarya Sakti
Jl. Ir. H. Juanda No. 14
Jambi
INDONESIA

14. Training in Tree Seed Technology, 6 April to 28June, 1996

Miss Syamsidah Rahmawati
Research & Development Centre for Biotechnology
Indonesian Institute of Sciences – LIPI
Jalan Raya Bogor Km 46
Cibinong, Bogor 16911
INDONESIA

15. Visiting Scientist Program, 8 October to 22 November 1996

Mr. Happy Tarumadevyanto
Faculty of Forestry
Department of Forest Product Technology
Bogor Agricultural University
Dramaga
Bogor
INDONESIA

16. Training course in Statistical Considerations in the Production of High Quality Seed from Planted Trees. Yogyakarta, Indonesia, 9-20 March 1997

Mr. Agung Nugroho
PT Indah Kiat
Jl. Teuku Umar 51A-
Pekan Baru
Riau 28141
INDONESIA

Mr. Arif Nirsatmanto
Balai Litbang Pemuliaan Benih
Tanaman Hutan (FTIRDI)
Jl. Palangan Tentera Pelajar
KM15 Purwobinangun
Pakem-Yogyakarta
INDONESIA

Mr. Budiadi
Faculty of Forestry
Gadjah Mada University
Yogyakarta
INDONESIA

Ms. Eny Faridah
Faculty of Forestry
Gadjah Mada University
Yogyakarta
INDONESIA

Mr. Herry Rachmat Isneni
PT ITCI Hutani Manunggal
Jl. Maqrkoni No. 56
P O Box 638
Balikpapan –Kaltim
INDONESIA

Mr. Jurianto
PT Wirakarya Sakti
Jl. H. Juando No. 14
Jambi
INDONESIA

Ms. Linda Manurung
PT Tanjung Redep Hutanii
Jl. SA. Maulana No. 267
Berau
Kalimantan Timur
INDONESIA

Mr. M. Agusriana
PT Surya Hutani Jaya
Tromol Pos 801
Samarinda
Kalimantan
INDONESIA

Mr. Mujahid
PT Inhutani I
Jl. Jend Sudirman No. 30
Balikpapan
Kalimantan
INDONESIA

Mr. Susilo Budi Wacono
Perum Perhutani Unit 1 Jawa tengah
Jl. Laksda Yos Sudarso no. 13
Salatiga 50711
INDONESIA

Mr. Sutrisno
Perum Perhutani
Jl. Argulobang No. 9 Baciro
Yogyakarta
INDONESIA

Mr. Syarifuddin
PT Musi Hutan Persada
Jl. Basuki Rakhmat 98
Palembang
INDONESIA

Mr. Widagda
PT Inhutani III
Jl. Sie Salak Km 28. Landasan Ulin
Banjarbaru- Kalimantan Selatan
INDONESIA

Ms. Zairina Tampubolon
Perum Perhutani
Gd. Manggala Wanabakti Blok VII Lt. 8-11
Jakarta
INDONESIA

17. Professional Attachment program to study diseases of tropical acacia and eucalypts, 15 March-14 May 1997

Dr. Erdy Santoso
Forest And Nature Conservation Research And Development Centre
Agency for Forestry Research and Development
Jln. Gunung Batu No 5
Bogor 16610,
INDONESIA

18 Indonesian Forest Seed Project study tour to Australia Sept 1999

Senior-level officers group

Mr. Harsono, Director General Land Rehabilitation and Social Forestry (DGLRSF), Ministry of Forestry and Estate Crops (MOFEC).
Mr. Sayhrir, Director of Forest Tree Seed (DFTS), DGLRSF, MOFEC.
Mr. Siswanto, Director of Social Forestry, DGLRSF, MOFEC.
Mr. Setyono, Head of Regional Forestry Service, S. Kalimantan, MOFEC.
Mr. Much. Toha, APHI (Association of Indonesian Forest Concessions)
Dr. Soren Moestrup, Chief Technical Adviser, Indonesian Forest Seed

Mid-level technical group

Mr. Suharisno, Head of Sub Directorate of Seed, DFTS.
Mr. Eka Widodo Sugiri, Head of Sub Directorate of Nursery, DFTS.
Mr. Suroto, Head of Regional Tree Seed Centre, S. Sumatra, DFTS.
Mr. Harijoko, Head of Regional Tree Seed Centre, Bali, DFTS.
Mr. Wartam, Head of Regional Tree Seed Centre, Maluku, DFTS.
Mr. Joni Siswandi, Head of Section, Reg. Tree Seed Centre, W. Java, DFTS.
Mr. Agus Supriyanto, Head of Section, Reg. Tree Seed Centre, S. Kalimantan, DFTS.
Mr. Djoko, Iriantono, Tree Seed Technology Centre, Bogor.
Mr. Muji Susanto, Tree Improvement Centre, Yogyakarta.
Mr. Maman Lukmanul Hakim, APHI (Association of Indonesian Forest Concessions).
Mr. Hidayat Salim, APHI (Association of Indonesian Forest Concessions)
Mr. Bambang Priyono, Manager, IFSP.
Mr. Fransiskus Harum, Liaison Officer, IFSP.
Mr. Elmer B. Lauridsen, Technical Adviser, IFSP.

19 Training in essential oil extraction and trial data analysis, Feb 2001

Mr Mudji Susanto
Balai Litbang Pemuliaan Benih Tanaman Hutan (FTIRDI)
Jl. Palangan Tentera Pelajar
KM15 Purwobinangun
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INDONESIA

20 Training in micro-satellite analysis of Acacia mangium using the ABI310 DNA fragment machine, June 2001 and June 2002.

Miss Istiana
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CSIRO Livestock Industries

Input to CSIRO submission to *Review of Australia's Relations with Indonesia*

Introduction

Australia has a long history of collaboration with Indonesia in the fields of animal health and animal production, dating back to the 1970's with the Research Institute for Animal Production (BPT) project, (Ciawi, Java) and assistance provided to eradicate foot and mouth disease (FMD) virus from Indonesia. Since that time Australian involvement has continued with a number of projects aimed at developing Indonesian research management, research planning and technical laboratory capabilities, providing essential equipment, and training scientific and technical staff. Many of these projects were initiated under the auspices of AusAid and more recently have been supported through ACIAR. AFFA is also a major supporter of Australian projects in Indonesia.

The Current Situation

CSIRO Livestock Industries (CLI) currently has a range of collaborative projects with Indonesian research institutions in animal health, parasitology, aquaculture, and animal nutrition. We believe that all of these activities have been and continue to be highly beneficial not only to Indonesia, but also to Australia in terms of establishing positive relationships with our northern neighbour as well as extending scientific skills and ensuring preparedness for exotic animal disease threats. As an example, the eradication of FMD in Indonesia created a buffer zone between northern Australia and mainland Asia where FMD is endemic. Indonesia has in turn benefited through a decrease in losses to animal production and through international trade recognition of its 'free' status.

Collaboration with Indonesian institutions is a key strategy in Australia's quarantine and animal health programs and CLI is involved in projects in Indonesia (notably in Java, Bali, Irian Jaya and West Timor) in conjunction with AFFA, ACIAR, Biosecurity Australia, and AQIS (through the North Australia Quarantine Strategy (NAQS).

Australia has a much-envied disease-free status, the preservation of which has major implications for our export trade position and 'clean-green' image internationally. Indonesia, as our immediate northern neighbour, is key to maintaining this position as it is the most likely source of accidental or potentially deliberate incursions, through import of animals or food products, of significant animal diseases such classical swine fever and infectious bursal disease of poultry. A possible incursion of zoonotic diseases capable of leaping the species barrier cannot be discounted, and would have significant implications for public health networks in Australia

The view that improved animal health status in Indonesia is beneficial to Australia's interests has been formally recognised since the Quarantine Review Committee (Chair Professor David Lindsay) recommended off-shore surveillance and prevention activities, resulting in the formation of NAQS. This led in turn to early NAQS programs in eastern Indonesia and PNG and the start of Australian/Indonesian collaboration in disease surveillance on a regular basis. The Nairn review of quarantine and of NAQS (1996) endorsed this approach. Australia continues to strengthen programs through NAQS in East Indonesia, PNG, and Northern Australia with a particular onshore focus on the port of Darwin. NAQS through AFFA has sponsored a number of activities in which CLI has been directly involved, including training in OIE List 'A' disease recognition and provision of diagnostic services and technology transfer to regional laboratories in Denpasar and Maros (South Sulawesi) in support of NAQS field surveys.

Both CLI and CSIRO Entomology have involvement in pre-border surveillance, research and training of Indonesian nationals to maximise Australia's knowledge of pests and diseases in our region and to identify high probability pathways for incursion. CLI specifically has capabilities in:

- Enhancing resistance to exotic pests and diseases of humans, animals and plants, through vaccination and development and deployments of resistant animals
- Developing new vaccines to prevent exotic animal disease
- Training skills for technology transfer to Indonesian veterinarians
- Use of new/enhanced technologies in disease diagnosis (eg genetic markers, geographic information systems, array and PCR technologies)

Current or recently completed animal health research and technology transfer projects have been targeted at

- Technology transfer for Nipah virus laboratory testing (under the GSLP scheme)
- Transfer of laboratory test capability for duck virus enteritis
- Viral diseases of farmed prawns in aquatic production systems (multi-country project, including Indonesia)
- Field studies for the use of sentinel animals for surveillance for Japanese Encephalitis

We continue to maintain close links with Indonesia. During the past 12 months, at least 16 CLI scientists have visited Indonesia on a number of occasions to carry out assessment and technology transfer activities across a range of areas and geographic locations and have contributed as plenary/invited speakers at 3 national meetings.

A key strategy, and an important benefit of collaborative efforts, has been the growth over the years of a cadre of Indonesian scientists with post-graduate training from Australian institutions. These people are not only based in laboratories, but also hold positions in the central government, provincial governments and provincial field services. As a direct result, Australian agencies have enjoyed strengthening relationships with, and ease of access to, Indonesian agencies in the various levels of government.

More detailed examples of three (3) current CLI projects in avian health, parasite control, and animal nutrition are included below, together with an assessment of benefits derived for both Indonesia and Australia.

Avian Virology

The Avian Virology Project has been in existence for three (3) years and represents a collaboration between CLI's Australian Animal Health Laboratory and the Veterinary Research Institute, Bogor, funded initially through AusAid and currently by ACIAR. It focuses on the epidemiology of infectious bursal disease virus (vvIBDV), an economically important disease of chickens, and aims to develop cheap and effective vaccines for control of the disease.

Benefits to Indonesia and Australia

The disease is widespread in Indonesia and causes significant economic losses to the Indonesian poultry industry. Small poultry producers, the most important source of meat for the indigent population, suffer significant (ca 25%) mortality rates annually due to the disease. Large commercial companies, a major part of the industry sector, may utilise vaccines that are often imported, with a consequent foreign currency drain, and thus often too expensive for regular use.

Australia is one of very few countries with a vvIBDV disease-free status. Incursion of the virus would have a devastating effect on the sustainability and profitability of the local poultry industry and likely result in a weakened position in defending our current restrictions on the importation of poultry meat and products. As vvIBDV are endemic in Indonesia, this work has allowed a full assessment of the nature of the threat to Australian industry, and to develop appropriate diagnostic tests and strategies for dealing with an incursion should one ever occur.

Sustainable Endoparasite Control for Small Ruminants in Southeast Asia
This work is a collaboration between CLI's FD McMaster Laboratory, Armidale, and the Research Institute for Animal Production (Balitnak) Indonesia and Research Institute for Veterinary Science (Balitvet) Indonesia. A number of research institutions in the Philippines and Malaysia are also involved. The major goal of this work is to prevent the spread of resistance to anthelmintics used for control of nematode parasites of sheep and goats in smallholder environments.

Benefits to Indonesia and Australia
A CSIRO-developed, Australian-commercialised assay has been effective in assessing the level of resistance in local small ruminant studies. It is proposed to extend studies to markets and abattoirs, testing a range of broad-spectrum dewormers for effectiveness. This will determine the current extent of resistance in high pressure sites in Indonesia and lead to increased capacity to control the spread of resistance elsewhere in the country.

This work is contributing directly to increased capability to diagnose susceptible and genetically-resistant nematode parasites in the Australian sheep flock, and provides opportunities to test the effectiveness of Australia's quarantine policies by detailed epidemiological studies in South-East Asia, including Indonesia. In addition, it provides market opportunities for the Australian company which has recently commercialised the assay technique.

Managing the Rumen Ecosystem to Improve Utilisation of Thornless Acacias
This ACIAR-supported South-East Asian project has the aim of determining the nutritional value of particular common fodder plants for ruminants. The CSIRO component is managed from CLI's Brisbane and Rockhampton laboratories. Indonesian work is undertaken in collaboration with the Agricultural University, Bogor and Balai Penelitian Ternak, Ciawi.

Benefits to Indonesia and Australia
While the Indonesian component of this project is relatively small, it has provided opportunities to improve local skills in nutritional sciences for food-animals and assist in the development of better animal feeding systems for smallholder farmers who form the major sector of the food-animal industry in Indonesia. The major benefit to Australia is the development of a positive collaborative framework for future work with Indonesian partner organizations.

Opportunities and Threats for the Immediate Future

Institutional restructuring
Through our recent collaborative work in Indonesia, we have become aware of developing concerns relating to agricultural and animal health capability following in-country institutional restructuring and regionalisation.

We perceive an apparent sense of frustration in central agencies that the defining of national priorities has become less focussed recently, and that where national priorities can be agreed, it is often difficult to secure adequate funding as resources must be negotiated from provincial budgets rather than from a central pool and thus must compete directly with provincial priorities. These concerns are mirrored at the provincial level, where some of the laboratories previously involved in collaboration with Australia are reporting difficulty in performing their functions owing to a lack of funding. There is a concern that some of the capability that has been developed over the past 2-3 decades may be rapidly lost.

There are opportunities for Australia to continue and expand major collaborative programs to ensure that good relationships established over time do not fade with retirement of key individuals in both countries, and to give support to Indonesian agencies as they seek to develop workable systems to ensure that priority issues are addressed under the new political/ structural arrangements. A key strategy should be to maintain a balance between support to the central government agencies and to the provincial authorities in the islands of eastern Indonesia.

Research and development priorities & opportunities
CLI is aware of the principles agreed between ACIAR and the Indonesian counterpart agencies during the recent bilateral consultations, which included, among others:

- **the need for research projects to be driven by design and implementation to include end-users....and explore opportunities for greater involvement of industry in future projects.**
- **the emphasis on the collaborative program on poverty reduction in Eastern Indonesia to be maintained.**
- **The issues identified covered a wide range of agriculture activities ranging from meat and livestock, horticulture and post harvest management. These also are the key focus areas of the Australia-Indonesia Working group on Agriculture and Food Cooperation.**

We support these principles, and have a strong desire to partner in projects which deliver real benefits to the Indonesian rural industries and communities.

The priorities identified at the national level in Indonesia, particularly in the area of animal health, currently centre on the diseases bovine brucellosis, classical swine fever (CSF), and rabies. There is a strong move in the islands off eastern Indonesia for an eradication campaign for CSF. Australia, through the NAQS program, has concerns regarding the presence of CSF in eastern Indonesia, based on potential ease of entry of the disease to Irian Jaya, from where it would easily spread to PNG. The indigenous people of both Irian Jaya and PNG rely heavily on the pig as a source of income, a repository of wealth and as sociologically important during major festivals. The introduction of CSF to the island of New Guinea would cause high mortalities and be an ongoing source of hardship and interruption to pig farming there. Any incursion PNG creates the flow-on risk of introduction into northern Australia through the islands of the Torres Strait.

Indonesia has recently initiated a CSF vaccination program, based on the use of existing vaccine products. Its likely outcome is reduction in disease incidents, but not total eradication. To assist, CSIRO is currently developing new generation vaccines and matching diagnostic tests that would greatly improve the probability of success of this initiative. Total eradication of CSF from Eastern Indonesia is seen by local veterinary authorities to be achievable, but would require a major bilateral program to be established to ensure a successful outcome. Some infrastructure capable of supporting such an initiative is already in place, as CSIRO has transferred a diagnostic capability to both the central and regional laboratories, and is supporting that capability through an AFFA funded quality assurance program.

Opportunities exist to develop and produce vaccines (eg for vvIBDV) and other veterinary products locally, thus reducing reliance on expensive imported products. To achieve this, Indonesian research institutions need assistance in linking research efforts with commercial outcomes. While some products have been developed, commercialisation skills often do not exist to ease them into the market place. In addition, commercial companies in the animal health area often do not have mechanisms for tapping into research taking place in government research institutions. This need has been recognised by ACIAR and its Indonesian partner organizations. There are ongoing opportunities for Australia to assist in furthering such linkages and building commercial skills within Indonesian agencies.

In recent years FMD has increased in prominence internationally as a disease of concern. The panAsia strain that caused the outbreak in the United Kingdom has also been implicated in outbreaks in several East Asian countries. It is being spread around the world more rapidly and effectively that other previously known strains. Consultations between Indonesian agencies and Biosecurity Australia have identified that Indonesia is in a historically low state of preparedness for FMD detection and prevention. Surveillance programs have been discontinued and Indonesia is unable to source reagents for diagnostic testing. From an Australian quarantine perspective, there is an urgent need to see Indonesia's capability to remain FMD-free greatly improved. If Indonesia identifies FMD preparedness as a high priority area for collaboration, we should be prepared to respond as a matter of urgency. In collaboration with Indonesian agencies, CLI could, through training and technology transfer of new generation diagnostic tests, make FMD surveillance more affordable and effective.

Destabilisation

Recent events in Indonesia, in particular terrorist activities, have the potential to markedly reduce both the desire of Australian agencies to carry out in-country projects, and the practical operation of these projects due to security and freedom of access concerns.

18 October 2002

ATTACHMENT 4

CSIRO Marine Research

CSIRO Marine Research considers Indonesia as a very important and vital partner for research in the northern waters of Australia. This relationship is managed on a sovereign nation basis with funding provided largely through the aid system, with ACIAR being the main provider. In this regard it is vital that the aid base for Indonesia be maintained or enhanced.

The CSIRO Tropical and Pelagic Resources Program has extensive relationships with a number of Indonesian organisations coordinated through the Ministry of Marine Affairs and Fisheries – the peak research body, the Agency for Marine and Fisheries Research (RIMF) (carries out marine research into fisheries) and the Directorate General for Capture Fisheries (DGF) (the peak body for collection of fisheries statistics and for the overall management of Indonesian fisheries). The research concentrates largely on internationally shared fisheries resources (e.g. snappers, tuna and sharks) and their management.

There are currently six large ongoing collaborative projects between CSIRO Marine and Indonesia. The research involves frequent visits by personnel of both countries to the partners and joint field research activities. Many of the Indonesian staff undertake training visits to the CSIRO laboratories at Cleveland. Given the similarity of the research requirements in northern Australia and Indonesia and the many shared resources it is expected that the present arrangements will continue for the foreseeable future.

The interior Indonesian Seas and nearby oceans have social and economic impact on Australia and Indonesia in a variety of ways, chiefly:

- Storage and transport of heat through these waters influenced by complex topography of the archipelago is a critical choke-point in the global climate system affecting conditions in both countries on time scales from seasons to decades.

- Marine environment conditions in the region are critical for regional defence systems particularly the subsurface conditions for acoustic systems and surface conditions (wind, waves, currents) for military transport.

- CSIRO Marine Research and the Indonesian Agency for Ocean Research and Fisheries (BRKP) have initiated a joint project to observe currents, temperature and salinity in the region in order to better understand the dynamics of variability, its role in the climate system and to develop a capability to predict environmental conditions and regional climate. The direct contact between Australia and Indonesia will involve an exchange visit to train an Indonesian scientist in the use and analysis of so-called "Argo floats", an autonomous robotic technology to measure subsurface oceanic conditions.

Collaborative Marine Projects between CSIRO, Australia and Indonesia

A. Fisheries Projects

Management of tuna baitfish resources in eastern Indonesia (1995-99)

Contact: Dr S. Blaber, CSIRO Marine Research
Participants: CSIRO Marine Research, Research Institute for Marine Fisheries, Usaha Mina
Funding: ACIAR, CSIRO, CRIFI

Pole-and-line fishing for tuna is a multi-million dollar industry in eastern Indonesia that employs many people, supports several canneries and generates export income. In contrast to the more industrial tuna fisheries in the Pacific it comprises many thousands of small artisanal wooden vessels and separate baitfish catching vessels. Its development is presently constrained by a shortage of baitfish, the important species of which are also utilised as human food in this region. There has been a lack of data on the exploitation and stocks of the baitfish used by the fishery in Indonesia.

In order to help answer some of these questions a collaborative research project between CSIRO (Australia) and the Research Institute for Marine Fisheries (RIMF) (Indonesia) on tuna baitfish in eastern Indonesia began in July 1995 and ran until 1999. This project resulted from approaches by the Indonesian government to CSIRO and formal requests for funding to the Australian Centre for International Agricultural Research (ACIAR).

The Indonesian State Fisheries Enterprises had a major role in the project and were involved in the research and will utilise the results. The main beneficiaries of the project are the many thousands of artisanal tuna fishermen and similar numbers of coastal people involved in catching baitfish, as well as the fishing companies, both state and private, which buy most of the tuna caught by the artisanal fishermen. The research was able to capitalise on the experience and expertise gained during previous successful ACIAR funded CSIRO studies of tuna baitfish in the Pacific and Indian Oceans. This research led by CSIRO began in 1986 in the Solomon Islands and the Maldives, and the results from the project were reported at an international baitfish conference in Honiara in December 1989 (Blaber and Copland, 1990). The outcomes engendered much interest throughout the South Pacific, and led to a second phase of the project incorporating Kiribati and Fiji from 1990 to 1993. An extensive series of scientific papers and fisheries articles resulted from the baitfish projects and a complete bibliography is included in this introduction. Most of the important biological and ecological questions about baitfish had been answered during the course of the research, and hence the work in Indonesia that began in 1995 could be tightly focused on issues particular to, and critical to the fishery in eastern Indonesia – namely, analysis of existing catch data, ways of assessing stocks, and management options.

Prior to the collaborative project the Indonesian Research Institute for Marine Fisheries in Indonesia had already undertaken considerable research into various aspects of baitfishing, much of which was relevant to, and provided vital background for the project. A special issue of the Indonesian Fisheries Research Journal contains the papers resulting from the collaborative CSIRO/RIMF project and the baitfish workshop held in Manado, North Sulawesi in July 1998.

Papers in this volume start with a description of the background to, and progress in resource-based fisheries management in eastern Indonesia (Soepanto). This is followed by an overview of the tuna pole-and-line and fishery and the associated baitfishery (Naamin and Gafa). Next there is a paper by Rawlinson *et al.* describing in detail the catch statistics and history of the tuna baitfishery. Three papers by Andamari *et al.* examine the reproductive biology and gonad maturity of anchovies, and the stageing and natural mortality of anchovy

eggs – all essential inputs to the daily egg production method of estimating the biomass needed for stock assessments described in the final paper by Milton *et al.*

The results can be used now, and in the future, by the Central, Provincial and Regency government agencies responsible for the wise management of bait fisheries resources in eastern Indonesia – a task that is vital to the wellbeing of the fishing companies, fishers and coastal peoples of the region.

Management and conservation of the Terubuk (*Tenualosa macrura*) fishery in Riau Province, Sumatra, Indonesia (with extension to the Management and conservation of the Terubuk (*Tenualosa ilisha*) fishery in North Sumatra Province) (1996-99)

Contact: Dr S. Blaber, CSIRO Marine Research)
Participants: CSIRO Marine Research, Research Institute for Marine Fisheries, Universitas Riau, Dinas Perikanan Propinsi Riau
Funding: ACIAR, CSIRO, CRIFI, Riau Provincial Govt

The *Terubuk* (*Tenualosa macrura*) is an economically and culturally important fish for the coastal community in Riau Province. The cultural significance of this fish can be gauged from the fact that the town of Bengkalis which is the centre for the fishery is known as "Kota Terubuk" and that there is a strong movement to reinstate the historical annual Terubuk Festival (Budaya Penyemahan Ikan Terubuk).Utilisation of this species is carried out by fishers of the Bengkalis region using mono-filament gillnets. The objective of fishing is to catch adult fishes in order to get *Terubuk* eggs, as the egg price was very high on the export market (Merta 1998). Moreover, this species is also associated with important socio-cultural aspects of Riau community life. Unfortunately, stocks of this species are depleted and results of a joint Indonesian-Australian project indicate that overfishing and low water quality are factors contributing to the low catches of *Terubuk*.

The ACIAR funded project entitled "Management and conservation of the Terubuk (*Tenualosa macrura*) fishery in Riau Province, Sumatra, Indonesia" was undertaken between CSIRO, RIMF, Dinas Perikanan Riau and University of Riau between 1996 and 1999. The objectives were:

1. To describe those aspects of the biology and ecology of *Tenualosa macrura* relevant to saving and managing the fishery (such as ageing, reproduction, diets and movements) and then to produce a detailed management plan.

2. To investigate which environmental parameters are relevant to the biology of *Tenualosa macrura* (salinity, temperature, turbidity, sawdust, pollution etc). The likelihood of large volumes of sawdust entering the water is based on the large number of sawmills adjacent to the estuary and the fact that sawdust was prominent in Sarawak estuaries under similar circumstances. Other contaminants may include byproducts of the oil and gas industry in the area.

3. To document the present nature of the fishery using what data are available and by instituting a new catch monitoring system.

4. To train both RIMF and Riau University staff in relevant biological and monitoring techniques.

All aspects of the project were completed successfully and the implementation phase has led to a new project shown below.

Community-based management of the Terubuk fishery in Riau, Indonesia (2001-2003)

Contact: Dr S. Blaber, CSIRO Marine Research)
Participants: CSIRO Marine Research, Directorate General for Fisheries, Research Institute for Marine Fisheries, Universitas Riau, Dinas Perikanan Propinsi Riau, Laksamana Samudera

Funding: ACIAR, CSIRO, CRIFI

Following the successful completion of the previous Terubuk project, the Directorate General of Fisheries made urgent representations to ACIAR for continuing collaboration with CSIRO in order to resolve questions relating to managing the fishery sustainably. An appropriate strategy for the management of the *Terubuk* fishery resource has to involve coastal community participation and be based on accurate and comprehensive information covering the biology and economics of the fishery, its socio-cultural aspects, and the socio-economic characteristics of coastal communities. For example, possible strategies for conserving and managing the *Terubuk* fishery resource may include controlling fishing effort and controlling sawmills releasing sawdust into the Siak river. This could result in, at least temporarily, some unemployment. Therefore, the extent to which the community is dependent on *Terubuk* and what alternative income sources are available has to be understood. Indonesia has experience of success in conserving fishery resources resulting from the involvement of communities, which were encouraged by their understanding of the importance of sustaining fishery resources. Such an understanding exists within the Bengkalis community resulting from their traditional knowledge coupled with publicity from the results of the previous ACIAR funded project. The overall objective of the new project is to develop an appropriate policy for the management of the *Terubuk* fishery involving coastal community participation in order to support a sustainable use of the resource, while optimising economic benefits to the Riau community and alleviating poverty among fishers. Most of the proposed work will be carried out by Indonesian staff, but some assistance is required for socio-economic studies and financial assistance is needed to complete the larval survey work. Both are necessary if biologically meaningful management plans that are acceptable to the community are to be implemented.

The project will enlist stakeholders in the *Terubuk* fishery, provincial government, and the sawmillers upstream to create conditions where the *Terubuk* stock can regenerate, thereby allowing an important export-oriented fishery to be revived. The direct beneficiaries of the success of the development will be the fishers, fish processors and traders who are direct stakeholders in the fishery. Indirect beneficiaries include consumers of the *Terubuk*, and the Bengkalis community if revival of the stock allows resumption of its annual *Terubuk* festival, with implications for cultural conservation and for tourist income. Indonesia will benefit from revived exports to Singapore and Malaysia. Curtailment of sawdust dumping will improve water quality, benefiting stakeholders in other fisheries in the rivers and strait.

Biology, fishery assessment and management of shared snapper fisheries in northern Australia and eastern Indonesia (1999-2003)

Contact: Dr S. Blaber, CSIRO Marine Research
Participants: CSIRO Marine Research, Directorate General for Fisheries, Research Institute for Marine Fisheries, Research Institute for Coastal Fisheries, Northern Territory Department of Primary Industry and Fisheries (NT DPIF), Agriculture, Forestry & Fisheries Australia (AFFA) and Balai Pengkajian Teknologi Pertanian (BPTP).

Funding: ACIAR, CSIRO, CRIFI

Australia and Indonesia share the Red Snapper and Gold-band Snapper resources of the Arafura and Timor Seas. In Australia snapper stocks are targeted by trawl, drop-line and trap fisheries in Queensland, the Northern Territory and Western Australia. Indonesia exploits the species within its extensive demersal fishery, by drop-lining and trawling. If both

Australian and Indonesian fisheries are to remain viable and ecologically sustainable, coordinated management will be necessary. The development of sustainable management strategies is vital for State and Territory Governments (Qld, NT & WA), as well as the Commonwealth Government, which has bilateral fisheries agreements with Indonesia, particularly the 1992 Fisheries Cooperation Agreement (FCA). Indonesia has accorded high priority to the fisheries sector as a new source of growth in the 2nd long-term development plan and the 6th 5-year plan (REPELITA VI). Repelita VI gives top priority to development in Eastern Indonesia, the poorest region. AusAID has also focussed its aid in the same region. The successful development of REPELITA VI's fisheries objectives is dependent on ecological sustainability and therefore requires the input of accurate information such as that provided by this project.

Management of these resources will only be effective if it is based on accurate information about the degree to which stocks are shared, comprehensive fishery catch-effort data and a detailed understanding of biology, life cycle and movement patterns. The main objectives of this project are, therefore:

1. To describe those aspects of the population dynamics, stock structure and biology of Red Snappers and Gold-band Snappers relevant to the management of stocks shared between Australian and Indonesian fisheries.
2. To characterise the social and financial structures of the fishery so that these can be taken into account in the development of management strategies for the snapper fisheries.
3. To assess the current fisheries and identify and explore ways of developing complementary fisheries management strategies that will result in the long term sustainability of the snapper fisheries.

The specific objectives are:

1. Biological Research

- **Describe the genetic population structure** of the two Red Snapper species (*Lutjanus malabaricus* and *L. erythropterus*) and of the Gold-band Snapper (*Pristipomoides multidens*) in northern Australia and southeast Indonesia, in order to define the extent of shared populations.
- **Examine the movement patterns of the two Red Snapper species** in northern Australia and southeast Indonesia using otolith microchemistry. This will enable the estimation of the proportion of shared populations, which migrate between Indonesia and Australia.
- **Describe the reproductive biology** of the Red Snappers (*Lutjanus malabaricus* and *L. erythropterus*) and Gold-band Snappers (*Pristipomoides multidens* and *P. typus*), including age at maturity, reproductive lifespan, spawning seasons and fecundity estimates.
- **Investigate the location of nursery habitats for Red Snappers,** these are currently unknown and yet necessary for a complete understanding of the life history.

2. Characterise the social and financial structures of the fishery

- **Describe the structure and organisation of the snapper fishery and post harvest chain in Indonesia and the □arious□onomic status of those involved;** in order to assess the potential constraints to negotiating and implementing management options and to understand their potential impacts on the different stakeholders.
- **Identify the location, extent and importance of snapper fisheries** for industrial and for artisanal scale fishers in southeast Indonesia inshore and offshore national waters in the Indonesian Fishing Zone, in order to identify which stakeholders may be disadvantaged (without regulation) by current trends in the organisation of the fishery, to distinguish from stakeholders disadvantaged with any proposed changes in regulation of the fishery.

- **Describe the role of state development plans and policies affecting the development of snapper fisheries in eastern Indonesia**, including direct state investment in or subsidy for fisheries infrastructure, boat building, gear, postharvest coldchains, credit systems.
- **Describe Indonesian catch and marketing regulatory agencies** (national and provincial); examine the laws and regulations in the light of UN Conventions and bilateral agreements with Australia; describe the various agencies involved in implementing and enforcing fisheries regulations, and their policies, capacities and actual performance including case studies of enforcement in national, shared and Australian waters in respect of Indonesian and of foreign vessels.

3. Fishery Assessment and Management Strategies

- **determine the sustainability of current catches of snapper species and provide the technical input for assessing the impact of different management strategies on the stocks.** Fishery assessments based on the collected biological information, historical catch data and characterisations of the social and financial aspects of the fishery, will be completed and used to evaluate possible management strategies.
- **develop the framework for strategies and plans for complementary conservation, management and utilisation of shared stocks:** these strategies will be in accordance with the objectives of the 1992 FCA between Australia and Indonesia and consistent with UNIA (United Nations Implementation Agreement on straddling stocks and highly migratory stocks).

Expected outputs:

1. A greater understanding of the degree to which snapper stocks are shared between Australia and Indonesia.
2. Information regarding the movements and life history of snapper species, which can be integrated into stock assessments and management policies.
3. Knowledge of the organisation and social/financial status of different sectors of the snapper fishery. This will provide a framework that will enable policy-makers to develop plans and programs that may have greater probability of successful implementation and avoid or mitigate any adverse social impact on disadvantaged groups.
4. A comprehensive assessment of the current status of the stocks of each species and whether current exploitation rates are sustainable.
5. Technical inputs to a framework for dialogue and consultation at the policy and managerial levels directed at complementary management strategies for snapper stocks.

Southern Bluefin Tuna Project (1992-2003)

Contact: Dr T. Davis, CSIRO Marine Research
Participants: CSIRO Marine Research, Research Institute for Marine Fisheries (RIMF), Research Station for Coastal Fisheries – Gondol (RSCF) & Directorate General for Fisheries.
Funding: AFMA, CSIRO, CRIFI

a. Monitoring longline landings in Bali

A collaborative research program between the CSIRO Division of Marine Research and the Research Institute of Marine Fisheries of Indonesia (RIMF) was set up in August 1992 to monitor the catch of southern bluefin caught by the longline fishery operating out of Indonesian ports. Most fresh southern bluefin are landed at the Port of Benoa, Bali and catches of the longline fishery operating out of this port have been monitored since 1993. A target of 30% of total landings are monitored.

At each plant, tuna and billfish landed by an individual boat are processed for export. Fish are cleaned and graded, and then weighed by the buyer/exporter contracted to purchase the

catch. Export quality fish are then placed directly into an ice slurry prior to being packed in cartons for export as whole fish. The reject fish are set aside and are available for RIMF samplers to measure their length and remove otoliths. The weights of individual fish, identified by species and graded into export and reject categories recorded by the buyer are then obtained by the RIMF sampler. These are □arious by number and weight for each species and export/reject category. The lengths of reject SBT are matched up with the recorded weights. All weights are dressed weights (gilled, gutted and de-finned with tail stock intact).

Buyers exporting fish are required to obtain an export permit for each shipment from the Directorate General of Fisheries Provincial Fisheries Service, Laboratory Quality Control and Fish Inspection Division (DGF). They submit a packing list itemizing the content of each carton. Each individual item is described by species, whether whole, or fillet or loin and whether fresh or frozen and purchase price. DGF provides monthly totals of product category. Tuna are not separated by species. The monthly total of whole tuna, fresh and frozen, corresponds directly to the export category of tuna monitored in the processing plants. The ratio of export tuna monitored at the processing plant to DGF export whole fresh and frozen tuna is used to multiply the monitored catch up to the estimated total Bali catch each month. These provide unbiased estimates of the total landings (export + reject) of each tuna species.

b) Biological studies on SBT

Using the catch monitoring project as a means to obtain samples, various biological studies on southern bluefin tuna have been carried out. In 1992-1995 a study of their reproductive dynamics was carried out. This study provided information on batch fecundity, spawning frequency and spawning season. Since then it was determined that changes in fishing methods was affecting the size distribution of southern bluefin tuna caught and that the spawning dynamics was more complicated than previously thought. This has prompted further sampling of gonads and a collaborative research project with RIMF and the Gondol Laboratory which started in July 1999 and will continue to June 2001.

Otoliths have been collected each year and southern bluefin tuna have been aged using techniques developed at CSIRO. The ageing is now carried out by contract at the Central Ageing Facility in Australia and is part of the annual monitoring of the southern bluefin spawning stock. We are particularly looking for new recruitment into the spawning stock and a possible fishing down of the older age classes.

A review of Indonesia's Indian Ocean tuna fisheries and extension of catch monitoring at the key off-loading ports (2002-2003)

Contact: Dr T.Davis, CSIRO Marine Research
Participants: CSIRO Marine Research, Research Institute for Capture Fisheries, Bogor Agricultural University, Indian Ocean Tuna Commission, DGF Indonesia, AFFA.
Funding: ACIAR, CSIRO, CRIFI, IOTC

The status of Indonesian tuna fisheries is poorly understood, both in terms of their total catch and key parameters such as catch per unit effort, size distribution of catches etc that are essential inputs into any assessment of the sustainability of current catch levels. There is little doubt however, that Indonesian catches of tunas and billfish are significant in terms of the overall catch of these species in the Indian Ocean.

As Australia, Indonesia, the CCSBT and IOTC work towards developing an improved understanding of the tuna fisheries of the NE Indian Ocean, the uncertainties surrounding Indonesian catches and effort are of significant concern to RCCF and RIMF. It was with this background that Indonesian and Australian scientists began discussions in 2000 regarding collaborative efforts on the tuna and billfish stocks of this region. It was agreed that the best approach to increased co-operation would be through institution building, technical co-

operation, training and skill sharing, and developing capacity by improving practices and procedures for data management and reporting in support of fisheries management.

To provide a foundation for this process, we are proposing a 15 month study to produce a country tuna fishing status report on Indonesian tuna fisheries in the Indian Ocean including a review of existing data collection systems, and the development of a system for the collection, storage and analysis of all catch data from the longline fleet operating out of Benoa in Bali, and Muara Baru and Cilacap in Java.

The project will involve significant collaboration between Indonesian and Australian fishery scientists and administrators, as well as field technicians. The overall objective is to build the small project into a larger program which will build capacity within Indonesia to administer and undertake their own data collection and stock assessments for tuna and billfish species. The monitoring component will require the development of teams of port samplers, and group co-ordinators. The project will provide training to Indonesian staff at both levels.

Two agencies are providing significant support for the catch monitoring planned in this proposal. IOTC will directly support all Indonesian costs for catch monitoring at Cilacap and Muara Baru. AFFA is supporting year 1 catch monitoring through an existing FRRF grant that will cover some CSIRO costs for travel and infrastructure at Benoa, and it is anticipated that funding will be extended in year 2. It is expected that the catch monitoring will continue after this pilot study is completed, and that funding will be provided by relevant and interested agencies other than ACIAR.

The Country Report will report on the Indonesian Indian Ocean tuna fisheries. Collecting and reporting on artisanal fisheries will be carried out by the Institut Pertanian Bogor (IPB). In year 1, researchers will document all available data at ports in Banda Aceh – North Sumatera; Bungus (Padang) – West Sumatera; Pelabuhanratu – West Java; Perigi – East Java. In year 2, researchers will visit ports at Benoa and Kedonganan – Bali; Ende – Flores; Kupang – West Timor; and revisit the port of Bungus – West Sumatera. The industrial tuna fisheries that operate in the Indian Ocean are longline tuna fisheries. These will be covered jointly by RCCF and CSIRO. Muara baru – West Java can be accessed as frequently as needed because of its close proximity to RIMF. Both Cilacap – West Java and Benoa – Bali will be visited each year.

Longline Catch Monitoring will expand from the current CSIRO/RIMF monitoring of SBT catches in Benoa to cover all species of tunas and billfish handled by processors, increase the number of processors monitored, and extend monitoring to other key ports. The methods developed by the CSIRO/RIMF SBT monitoring program will be used for the expanded program. New enumerators will be recruited from local university graduates. Monitoring teams will be set in place three months after the project commences. This delay will facilitate recruitment and training.

The Port of Benoa will be covered by five fulltime and one part-time enumerator. Activities will be supervised fortnightly by a supervisor based at Gondol Research Institute for Mariculture. The database for catch data and export statistics will be based at the Research Institute.

The Port of Muara Baru and Cilacap will be monitored by six and three enumerators, respectively. Supervision and databases will be based at RIMF, Jakarta. The costs of monitoring at these ports will be supported totally by IOTC.

The intent is to use this small joint ACIAR/IOTC/AFFA/CSIRO/RCCF/DGF/IPB project as the first step in developing a co-operative program between Australia and Indonesia on Indian Ocean tuna. As such the project will aim to identify issues that require attention, and develop a strategic plan for action, along the lines suggested at the Bali meeting in 2000. The medium to long term plan is to develop the capacity in Indonesia to monitor and manage

their Indian Ocean tuna fisheries, especially those which fish shared stocks, and to better meet their international responsibilities under the UN Law of the Sea Convention.

Artisanal shark and ray fisheries in Eastern Indonesia: their various economic and fishery characteristics and relationship with Australian resources (2001-2003)

Contact: Dr S. Blaber, CSIRO Marine Research
Participants: CSIRO Marine Research, Research Institute for Marine Fisheries, Indonesian Institute of Sciences (LIPI), Centre for Agricultural and Socioeconomic Research, University of Haluoleo, Kendari & Murdoch University, Perth, Australia
Funding: ACIAR, CSIRO, CRIFI

Currently both Australia and Indonesia have fisheries that target elasmobranchs (sharks and rays) as well as fisheries that take them as bycatch. In northern Australia the stocks targeted of some species may be shared with those targeted in south-eastern Indonesia. Worldwide, there is increasing concern over the exploitation of elasmobranchs. This is primarily due to the fact most elasmobranchs are long lived, slow to mature and have a low fecundity, which means they can be very vulnerable to overfishing. The Food and Agriculture Organisation (FAO) of the United Nations has developed an International Plan of Action for sharks. This plan requests that countries with fisheries for elasmobranchs provide regular assessments of these resources and where necessary, take management measures to protect threatened species or stocks.

This project follows from an initiative developed by DGF (Indonesia) proposing collaborative research on shark and tuna and subsequently taken forward at the Indonesia – Australia Workshop on Shark and Tuna, organised by ACIAR, AFFA and CSIRO in Bali, in March 2000. This workshop was attended by Indonesian and Australian agencies. The Shark Working Group identified several major issues regarding elasmobranch fisheries and opportunities for collaboration between Australia and Indonesia. The main issues raised included the lack of species composition data for the fisheries, the extent of shared stocks between Australia and Indonesia and the □arious□onomic structure of the different fisheries. Currently Indonesia has the highest annual reported landings of elasmobranchs worldwide (100,000 t), with the export of shark products worth over US $13 M . However, there are no reliable species-specific catch data available from the Indonesian fisheries and little or no management of elasmobranch resources. The socioeconomics of the Indonesian fisheries are of great concern as it is believed that many artisanal fishers rely heavily on elasmobranchs. The level of this dependence has not been assessed but information on its extent is vital because any management may impact heavily on these groups of fishers.

Elasmobranchs in Indonesia are taken in target fisheries, primarily by artisanal fishers, utilising nets, longlines and droplines. They are also taken by industrial fish trawlers and as bycatch in the pelagic tuna fisheries. The focus of the current ACIAR project is the artisanal fishery in south-eastern Indonesia.

Fisheries and seabed habitats of the Timor MOU Box (1998-1999)

Contact: Mr T. Skewes, CSIRO Marine Research)
Participants: CSIRO, CRIFI
Funding: AFFA, EA

In September-October 1998 CSIRO Marine Research conducted a survey of the MOU 74 Box, a 50,000 km^2 area of shallow reefs, shoals and deeper waters between Broome and Timor, to assess the status of reef resources in the area and the environment that supports them. Findings are outlined in a two-volume report released in July 1999. The study investigated the impact of traditional Indonesian fishing on several target species and found that there

was a severe depletion of some higher value beche-de-mer, trochus and sharks. It also identified and mapped marine seabed habitats and documented a severe incident of coral mortality that occurred in early 1998, caused by elevated sea temperatures. The report provides important baseline information on the region so that future impacts, whether the result of fishing or environmental fluctuations, can be monitored and managed. The study also forms the basis of a management strategy being currently negotiated with Indonesian Authorities to regulate the fishing effort in the area. The field team included an Indonesian scientist from CRIFI, and the report has gained wide acceptance from Indonesian counterparts.

B. Oceanographic Projects

Contact: Dr G. Meyers, CSIRO Marine Research

XBT ship of Opportunity Network

Duration: Part of GOOS Sustained Observing System, since 1983.
Funding: CSIRO, BOM, RAN

Thermal structure is monitored on three merchant ship routes using XBTs launched by volunteer observers. The routes are Fremantle to Sunda Strait, Port Hedland to Ombai Strait, Jakarta to Torres Strait. The data are sent in near real time through the Global Telecommunication System to meteorology and climate centers around the world, where they are used in the operational seasonal climate prediction systems.

Indonesian throughflow measured in Lombok, Ombai and Timor Straits by bottom mounted pressure gauges

Duration: 1997-2000 (approx.)
Funding: ONR, CSIRO

The geostrophic current in the straits was measured hourly by bottom mounted pressure gauges on both sides of the strait. The current is calculated from the pressure difference across the strait. The gauges were deployed and recovered by the Indonesian research vessel R/V Baruna Jaya.

Indian Ocean Thermal Analysis

Duration: 2 years in latest phase
Funding: CSIRO, International Pacific Research Center (Honolulu)

This is the latest phase of a series of projects that have managed the Indian Ocean thermal data sets collected by all contributors to TOGA, WOCE, GOOS and earlier projects. The XBT data have been used in a large number of research papers that address optimal network design, regional currents (e.g. Indonesian throughflow), surface layer heat budget, ocean-atmosphere interaction and ocean-model validation. The latest phase includes data-archeology to identify all available thermal data for the 20th Century in □arious agency and national archives, data assembly, quality control and mapping by consistent, published methods.

Australian Community Ocean Model (ACOM) and Predictive Ocean-Atmosphere Model for Australia (POAMA)

Duration: R&D phase: six years completed in 2001; now operational
Funding: CSIRO, BMRC, CVAP (LWRRDC and other rural R&D Agencies)

ACOM is an ocean general circulation model with a data assimilation module that provides operational, large-scale analyses of ocean thermal structure in the region. POAMA is a couple ocean-atmosphere general circulation model with initialization module based on observed ocean thermal structure. The model is run operationally every three days and provides prediction of the regional, seasonal climatic conditions with lead time up to one year.

RAN Ocean Modelling System (OMS)

Duration: 3 years, starting 1 September 2002; with possibility of stage two
Funding: CSIRO, BMRC, RAN

OMS Stage 1 will provide operational, daily, eddy resolving analyses of thermal structure and currents. Stage 2 will develop a model with finer scale resolution, on the order of 2 km.

INSTANT = International Nusantara* Stratification and Transport Program

Duration: 3 years, starting 1 July 2003
Funding: CSIRO, BPPT, NSF (US), SIO, LDEO, LODYC (France), NIOZ (Netherlands)

Mooring arrays in all the Archipelago passages of Indonesian throughflow and auxiliary data to accurately measure the mass and heat transport and identify proxy-measures that can be monitored operationally in the long term. Identification of the effect of throughflow on basinscale heat transports. Identification of regional air-sea interaction that affects the atmospheric heat sources over the Indonesian region.

Building Australia's relationship with Indonesia – Submission to CSIRO International Program from CSIRO Sustainable Ecosystems

The following is a submission for the review of Australia's relations with Indonesia – political, strategic, economic (including trade and investment), social and cultural, by the Minister for Foreign Affairs.

Terms of reference: The Joint Standing Committee on Foreign Affairs, Defence and Trade shall review the political, strategic, economic (including trade and investment), social and cultural aspects of the bilateral relationship, considering both the current nature of our relationship and opportunities for it to develop.

Nature of Collaboration

CSIRO Sustainable Ecosystems (CSE) has had an 8-year collaborative project funded jointly by ACIAR, CSIRO and the Indonesian Central Research Institute for Food Crops (CRIFC). The project began in January 1995 and the current phase will end in December 2002. The focus of the project has been the development of ecologically-based management of rodent pests in lowland irrigated rice agricultural systems in West Java. In 1995, Indonesia had limited capacity to address this important problem. The collaborative project therefore had an important capacity-building element with significant inputs into infrastructure, training and tertiary education.

Impacts of the Collaborative Relationship

- A National Rodent Control Laboratory was developed and equipped at the Indonesian Institute for Rice Research. The laboratory was officially opened in April 1997.
- Four scientific and 4 technical staff in Indonesia were trained in the principles and practical aspects of vertebrate pest management.
- CSIRO staff provided lectures at Gadjah Mada University (GMU) in Yogyakarta and assisted with the development of a curriculum on wildlife management. GMU now offers the only tertiary accredited course on wildlife management in Indonesia.
- Benefits to CSIRO: three Australian scientists and two technical officers obtained valuable experience in working on wildlife management issues in rice ecosystems in Asia. This led to CSIRO becoming the lead agency in collaborative projects in 4 other SE Asian countries and 1 South Asian country.
- Rodent management practices have been developed and tested with farmers at a village level for lowland irrigated rice. These practices have been applied in South Sumatera, Central Java, East Java, Bali and Kalimantan leading to improved livelihoods for rural communities.

Opportunities for Future

- Assist with the training of the next generation of Indonesian vertebrate pest managers (eg an Indonesian MSc student will begin at ANU in 2003)
- New collaborative projects on vertebrate pest management (mainly rodents) in rainfed upland and lowland agricultural systems. These systems typically contain the poorest sector of farming communities in Indonesia.

Other ACIAR funded projects:

Prospects for Improved Integration of High Quality Forages in the Crop-Livestock System of Sulawesi,

Contact: Bruce Pengelly

This project was developed when it was identified that the economic impact of the decline in cattle numbers is that Sulawesi will inevitably be unable to maintain its role as an exporter of cattle. This outcome will impact on the agricultural and overall economy in a region which is already on of the poorest of the 26 provinces of Indonesia.

A systems approach has been adopted in this project to evaluate the potential impact of improved forages on production of cattle. Emphasis has been placed on using simulation and whole-of-farm economic analysis to evaluate the economic benefits and risks associated with greater forage development on-farm, and the possible interactions between livestock and crop production.

Optimising crop livestock systems in West Nusa Tenggara Province
Contact: Andrew Ash

This project has adopted a systems approach to smallholder farming systems in the eastern islands of Indonesia. The project will produce information that can be immediately applied by smallholder farmers in the region to achieve intensification of their livestock enterprise in a way that integrate with their cropping systems.

Miscellaneous submissions from CSIRO Divisions

Comments from CSIRO Manufacturing and Infrastructure Technology

CSIRO Manufacturing and Infrastructure Technology has developed a good relationship with the Corrosion Centre within the Institute Technology Bandung (ITB), through a 5-Nation Collaboration program. Indonesia is one of five nations participating in a research program aimed at the harmonisation of durability standards and performance tests for components in buildings and infrastructure. This program has continued under an *'Asia/Pacific Collaboration on Concrete Solutions to Corrosion Protection of Reinforcing Steel'* since 2000. In this program, Indonesia, the Philippines, Thailand, Vietnam and Australia has agreed to carry out independent research with a common objective of establishing scientific information necessary for the harmonization of concrete durability standards. China joined the group in 2001 with work in marine concrete being conducted by the Shanghai Research Institute for Building Sciences (SRIBS).

Three meetings have been held so far. The inaugural meeting was hosted by the Thai Institute for Science and Technology Research in Bangkok in 1999. The second hosted by ITB in Bandung in 2000, and the most recent meeting was held at CSIRO in Melbourne in 2001.

Apart from the research program, the linkage with ITB has lead to an Indonesian lecturer commencing a PhD program in 2001 under the joint supervision of Doctors N. Gowripalan (UNSW) and V. Sirivivatnanon (CSIRO).

As well, the Division recently hosted an Indonesian researcher from LIPI and the result was very promising for further business and research collaboration opportunities especially with regards to establishing an engineering and manufacturing network to provide maintenance support for the Indonesian mining sector.

LIPI has also been included as a potential collaborative Asian partner in a Telstra Broadband Fund application submitted by CSIRO. Should this application be successful further opportunities can flow on from this activity.

Comments from CSIRO Textile and Fibre Technology

Indonesia is one of the four major export countries for Australian cotton. Therefore as part of the Cotton Cooperative Research Centre's Project 'Quality issues from a mill perspective' CSIRO and the CRC are interacting with mills in each of the four countries to further understand their technical requirements for Australian cotton.

Comments from Mr Lyn Craven, a research scientist with CSIRO Plant Industry

There are benefits for Australian scientists (and hence for the Australian community) if increased cooperation and increased collaborative research were to be initiated between CSIRO and LIPI. Examples are joint studies into surveying the phytochemistry of wild species of plants for novel compounds ("bioprospecting" in current language), collaborative research in biodiversity (cataloguing the diversity of species in natural ecosystems, acquiring an understanding of the genetic relationships of these species, etc).

Projects such as bioprospecting could lead to the discovery and development of valuable new drugs and other products. Biodiversity studies will allow assessment of the degree to which species are shared between Australia and Indonesia and what the species actually are. NOTE that bioprospecting is pretty useless unless one knows the names of the organisms that one is analysing.

While the primary mass of research effort should logically be located in CSIRO and LIPI, the role universities can play in cooperative projects should be recognised and such involvement facilitated. Universities provide great opportunities for demonstrating the mutual benefits of international collaboration and engagement to students who ultimately will occupy influential positions in their respective communities. It is important that it be seen that the advantages of such international collaboration are greater than the advantages of pursuing such research independently. Also, many Indonesian universities are poorly equipped with facilities for research; collaboration with researchers in Australian research agencies and universities will allow access for Indonesians to facilities that do not exist on their own campuses.

While large projects have an economy of scale, opportunities for smaller research projects, involving fewer people should be increased and in Indonesia such projects facilitated through a simplification of the process for obtaining research permission and travel documentation.

As a postscript, terrorist acts against Westerners are more likely to be actively condemned by the Indonesian people and the Indonesian administration if they are committed against countries that have demonstrated real support and equitable collaboration.