Charting a Common Future:
China, Australia and the Region beyond 2020
描绘共同未来：2020年后的中国、澳大利亚及亚洲地区

The Australia-China Relationship at Forty:
Building a Pathway for the Future

An Outcomes Paper from the 2012 Second Track Dialogue
Beijing, 25-26 September 2012.

Supported by
Griffith University and Peking University in collaboration with the Queensland Government, have established a future-orientated partnership between Australia and China. This partnership will focus on how the region will evolve in the next 20 years and how this evolution can be shaped. With this background, the Dialogues, which is co-organised by The Griffith Asia Institute and Office of International Relations, Centre for Australian Studies, Peking University, will be conceptually linked around the overarching theme of “Charting a Common Future: China, Australia and the Region Beyond 2020”.

The Dialogues incorporate three yearly events: an Annual Leader’s Lecture, Second Track Dialogue and an Emerging Leaders Dialogue. The project works on building capacity and relationships between Queensland, Australia and its Asia Pacific neighbours, particularly China. It encourages cooperation and innovation by bringing together leaders and emerging leaders to discuss issues of importance to the Asia Pacific region. These events provide an avenue to formulate and express ideas than can influence future policy decisions.
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The Background Papers presented the current state of play and established a starting point for discussion at each Dialogue session.
BACKGROUND

On 25 and 26 September 2012, Peking University hosted the annual Australia-China Futures Dialogue Second Track conference in Beijing. A range of Australian and Chinese experts—drawn from business, government and universities—met over two days to exchange perspectives, and to formulate recommendations, on the overarching theme of “The Australia-China Relationship at Forty: Building a Pathway for the Future”. The Dialogues were officially opened with the Australia China Futures Dialogues Annual Leader’s Lecture presented by HE Ms Frances Adamson, Australian Ambassador to The People's Republic of China.

In addition to the opening and closing plenary sessions, the forum consisted of four workshop sessions over two days that addressed distinctive areas of the relationship and explored how increased cooperation across these areas could enhance the depth and breadth of the broader Sino-Australian relationship. Each session comprised four speakers and were co-chaired and moderated by Australian and Chinese experts in their field. Following the completion of presentations, the Chairs of each session opened up the discussion to plenary debate.

The Dialogue was divided into four discrete sessions, with presenters and subsequent discussion addressing a number of specific questions for each session:

Session 1 - Promoting Knowledge and Understanding: Cooperation in Higher Education

Key questions:

1. What have been the key features of higher education policy in China and Australia recently?
2. How significant is cooperation between Australian and Chinese higher education institutions?
3. What is the Chinese and Australian experience in developing 'world class universities'?
4. What lessons can Australia and China learn from each other in this area?

Session 2 - Promoting Material Gains: Economic Relations Today and Future Prospects

Key questions:

1. What are the key developments in bilateral trade and investment between China and Australia?
2. What are the primary strengths and weaknesses in the Australia-China economic relationship?
3. What are the main challenges that lie ahead in the Australia-China economic relationship?
Session 3 - Emerging Areas of Closer Cooperation I - Science Partnerships and Engagement

Key questions:

1. What are the main benefits flowing from science partnerships between China and Australia?
2. How have collaborations between Australian and Chinese institutions in the area of science evolved in recent years?
3. In what ways can the depth and breadth of science collaboration in the China-Australia relationship be improved?

Session 4 - Emerging Areas of Closer Cooperation II - Disaster Management

Key questions:

1. What have been the primary challenges confronting China and Australia in their recent experience with disaster management?
2. What lessons can both countries learn from each other in approaching disaster management?
3. How can Australia and China build on existing cooperation in the area of disaster management?

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The purpose of this outcomes paper is to outline the key recommendations that resulted from the Second Track forum and the major ideas for promoting greater understanding between China and Australia across the four areas that were covered. A key theme of the Dialogue was to identify ways to broaden areas of emerging cooperation in the fields of higher education, bilateral economic relations, science partnerships and engagement, and disaster management.

The discussions that occurred during the Second Track Dialogue and the information provided by speakers and commentators alike will provide most of the content of this paper. Some additional research has been conducted to provide further background to some of the issues raised during the dialogues.
SESSION 1

Promoting Knowledge and Understanding: Cooperation in Higher Education

The keynote speakers in this session were: Professor Wanhua Ma (Director, Center for International Higher Education, Peking University), Professor Cathryn Hlavka (Minister Counsellor Education, Australian Embassy in China), Professor Juan Hu (Executive Dean, School of Education, Renmin University of China) and Professor Simon Marginson (Center for the Study of Higher Education, University of Melbourne). The session was chaired by Professor Andrew O’Neil (Director, Griffith Asia Institute) and Professor Shusen Liu (Deputy Dean, School of Foreign Languages and Secretary General, Center for Australian Studies, Peking University). The following is a summary of the key themes raised in discussion.

- **Need to learn from the different experiences of the internationalization of education in Australia and China.** The two countries’ experiences of the internationalization of education have been markedly different in terms of their extent, goals and effects. The Australian experience has been defined by a university-led push to attract fee paying foreign students to compensate for declining public funding, while China’s has been defined by an outflow in students seeking education at foreign universities. Australia has been a major destination for Chinese students, with more than 130,000 studying in Australia in 2010.

- **Contrasting Australian and Chinese approaches to the development of “world class universities” and priorities for investment in R&D.** The key distinctions between Australia and China in this context are that China’s push toward this goal is state-led and oriented toward capacity building investment while Australia’s development of “world class” universities has been the result of the investment and planning strategies of individual universities.

- **Student mobility and imbalances in student numbers.** The increasing mobility of students in both Australia and China raises both challenges and opportunities for higher education policy. For China, the increasing number of students seeking a foreign university education has created a “brain drain” problem which has prompted the government to implement various measures since the early 2000s to encourage students to return on completion of their studies abroad. Since 2001 China has also focused on attracting foreign students to study in Chinese higher education institutions by encouraging Chinese institutions to establish joint cooperation programs and schools with foreign universities. This constitutes a major opportunity for Australian universities to develop greater linkages with their Chinese counterparts at the faculty and student level.

- **Quality control in higher education.** In the increasingly competitive global market for education services Australian and Chinese universities must remain committed to ensuring quality control of the degrees, programs and courses offered to both domestic and international students. Australia’s greater length of experience and expertise in both quality assessment and internationalization of education provides
Chinese institutions with a viable model of emulation as it seeks to align its capacity building in its higher education sector with quality control.

- **Balancing objective and reputational data in rankings of universities.** A major focus in both Australia and China has been improving the position of their universities in world rankings of higher education institutions. Both countries have achieved major milestones in recent world rankings that have reflected their respective strengths and investment strategies in higher education. However, over-reliance on reputational rather than objective factors in determining “world class” universities has tended to distort higher education policy in Australia.

- **Facilitating increased cooperation between Australian and Chinese higher education institutions.** Although Australian universities have 855 formal agreements with Chinese higher education institutions, many of these agreements have yet to be operationalized.

**Policy Recommendations**

The following issues are regarded as being of key importance in improving Australia-China cooperation in higher education:

1. **University rankings methodologies.** Policy-makers and universities in both countries need to distinguish more carefully between university world rankings methodologies that rely on reputational data alone and those that combine reputational data with objective data such as citation information.

2. **Capacity building and quality assessment.** Australia and China can learn from each others’ experience and expertise in capacity building and quality assessment in the higher education sector. Australia’s experience in the development of consistent and transparent quality assessment of higher education institutions and the non-political allocation of government funding has much to offer China. China’s capacity-building approach to government policy in the higher education sector can serve as a model for Australia.

3. **Imbalance of student numbers.** Australian governments, businesses and universities can contribute to redressing the imbalance between the number of Chinese students studying in Australia and the number of Australian students studying in China through the development of programs that encourage the study of Chinese language, culture and society within Australian society.

4. **Joint programs.** Australian universities can encourage greater numbers of Australian students to study in China through developing more joint Masters and/or Doctoral programs with Chinese universities to facilitate longer in-country study.
Session 2

Promoting Material Gains: Economic Relations Today and Future Prospects

The keynote speakers in this session were: Dr Geoff Raby (Chairman and CEO, Geoff Raby & Associates and former Australian Ambassador to China), Mr Clinton Dines (Executive Chairman, Caledonia), and Professor Xingqiao Ping (School of Economic, Peking University). The session was chaired by Professor Leong Liew (Department of International Business and Asian Studies, Griffith University) and Professor Dou Ding (School of International Studies, Peking University). The following is a summary of the key themes raised in discussion.

- **Opportunities to broaden Sino-Australian economic/trade relations.** The strength of the bilateral economic relationship has been built on the complementarity of the Australian and Chinese economies since the 1980s and the convergence of economic reform in each country over the same period. These factors alone however are not enough to stimulate additional Australia-China trade and economic opportunities. The fact that China not only remains in a industrialising phase of development but also rapid urbanisation will create opportunities for Australian governments and businesses to provide China with expertise and services in such areas as technology innovation, energy efficiency technologies, and environmental protection/management, urban planning and management.

- **Negative perceptions of Chinese FDI in Australia.** The recent controversy regarding Chinese foreign direct investment (FDI), particularly from state owned enterprises (SOEs), in Australia’s mining and agricultural sectors demonstrates that there remain barriers to broadening the economic and trade relationship. The SOE issue has led to fears that China is attempting to exercise undue influence through the investment of its SOEs in key sectors of the Australian economy. Both Australia and China need to be much more cognisant of popular perceptions in each country and develop a greater understanding of each others’ unique political cultures and histories. Just as there is no monolithic Australian view on Chinese investment, the Australian public and policy-makers should recognise that the Chinese view is also comprised of disparate parts – i.e. political elite view, business view and nationalist/populist view. The increasing privatisation of China’s SOEs should serve to underline this distinction between Chinese government and business views.

- **The “End” of the “Resources Boom”?** The recent debate in Australia regarding the end of the “resources boom” has been over-stated. China’s continued investment in infrastructure development, rapid urbanisation, and the industrialisation of its relatively underdeveloped central and western provinces will continue to drive demand for Australian iron ore, coal and other natural resources into the foreseeable future. It is possible that we have only seen the beginning of the impact of China’s economic rise on the Asia-Pacific region.

- **The limited nature of the debate in Australia on China’s rise.** The public and policy debate in Australia on the impact of China’s continued rise on Australia, the region
and the world remains “thin”. While there is a general recognition that China’s enormous economic growth and development has generated a geopolitical shift in the Asia-Pacific, this has not translated into the adaptation of long-standing Australian policy settings in the economic and political/security spheres. Rather, successive Australian governments have simply tended to “ride” the “resources boom” to maintain political power. Uncertainty regarding the long-term impact of China’s rise on Australia and a lack of political leadership in steering the national conversation has also generated contradictory views of China and provided space for marginal political and interest groups to hijack the debate and create tensions in Australia-China relations.

- **Increasing dependence of the Australian economy on China.** A major concern for Australia is its increasing dependence on China as a major export market for its natural resources with some 33% of its total resource exports going to China by 2011. A key challenge for Australia is to encourage the diversification of Australian exports to China. However there are a variety of barriers – perceptual, regulatory and political – to broadening the economic relationship with China.

**Policy Recommendations**

The following issues are regarded as being of key importance in improving Australia-China economic and trade relations:

1. **Diversification of Australian exports to China.** Over the past two decades Australia’s exports to China have primarily consisted of natural resources (coal, iron ore, natural gas etc) and primary agricultural produce. While Chinese demand for such products will continue into the foreseeable future, the increasing industrialisation of its economy and urbanisation of its society provides opportunities for Australia to diversify its export of goods and services to China in the fields of technology innovation, energy efficiency technologies, and environmental protection/management, urban planning and management. Diversification of Australian exports to China will not only be beneficial in economic terms for the Australia-China relationship but also positively modify existing perceptions of each other.

2. **A more balanced view of Chinese FDI in Australia is required.** Australian political leaders, policy-makers and the public need to take a more nuanced view of Chinese FDI in Australia. Recent controversies such as Chinalco’s investment in Rio Tinto, Sinosteel’s takeover of Midwest and its bid for Murchison, China Minmetals purchase of OZ Minerals and a Chinese-led consortium’s investment in Cubbie Station have generated concerns that China is attempting to exercise undue influence in Australia’s resources sector. Such concerns should be placed in context. First, Australians need to recognise that as China’s SOEs continue to privatise that the interests and investments of such SOEs do not necessarily correlate to those of the Chinese government. Second, Chinese FDI in the resources and agricultural sectors is subject to governmental oversight through the Foreign Investment Review Board (FIRB). Third, Australia has attracted substantial FDI in its agricultural and
resources sector since European settlement without engendering foreign economic domination.

3. **A greater Chinese understanding of Australian economy, society and political culture is required.** The recent controversies in the Australia-China trade and economic relationship noted above have also generated adverse reactions in China by raising the perception that Australian government investment guidelines and policy decisions are targeted against Chinese investment in the resources sector and discriminate against SOEs. This perception fails to account for the fact that the Australian government, through the FIRB, has approved the vast majority of Chinese investments in Australian businesses since 2007. This suggests that Chinese investors need to have a greater understanding of both Australia’s FDI framework and its democratic political culture.

4. **Better management of the “resources boom”.** Despite recent political debate to the contrary, China’s continued investment in infrastructure development, rapid urbanisation, and the industrialisation of its relatively underdeveloped central and western provinces will continue to drive demand for Australian resources. This promises to deliver continued economic benefits to Australia. Rather than simply continuing to ride the resources boom, Australian political leaders and policy-makers must construct a comprehensive strategy to manage the effects of this on Australia’s society and economy.

5. **Necessity for a comprehensive national conversation on the impact of the rise of China on Australia, the region and the world.** China’s continued economic growth and development is producing geopolitical change in the Asia-Pacific that impacts directly on Australia’s security and economic interests. This has raised the so-called “China Choice” for Australian political leaders and policy-makers – i.e. can Australia reconcile its burgeoning trade and economic relationship with China and its long-standing security alliance with the United States. This has been a largely elite driven debate and has not translated into the adaptation of long-standing Australian policy settings in the economic and political/security spheres. In the economic sphere, Australia must not continue to solely rely on the “resources boom” but reinvigorate the tradition of economic reform begun in the 1980s to maximise the benefits of the boom. In the security sphere, Australian leaders and policy-makers must effectively communicate to the public that the rise in China’s geopolitical weight in the Asia-Pacific is the direct outcome of its economic development and that its capacity to accrue economic and military power is increasing relative to the United States.
Session 3
Emerging Areas of Cooperation I: Science Partnerships and Engagement

The keynote speakers for this session were Dr Shizhuan Zhang (Deputy Director, International Cooperation Bureau, Chinese Academy of Sciences), Professor Max Lu (Senior Deputy Vice Chancellor, University of Queensland), and Professor David Shum (Dean Health Research, Griffith University). The session was chaired by Professor Zhihong Xu (Director, Environmental Futures Centre, Griffith University) and Professor Xing Zhu (Assistant President and Vice Director, National Center for Nanoscience and Technology, Peking University). The following is a summary of the key themes raised in discussion.

- The magnitude of science and technology cooperation between China and Australia has increased significantly over the past ten years. This has been evident in joint publications between researchers from both countries, but also in other key areas, including the establishment of joint laboratories, joint centres, and critical strategic alliances between researchers and institutions.

- But China is a crowded marketplace in science and technology. The US has a deep set of networks and there are questions about whether the Australian Government has an integrated strategic approach to promoting future science and technology cooperation with China.

- Moreover, while Chinese Government funding for science and technology is rising steadily, Australian Government funding is projected to be static at best, and at worst decline in real terms.

- While strategic approaches to joint research collaboration are important, serendipity and chance still play a key role in bringing Chinese and Australian researchers together. This speaks to the importance of ensuring both strategic (i.e. government-led) and organic processes (researcher-led) in promoting research networks and alliances.

Policy Recommendations

The following issues are regarded as being of key importance in improving Australia-China cooperation in science partnerships and engagement:

1. Mutual understanding and respect is crucial in facilitating greater Australia-China science partnerships and engagement. Greater understanding of each country's research environments, institutions, and funding priorities can assist the development of collaboration between individual researchers and between institutions by identifying complementarities in priority areas of research and clarifying roles of research institutions and government organisations.
2. **Greater consistency of funding and support for scientific research in Australia is required.** Both Australia and China have recognised the crucial role of R&D in driving innovation, economic development and ensuring their future prosperity. However Australian commitment to fostering R&D is undermined by inconsistent national research policy and priorities and inconsistent funding of scientific research. Federal and state governments need to establish a consensus on funding priorities and improve inter-government coordination of policy and funding on international scientific research collaboration. This would enhance the already well-developed collaborations and engagements between Australian and Chinese government agencies/organisations and Australian and Chinese universities.

3. **Recognition that scientific collaboration and engagement can grow both organically and strategically.** The establishment of national research goals can identify key strategic priorities, provide funding and establish research guidelines but the role of people-to-people research networks in fostering international collaboration should be recognised and encouraged through establishment of incentives such as seed funding for emerging areas of Australia-China research collaboration.

4. **More flexible funding models for international collaborations are required.** Greater Australia-China scientific collaboration could also be fostered by the modification of existing funding arrangements in Australia such as Australian Research Council (ARC) and National Health and Medical Research Council (NHMRC) to encourage the Australian researchers to compete for funding from Chinese institutions and organisations. This is an area of opportunity for Australia as China has emerged as one of the world’s leading investors and spenders on R&D.
Session 4

Emerging Areas of Cooperation II: Disaster Management and Recovery

The keynote speakers for this session were: Professor Chuncheng Shan (State Council, People’s Republic of China), Ms Michele Robinson (Vice President, Australia China Business Council, QLD), Associate Professor Anne Tiernan (School of Government and International Relations, Griffith University), Professor Jianguo Gao, (Research Fellow, Institute of Geology, China Earthquake Administration), Mr Jim McGowan (Adjunct Professor, Griffith University), Professor Ning Li (Director, Institute of Disaster and Public Safety, Beijing Normal University). The session was chaired by Professor Russell Trood (Professor of International Relations, Griffith University) and Mr Xusheng Yang (Deputy Director, Relief and Health Department, Red Cross Society of China). The following is a summary of the key themes raised in discussion.

- **How governments coordinate responses to disasters—and how they are perceived to respond to such events—is important in building community confidence and resilience.** Governments are subject to greater scrutiny in this area than ever before, and the examples of Hurricane Katrina and the Fukushima disaster underscore the costs for Governments when planning and response are perceived to be inadequate.

- **China and Australia have in common a large geographical radius and both are highly decentralised in terms of population distribution.** This renders the challenge for governments significant in terms of managing expectations about their capacity to respond and makes ensuring resilience across key sectors of the population at-large a key objective.

- **The Asia Pacific is more disaster prone than any other region in the international system.** Earthquakes are occurring more frequently in the region, which means inter-state cooperation will become increasingly important. ‘Disaster diplomacy’ among states will become a regular feature of countries’ response to these events.

Policy Recommendations

The following issues are regarded as being of key importance in improving Australia-China cooperation in disaster management and recovery:

1. **Necessity to focus on building disaster resilience.** Most governments have tended to focus on disaster response and recovery aspects of disaster management but recent experiences in Australia and China demonstrate the need to develop comprehensive approaches to all phases of disaster management including prevention, preparedness, disaster mitigation as well as response and recovery. This requires coordination between multiple government agencies (e.g. emergency services, planning agencies, relief agencies) as well as NGOs.

2. **Inter-governmental and inter-agency policy frameworks are crucial in ensuring effective disaster management.** They establish structures, responsibilities, routines,
and relationships within and between governments and agencies that support coordination during the prevention and preparedness phases of disaster management, enable effective coordination during the response and recovery phases, and enable policy adaptation and learning in the post-disaster review phase. The development of effective inter-governmental and inter-agency coordination also contributes to positive public perceptions of government competence in both political and administrative terms.

3. **Importance of managing public expectations during disaster response and recovery.** The recent experience of disaster management in Australia and China demonstrates that a key challenge for government and government agencies is to manage public expectations during the response and recovery phases of a disaster event. A central element in managing expectations is to ensure information regarding the disaster event and governmental responses are quickly and effectively communicated to the public so as to establish community confidence in disaster response and recovery operations. This can be achieved through the establishment of emergency operation centres to ascertain on-the-ground information and provide situational awareness to personnel responding to disaster events.

4. **Provision of health, social and psychological measures during recovery phase.** The recent Australian and Chinese experiences of during the disaster recovery phase after the 2011 Brisbane floods and the May 2008 Sichuan earthquake demonstrate the importance of the timely provision of health, social, and psychological services to communities affected by disaster events. The delivery of such services enables communities to more effectively recover from disaster events, assist in the management of public expectations of the response and recovery phase, and improve community resilience.

5. **Establishment of permanent government administered funds for disaster relief and recovery.** The scope and scale of a number of recent disasters in the Asia-Pacific region such as the 2008 Sichuan and 2010 Christchurch earthquakes, the 2011 Fukushima disaster and the 2011 Brisbane floods has underlined the need for the establishment by the regions’ governments of permanent government administered disaster management funds to cover the financial cost of relief and recovery operations. This would be a major contribution to enhancing the resilience of governments and communities by providing accessible funds for targeted relief and recovery operations and infrastructure repair.

6. **Establishment of effective communication with the public during disaster response and recovery.** The dissemination of information to the public through radio, television, print media and social media such as Twitter and Facebook is an important component of ensuring community confidence in disaster response and recovery. The provision of timely and relevant information regarding responses to disasters contributes to positive public perceptions of the political and administrative competence of government and can mitigate politicisation of disaster management during the post-disaster review process.
7. *Incorporation of NGOs in disaster management coordination bodies.* Recent Australian and Chinese experiences in disaster management demonstrate the important contributions that NGOs can make to disaster response and recovery when incorporated into disaster management bodies. The role of Volunteers Queensland during the 2011 Brisbane floods is particularly noteworthy in this respect.
APPENDIX 1 - 2012 Second Track Dialogue Participants

Professor Qifeng Zhou, President, Peking University
Professor Shunong BAI, College of Life Science, Peking University
Hon Mr Robert Borridge AO, Chairman of Rotec Design Limited, Former Premier of Queensland
Professor Cordia Chu, Director, International Centre for Development, Environment & Population Health, Griffith University
Dr Michael Clarke, Research Fellow, Griffith Asia Institute
Professor Kate Darian-Smith, Professor of Australian Studies and History, University of Melbourne
Mr Clinton Dines, Executive Chairman, Caledonia Asia
Associate Professor Dou DING, School of International Studies, Peking University
Dr Peiyi Ding, Business Manager, Tourism Confucius Institute, Gold Coast
Mr Jianguo GAO, Research Fellow, Institute of Geology, China Earthquake Administration
Professor Rongqiao HE, Institute of Biophysics, Chinese Academy of Sciences
Ms Cathryn Hlavka, Minister Counsellor (Education), Australian Embassy
Mr Kevin Hobgood-Brown, Managing Director, Riverstone Advisory
Mr Trevor Holloway, Counsellor (Economic), Australian Embassy
Professor Chengwen HONG, Deputy Director of the Institute of Higher Education, Beijing Normal University
Professor Juan HU, Executive Dean, School of Education, Renmin University of China
Emeritus Professor Zhuanglin Hu, Director, Center for Australian Studies, Peking University
Mr Tim Lane, Chief Adviser - Australia/China Relations, Rio Tinto
Professor Ning LI, Director, Institute of Disaster and Public Safety, Beijing Normal University
Professor Leong Liew, Head of Department, Department of International Business & Asian Studies, Griffith University
Professor Shusen LIU, Deputy Dean, School of Foreign Languages, Secretary General, Centre for Australian Studies, Peking University
Professor Max LU, Senior Deputy Vice Chancellor, University of Queensland
Dr Yanhua LUO, Professor School of International Studies, Peking University
Professor Wanhua MA, Director, Center for International Higher Education Graduate School of Education, Peking University

Professor Wen MA, Executive Director, Asia Pacific Water Security Center (APSCW), Tsinghua University

Professor Colin Mackerras, Department of International Business & Asian Studies, Tourism Confucius Institute, Griffith University

Professor Simon Marginson, Professor of Higher Education, Centre for the Study of Higher Education (CSHE), University of Melbourne

Mr Jim McGowan AM, Adjunct Professor, Griffith University

Mr Bolun NING, Program Officer, Chinese Academy of Science

Professor Ian O’Connor, Vice Chancellor & President, Griffith University

Professor Andrew O’Neil, Director, Griffith Asia Institute

Hon Melissa Parke MP, Federal Member for Fremantle

Professor Haig Patapan, School of Government & International Relations, Griffith University

Professor Xinqiao PING, School of Economics, Peking University

Professor Michael Powell, Pro Vice Chancellor (Business), Griffith University

Dr Geoff Raby, Chairman & CEO, Geoff Raby & Associates, Former Australian Ambassador to the Peoples Republic of China

Ms Michele Robinson, Vice President, Australia China Business Council (ACBC) Qld

Professor Chunchang SHAN, State Council, People's Republic of China

Professor Xiaoguang SHI, Director, Centre for International Higher Education, Graduate School of Education, Peking University

Professor David Shum, Dean (Research) Health, Griffith University

Mr Richard Smith AO, Australian Prime Ministerial Envoy, Adjunct Professor in the School of Government and International Relations, Griffith University

Associate Professor Anne Tiernan, School of Government and International Relations, Griffith University

Associate Professor Susan Trevaskes, Australian Research Council, QEII Research Fellow, Griffith Asia Institute

Dr Russell Trood, Australian Prime Ministerial Envoy and Professor of International Relations, Griffith University
Ms Jen Tyrell, Counsellor (Education and Research), Australian Embassy in China

Mr Qiang WANG, Director, Division of America and Oceanian Affairs, Department of International Cooperation, Ministry of Science and Technology of China

Mr Yongguang WANG, Chief Forecaster and Resercher, National Climate Center of China Meteorological Administration

Dr Yi WANG, Lecturer- Chinese, Griffith Asia Institute

Professor Qiaoling WU, School of Economics, Peking University

Associate Professor Yong XIE, Deputy Director, International Affairs Office, University of Chinese Academy of Sciences

Associate Professor Kaiwen XU, Chief Supervisor, Psychiatrist & Psychotherapist, Counseling and Psychotherapy Center, Peking University

Professor Lan Xu, Deputy Director, Institute of Microbiology, Chinese Academy of Sciences

Professor Zhihong XU, Director, Environment & Planning Research Centres, Griffith University

Mr Xusheng YANG, Deputy Director, Relief and Health Department, Red Cross Society of China

Professor Jianxin Zhang, Vice Director, Institute of Psychology, Chinese Academy of Sciences

Dr Shizhuan ZHANG, Director, Division of Americas & Oceania, Bureau of International Cooperation, Chinese Academy of Sciences

Mr Zijian Zhang, Commissioner, Queensland Government Trade and Investment Office

Professor Feng ZHU, Deputy Director, Center for International and Strategic Studies, Peking University

Professor Xing ZHU, Assistant President and Deputy Director, National Center for Nanoscience and Technology, Peking University
APPENDIX 2: Background Paper Promoting Knowledge and Understanding: Cooperation in Higher Education

Introduction

Over the past 25 years, the internationalisation of higher education and subsequent development of the “knowledge-based economy” has brought education and innovation into the heart of global competition and policy thinking. In order to capitalise on the sharp increases in global student movements and cross-border consumption of higher education services, countries such as Australia and China have significantly reformed their domestic higher education sectors and have actively engaged in international collaborations in their quest to create “world-class” universities. Today, the Australia-China education relationship is comprised of a multi-faceted partnership that is built on a solid foundation of international student flows, exchanges, research collaborations and university partnership agreements. Chinese students comprise about one-third of all international students in Australia, while Australia is the world’s single biggest foreign educator of Chinese students. Despite the remarkable success of this aspect of the relationship, Australia also faces many challenges as it attempts to retain its standing as a preferred destination of choice for Chinese students in the “Asian Century” and grapples with the increased competition from overseas institutions for a larger proportion of the Chinese market.

Part 1: Education Reform in Australia and China

1.1 The Australian Experience

The internationalisation of Australian higher education began with the Colombo Plan in the 1950s, which involved sponsoring thousands of mainly Asian students to study or train in Australian tertiary institutions through a multilateral scholarship exchange program. As many as 40,000 foreign students came to study in Australia on scholarships and fellowships, with many Colombo scholars returning home to become leaders in business and government. Despite the success of the program in building positive bilateral relationships in the Asia-Pacific region via alumni networks, concerns over the growing number of

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private foreign students throughout the 1970s led the Australian Government to launch two inquiries into the overseas students programs in 1982, which recommended the end of the aid approach to international education and the introduction of unrestricted numbers of full-fee-paying international students. A full-fee program for overseas students was subsequently introduced in 1985, and as the emphasis began to shift from educational aid to educational trade, Australia’s education sector began to grow steadily in the 1980s and 1990s. While the number of foreign aid students subsidised by the Australian Government fell from 20,000 in 1986 to 6,000 in 1991, the number of full-fee paying international students rose sharply from 47,000 in 1990 to over 188,000 in 2000. During this period, the Australian Government also began to reduce its public funding of Universities, making Universities increasingly reliant on international student revenue.

By 2005, Australia had become the fifth largest recipient of overseas higher education among OECD countries in 2005. In 2007, there were 254,414 onshore international students in Australia (26% of the total student populace), while the estimated value of Australian exports in all sectors of education was $12.6 billion. In 2009, the number rose to 329,970, with numbers of commencing onshore international students growing at an average rate of 10% between 2006 and 2009. Of these students, over 80% were from Asia, including 21 per cent from mainland China. Australia’s share of the international student market also increased from 5.1% in 2000 to 7.0% in 2009, making Australia the third largest provider of international education services. In 2010, revenue from international students provided 18% of University income, while more than 130,000 Chinese students studied in Australia, about a quarter of the total foreign student population. Between 2010 and 2011, education services as a group became Australia’s largest service export industry, with onshore activity contributing $16.3 billion to the Australian economy.

While international student numbers saw almost uninterrupted growth over two decades from about 30,000 students in all sectors of education in 1990 to 630,700 in 2009 (an average annual increase of 17%), there was a significant downturn in numbers between 2010–11 when only 282,000 student visa applications were lodged in Australia, a decline of

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16 Studies in Australia “International higher education partnerships”
5.1% from 2009–10 and 23% less than the peak of 2008–09. Moreover, while more than 97,000 Chinese students were enrolled in higher education courses in Australia at the end of 2011, just over 3,000 Australian students were studying in China, thereby indicating that the market in international student flows remains decidedly one-sided.

Australia: Overseas Students from China

<table>
<thead>
<tr>
<th>Year</th>
<th>Enrolments from China</th>
<th>Students in Higher Education Institutions</th>
<th>Total Enrolments</th>
<th>Percent from China</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>1,832</td>
<td>42,571</td>
<td>44,403</td>
<td>4.3</td>
</tr>
<tr>
<td>1994</td>
<td>1,649</td>
<td>46,441</td>
<td>58,089</td>
<td>3.6</td>
</tr>
<tr>
<td>1995</td>
<td>1,272</td>
<td>51,994</td>
<td>63,266</td>
<td>2.0</td>
</tr>
<tr>
<td>1996</td>
<td>1,757</td>
<td>53,188</td>
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<td>1997</td>
<td>2,575</td>
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<td>1998</td>
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<td>105,558</td>
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<td>1999</td>
<td>3,292</td>
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<tr>
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<td>239,493</td>
<td>285,764</td>
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<td>2006</td>
<td>51,301</td>
<td>250,794</td>
<td>272,095</td>
<td>20.5</td>
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</table>


1.2 The Chinese Experience

Over the past three decades, the forces of globalization and modernization have also led to substantial changes in China’s educational policy and governance. In 1978, late Chinese leader Deng Xiaoping implemented policies that were designed to increase the number of Chinese students and scholars that would be sent abroad, which at that time only numbered 860. Throughout the 1980s, an increasing number of Chinese Universities began to conduct cooperation and exchange programs with overseas institutions from US, Japan, Germany, France, UK and Canada, and during the early 1990s, former Chinese President

21 Department of Foreign Affairs and Trade, Trade in Services Australia, Canberra, 2011, p. 111.
Jiang Zemin initiated policies that aimed entice China’s highly skilled academic diaspora to return to China.\textsuperscript{26} In January 1995, the former National Education Committee enacted the \textit{Provisional Regulations on Chinese-Foreign Cooperation in Running Schools} in order to speed up the internationalisation process,\textsuperscript{27} and in the same year, the Chinese Government also launched Project 211 which aims to enhance the country’s top 100 institutions by improving their quality of education, scientific research, management and institutional efficiency. In 1998, a more narrowly focused program entitled Project 985 was also introduced, which aimed to create its own version of the US Ivy League or Australia’s “Group of Eight” by announcing that it intended to develop 9 “first-rate universities of international advanced level,” a number that was increased to 39 in 2004.\textsuperscript{28} In 2005, the 111 program was also introduced which aims to recruit Chinese intellectuals from abroad to mainland universities in order to deal with the problem of “brain drain.”\textsuperscript{29}

Over the last decade, the Chinese government has made concerted efforts to open its education market to the world. In July 2001, the Chinese Ministry of Education announced the \textit{Tenth Five-year Plan of China’s National Educational Development} which aimed to develop disciplines that would be recognised internationally and to encourage Chinese universities to strengthen their cooperation with overseas universities.\textsuperscript{30} By 2002, there were 712 Chinese-foreign cooperatively run schools and projects in China, a ten-fold increase from 1995.\textsuperscript{31} In February 2003, the Chinese Government adopted the \textit{Provisional Management Method of Higher Educational Institutions on Running a School Outside China}, and in September 2003, it also adopted the \textit{Regulations of the People’s Republic of China on Chinese-Foreign Cooperation in Running Schools} which was targeted at “strengthening international exchange and cooperation in the field of education and promoting the development of the educational cause.”\textsuperscript{32} By 2004, the Chinese government had approved more than 800 cooperative programs involving 96 Chinese higher educational institutions and overseas institutions, and in 2005, there were more than 1,000 examples of Chinese-foreign cooperation in running schools (CFCRS) and collaborative projects across China’s 28 provinces, autonomous regions, and municipalities.\textsuperscript{33} In 2008, more than 220,000 foreign students were studying in China, while China’s then Education Minister also announced a strategy to bring the number of international students to 2% of the total student body in leading Chinese universities by 2020.\textsuperscript{34} Between 1999 and 2010, the number of international students enrolled in Chinese universities more than doubled, and reached a record of

\begin{footnotesize}
\begin{enumerate}
\item China Education Centre “Project 211 and 985,” \url{http://www.chinaeducenter.com/en/cedu/ceduproject211.php}.
\end{enumerate}
\end{footnotesize}
260,000 in 2010, an 8% increase from 2009.\textsuperscript{35} The number of international students in China also rose by over 400% between 2000 and 2008 and hailed from 184 countries and regions around the world.\textsuperscript{36}

By 2011, China’s share of global university enrolments had more than doubled to 15%, while the number of Chinese Universities has also doubled over the last decade from 1,022 in 2001 to 2,263 in 2011.\textsuperscript{37} The Chinese Government has also set a target of 500,000 foreign students by 2015.\textsuperscript{38}

**Total number of foreign students in China**

![Graph showing the total number of foreign students in China](image)

**Source:** Sinograduate “International Student Numbers,” [http://www.sinograduate.com/international-student-statistics](http://www.sinograduate.com/international-student-statistics)

**Part 2: Individual Research Collaboration**

As the transnational flows of highly skilled individuals continue to increase, the contributions made by academic diasporas and the knowledge networks they sustain have become a key element in encouraging greater international collaboration.\textsuperscript{39}

### 2.1. The Chinese Academic Diaspora

Between 1997 and 2007, 384 university lecturers and tutors and 6,264 researchers came to Australia as permanent arrivals from China, while the numbers of long term arrivals were 784 and 2,589 respectively.\textsuperscript{40} In their study on the Chinese academic diaspora in Australia, Welch and Zhen found that all respondents had established some form of communication and/or collaboration with their mainland counterparts,\textsuperscript{41} with many agreeing that sharing...

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\textsuperscript{36} Sinograduate “International Student Numbers,” [http://www.sinograduate.com/international-student-statistics](http://www.sinograduate.com/international-student-statistics)


the same cultural and linguistic backgrounds contributed to a greater closeness in scholarly communications which in turn facilitated the growth of a reciprocal collaborative partnership.\textsuperscript{42} This finding is also supported by the study conducted by Yang and Qiu, who found that “[i]n terms of how their self-identity affects their life and work at the university and their international collaboration especially with China, there was a clear agreement [that] mainland Chinese remained as part of their self-identity.” However, rather than narrowing the scope of collaboration, most respondents had also managed to develop knowledge networks with both Chinese and non-Chinese counterparts, thereby enabling them to become a “modern kind of cosmopolitan literati that have a great deal to offer to Australia, China and the world.”\textsuperscript{43} Similarly, a study conducted by Hugo found that 74% of respondents were interested in maintaining links with China, 85% had an interest in promoting quality research in China, 69% regularly visited colleagues in China, 59.5% regularly presented academic papers in their home country, and almost two-thirds were conducting active research projects with their mainland colleagues.\textsuperscript{44}

On the other hand, the studies also revealed a number of barriers to enhancing collaboration networks with their Chinese mainland counterparts. These include (a) a perceived lack of development of their particular field of expertise or research area in China;\textsuperscript{45} (b) a lack of coordination and follow-up with mainland counterparts at the administrative level which had the effect of constraining effective scholarly contacts between Chinese expatriate scholars and the home country;\textsuperscript{46} and (c) a lack of research opportunities with mainland Chinese counterparts despite a strong desire by the Chinese knowledge diaspora to engage in such collaborations.\textsuperscript{47}


\textsuperscript{44} Hugo, Graeme, “The Indian and Chinese Academic Diaspora in Australia: A Comparison,” Working Paper No. 7, Paper prepared for the 20th International Conference of the International Association of Historians of Asia (IAHA) held at Jawaharlal Nehru University, New Delhi on November 14-17, 2008, pp. 22-23.


Australia: Permanent and Long Term Movement to and from China of Academics
1997-8 to 2005-06

Source: Hugo, Graeme, “Issues and Options for Enhancing the International Mobility of Researchers – An Australian Perspective,” Paper prepared for OECD Committee for Scientific and Technological Policy (CSTP) and Steering and Funding of Research Institutions (SFRI) Workshop on The International Mobility of Researchers, IEA, Paris, 28th March 2007.

Australia: Permanent and Long Term Movement to and from China of Researchers
1997-8 to 2005-06

Source: Hugo, Graeme, “Issues and Options for Enhancing the International Mobility of Researchers – An Australian Perspective,” Paper prepared for OECD Committee for Scientific and Technological Policy (CSTP) and Steering and Funding of Research Institutions (SFRI) Workshop on The International Mobility of Researchers, IEA, Paris, 28th March 2007.
2.1.2. The Australian Academic Diaspora

The Australian academic workforce has also become increasingly mobile, with over 30% per cent of academics having taken concrete steps to find an academic position in another country.\(^\text{48}\) The numbers leaving on a long term or permanent basis increased from 463 in 1993-94 to 1,514 in 1999-2000, and while the numbers declined slightly in 2001, more academics left Australia permanently in 2002-03 than moved here.\(^\text{49}\) However, unlike the Chinese example, the reasons for these outflows appear to be primarily motivated by necessity. The literature identifies numerous impediments which have impacted on the ability of Australian academics to establish and maintain collaborative links between Australia and themselves and their host country, including (a) “unimaginative” policies and institutions relating to researcher mobility which are too narrowly focused on brain drain/gain rather than “brain circulation”;\(^\text{50}\) (b) a lack of domestic opportunities/bad institutional conditions in Australian universities;\(^\text{51}\) (c) superior research funding and structure in overseas universities;\(^\text{52}\) and (d) a lack of language proficiency in Chinese which has the potential to impede collaborations between Australian academics and their Chinese counterparts.\(^\text{53}\) In their study of the Australian academic diaspora, Fahey and Kenway found that most of the respondents did not like to make a link between their nationality and their intellectual work and did not feel a diaspora-like loyalty to the ‘national interest’ research agenda of Australia. However, the study also found that “most do feel a connection of some sort with their own epistemic community as it exists in Australia and overseas” and would be willing to make more of a contribution if they were given the opportunity to do so.\(^\text{54}\)

Part 3: Institutional Cooperation

Universities play a crucial role when it comes to fostering international collaboration. Since 1990, there has been a steady increase in the number of formal agreements between Australian Universities and International Institutions, culminating with a substantial 7,123 agreements by 2012. Of these agreements, 4,227 new ones have been signed since 2009, while Griffith University had the highest number of agreements in both 2009 (nearly 500) and 2012 (over 600).\(^\text{55}\) Of these formal agreements, 5086 (71%) deal with academic and/or

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\(^{48}\) Bexley, Emmaline; James, Richard and Arkoudis, Sophie, *The Australian academic profession in transition: Addressing the challenge of reconceptualising academic work and regenerating the academic workforce*. Commissioned report prepared for the Department of Education, Employment and Workplace Relations, September 2011, p. 5.


\(^{52}\) Hugo, Graeme, “Issues and Options for Enhancing the International Mobility of Researchers – An Australian Perspective,” Paper prepared for OECD Committee for Scientific and Technological Policy (CSTP) and Steering and Funding of Research Institutions (SFRI) Workshop on *The International Mobility of Researchers*, IEA, Paris, 28th March 2007.


research collaboration, 3951 (55%) with Student exchanges, 3484 (48%) with Staff exchanges, and 1544 (21%) with Study Abroad arrangements. Of these agreements, Study Abroad arrangements have seen the largest increase in formal arrangements since 2003, rising by 81% from 852. Of the top ten countries that have concluded formal agreements with Australian Universities since 2003, China continues to be the top source country for formal agreements, increasing by 72.8% from 514 in 2003 to 885 in 2012.

Number of Formal Agreements between Australian Universities and International Institutions: 1990-2012

Source: Universities Australia, International Links of Australian Universities: Formal agreements between Australian universities and overseas higher education institutions, May 2012, p. 3.

Number of Agreements for Top Ten Countries 2003-2012


3.1 Student/Staff Exchanges

Evidence suggests that many successful international collaborations can be traced to undergraduate student exchanges and the alumni networks that they engender, thereby making it essential that China continues to be a top source country of international students.

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56 Universities Australia, International Links of Australian Universities: Formal agreements between Australian universities and overseas higher education institutions, May 2012, p. 5. 


61 Australian National University, University of New South Wales, University of Melbourne, University of Western Australia, University of Adelaide, Monash University, University of Queensland and University of Sydney.

62 Peking University, Tsinghua University, Fudan University, Shanghai Jiao Tong University, Nanjing University, University of Science and Technology of China, Zhejiang University, Xi’an Jiao Tong University and Harbin Institute of Technology.

63 Group of Eight Australia “Go8-C9 Student Leadership in International Cooperation (SLIC) Project” <http://www.go8.edu.au/university-staff/international-collaboration/slic-project>


67 Universities Australia “Universities Australia announces China-Australia Executive Leadership Program 2011”
At the institutional level, Australian Universities have also entered into numerous collaboration agreements with their Chinese counterparts in order to promote student and staff exchanges. Examples include La Trobe University’s Australia-China Students Forum agreement with Peking University,69 Griffith University’s Outgoing Exchange Program,70 the Australian National University’s Exchange Agreements with Peking and Tsinghua Universities,71 and the University of New South Wales Confucius Institute Formal Exchange Agreements and Practicum Exchange Programs.72

3.2. Collaborative Research Centres

There are currently more than 30 Australian Studies Centres in China’s tertiary education institutions and think tanks.73 The Australia-China Council (ACC) provides funding to a network of more than 20 Australian Studies Centres across China, and in 2003, it entered into a partnership with a consortium of Australian universities to promote Australian Studies in China.74 It also helped to establish the Foundation for Australian Studies in China (FASIC), an independent non-profit foundation in Australia which was created to support Australian Studies Centres located across China.75 Australian Universities have also established dedicated China research centres in order to promote a more comprehensive understanding of China,76 including the Australian Centre for China in the World at the Australian National University (ANU),77 the China-focused Griffith Asia Institute at Griffith University,78 the China Studies Centre at the University of Sydney,79 the Centre for China Studies at La Trobe University,80 and the University of Adelaide’s China-Australia Environmental Science and Technology Institute at the University of Adelaide.81

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68 Chinese Embassy in Australia, “Prime Minister Julia Gillard re-affirmed the strength of Australia’s education relationship with China,” Media Release, 27 April 2011.
69 La Trobe University Centre for China Studies “Australia-China Student Forum”<http://www.latrobe.edu.au/china-centre/educational-cooperation/student-exchange/>
72 University of New South Wales “Confucius Institute Agreements”<http://www.confuciusinstitute.unsw.edu.au/research-china/agreements/>
77 Australian National University “Australian Centre on China in the World”<http://ciw.anu.edu.au/>
80 La Trobe University Centre for China Studies “Academic Collaboration”<http://www.latrobe.edu.au/china-centre/collaboration>
Chinese-Government funded Confucius Institutes are also playing an increasingly prominent role in promoting Chinese language and culture and exchange in Australia. The first Confucius Institute was established at the University of Western Australia in 2005, and there are currently seven such institutions in Australian Universities and ten across the country. However, the proliferation of Confucius Institutes in Australia has also engendered some controversy, with some expressing disquiet about the possibility that the state-owned institutes could exercise undue influence in participating Australian Universities.

3.3 Cooperative Educational Programs

Individual Australian Universities have also entered into more intimate partnership agreements with Chinese universities. In 2004, Australia offered the highest number of cooperative educational programs in China, with 21 Australian Universities offering a total of 50 Bachelors and Masters Degrees. By 2012, the total number of offshore programs offered by Australia had increased to 1,027, while the top five source countries were Malaysia (25%), Singapore (24%), China (14%), Hong Kong (10%) and France (3%). When compared to the 2004 figures, China’s 2012 total of approximately 143 offshore programs constitutes a significant rise in collaborative programs over the last 8 years. The top five Universities that offered the highest number of offshore programs were the University of Canberra, University of Southern Queensland, Curtin University, University of Sydney, and the University of South Australia.

In relation to individual University collaborations, some notable partnerships between individual Australian and Chinese Universities include the Griffith Asia Institute’s partnership with Peking University to conduct the Australia-China Futures Dialogues, La Trobe University’s partnership agreements with over 30 Chinese Universities, and the Australian National University’s collaboration with the China Institutes of Contemporary International Relations which produced the report Australia and China: A joint report on the bilateral relationship in 2012.

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83 La Trobe University, University of New South Wales, University of Adelaide, University of Queensland, University of Melbourne, University of Sydney.
3.4 Global Indicators

Australia currently does not have a University in the top 50 of the *Shanghai Jiao Tong Top 500 Academic Ranking of World Universities*, but it reached somewhat of a milestone in August 2012 when five Universities were included in the top 100 for the first time. These include the University of Melbourne (57), Australian National University (64), University of Queensland (90), University of Sydney (93) and the University of Western Australia (96). Nineteen of Australia’s 39 Universities are also included in the top 500, making it the fourth most successful education system globally. While China does not currently have a University in the *Shanghai Jiao Tong* top 100, the fact that it now has 42 Universities in the top 500 clearly shows that it is well on its way to building “world-class” institutions.

In relation to research output, Australia’s shares of world publications and citations have grown steadily from 2.4% and 2.5% in 1981 to 3.2% and 4.1% in 2009, while China’s shares of publications and citations have increased very rapidly from 0.3% and 0.1% in 1981 to 9.9% and 7.2% in 2009. Both countries have also seen a rise in internationally co-authored publications, with Australia’s proportion rising from 25% in 1996 to 45% in 2009 and China’s proportion rising to between 22% and 27%. Between 1996 and 2009, joint publications between Australia and China grew 20-fold, rising from 114 to 2,295. China was Australia’s 12th highest partner by number of joint publications in 1996, rising to 8th by 2000 and 3rd by 2008. Over that period, Australia also rose from 10th to 6th amongst China’s partners, overtaking France, Italy, Korea and Hong Kong. Australia-China joint publications accounted for about 0.6% of total Australian publications and about 0.8% of total Chinese publications in 1996, growing to 5.5% and 1.7% respectively in 2009.

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Part 4: Long-term Strategies

Both China and Australia have developed numerous long-term strategies which are aimed at enhancing international collaboration and fulfilling the goal of building “world-class” Universities. In October 2010, the Council of Australian Governments (COAG) introduced the International Students Strategy for Australia 2010-2014, which acknowledges that “Australia's relationship with international students deepens our understanding of the world and the world's understanding of Australia, contributing to our regional and global reputation.”97 In July 2010, China announced its Outline of China’s National Plan for Medium and Long-term Education Reform and Development (2010-2020), which reiterates the importance of promoting international exchanges and cooperation,98 while the Chinese Ministry of Education (MoE) also released its Work Priorities for 2012 which include improving the operation of CFCRS and Confucius Institutes, enhancing the experience of overseas students, and improving the quality of University administrations.99 Individual Universities have also adopted long-term strategies, with Griffith University recently unveiling its Griffith 2020 plan which emphasises the importance of strengthening and enhancing Griffith University’s engagement with Asia in research, learning and teaching, and external partnerships.100

100 Griffith University “Strategic Directions: Griffith 2020”
3.1 Challenges and Opportunities

Despite the current efficacy of the Australia-China education relationship and implementation of long-term strategies, the future trajectory of the partnership and ability of both countries to develop “world-class” universities also faces numerous challenges.

In the Australian context, the 2008 *Higher Education Review* found that Australia needed to improve the capacity of individual universities to increase the effectiveness of global collaborations by (a) promoting the international mobility of staff and students; (b) investing more in research; (c) promoting reciprocal student exchanges; (d) attracting a greater proportion of international skilled talent; and (e) opening up current granting programs to international partners and participants.10¹ Similarly, Marginson has argued that Australian Universities will not be able to adequately accommodate the burgeoning international student market unless they introduce a range of internationally competitive scholarship schemes for outstanding full fee undergraduate and doctoral students and post-doctoral scholars and researchers, address poor standards of English preparation and support for commencing international students, and embrace the pedagogical and curricular potentials of intercultural education.10²

In the Chinese context, Liu and Dai argue that China’s main challenge lies in the fact that because “universities in China have just started internationalization, and still have drawbacks of the planning system, international exchanges and dialogues have not been initiated at all levels of universities.”10³ In order to become “world-class” institutions, Chinese Universities will need to (a) diversify their range of research disciplines in order to take full advantage of “cutting-edge” knowledge and to enable Chinese Universities to target and attract high-calibre talent; (b) build up enduring linkages for future collaboration;¹⁰⁴ (c) change the ideology built under the planning system in order to raise the quality of University leadership, administration and management; and (d) learn how to “sell” their universities in the national and international higher education markets.¹⁰⁵

The above-mentioned factors indicate that Australia’s main challenge lies in reinvigorating and diversifying an established education system by embracing “a more plural mission and a more balanced set of objectives, encompassing not just research but the range of cross-border linkages and activities suggested in ‘third wave internationalisation’ strategies, would better serve the nation.”¹⁰⁶ Conversely, China’s main challenge lies in figuring out how to become a more multi-faceted player in the global knowledge economy and in the process embrace a larger international sense of themselves.¹⁰⁷

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Conclusion

According to Ivanov, “China’s move into the cross-border provision of higher education should not only be seen as a looming threat to Australia’s $15 billion international education industry [but] also [as] an opportunity for Australia to capitalise on its existing education-supplier status, while re-calibrating its education relations with China towards a more comprehensive partnership.” The fact that Australia and China have do not share a similar history, culture or political structure does not preclude the fact that both nations place great value on the role of knowledge and universities and share a strong determination to build “world-class” universities in the world. An increase in education collaboration will promote goodwill and encourage trade and investment as well as becoming the basis of future research collaboration, which will in turn improve our respective international reputations as centres for learning, research and innovation. However, in order to achieve this, both the Australian and Chinese higher education sectors will need to build on their successes and broaden the focus of their international education activities in order to produce globally competitive Universities.

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<http://www.confuciusinstitute.unsw.edu.au/research-china/agreements/>


APPENDIX 2: Background Paper - Promoting Material Gains: Economic Relations Today and Future Prospects

Introduction

The Australia-China economic relationship continues to be the cornerstone of the broader bilateral partnership between the two countries.112 Bilateral trade has grown exponentially since the establishment of diplomatic relations in 1973 from less than $100 million to more than $100 billion over the past four decades, while China overtook Japan to become Australia’s largest trading partner in 2007, and became Australia’s largest export market in 2009.113 This rapid increase can be attributed to the many complementarities that underpin the economic relationship: while Australia, as an agriculture and resource-based country, primarily exports wheat, milk and animal product, textile fibres, iron ores and energy products to China (thereby providing resource-hungry China with raw materials for its industrial development), China satisfies Australia’s demand for labour-intensive manufacturing goods (including textiles and clothing, electronic products, and some general machinery) which in turn provides Australia with cheaper goods for consumption.114 However, the relationship has also faced numerous challenges in recent years which may impact on the future trajectory of the relationship, including Australian concerns over Chinese Foreign Direct Investment (FDI).

Part 1: Historical Development of Australia-China Trade Relationship

In the four decades that have elapsed since both countries signed the Trade Agreement between the Government of Australia and the Government of the People’s Republic of China in 1973,115 the bilateral economic relationship has been greatly enhanced by China’s rapid economic development and emergence as one of Australia’s primary trading partners.

1.1 Trade Flows since 1973

Since it implemented its “open-door and economic reform” policy in 1979, China’s economy has been growing at an exponential rate, with its gross domestic product (GDP) increasing from $175.6 billion in 1979 to $4.91 trillion in 2009, averaging a GDP growth rate of 9.5 per cent over the last two decades.116 For a globally integrated, medium-sized economy such as Australia, the gradual opening up of China’s economy to foreign trade and investment throughout the 1980s and 1990s presented an invaluable opportunity to strengthen the existing bilateral trade relationship.117

115 Department of Foreign Affairs and Trade, Australia – China Free Trade Agreement: Joint Feasibility Study, Commonwealth of Australia, March 2005, p. 5.
By the end of the 1990s, Australian merchandise exports to China totalled $4 billion, while exports to China accounted for only 5% of total Australian exports. However, merchandise exports to China have risen steadily since then, reaching $18 billion (11%) in 2004, $24.8 billion in 2006-07, and $42.4 billion in 2009, an increase of 31.2% from 2008. In 2004, China replaced the U.S. to become Australia’s second largest merchandise export market after Japan and accounted for 10% of Australian exports, and in 2007, China became Australia’s largest trading partner, with exports and imports reaching a combined total of $52.7 billion compared with Japan’s total of $50.6 billion. In 2009, China surpassed Japan to become Australia’s largest export market. China also became Australia’s second largest source of imports in 2004, with merchandise imports reaching $29.2 billion in 2009, up from $9 billion in 2000.

Since 2005, two-way trade has increased at an annual growth rate of 20.2% per annum, while exports of goods and services have increased at an annual rate of 27.3% and imports have increased by 12.7% per annum. In 2010, Australia’s trade in goods and services with China had reached $105.3 billion (up 23.6% from 2009), while exports of goods and services to China grew to $64.4 billion (up 34.3%) and imports grew to $41.0 billion (up 10.0%).

China has maintained its status as Australia’s largest individual two-way goods and services trading partner, accounting for $121.1 billion (19.9%) of total trade in 2011, and has remained Australia’s largest export market, accounting for 24.6 per cent $77.1 billion (24.6%) of total exports. China also continues to be Australia’s largest import source, accounting for $43.9 billion (14.9%) of total imports in 2011.

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125 Department of Foreign Affairs and Trade, Australia’s Trade with East Asia: 2010, August 2011, p. 3.
126 Department of Foreign Affairs and Trade, Composition of Trade Australia: 2011, July 2012, p. 5.

Source: Department of Foreign Affairs and Trade, Composition of Trade in Australia, 2011, p. 5.

Source: Department of Foreign Affairs and Trade, Australia’s Trade with East Asia, 2010, p. 7.
The above figures make it clear that the Chinese and Australian economies have reached a high level of complementarity, with expectations for further growth and development. Between 1972 and 2006 alone, the total merchandise trade between Australia and China increased at an average annual growth rate of 18.5% (year-on-year), around twice that for total world trade (around 9.8%) over this period. However, the relationship has also become increasingly unequal in terms of trade flows. Between 1972 and 2006, the import dependency of Australia on China increased from 0.74% to 9.85%, while export dependency increased from 1.18% to 13.77%, suggesting that the Australian economy has become increasingly dependent on the Chinese economy in recent decades. On the other hand, the import dependency of China on Australia only increased from 0.84% to 1.99% during the same period, while export dependency actually fell between 1972 and 2006.

1.2 The Resources Boom

Over the last decade, the biggest growth area in Australia’s bilateral trade relationship with China has been the trade in resources, including raw materials, metals and minerals. With its abundant resource and energy stores, Australia has benefitted greatly from China’s growing demand for resources and has become a major exporter of raw materials and primary commodities to China.

Between 2001 and 2011, Australia’s total exports of resources increased three-fold from $57.1 billion to $190.5 billion, while their share in total exports rose from 36.2% in 2001 to 60.8% in 2011 at an average growth of 15.0% per annum. During this period, the proportion of total resources exports that went to China also increased from 7.3% to 33.1%. Between 2009 and 2010, more than 85% of Australian merchandise exports to China comprised primary products, with Iron ore and concentrates accounting for around $25 billion (54%) of the $46.4 billion of total merchandise exports to China. China has been Australia’s largest market for Iron ore since 2004, accounting for $34.7 billion in 2010 (an increase of 59.2% from 2009) and $44.3 billion in 2011, or 68.7% of the total market. Between 2009 and 2010, exports in Lead, Zinc and Manganese also rose by 54.7% to $2.1 billion in 2010, while Crude petroleum rose by 109.5% to $1.7 billion. Thermal Coal exports have risen from 1.5% in 2007 to 12.7 per cent in 2011, while Metallurgical Coal exports have been more volatile, surging from 0.9% of the value of exports in 2008 to 17.6% in 2009 only to fall back to 8.1% in 2011. Over the last decade, Australia has also entered into numerous arrangements with China for the export of Liquefied Natural Gas (LNG) to

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130 Foreign Affairs, Defence and Trade References Committee, Opportunities and Challenges: Australia’s Relationship with China, November 2005, pp. 35-36.
131 Department of Foreign Affairs and Trade, Composition of Trade Australia: 2011, July 2012, p. 7.
133 Department of Foreign Affairs and Trade, Australia’s Trade with East Asia: 2010, August 2011, p. 3.
134 Department of Foreign Affairs and Trade, Composition of Trade in Australia, 2011, p. 17.
135 Department of Foreign Affairs and Trade, Australia’s Trade with East Asia: 2010, August 2011, p. 3.
136 Department of Foreign Affairs and Trade, Composition of Trade in Australia, 2011, p. 17.
China; in 2002, Australia and China also signed a US$13.75 billion deal to export up to AU$1 billion of LNG to the Guangdong LNG project each year over a twenty-five year period, while a further US$35 billion large-scale twenty-year natural gas contract was signed in 2007.  

While the growing Chinese demand for resources has clearly been beneficial for Australia, its increasing reliance on China as an export market also raises the question of how sustainable this approach is in the long-term. The recent report *Australia & China: Future Partnerships 2011* indicates that energy and natural resources will remain the cornerstone of the Australia-China economic relationship as Chinese demand for Australia’s natural resources and energy exports continues to grow, thereby presenting opportunities for greater cooperation between Australia and China in trading, business and investment in the resources and energy sector. However, an analysis by Deloitte Access Economics in July 2012 also predicted that the mining boom will end in two years because no new mining projects are planned to go ahead in the near future. Such forecasts highlight Australia’s vulnerability and reinforce the need to diversify its economic relationship with China in order to make it more sustainable for the future.

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Part 2: Foreign Direct Investment

In recent years, the level of Chinese foreign direct investment (FDI) in Australia has become an increasingly prominent feature of Australia’s economic relationship with China. While these investments have been largely welcomed, concerns have also been raised about the potential risks that may be associated when Chinese State-Owned Enterprises (SOEs) make investment bids in Australia.

3.1 Australian Investment in China

In 1988, Australia and China entered into an Agreement on the Reciprocal Encouragement and Protection of Investments, thereby setting the scene for potential future economic growth in foreign direct investment. However, while Australia was the fourth largest foreign investor in China in the years that followed the implementation of China’s “open door” policy in 1979, Australian investment in China has since lagged substantially behind trade. At the end of 2008, total Australian investment in China only reached $6.9 billion, making it Australia’s 14th largest investment destination. In 2009, China accounted for only 0.7% of Australia’s outward FDI stock.

The Australian Business Foundation Report Engaging China: The realities for Australian businesses suggests that Australia’s continuing failure to invest more in China may reflect the complementarity, rather than competitive, nature of the two economies because “relatively few Australian and Chinese sectors have natural synergies, which may discourage investment.” Potential deterrents include restraints on foreign investment in many sectors where Australia has expertise to offer China (such as mining, financial services and broad acre agribusiness), regulatory and other impediments, a lack of awareness of business opportunities, high-profile investment failures in the 1990s, and perceptions that the Chinese business environment is too complex, highly competitive and challenging.

Australia’s Outward FDI Stocks (2009)

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3.2 Chinese Investment in Australia

While China embarked on a ‘go global’ strategy for outward foreign direct investment (OFDI) in 1999,\(^{146}\) Chinese FDI investment in Australia has also remained relatively low despite a significant rise in investments in the resources sector over the last few years.

In 2006, China’s outward FDI in Australia amounted to only $908 million\(^{147}\), while the accumulated stock of Chinese investment in Australia stood at $3.5 billion (0.25% of total stock), making it Australia’s 17th most important foreign investor.\(^{148}\) However, Chinese firms also began to invest heavily in Australian enterprises around this time, and were responsible for investing $532 million in 2007, $1.892 billion in 2008 and $2.436 billion in 2009. Similarly, Foreign Investment Review Board (FIRB)-approved Chinese FDI rose to $10 billion between 2005 and 2007 (80% of which was targeted at the minerals and resources sector),\(^{149}\) and to $26.6 billion in 2008-09, putting China in second place in terms of the value of total approvals.\(^{150}\) By the end of 2009, Australia was the fourth-largest destination for Chinese FDI with its stock reaching $5.863 billion, while that year also witnessed several major Chinese acquisitions in the Australian resources sector, including Yanzhou Coal’s acquisition of Felix Resources for $3.3 billion, Minmetals’ acquisition of OZ Minerals for $1.3 billion, and Valin’s investment of $1.28 billion in the Fortescue Metals Groups (FMG).\(^{151}\)

Despite this rapid growth in approved investments, Chinese FDI in Australia still amounted to less than 1.8% of Australia’s total FDI stock in 2009, although this still constituted a 70% increase from 2008.\(^{152}\) By the end of 2009, the value of the stock of realised Chinese investment in Australia amounted to only $16,637 million (including $9,167 million of FDI), while the value of realised Australian investment in China was $6,327 million (including $2,347 million FDI).\(^{153}\) And while the total stock of Chinese FDI reached a record $507 billion in 2011 (up 6.6% from 2010), marking the highlight of a consistent period of growth that has seen Chinese FDI in Australia increase by annual average growth rate of 90% from 2006 to 2011,\(^{154}\) it still only makes up around 3% of total FDI in Australia.\(^{155}\)

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\(^{146}\) Larum, John, *Chinese Perspectives on Investing in Australia*, Lowy Institute for International Policy, June 2011, p. 4.

\(^{147}\) Huang, Xueli and Austin, Ian, *Chinese Investment in Australia Unique Insights from the Mining Industry*, Palgrave Macmillan, New York, 2011, p. 27.


\(^{149}\) Drysdale, Peter “China as a new foreign investor,” Senate Economics References Committee, July 2009, p. 4.


\(^{151}\) Huang, Xueli and Austin, Ian, *Chinese Investment in Australia Unique Insights from the Mining Industry*, Palgrave Macmillan, New York, 2011, p. 27.


\(^{154}\) Australian Trade Commission “Australia – one of the world’s leading investment destinations,” 9 May 2012, p. 1.


2.3. Recent Controversies

Over the last few years, there has been a distinct shift in the way that Chinese FDI has been perceived in Australia, with some suggesting that the benefits are outweighed by the potential risks that such investments could pose to Australia’s “national interest.” Three particular investment projects that have excited controversy include Chinalco’s investment in Rio Tinto, Sinosteel’s takeover of Midwest and its bid for Murchison, and China Minmetal’s purchase of OZ Minerals. In the case of Chinalco and Rio Tinto, the deal was approved by the Treasurer after protected negotiations, but only on the proviso that Chinalco would not raise its shareholding without fresh approval above 14.99% and would not seek to appoint a director to Rio Tinto. Similarly, China Minmetal’s purchase of OZ Minerals was made subject to a number of legally enforceable undertakings (operating the acquired mines as a separate business with commercial objectives, operating the mines using companies incorporated, headquartered and managed in Australia, and pricing all off-
take on an arms-length basis) while an earlier takeover proposal that included Prominent Hill, which is located in the Woomera Prohibited Area, was not approved on national security grounds.\textsuperscript{156}

Another source of concern for Australian policy-makers is that the new wave of Chinese investment has emanated largely from State-Owned Enterprises (SOEs), which has led to suggestions that the Chinese state is attempting to exercise undue influence in Australia. The Australian government has responded to these concerns by strengthening its policy on screening foreign investments, and in February 2008, it announced a new set of guidelines that cover investment applications by SOEs.\textsuperscript{157} Under the amended \textit{Foreign Acquisitions and Takeovers Regulations 1989 (Cth)}, investments by foreign governments and their agencies, such as SOEs and Sovereign Wealth Funds, must be reviewed by the FIRB and approved by the federal treasurer irrespective of the investment size and must also pass the “national interest” test.\textsuperscript{158}

The guidelines and subsequent policy decisions by the Australian Government have been viewed by many Chinese investors as being unnecessarily restrictive because they limit the stake in Australian natural resources companies\textsuperscript{159} and appear to actively discriminate against government-owned entities.\textsuperscript{160} In July 2012, Opposition leader Tony Abbott reignited the debate when he stated that “it would rarely be in Australia’s national interest to allow a foreign government or its agencies to control an Australian business,”\textsuperscript{161} thereby suggesting that this issue will not be resolved anytime soon. Nevertheless, the fact that the Australian Government approved over 160 proposals for Chinese investment in Australian businesses between 2007 and 2010 (the number has since risen to 380) totalling $60 billion, with only five being made subject to conditions, undertakings or amendments\textsuperscript{162} also suggests that Chinese FDI in Australia will continue to grow over the next few decades regardless.\textsuperscript{163}

In order to facilitate greater cooperation in this area, both countries need to make a concerted effort to strike a balance between making their domestic FDI frameworks more open and transparent and protecting their interests.\textsuperscript{164} If these issues are not successfully resolved, they may “give rise to investment-related tensions that can escalate into more

\textsuperscript{157} Drysdale, Peter “China as a new foreign investor,” Senate Economics References Committee, July 2009, p. 6.
\textsuperscript{158} Huang, Xueli and Austin, Ian, \textit{Chinese Investment in Australia Unique Insights from the Mining Industry}, Palgrave Macmillan, New York, 2011, pp. 52-53.
\textsuperscript{161} The Hon. Tony Abbott MHR “Working Harder on a complex relationship,” Address to AustCham, Beijing, China, 24 July 2012.
serious problems for the overall Australia-China relationship, especially when compounded by differences on other issues.”

**Part 3: State-Based Initiatives**

Away from the Federal economic framework, Australian States have also engaged in various economic collaborations which have further enhanced the Australia-China bilateral relationship. In particular, the resource-rich states of Queensland and Western Australia have made a concerted effort to build bilateral ties with their Chinese counterparts.

### 3.1 Queensland

China (including Hong Kong) is Queensland’s second largest merchandise trading partner. In 2010-11, total two-way merchandise trade between China and Queensland was valued at $11.3 billion, an increase of 2.9% from 2009–10. Queensland’s merchandise exports to China were valued at $6.8 billion, while merchandise imports were valued at $4.5 billion. Services exports from Australia to China were valued at $5.8 billion in 2009–10, accounting for 11.0% of Australia’s total services exports.

![Figure 6: Top 10 Queensland merchandise export destinations](image)


In 1988, the *Queensland China Council* was established in order to facilitate commercial, cultural, educational, scientific and technical interchange between Queensland and China. This was followed in 1989 by the signing of a *Memorandum of Agreed Cooperation* between Queensland and its sister city Shanghai, with the aim of further developing bilateral trade, economic and cultural relations and mutual understanding. In January 1999, the Queensland Government and Jiangsu Provincial Government jointly signed the *Memorandum of Understanding between Jiangsu Provincial Government and State Government of Queensland Regarding Business Co-Operation* (MOU) with the aim of

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165 Larum, John, *Chinese Perspectives on Investing in Australia*, Lowy Institute for International Policy, June 2011, p. 3.

166 Trade & Investment Queensland “Queensland’s Trade with China”


167 Queensland China Council “About Us”

facilitating the Memorandum is to facilitate the enhancement of commercial relationships and co-operation between the State of Queensland and the Province of Jiangsu.  

In 2004, the Queensland Government signed an *Economic Cooperation Memorandum of Understanding* (MOU) with China’s Guangdong Province, which was replaced with a *Friendship State Agreement* in 2008. The Friendship Agreement identifies areas of mutual interest including trade and investment in infrastructure, building materials and professional services; medical biotechnology and clinical trials; education and training; agribusiness; and energy, climate change and water resource management. It also led to the creation of the *Bridge to China* initiative, which is aimed at providing opportunities for Queensland businesses to share experiences with other successful exporters to the Greater China Region. In March 2010, thirteen Queensland companies participated in the first Green Building mission to China, which included Hong Kong and the cities of Foshan, Guangzhou, Changsha and Shanghai, while in September 2010, forty-eight Queensland companies and organisations participated in one of the largest trade missions to Guangzhou to attend the annual China International Small and Medium Enterprises Fair. In June 2011, Queensland signed a statement of intent for the development of international collaborations with His Excellency Xu Ming, Vice Governor of Jiangsu Province. In 2010–11, *Trade & Investment Queensland* also assisted Queensland companies to secure $123.9 million in export sales to China and Hong Kong.

In the policy document *Strengthening the Queensland economy through global markets: Queensland Trade and Investment Strategy 2011–2016*, the Queensland government stated that “[t]he increasing wealth of Asia, particularly China and India, can be a source of prosperity for Queensland. But this will depend on Queensland firms creating and providing the goods and services these markets want, and being able to compete with the rest of the world to supply them”. This indicates that Queensland is determined to build stronger bilateral ties with China on its own volition in the near future.

### 3.2 Western Australia

China is Western Australia’s largest trading partner and the trade relationship continues to flourish. Western Australia is responsible for exporting 70% of Australia’s national exports to China, while 80% of Chinese investments are also conducted there. Two-way

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merchandise trade with China was worth $19.2 billion in 2007–08, while Western Australia also accounts for more than 60% of Australia’s merchandise exports to China. Western Australia’s goods exports to China were worth $17.4 billion in 2007–08 and have grown by an average 29% a year over the past decade. China is also Western Australia’s 5th largest goods import source, with total imports from China being valued at $1.9 million in 2007–08. In 2006, Western Australia’s North West Shelf Venture also obtained a contract to supply the Guangdong Liquefied Natural Gas Terminal with between 3-4 million tonnes of LNG a year for 25 years.175


The Western Australian Government established a sister state relationship with Zhejiang Province in 1987, while Perth and Nanjing established a sister city relationship in 1998. Other sister city agreements also exist between Bunbury and Jiaxing (Zhejiang Province), Joondalup and Jinan (provincial capital of Shandong Province), and Cockburn and Yueyang (Hunan Province).176 Western Australia and Zhejiang enjoy particularly strong bilateral ties and frequently engage with one another via the Western Australia-Zhejiang Exchange Committee, annual public servant exchanges and numerous Memorandums of Understanding, including an agreement between the WA Department of Agriculture and Food and Zhejiang University to develop a barley crop tolerant of Australian conditions.177 The massive volume of resources exported from WA to China will ensure that China will continue to have a close relationship with the state, and consequently, WA will continue to provide ample investment and collaboration opportunities over a growing range of areas.178

In September 2011, WA Premier Colin Barnett and NDRC Chairman Zhang Ping signed a Memorandum of Understanding on the Promotion of Investment Cooperation (MOU) which aims to enhance the “significant interdependence, complementarily and cooperation potential between the State of Western Australia of the Commonwealth of Australia and the People's Republic of China in resources, resources-related technologies, agriculture, and general trade and investment.” The MOU also established a China-Western Australia Investment Facilitation Working Group, which will bring Western Australian and Chinese officials together annually to identify key growth sectors and opportunities for joint development initiatives and opportunities to establish alliances between Chinese and Western Australian businesses. While the deal was criticised for appearing to bypass federal oversight, the fact that this is the first time that China has entered into such a pact with a state or provincial government anywhere in the world it also evidences the ability of individual states to build separate bilateral relationships with China, especially when it comes to the highly disputed area of foreign direct investment.

### Part 4: The Future trajectory of the Australia-China Economic Relationship

In an address to the National Press Club in April 2012, the Hon. Dr. Craig Emerson MP stated that China “is a big part of the Asian success story [and] will be a big part of Australia's future success.” He also emphasised that the Australia-China economic relationship can be both deepened and broadened by diversifying further into exports of agricultural and manufactured goods and of services such as education, tourism, financial services, logistics, architecture and design and entertainment.

According to the report Australia and China: A Joint Report on the Bilateral Relationship, this process of diversification beyond existing economic complementarities will be a key characteristic of the future relationship. In relation to resources, a shared understanding of the challenges of global resources and energy security in the 21st century will become an increasingly important prerequisite to greater collaboration and partnerships between Australia and China, which will in turn facilitate the growth of emerging industries focusing on clean energy sources, energy efficiency, environmental protection and biotechnology. Similarly, while the mining boom will continue to accelerate beyond the short term, Chinese investment in Australia will increasingly expand beyond the mining sector while China has the potential to become a major overseas expansion destination for Australian financial companies in emerging fields. However, the report also states that differences and friction between the two countries will also become more apparent,

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182 Hon. Dr. Craig Emerson MP “Why China is important to us,” Address to the National Press Club, 3 April 2012. [http://trademinister.gov.au/speeches/2012/ce_sp_120403.html]

especially when it comes to commodity products of economic and strategic importance.\textsuperscript{184} Nevertheless, if concerns over Chinese FDI can be successfully addressed, then the combination of China’s financial resources and Australia’s mineral resources “could yield the world’s most important mining capital market.”\textsuperscript{185}

**Conclusion**

The current transformational shift in the global centre of economic gravity from Europe and the United States to Asia is the defining feature in what has been dubbed the 21st “Asian Century.”\textsuperscript{186} In this environment, the prospects for further growth in the breadth and depth of the commercial relationship are excellent. China is Australia’s largest trading partner and will probably remain so for the foreseeable future,\textsuperscript{187} while the economic complementarities that have underpinned rapid growth in trade over the past four decades are also likely to be maintained and enhanced.\textsuperscript{188} Opportunities abound for greater constructive engagement in the resources and energy sector and beyond,\textsuperscript{189} which will in turn strengthen the already strong economic and political ties that define the Australia-China bilateral relationship.\textsuperscript{190} Based on these considerations, it is clear that the strategic partnerships that arise from greater economic engagement between the two nations will also determine our prosperity in the decades ahead.\textsuperscript{191}

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\textsuperscript{186} Hon. Dr. Craig Emerson MP “Why China is important to us,” Address to the National Press Club, 3 April 2012. <http://trademinister.gov.au/speeches/2012/ce_sp_120403.html>


\textsuperscript{189} KPMG International and University of Sydney, *Australia & China: Future Partnerships 2011*, KPMG International Cooperative, 2011, p. 52


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APPENDIX 4: Background Paper - Emerging Areas of Closer Cooperation 1: Science Partnerships and Engagement

Introduction

In the three decades that have passed since the treaty-level Australia-China Science and Technology Cooperation Agreement was signed in May 1980, Australia’s bilateral science and research relationship with China has grown to feature prominently in the relationship. Both countries now share a strong, longstanding, and productive science and research partnership that is consistently reinforced by regular high-level visits between political leaders and Australian and Chinese Science Academy leaders, while Chinese and Australian institutions and universities have become prolific partners in ground-breaking scientific endeavours. China is currently Australia’s third highest partner in terms of research and development (R&D) and joint scientific publications, while Australia is China’s sixth highest partner. Both countries have made significant investments in joint research over the years in a diverse array of areas such as medical research, disaster management, biodiversity, water conservation, food security, wireless communications, and new alloys for manufacturing and clean energy. Moreover, each country’s commitment towards a radical shift in priorities from “imitation” to “invention” over the last 40 years has enabled it to build a relationship built on world-class scientific strengths and complementary intellectual traditions that will continue to flourish in the decades to come.

Part 1: Developments in Science & Technology

The landscape of innovation has changed dramatically over recent years as the R&D process has become increasingly globalized. The centre of gravity of growth in science and technology (S&T) has also progressively moved away from the U.S and Japan towards Asia. According to United Nations Educational, Scientific and Cultural Organization (UNESCO) data, the Americas and Europe are declining, Africa and Oceania are flat, and Asia is rising in term of their share of total global expenditure on R&D, publications and patents, with the report concluding that “one would expect [Asia] to become the dominant scientific continent in the coming years.” This has in turn increased the impetus of countries such as Australia to engage in international collaborations with emerging S&T leaders such as China.

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192 Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE), Science and Research Collaboration between Australia and China, Canberra, 2012, p. 3.
1.1 Australia

In the 1970s, R&D spending in Australia was relatively low, while the 1980s saw business sector expenditures increase as the Government share of R&D spending began to fall. However, since the second half of 1990s, the Australian Government has shown a greater willingness to invest in R&D and to encourage innovation in order to produce new products and services and has also launched a number of inquiries and reports that are aimed at improving Australia’s innovation capacity. In December 1997, the government released the Investing for Growth statement which increased support for business innovation by providing $1.26 billion over the four years from 1998-99, with additional funding for R&D grants, venture capital and technology diffusion, and in January 2001, the Australian Government announced a five-year $2.9 billion comprehensive and integrated package of funding for science and innovation in the report Backing Australia’s Ability: an Innovation Action Plan for the Future, with the aim of ensuring that “Australia’s research base—the backbone of the innovation system—remains strong and internationally competitive.”

In 2009, increased international collaboration in S&T was identified as one of the seven National Innovation Priorities in the Australian Government’s policy document Powering Ideas: An Innovation agenda for the 21st Century, and in June 2010, the House of Representatives Standing Committee on Industry, Science and Innovation released the report of its inquiry into Australia’s International Research Collaboration which held that “[c]ollaboration at the international level is not only desirable, but an absolute necessity.”

The government’s response to the House of Representatives Committee review acknowledged that “improved Australian Government coordination of Australian international research activities is essential for Australia to benefit from international research and development, and to facilitate technology uptake by Australian industry,” and concluded that “international science engagement is essential to maximise the economic, social and environmental impact of Australian research and to leverage Australia’s investment in science and innovation.”

In 2011, he Australian Government released the Australian Innovation System Report, which also highlights the importance of international engagement to ensuring that national science and innovation policy supports the capturing of benefits for Australia.

While Australia has made a concerted effort to formulate more effective policies on international collaboration, domestic spending on R&D has been growing much more slowly in Australia than in many other countries. Since 1996, Australia’s overall R&D spending has only grown at an average rate of 8%. In 2004, Australia’s investment in R&D, higher

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202 House of Representatives Standing Committee on Industry, Science and Innovation, Australia’s International Research Collaboration, Canberra, June 2010, p. 2


205 Australian Academy of Science, Australian Science in a changing world: innovation requires global engagement, Position Paper, Canberra, November 2011, p. 16.
education and information and communication technologies was below the Organisation for Economic Cooperation and Development (OECD) average, while Australian Government expenditure on science and innovation was 22% lower as a share of GDP in 2007–08 than it was in 1993–94.\(^{206}\) However, Australia’s Government-funded Gross Expenditure on R&D (GERD) to GDP ratio had also increased to 0.77% by 2008, placing it 6th among OECD countries.\(^{207}\) Moreover, Australia’s overall investment in R&D has also grown steadily over the last decade and reached 2.21% of GDP in 2008-09, while GERD also reached $27.7 billion in 2008–09, the result of a compound annual growth rate of 12% over the last ten years.\(^{208}\) The Commonwealth science and innovation budget was also increased from $6.56 billion in 2007–08 to $6.88 billion in 2008–09, a rise of 5%, amount that was increased by 25% to $8.58 billion in 2009-10.\(^{209}\) Despite this growth, Australia’s expenditure on R&D was still just below the OECD average, and well below leading nations of comparable size.\(^{210}\)

### Australia: Gross expenditure on research and development, 1998–99 to 2008–09

![Graph showing gross expenditure on research and development](image)


For its size, Australia is a prolific producer of world-leading scientific publications. With only 0.3% of world population, Australia produced over 3% of total world scientific publications in 2008, with an even higher share (4%) of the world’s highly cited (top 1%) publications,\(^ {211}\) rising to 3.24% in 2009 which gave it a ranking of 9th among OECD countries. In terms of


research output relative to underlying research capacity, the 402 publications per thousand researchers produced in 2009 ranked Australia 7th in the OECD. However, in terms of citations per publication, Australia was ranked 18th in the OECD over the five year period 2005–09 despite a 5% increase in citations of Australian research compared with the baseline period.  

1.2 China

Following the adoption of the “Open Door” policy in 1978, China began reforming its R&D funding system by making the modernisation of S&T one of the key pillars of the “Four Modernizations.” Between 1978 and 1985, numerous policies were initiated for this purpose, including the Outline of the National Science and Technology Development Plan (1978–1985), Main Tasks of Scientific and Technological Research, and a National Plan for Basic Science and a National Plan for Technological Sciences. In 1981, the National Leading Group for Science and Technology of the State Council was established in order to further strengthen scientific management.  

During the first phase of development (1985-1992), a systematic reform of the entire national innovation system began in March 1985 with the introduction of the Structural Reform of the Science and Technology System. During this period, China also established the National Natural Science Foundation of China and initiated the National High-Tech R&D Programme (863 programme) with the main aim of creating high-tech industrial development zones and encouraging the development of technology-based enterprises. The second phase (1992-1998) was aimed at accelerating and diversifying the reform process. In 1995, the Decision on Accelerating the Progress of Science and Technology was issued, followed by the Law on Promoting the Transformation of Scientific and Technological Achievements in May 1996. Concerned with China’s inadequate investment in basic research, the government also launched the National Key Basic R&D Programme (973 programme) in March 1997 with the purpose of supporting cutting-edge science projects in selected fields such as biology, mathematics, astronomy, and chemistry. The most recent phase has been aimed at consolidating China’s innovation system in order to enable it to compete in the global knowledge economy, as exemplified by the initiation of the Knowledge Innovation Programme (KIP) in June 1998 by the Chinese Academy of Sciences aimed at transforming it into a scientific research base of international standing; the Innovation Fund for Technology-based Small Enterprises in June 1999; and the Chinese...

Government decision on *Strengthening Technological Innovation to Develop and Industrialize High-tech* in August 1999.\(^{219}\)

Over the last decade, China has capitalised on the success of these reforms by transforming itself into one of the world’s leading producers of high quality science, facilitated by rapidly increasing budgetary support.\(^{220}\) In 2001, the government launched the *International Science and Technology Co-operation Programme* (ISTCP), which saw its budget increase from 100 million Yuan to 400 million Yuan in 2008.\(^{221}\) In 2005, the government issued the *Outline of the Medium- and Long-Term Plan for National Science and Technology Development* (2006–2020) which emphasised China’s desire to become an globally recognised innovator by raising the level of China’s R&D intensity to 2.5 per cent of its GDP by 2020,\(^{222}\) reducing China’s dependence on imported technologies to 30%, improving the contribution to economic growth made by technological advances to 60%, and joining the world’s top five countries in terms of number of patents granted for domestic inventions and citations in international science papers.\(^{223}\) In 2006, it issued the *Outline for the Eleventh Five-Year Plan for Implementing International S&T Cooperation* to diversify the fields covered by co-operation and improve the effectiveness of these partnerships.\(^{224}\) In 2008, the three main S&T programmes received a government allocation of 5.6 billion Yuan or US$ 805.2 million (863 programme), 5.1 billion Yuan or US$ 729.5 million (National Program for Key Technology R&D) and 1.9 billion Yuan or US$ 273 million (973 programme) respectively, while the *International S&T Co-operation Programme* also received 400 million Yuan. The *National Natural Science Foundation of China* also increased its project funding for basic research from 4.1 billion Yuan in 2006 to 6.3 billion Yuan in 2008,\(^{225}\) while the budget for its special fund for international S&T co-operation had nearly doubled by 2008 from 63.9 million Yuan to 144.4 million Yuan.\(^{226}\)

Because of these reforms and initiative, China’s scientific stature has rapidly risen, and in less than a decade, China has become one of the world’s biggest spenders on R&D. Since 1996-97, China’s overall research and development expenditure has been growing at a rate of 22% per year, while growth in business spending on R&D has been growing at a rate of 28% per year.\(^{227}\) Between 2000 and 2008, China’s GERD leapt from 89.6 billion Yuan (US$ 10.8 billion) to 461.6 billion Yuan (US$ 66.5 billion), while the ratio of GERD to GDP likewise

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increased from 0.90% to 1.54%. In 2011, China’s investment in R&D alone accounted for 13% of the OECD total in 2008, up from 5% in 2001. China’s expenditure on R&D has been growing at a rate of more than 18% per year – vastly more than the other top three R&D spenders (the US and Japan), which have grown 2.9% per year in real terms. China has set a target of raising R&D intensity to 2.5% or above by 2020. However, the share of GERD devoted to basic research actually dropped in China between 2004 and 2008 from 5.96% to 4.78%, even if expenditure on basic research nearly doubled from 11.72 to 22.08 billion Yuan over the same period.

China’s Gross Domestic Expenditure on R&D (1996-2006)

![Graph showing China's Gross Domestic Expenditure on R&D (1996-2006)]

Source: Ministry of Science and Technology of the People’s Republic of China (MOST), *China Science & Technology Statistics Data Book*, 2007, p. 3.

China has also become one of the world’s most prolific countries for scientific authorship. In 2000, it ranked eighth in the world, and by 2007, it had climbed to third place. Over the same period, the number of scientific papers published by Chinese researchers nearly tripled from 30,499 to 89,147, representing an average growth rate of 17.3%. However, the average citation rate for Chinese papers in the Essential Science Indicators database during the period 1999–2008 was only 4.61, which indicates that there is still a gap in the quality of scientific publications between China and the world leaders in S&T.

1.3 Comparing Australia and China’s R&D Performance

A comparative analysis of Australia and China’s research intensity reveals that both countries have increasingly embraced the fact that R&D is a vital component of ensuring their future prosperity. In 1998, Australia’s research intensity was 67% of the OECD

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average and China’s just 31%, but by 2008, the figures had risen to 95% and 63% respectively. China has become one of the largest investors in research and development and sources of scientific publications, while Australia has become one of the most prolific producers of scientific publications per capita. Although Australia and China both devote a smaller proportion of GDP to R&D than the OECD average, both countries have been increasing this relative investment faster than the average growth in OECD countries. By 2008, the figures had risen to 95% and 63% respectively.

Australia has a relatively low rate of international collaboration on R&D and innovation, with only 3.6% of innovative firms collaborating internationally, ranking Australia 21st out of 23 OECD countries. By contrast, China had established collaborative partnerships in S&T with 152 countries and regions and signed 104 agreements with the governments of 97 countries and regions by the end of 2008. The 2011 Chinese science budget was set at 194.4 billion yuan (US$29.6 billion), representing a 12.5% rise on the previous year, while the 2011-12 Australian science budget was set at AU$9.4 billion, with almost no growth from the previous year.

Australia’s shares of world publications and citations have slowly but steadily increased from 2.4% and 2.5%, respectively, in 1981 to 3.2% and 4.1%, respectively, in 2009. By contrast, China’s shares have been increasing rapidly, from 0.3% of total world publications

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and 0.1% of total world citations in 1981, to 9.9% and 7.2%, respectively, in 2009. China overtook Australia in 2000, and is now second only to the USA in publications output.237

**Part 2: Avenues of Collaboration**

Over the last four decades, Australia and China have developed a rich network of S&T collaborative mechanisms, ranging from individual researchers to collaborative teams, science institutions, national governments and global bodies.238

**2.1 Government-to-Government Collaboration**

The Australian and Chinese Governments have solidified their S&T collaborative relationship by implementing various agreements and initiatives.

Government-to-government cooperation was formalised by the signing of the treaty-level *Agreement on Co-operation in Science and Technology* on 6 May 1980, which affirmed the desire of the Chinese and Australian Governments to strengthen diplomatic relations and improve scientific and technological cooperation.239 Between 2001 and 2011, the Australian and Chinese Governments oversaw the *Australia-China Special Fund for Science and Technology Cooperation* under the *International Science Linkages* (ISL) program,240 and by 2009, the Special Fund had supported 129 projects and four joint research centres that conduct leading edge research in priority areas.241 Since 1991, the Australian and Chinese Governments have worked through the *Australia-China Joint Science and Technology Commission* (JSTC) to promote bilateral collaboration in S&T and to coordinate policy support.242 In April 2011, Prime Minister Julia Gillard and Chinese President Hu Jintao signed a *Joint Ministerial Statement on bilateral cooperation in Science and Research* that committed each party to $9 million over three years to a new Australia-China Science and Research Fund from 2011 to 2012 (thereby replacing the ISL program),243 and in August 2011, the 8th Australia-China JSTC meeting was held in Shanghai and produced the *Memorandum of Understanding on the management of the Australia-China Science and Research Fund (ACSRF)*, which replaces the earlier fund and aims to assist and support future collaborations between Australian and Chinese scientists and research institutions.244

In addition to the above-mentioned initiatives, other government-led programs include the *Australia-China Council* (managed by the Department of Foreign Affairs and Trade) which

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has funded collaborative activities in areas such as science communication, perinatal health, botany for pharmaceuticals, agricultural genetics, sustainable architecture, financial services, and health system reform; the Australia-China Joint Coordination Group on Clean Coal Technology (managed by the Department of Resources, Energy and Tourism); and the Australia-China Environment Development Partnership (managed by AusAID).  

2.3 Collaboration between Scientists

For countries such as Australia that produce only a small proportion of the world’s scientific output, the maintenance of international linkages to leading overseas researchers and facilities is vital. International co-operation between Australian and Chinese Scientists tends to revolve around personal exchanges, communications among academics, and the importation of technology to joint research projects.  

In relation to the global movement of individual scientists, the graphs below indicate that both China and Australia tend to attract more foreign scientists than they send abroad, even if Australia’s scientists appear to be slightly more mobile.

**Travel by Chinese and foreign scientists by type of project, 2001-2008**

![Graph showing travel by Chinese and foreign scientists by type of project, 2001-2008](image)


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International migration of academics and scientists, Australia, 1993–94 to 2006–07

Source: Hugo, Graeme “The demographic outlook for Australian universities’ academic staff,” Council for Humanities, Arts and Social Sciences (CHASS), November 2008, p. 33.

Until it was replaced in 2011, the ISL program provided funding to facilitate initial contacts between Australian and Chinese researchers. Under the new ACSRF program, the Knowledge Exchange Symposium, the first of which will be held in September 2012, will provide an opportunity for Australian and Chinese scientists to “hear expert views and the experiences of others, highlight successful Australia-China collaborations and strengthen research-industry linkages.”

Other initiatives that are designed to facilitate greater collaboration between scientists at the individual level include the Australia-China Young Scientists Exchange Program (YSEP), which was established by the in 2006 in order to encourage the formulation of research networks and collaborative research projects between young Australian and Chinese Scientists, the Australia-China Energy Symposium which facilitates knowledge exchange on clean energy, the annual Australia-China Academies Symposium series, which began in 2004 and are jointly organised by the Chinese Academy of Sciences, Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, and the National Health and Medical Research Council (NHMRC) Early Career Fellowships which enable developing health and medical researchers of outstanding ability to undertake advanced training in health and medical research either in Australia or overseas.

In August 2010, eminent Australian and Chinese scientists and policy makers celebrated *Partners for a Better Future: Australia-China Science and Technology Week* at the 2010 Shanghai World Expo in order to highlight the achievements of cooperation under the treaty and determine the prospects for future collaborations.\(^{254}\)

### 2.3 Collaboration between Institutions and Universities

Cooperation and exchange also occurs between scientific research organisations and tertiary education institutions and takes various forms including mutual visits, academic conferences and the establishment of joint laboratories.\(^{255}\)

The Chinese Academy of Sciences (CAS), Commonwealth Scientific and Industrial Research Organisation (CSIRO), Chinese Academy of Engineering, Australian Academy of Technological sciences and Engineering, Australian Academy of Science, Australian Agency for International Development (AusAID), and the Australian Centre for International Agricultural Research (ACIAR) have all been active in driving scientific cooperation between Australia and China.\(^{256}\) In particular, the relationship between the CSIRO and CAS has been one of the most enduring and important pillars of the Australia-China S&T relationship since 1975, and has since been strengthened by regular reciprocal visits between CAS and CSIRO executives. In 1985, the CSIRO and CAS signed a *Research Cooperation Agreement*, which has resulted in numerous significant joint research projects.\(^{257}\)

Notable examples of CSIRO collaboration projects with China include: a 1985 agreement with the China National Non-Ferrous Metals Industry Corporation, which led to thirty Chinese managers undertaking training at CSIRO in 1988; the 1992 establishment of the *China Eucalypt Research Centre* in Guangdong Province, with the assistance of CSIRO; a 1994 contract for CSIRO to supply optical technology to the Chinese Mint; a 2002 collaboration between CSIRO and the Beijing Meteorological Bureau on an air quality forecasting system before the Beijing Olympics;\(^{258}\) a joint project between CSIRO Land and Water, the CAS Institute of Soil and Water Conservation (CAS ISWC) and the Australian Centre for International Agriculture Research (ACIAR) in 2007 that produced a tool that is helping China’s land and water resource managers rehabilitate an important water catchment and helping to secure China’s environmental future;\(^{259}\) the CSIRO’s 2007 collaboration with Huaneng Energy in China to have a post combustion capture pilot plant installed at the Huaneng Beijing Co-generation Power Plant;\(^{260}\) the commercial partnership with Chinese Nuchtech in 2008 which combined CSIRO’s neutron scanning system and Nuchtech’s X-ray system to produce a world class security inspection technology and system design;\(^{261}\) and


the formation of a strategic energy research alliance with PetroChina, one of the largest oil companies in the world.262 Between 1980 and 2006, the CSIRO undertook over 140 projects in China and invested over AU$24 million in joint research between Chinese and Australian organisations.263

In 2009, the CSIRO and CAS agreed to the formation of a new joint steering committee to oversee the relationship and discuss opportunities for new collaboration in four key areas, namely sustainable water, agriculture and crop breeding; climate science and remote sensing; nanotechnology and new materials for energy; and health and biotechnology. The CSIRO’s Division of Plant Industries’ also signed two Memorandums of Understanding with the Guangxi Sugarcane Research Institute and the Guangzhou Sugarcane Industry Research Institute in March and April 2010 to determine whether the genes of wild sugarcane varieties in China may be used to increase Australia’s sugarcane production levels.264* An analysis by Thomson Reuters in March 2010 also found that at the institutional level, the Chinese Academy of Sciences was the single most frequent partner institution for Australian collaboration as measured by publication data between 2004 and 2008.265

Universities have also established scientific collaborations with other universities, institutions and companies. In 2005, the Australian Technology Network of Universities (ATN) and the International Strategic Technology Alliance (ISTA) entered into a broad collaborative Agreement with the objective of delivering enhanced research outcomes in areas of significance and relevance to the research agenda of member universities through the development of joint capabilities in nanoscience and nanotechnology, which was transformed into a formal Memorandum of Understanding in 2009 and led to the formation of the network in 2009 and led to the formation of the ATN/ISTA (Australia/China) NanoNetwork.266 Other notable joint centres include:

- The Australia-China International Centre for Light Alloys Research, which was jointly established in 2007 by Chalco and Australia’s Monash University;267
- The Australia-China Centre for Excellence in Stem Cell Research, an initiative between Monash University and Peking University which was also established in 2007;268
- The China-Australia Centre for Phenomics Research which was established in 2008 by the Australian National University (ANU) and the Chinese Academy of Sciences, and focuses

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on identifying novel genes and pathways involved in infection and immunity through the ENU mutagenesis of the mouse genome discovery platform;\(^{269}\)

- The **Australia-China Research Centre for Wireless Communications**, which was established in 2009 by the CSIRO and Beijing University of Posts and Telecommunications, and aims to provide a hub for long-term cooperation between research communities focusing on future wireless communications technologies;\(^{270}\)

- The **Australia-China Centre on Water Resources**, which was established in 2006 and is a collaborative venture between the various Chinese and Australian institutions that has two key nodes in the University of Melbourne’s School of Engineering and the Chinese Academy of Sciences Institute of Geographic Sciences and Natural Resources Research;\(^{271}\)

- The **Australia–China Joint Laboratory on Nanoscience**, which was established in 2010 and is managed by the Australian Technology Network of Universities (ATN) and the International Strategic Technology Alliance of Chinese universities (ISTA);\(^{272}\)

- The collaboration between Suntech Power Holdings Co Ltd and Swinburne University of Technology in order to establish a $130 million Victoria-Swinburne Advanced Solar Facility;\(^{273}\)

- The **QBI-IBP Joint Laboratory of Neuroscience and Cognition**, which was established in 2010, is a joint initiative between the Chinese Academy of Sciences’ Institute of Biophysics and the Queensland Brain Institute (QBI) at UQ, and aims to foster a greater understanding of how functions such as attention, learning and memory are regulated in the healthy brain, as well as in disease or injury;\(^{274}\) and

- The **Australia-China Joint Research Centre for Functional Molecular Materials**, which was formally established in 2010 and links the ANU and Monash University with Jiangsu, Nanjing, and Zhengzhou Universities and the Harbin Institute of Technology in China with the aim of developing metal-rich materials that generate important electronic, optical or magnetic properties.\(^{275}\)

### 2.4 Scientific Publications


\(^{273}\) Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE), Science and Research Collaboration between Australia and China, Canberra, 2012, p. 54.


While R&D expenditure is a measure of research input, publications can be used as one measure of research output.\textsuperscript{276} China is currently Australia’s third highest partner in terms of joint scientific publications, while Australia is China’s sixth highest partner.\textsuperscript{277}

**Joint Publications between Australia and China (1996-2009)**

**Australian and Chinese share of World Publications (1981-2009)**

![Graphs showing joint publications and Chinese and Australian contributions to world publications.](image)


Between 1996 and 2009, joint publications between Australia and China grew 20-fold, rising from 114 to 2,295. China was Australia’s 12\textsuperscript{th} highest partner by number of joint publications in 1996, rising to eight by 2000 and third by 2008, while Australia rose from 10\textsuperscript{th} to sixth amongst China’s partners during the same period. Australia-China joint publications accounted for about 0.6\% of total Australian publications and about 0.8\% of total Chinese publications in 1996, growing to 5.5\% and 1.7\% respectively in 2009.\textsuperscript{278}

International collaboration has been increasingly important for Australian researchers, with the proportion of internationally co-authored publications rising from 25\% in 1996 to 45\% in 2009. For China, the proportion has remained at around 22\% to 27\%, although this


\textsuperscript{277} Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE), “Collaboration with China.”

represents a huge increase in absolute numbers (from fewer than 3,500 papers to over 30,000) due to the rapid increase in China’s publications output over the last decade.279

**Part 3: Future Trajectory of the Australia-China Science Relationship**

Since the beginning of the 21st century, global investment on R&D has almost doubled, while the global scientific landscape continues to shift towards the East and South. In this rapidly changing environment, both countries are in a unique position to benefit from this shift by capitalising on the economic benefits that follow from increased R&D collaboration.280

In 2012, the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) launched the report *Science and Research Collaboration between Australia and China*. The key findings of the report were that (1) both Australia and China have prioritised developing a national innovation system to use science and research to build prosperity and address key challenges; (2) there is scope for collaborative relationships in areas of global importance such as sustainable agriculture, water resources management and renewable energy; (3) the large number of Chinese students studying in Australia are developing networks that may assist future collaborative efforts; and (4) significant opportunities exist for research institutions and business to create innovation-driven partnerships with Chinese organisations.281 This suggests that in the future, strategic international science and innovation collaborations with emerging global R&D leaders such as China will become increasingly crucial for Australia in order to enable it to build new industries and address national needs in established scientific fields.282 Therefore, with increased coordination and investment for the future, the Australia-China S&T relationship can provide a basis for 21st century engagement by enabling both countries to develop strong science and innovation-driven economies.283

However, the DIISRTE survey report *Collaboration with China: Current Situation and Future Prospects* also identified numerous potential problems which may impede the proliferation of joint scientific endeavours. These include (1) the investment that is required to establish partnerships with Chinese organisations;284 (2) competition with other countries who also see China as an attractive partner; (3) insufficient information about the Chinese research system and priorities; (4) incomplete understanding of the delineation in responsibilities between different Chinese agencies (and, in turn, Chinese understanding of the responsibilities of various Australian agencies); (6) indigenous innovation policy developments in China and intellectual property issues; (7) the search for predictable and sustainable funding for research activities; (8) funding models are not flexible enough to be

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used for the full range of desired research collaboration purposes; and (9) different financial cycles in Australia and China and fluctuating exchange rates.285

Conclusion

China’s and Australia’s S&T strategic collaboration will become an increasingly prominent element of the Australia-China bilateral relationship as we head further into the 21st “Asian Century.” Historically, both countries have faced (and continue to face) various common challenges, such as water and energy shortages, food security, climate change, ecological deterioration, environmental pollution, natural disasters, and ageing and health issues. As such, China’s and Australia’s S&T cooperation is complementary to each other and suits the interests of both countries, thereby making it vital that S&T cooperation is given strategic importance so as to address common challenges for a common brighter future.286

References


285 Department of Industry, Innovation, Science and Research (DIISR), Collaboration with China: Current Situation and Future Prospects, Canberra, 2011, p. 3.


Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) and Chinese Ministry of Science and Technology (MOST), Partners for a Better Future – Australia and China: Science and Technology Week, Shanghai World Expo, 2010.


Department of Industry, Innovation, Science and Research (DIISR), Collaboration with China: Current Situation and Future Prospects, Canberra, 2011.


APPENDIX 5: Background Paper - Emerging Areas of Closer Cooperation II: Disaster Management and Recovery

Introduction

Over the past two decades, more than 200 million people have been affected every year by a wide array of disasters, ranging from natural disasters such as earthquakes, landslides, volcanoes, floods, cyclones and droughts, to man-made disasters such as climate change, infectious diseases and pandemics, and environmental degradation.\(^\text{287}\) In 2008 alone, 321 natural disasters killed over 235,000 people, affected the lives of more than 211 million and cost over US$181 billion.\(^\text{288}\) As a result, states around the world have increasingly recognised that addressing disasters requires an integrated approach to prevent, prepare for, respond to and recover from them.\(^\text{289}\) In particular, it is now internationally acknowledged that Disaster Risk Management (DRM) frameworks must not only be systematically integrated into policies, plans and programmes at the domestic level, but should also be further strengthened through bilateral, regional and international cooperation.\(^\text{290}\) As two nations that are particularly disaster-prone and reside in the Asia-Pacific, a region that experiences the most disasters in terms of incidents, casualties and people affected,\(^\text{291}\) Australia and China have much to gain from engaging in bilateral and multilateral arrangements in order to ameliorate the potential effects of emerging disasters and to mount an effective response once they occur.\(^\text{292}\)

Part 1: Disaster Risk Reduction and Management

1.1 Defining Disaster Risk Management (DRM)

The DRM model comprises a multi-faceted approach which integrates the full three-stage cycle of prevention, management and recovery from hazards and disasters.\(^\text{293}\) DRM aims to eliminate as many risk factors as possible “through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.”\(^\text{294}\)


\(^{288}\) Australian Agency for International Development (AusAID), Investing in a Safer Future: A Disaster Risk Reduction policy for the Australian aid program, Commonwealth of Australia, Canberra, June 2009, p. viii.


\(^{294}\) Australian Agency for International Development (AusAID), Investing in a Safer Future: A Disaster Risk Reduction policy for the Australian aid program, Commonwealth of Australia, Canberra, June 2009, p. 9.
In addition to the general focus policy initiatives, legislative frameworks, and national preparedness plans, the DRM model also focuses on prevention and resilience. While disaster risk prevention aims to prevent and/or mitigate the effects of a potential disaster by identifying risk factors and putting effective measures into place through scientific understanding and technological know-how, resilience aims to reduce the vulnerability and enhance their ability to recover from the adverse effects of natural hazards. The more vulnerable individuals, communities and states are to physical, social, economic and environmental factors that impede their sustainable development, the more likely it is that they will suffer extensive and prolonged physical, economic and psychological losses in the aftermath of a disaster.

1.2 Global and DRM Mechanisms

Over the last century, the frequency and severity of natural disasters appears to have increased exponentially. In 2011 alone, 332 separate natural disasters were registered which killed a total of 30,773 people, caused 244.7 million victims worldwide, and created an estimated US$ 366.1 billion in economic damages. Asia was the continent that was most often hit by natural disasters in 2011 (44.0%), followed by the Americas (28.0%), Africa (19.3%), Europe (5.4%) and Oceania (3.3%).

![Natural Disaster Reported 1900-2011](http://www.emdat.be/sites/default/files/Trends/natural/world_1900_2011/eveyr2.pdf)

On a global level, the first main international initiative to focus on DRM was the United Nations (UN) General Assembly’s declaration that 1990–1999 would become the International Decade for Natural Disaster Reduction. In 1994, the first World Conference on Natural Disaster Reduction was held in Yokohama and led to the Yokohama Strategy and

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300 Ibid, p. 31.
Plan of Action for a Safer World, which emphasised the fact that every country has the duty to protect its people, infrastructure and national, social and economic assets from the impact of disasters. In 2000, the UN General Assembly endorsed the United Nations International Strategy for Disaster Reduction (UNISDR), and in 2005, the second World Conference on Disaster Reduction was held in Kobe, Hyogo, Japan, in the aftermath of the 2004 Indian Ocean Tsunami which led to the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters.301 In addition to placing DRM at the top of its list of five priorities, the Conference also promoted a strategic and systematic approach to reducing vulnerabilities and risks to hazards and underscored the need to make nations and communities more resilient to disasters.302

1.3 Regional DRM Mechanisms

The Asia–Pacific is the most natural disaster prone region of the world. Between 1980 and 2009, 45% of all disasters worldwide occurred in the region, and between 2000 and 2008, 83% of global deaths from disasters occurred there despite the fact that the region accounts for only 61% of the world’s population.303 The 2004 tsunami and earthquakes in the Indian Ocean alone killed more than 275,000 people and caused up to $19 billion damage.304

Natural Disaster occurrence and impacts: Regional Figures

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</tr>
<tr>
<td>Total 2011</td>
<td>6.60</td>
<td>62.72</td>
<td>270.85</td>
<td>1.19</td>
<td>26.56</td>
<td>356.52</td>
</tr>
<tr>
<td>Apr. 2002-10</td>
<td>3.13</td>
<td>50.27</td>
<td>41.61</td>
<td>13.48</td>
<td>2.97</td>
<td>109.35</td>
</tr>
</tbody>
</table>

The importance of applying DRM principles to this highly disaster-prone region is also reflected in the many disaster-specific regional agreements that have been promulgated over the last decade. In the Pacific, a regional version of the Hyogo Framework entitled the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015 was adopted which provides a single, overarching 10-year DRM plan for the region. Similarly, many Asia-Pacific organisations and nations have adopted DRM frameworks. The most notable agreements include: (a) the Association of South East Asian Nations ASEAN Agreement on Disaster Management and Emergency Response (2005); (b) the Beijing Action for Disaster Risk Reduction in Asia (2005); (c) Kuala Lumpur Declaration on the East Asia Summit 2005; (d) the ASEAN Regional Forum ARF Statement on Disaster Management and Emergency Response 2006; and the (e) Delhi Declaration on Disaster Risk Reduction in Asia 2007.305

In addition, there are also several regional centres and working groups that deal specifically with DRM, including the Asian Disaster Preparedness Center (ADPC), which was created in 1986 and aims to promote disaster awareness and the development of local capabilities to foster institutionalized disaster management and mitigation policies in order to produce safer communities and sustainable development in Asia and the Pacific,306 and the Asian Disaster Reduction Center (ADRC), which was established in 1998 and aims to build disaster resilient communities and to establish networks among countries in the region.307

Part 2: Comparing the Chinese and Australian Experience of Disaster Management

1.1 The Australian Experience

Australia has a lengthy history of large scale and devastating natural disasters, including catastrophic bushfires, far reaching floods, and damaging storms. As the table below indicates, Australia’s ten worst natural disasters since 1900 have occurred within the last twenty years:

Top 10 Natural Disasters in Australia, 1900 – 2012 (Numbers of total affected people)

<table>
<thead>
<tr>
<th>Disaster</th>
<th>Date</th>
<th>No. Total Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought</td>
<td>Dec-1992</td>
<td>7,000,000</td>
</tr>
<tr>
<td>Extreme temperature</td>
<td>Feb-1993</td>
<td>3,000,500</td>
</tr>
<tr>
<td>Storm</td>
<td>7-Nov-1994</td>
<td>2,500,104</td>
</tr>
<tr>
<td>Extreme temperature</td>
<td>Dec-1994</td>
<td>1,000,034</td>
</tr>
<tr>
<td>Extreme temperature</td>
<td>Nov-1995</td>
<td>500,100</td>
</tr>
<tr>
<td>Storm</td>
<td>31-Aug-1996</td>
<td>450,220</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disaster</th>
<th>Date</th>
<th>No. Total Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm</td>
<td>Dec-1995</td>
<td>400,045</td>
</tr>
<tr>
<td>Storm</td>
<td>25-May-94</td>
<td>240,220</td>
</tr>
<tr>
<td>Flood</td>
<td>25-Dec-2010</td>
<td>175,000</td>
</tr>
<tr>
<td>Storm</td>
<td>Nov-1994</td>
<td>120,090</td>
</tr>
</tbody>
</table>

Source: [http://www.emdat.be/result-country-profile](http://www.emdat.be/result-country-profile)

Over the last decade, Australia has significantly reformed its emergency management framework in order to bring it in line with DRM principles. In August 2002, the Council of Australian Governments (COAG) released the report *Natural Disasters in Australia: Reforming mitigation, relief and recovery*,\(^{308}\) which concluded that the current natural disaster arrangements could be improved by adopting a systematic national process of disaster risk assessments and by shifting the focus towards cost-effective, evidence-based disaster mitigation. The report also led to the *Disaster Mitigation Australia Package*, which provided a new funding program for natural disaster mitigation.\(^{309}\) In June 2009, the Australian Government also launched *Investing in a Safer Future: A Disaster Risk Reduction policy for the Australian aid program*, which provides the framework for the full integration of disaster risk reduction into Australia’s aid program.\(^{310}\) In February 2011, COAG adopted a whole-of-nation resilience-based approach to disaster management under the *National Strategy for Disaster Resilience (NSDR)*, which recognises that a national, coordinated and cooperative effort is needed to enhance Australia’s capacity to withstand and recover from emergencies and disasters.\(^{311}\)

The Australian Government provides financial assistance directly to state and territory governments through the *Natural Disaster Relief and Recovery Arrangements (NDRRA)*, which was implemented by 2011 and is coordinated by Emergency Management Australia (EMA) within the Attorney-General’s Department.\(^{312}\) The main purpose of the NDRAA is to help alleviate the financial burden that is placed on affected states and territories during large-scale disasters, to provide immediate emergency assistance to disaster-affected communities, and to put measures in place that facilitate disaster recovery and resilience building.\(^{313}\) In addition, the *National Partnership Agreement on Natural Disaster Resilience* also provides about $26 million per year for the states and territories to engage in mitigation activities. As a result, Australia has managed to put in place a highly effective emergency management framework that has enabled it to effectively respond to large-scale disasters, as was evidenced during the 2010-11 Queensland floods where more than 320 of Australia’s 559 local government areas were declared disaster zones as a result of flooding.


\(^{311}\) Coalition of Australian Governments (COAG), *National Strategy for Disaster Resilience: Building our nation’s resilience to disasters*, December 2009, p. ii.


\(^{313}\) Ibid, pp. 54-55.
storms, cyclones, and fires.\(^{314}\) During the crisis, the Australian Government sent about 1,900 troops from the army, navy, and air force to help in the immediate aftermath of the disaster and committed a total of $5.95 billion to recovery and the reconstruction of the devastated state.\(^{315}\)

**The Chinese Experience**

China is among the countries that are most seriously affected by natural disasters due to its vast territory, complex terrain and landforms, and complicated weather and geographical conditions.\(^ {316}\) Between 1990 and 2005, an average of 370 million people were affected by disasters each year which created direct annual economic losses of $25 billion, while six of the world’s ten deadliest natural disasters throughout history have occurred in China.\(^ {317}\)

<table>
<thead>
<tr>
<th>Disaster</th>
<th>Date</th>
<th>No Total Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood</td>
<td>1-Jul-1998</td>
<td>238,973,000</td>
</tr>
<tr>
<td>Flood</td>
<td>1-Jun-1991</td>
<td>210,232,227</td>
</tr>
<tr>
<td>Flood</td>
<td>30-Jun-1996</td>
<td>154,634,000</td>
</tr>
<tr>
<td>Flood</td>
<td>23-Jun-2003</td>
<td>150,146,000</td>
</tr>
<tr>
<td>Flood</td>
<td>29-May-2010</td>
<td>134,000,000</td>
</tr>
<tr>
<td>Flood</td>
<td>15-May-1995</td>
<td>114,470,249</td>
</tr>
<tr>
<td>Flood</td>
<td>15-Jun-2007</td>
<td>105,004,000</td>
</tr>
<tr>
<td>Flood</td>
<td>23-Jun-1999</td>
<td>101,024,000</td>
</tr>
<tr>
<td>Flood</td>
<td>14-Jul-1989</td>
<td>100,010,000</td>
</tr>
<tr>
<td>Storm</td>
<td>14-Mar-2002</td>
<td>100,000,000</td>
</tr>
</tbody>
</table>

**Source:** [http://www.emdat.be/result-country-profile](http://www.emdat.be/result-country-profile)

As a result, China has made DRM one of its top policy priorities over the last two decades. In 1994, the State Council enacted the *China Agenda 21*, which emphasized the importance of disaster mitigation in order to promote sustainable development. This was followed by the *People’s Republic of China Mitigation Plan* (1998–2010) in 1998, which outlined the guidelines, main objectives, tasks, measures and actions that would comprise China’s national DRM strategy\(^{318}\) and produced numerous disaster mitigation initiatives such as the Three Gorges Project on the Yangtze River, the Xiaolangdi Project on the Yellow River, the Northwest-North-Northeast Shelter Forests Belt Project, and the Beijing-Tianjin Sand Source Control Project. Over the last decade, the Chinese Government has issued two main DRM

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\(^{314}\) Ibid, p. 53.

\(^{315}\) Ibid, p. 60.


programs, the *National Integrated Disaster Reduction Eleventh Five-Year Plan* (2006–2010) and the *National Comprehensive Disaster Prevention and Mitigation Twelfth Five-Year Plan* (2011–2015), which have focused on further enhancing DRM measures such as information management, monitoring and forecasting, comprehensive defense capacity, emergency and rescue operations, catastrophe reduction in urban and rural communities, scientific and technological support for disaster reduction, and education on disaster reduction. China has also enacted more than 30 laws and regulations relating to disaster management[^119] and has put in place community resilience-building programs such as the *Disaster Mitigation Model Communities Standards* (2007) and *National Integrated Disaster Mitigation Model Communities Standards* (2010).[320]

As a result of these reforms, China has adopted a comprehensive natural disaster risk management regime that is defined by central leadership, departmental responsibility, and graded disaster administration. The *National Committee for Disaster Reduction* is the main government organ which is responsible for formulating the policies and strategies for DRM, coordinating the major activities of disaster reduction, guiding local disaster reduction, and promoting international communication and cooperation.[^321] The government has also created departments that deal with specific disaster risks, such as the *State Flood Control and Drought Relief Headquarters, Earthquake Resistance and Disaster Relief Headquarters of the State Council, and State Forest Fire Prevention Headquarters*, while local governments have also set up corresponding units with similar functions.[^322] This framework enabled China to mount an effective response to the Sichuan earthquake on 12 May 2008, which caused 69,227 deaths, completely destroyed the city of Beichuan in Beichuan County and the town of Wenchuan in Wenchuan County, and created a total direct economic loss of $125 billion. In addition to establishing eight working groups within hours after the quake hit in order to coordinate the effective provision of emergency services, the Chinese Government had also dispatched more than 113,000 Chinese army rescue forces within the first week while.[^323] Within two months, most of the structural damage had been cleared, and in June 2008, the *Regulations on Post-Wenchuan Earthquake Rehabilitation and Reconstruction* were enacted in order to ensure an effective and orderly post-earthquake rehabilitation and reconstruction and a stable resumption of normal life and economic activities.[^324]


Part 2: Bilateral Engagement and Cooperation in DRM

In addition to the above-mentioned domestic reforms, both Australia and China have also increasingly engaged in both bilateral and multilateral collaborations in order to apply DRM principles to a range of both natural and man-made disaster risk scenarios.

2.1 Natural Disasters

An effective response to a natural disaster involves the ability to provide a vast array of emergency services in the immediate aftermath of a disaster and to implement post-disaster recovery measures in order to protect the long term well-being of survivors.

In the aftermath of the Sichuan Earthquake, Australian remote sensing expert Associate Professor Linlin Ge from the University of New South Wales sought the cooperation of the Japanese Earth Remote Sensing Data Analysis Center in order to download images of Sichuan’s quake-ravaged terrain. Teams from Australia, Japan and China worked 24 hours a day capturing and interpreting the satellite data in order to guide Chinese rescue and reconstruction teams to the worst-affected areas. In 2009, China reciprocated by offering two satellites with optical and infrared sensors to monitor fire behaviour when severe bushfires struck Victoria in 2009. These collaborations led to the establishment of a formal partnership between the China Earthquake Administration, National Research Centre of the Chinese State Administration of Work Safety, Australian Cooperative Research Centre for Spatial Information, New South Wales Land and Property Management Authority and UNSW in order to allow Australia to have ongoing access to Chinese satellites during natural disasters.325

In addition to providing logistical assistance, Australia’s established relationship with China in the field of Community Mental Health has also enabled the two countries to collaborate in treating the psychological trauma of disaster survivors. In 2003, the University of Melbourne, St. Vincent’s Health and Peking University’s Institute of Mental Health established the Asia Australia Mental Health (AAMH), which aimed to develop community based mental health care solutions.326 In 2006, the AAMH conducted the “Protecting Children in Disasters” project which aimed to promote the short and long-term well-being of children in post-disaster environments.327 and in the immediate aftermath of the Sichuan earthquake, the AAMH assembled and coordinated an Australian team of disaster mental health experts to provide psychological first aid training to nearly 300 Sichuan disaster relief workers and health professionals. The program was the first disaster mental health training conducted by an overseas agency to be officially recognised by the Chinese government.328

2.2 Climate Change

In recent decades, scientists have increasingly recognised that Climate Change contributes to more frequent, severe and unpredictable weather-related hazards such as droughts,

tropical cyclones, floods and heat waves.\textsuperscript{329} As a result, states such as Australia and China have made a concerted effort to not only integrate DRM principles into their domestic Climate Change Adaptation (CCA) frameworks, but also to develop joint coordination plans in order to reduce their vulnerability to climate change risks.\textsuperscript{330}

Given that China is currently the world’s largest emitter of carbon pollution (around 20\% of global carbon pollution) and that Australia’s per capita emissions are almost five times as high as China’s,\textsuperscript{331} greater bilateral cooperation is clearly in the national interest of both countries. In 2003, the Australian and Chinese governments issued the \textit{Joint Declaration on Australia-China Bilateral Cooperation on Climate Change} and signed a \textit{Memorandum of Understanding (MOU)} which provided for cooperation in climate change policy areas such as climate change impacts and adaptation, national communications (greenhouse gas inventories and projections), technology cooperation, and capacity building and public awareness.\textsuperscript{332} In April 2008, they also issued a \textit{Joint Statement on Closer Cooperation on Climate Change} and announced the establishment of the \textit{Australia-China Ministerial Dialogue on Climate Change} in order to facilitate closer cooperation on climate change issues.\textsuperscript{333}

There are two main bilateral programs that aim to foster greater collaboration between Australia and China on the issue of Climate Change. The \textit{Australia-China Climate Change Partnership} program aims to address climate change issues of mutual concern and build collaborations in a range of projects dealing with issues such as capacity building on emissions reporting, renewable energy technology, energy efficiency, capture and use of methane, climate change and agriculture, climate change and biodiversity, land use, land use change and forestry, adaptation and climate change science.\textsuperscript{334} Major projects include the collaboration between the Chinese Academy of Sciences, the State Grid Corporation of China and BP Solar to conducted a joint feasibility study on the proposal to develop the city of Weihai in Shandong province into the largest solar energy city in the world, and the collaboration between the Chinese Academy of Forestry, the CSIRO and Australian National University (ANU) in order to launch the Australia \textit{National Carbon Accounting System} pilot project.\textsuperscript{335} In addition, the Australian Government also pledged to invest \textdollar{}AU20 million in order to establish the \textit{Australia-China Joint Coordination Group on Clean Technology} in 2007, bringing Australia’s total investment to date in China-specific Climate Change and water programs until 2015 to \textdollar{}94.6 million.\textsuperscript{336} Under the auspices of this group, the CSIRO

\begin{itemize}
\item \textsuperscript{333} Australian Centre on China in the World and China institutes of Contemporary International Relations, \textit{Australia and China: A Joint Report on the Bilateral Relationship}, 2012, p. 31.
\item \textsuperscript{336} The Hon. Kevin Rudd MP and Senator Penny Wong, “Australia and China working together to tackle Climate Change,” Media Release, 11 April 2008.
\end{itemize}
Energy Transformed National Research Flagship, the China Huaneng Group and China’s Thermal Power Research Institute were funded with a $4 million Australian Government grant to initiate the first carbon capture and storage project in Beijing.337

2.3 Infectious Diseases

Infectious diseases and pandemics pose a grave risk to our well-being and security. In 2010 alone, 1.8 million people died from AIDS, 1.1 million from tuberculosis, and 655,000 from malaria. The Asia-Pacific in particular has become increasingly vulnerable to infectious diseases and has dealt with a variety of outbreaks and pandemics over the last decade, including Severe Acute Respiratory Syndrome (SARS), the Avian Influenza H5N1 virus, and the continued growth of HIV/AIDS infection rates.338 By 2009, an estimated 4.9 million people in Asia were living with HIV, including 360,000 who became newly infected that year.339

In recent years, Australia and China have collaborated on a number of projects that are designed to reduce the risk posed by infectious diseases such as SARS and HIV/AIDS. In 2004, Dr. Linfa Wang and Dr. Marion Andrew from AAHL were invited to visit the Chinese Academy of Medical Sciences and the Chinese Centre for Disease Control in order to develop collaborative projects in the areas of SARS and biosecurity training.340 In 2007, the Australian Government also contributed $25 million to the China-Australia Integrated Health & HIV/AIDS Facility (CAHHF), a joint collaboration between the Chinese Ministry of Commerce, Chinese Ministry of Health (MOH), Australia’s Department of Health and Ageing and AusAID that is scheduled to run between 2007 and 2012 and is aimed at improving China’s capacity to halt and reverse the spread of HIV, protect its population against emerging infectious diseases, and strengthen its health systems. The facility also manages cross-border HIV harm minimisation work through AusAID’s HIV/AIDS Asia Regional Program (HAARP), with the Australian Government contributing $7.4 million to HAARP programs in China that are aimed at reducing the transmission of HIV by injecting drug users in Guangxi and Yunnan, and also oversaw Phase II of the China HIV/AIDS Roadmap Tactical Support Project (CHARTS) from 2007 to March 2011.341 While the Facility is concluding its work, it has also engendered 22 new Sino-Australian partnerships of which 46% have either established a Memorandum of Understanding or are actively discussing collaboration opportunities beyond the facility, while Australia and China’s health ministers have also signed a new three-year bilateral Plan of Action on Health Cooperation (2011–14).342

2.4 Environmental Security

As the world continues to experience rapid economic and industrial growth, concerns over the corresponding degradation of the environment and increased scarcity of precious resources such as water have also intensified as countries are becoming increasingly aware that they will face major environmental challenges in the coming years unless a comprehensive environmental DRM framework is put in place. In the Asia-Pacific region, water shortages have already become evident in many countries, which in turn reflects an overall global trend which has seen water availability per capita decline dramatically in developing countries since the 1950s.

Until recently, the primary collaborative mechanism was the Australian China Environment Development Partnership (ACEDP) a $25 million initiative of the Australian Government and AusAID which commenced in July 2007 and concluded in 2012. The main objective of the partnership was to support and improve policy development in China in the area of environmental protection and natural resources management. During its five-year run, the partnership facilitated the development of numerous collaborative projects, including (a) experimental monitoring of the Yellow River, the Pearl River basin and the Dalinghe River using an Australian river health and monitoring system which was supported by a $2 million grant from the Australian Government; a master-plan review and related governance arrangements for the Lake Tai Basin which supplies water to over 30 million people; (c) a new Algal Bloom Alerts Level Framework as well as policy measures to reduce agricultural pollution; (d) the successful adoption of new hardware and software to improve wastewater treatment in the two municipalities of Suzhou and Huzhou; and (e) the development and adoption of China’s National Wetland Park Assessment Guidelines. The Partnership has also led to seven Memorandums of Understanding and numerous other follow-up activities between Australia and China in order to sustain the collaboration.

Other significant collaborative ventures include:

- **The Australia-China Centre on Water Resources Research**, which was launched in 2006 and has two key nodes at Beijing at the Institute of Geographic Sciences and Natural Resources Research of the Chinese Academy of Sciences in Beijing and the University of Melbourne. Since 2006, seventeen successful projects have been conducted totaling $3.48 million in research funding, and five proposals totaling $3.93 million in research funding have been submitted,

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• The collaboration between the Australian Centre for International Agricultural Research (ACIAR), Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Chinese Academy of Sciences in order to develop a decision support tool called ReVegIH (Re-vegetation Impacts on Hydrology), which provides land managers and policy makers with advice on the potential reduction of water available for downstream urban, industrial and agricultural purposes following the implementation of China's 50-year Clean River: Green Hills policy; and

• The Qinghai Forestry Resources Management Project, a six-year, $13 million AusAID initiative that was held between 2002 and 2008 and was aimed at improving forestry resources management and environmental sustainability in Qinghai Province. The program successfully enhanced the capacity for improved management of vegetation, soil and water resources for the benefit of local and downstream communities in the Huangshui River Catchment through a participative ecological approach to forestry and land management and the use of a Community Development Fund.

In February 2012, the second AusAID-funded High Level Water Policy Dialogue was held, which resulted in a commitment by Australian Department of Sustainability, Environment, Water, Population and Communities and Chinese Ministry of Water Resources to engage in future collaborations on water management.

Part 3: Recovering from Disasters and the Role of Resilience

In recent years, Australia and China have also increasingly recognised that hazard mitigation mechanisms such as foreign humanitarian aid and post-disaster recovery operations present great opportunities for reducing vulnerability and creating more risk resilient communities and nations.

3.1 Foreign Aid

In the two decades since Australia became one of the first Western donors to provide foreign aid to China, Australia has broadened its focus to providing country-specific, non-conditional aid to fragile states mainly within the Asia-Pacific region. The Australian government’s first policy statement on foreign aid was Better Aid for a Better Future in 1997, which provided a clear objective centred on poverty reduction and sustainable development. Between 1997-98 and 2005-06, the foreign aid budget increased from $1.7 billion to $2.5 billion, while support for governance-related programs in the region

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increased from $160 million in 1996–97 to $885 million in 2005–06.\textsuperscript{357} In 2006, Australia released its foreign aid White Paper\textit{Australian Aid: Promoting Growth and Stability}, which aimed to provide a strategic framework to guide the direction and delivery of Australia’s overseas aid program over the next ten years and was followed by an announcement by the Australian Government that Australia’s official aid expenditure would double to around $4 billion annually by 2010.\textsuperscript{358} By 2009-10, total expenditure on DRM across the AusAID program had risen to over $59 billion,\textsuperscript{359} and in July 2012, Foreign Affairs Minister Bob Carr announced that Australia will contribute $100 million over five years to help developing countries reduce their vulnerability to natural disasters.\textsuperscript{360} Australia has also provided substantial financial assistance to individual disasters and in the aftermath of the 2004 Indian Ocean Tsunami, the Australian Government pledged $500 million, while World Vision Australia (WVA), the country’s largest international Non-Governmental Organisation (NGO), raised over $100 million in public donations in less than two months following the tragedy.\textsuperscript{361}

China’s foreign aid assistance has also grown dramatically over the last decade. It is estimated that China’s economic assistance grew from $51 million in 2002 to $25 billion in 2007. China’s 2011 White Paper\textit{China’s Foreign Aid} stipulated that China had provided a total of $38.83 billion in aid to foreign countries by the end of 2009, while the Financial Times reported that China lent more money to developing countries than the World Bank in both 2009 and 2010.\textsuperscript{362} According to some estimates, China’s foreign aid currently ranges from $1.5 billion to $2 billion annually, making it comparable with mid-sized aid donors such as Australia, Belgium or Denmark by OECD standards.\textsuperscript{363} While AusAID provided $19.4 million in country program aid to China in 2010-11, China’s increasing economic resources and maturing approach to collaboration with international donors has led to a shift in focus from aid recipient to equal partner in tackling DRM issues and promoting sustainable development in the Asia-Pacific region, resulting in the gradual phasing out of bilateral programs in China from 2011–12.\textsuperscript{364}

Both countries have also emphasised the necessity of engaging in greater bilateral and multilateral collaborations in their respective foreign aid White Papers. In \textit{Australian Aid: Promoting Growth and Stability}, the Australian Government stated that “Australia will work with other bilateral donors to reduce the burden of aid coordination for already stretched partner governments, and will identify opportunities to lead other donors towards coordination, [with] particular emphasis [being] given to engaging emerging donors, such as

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{357} Australian Agency for International Development (AusAID), \textit{Australian Aid: Promoting Growth and Stability}, a White Paper on the Australian Government’s Overseas Aid Program, Commonwealth of Australia, Canberra, April 2006, p. 3.
\item \textsuperscript{358} Ibid, p. 2.
\item \textsuperscript{362} Weston, Jonathan; Campbell, Caitlin and Koleski, Katherine “China’s foreign assistance in review: implications for the United States,” U.S.-China Economic and Security Review Commission, September 1, 2011, pp. 1-2.
\item \textsuperscript{363} Ibid, p. 3.
\end{itemize}
\end{footnotesize}
China in the Pacific.”\textsuperscript{365} Similarly, \textit{China’s Foreign Aid} stipulates that one of its primary aims is “to strengthen its communication and exchanges with other aid providers” as well as expanding its focus from bilateral aid to trilateral and regional cooperation with multilateral organizations.\textsuperscript{366} Therefore, one potential avenue of future collaboration lies in strengthening China’s engagement in regional development issues and initiatives and exploring both countries’ interest in working jointly to support development priorities in third countries.\textsuperscript{367}

3.2 Disaster Recovery Missions

Another element of resilience-building involves the use of defence forces in order to provide recovery assistance in the aftermath of a disaster and to facilitate the reconstruction of shattered communities. In addition to achieving humanitarian objectives and providing vital services such as primary health care, logistics, communication and field engineering capabilities,\textsuperscript{368} post-disaster recovery missions can reinforce alliances and build new partnerships.\textsuperscript{369}

Between 1990 and 2011, the Australian Defence Force (ADF) was involved in 30 offshore disaster recovery missions\textsuperscript{370} including providing ongoing assistance to the \textit{Regional Assistance Mission to Solomon Islands} (RAMSI) since 2003 in order to restore stability, law and order and effective governance,\textsuperscript{371} while the \textit{China International Search and Rescue Team} (CISAR) has also carried out nine international rescue missions since 2003.\textsuperscript{372} Australia and China have also acted as collaborating partners in numerous recent multilateral disaster relief missions, including the Haiti Earthquake of January 2010, the Pakistan Floods of July 2010, and the Great East Japanese Earthquake of 2011.\textsuperscript{373} In November 2011, the ADF and Chinese People’s Liberation Army (PLA) commenced “Cooperation Spirit 2011” in Sichuan Province, a bilateral humanitarian assistance and disaster relief exercise that was aimed at enhancing DRM coordination and cooperation between the two countries.\textsuperscript{374} Therefore, disaster relief missions and preparatory exercise provide another avenue for closer DRM collaboration.

\textsuperscript{367} Australian Agency for International Development (AusAID) "China Annual Program Performance Report 2011,” June 2012, p. 11.
\textsuperscript{368} Yates, Athol and Bergin, Anthony “More than good deeds: Disaster risk management and Australian, Japanese and US Defence forces,” Australian Strategic Policy Institute Special Report No. 43, December 2011, p. 11.
\textsuperscript{369} Ibid, p.13.
\textsuperscript{371} Australian Agency for International Development (AusAID), \textit{Australian Aid: Promoting Growth and Stability}, a White Paper on the Australian Government’s Overseas Aid Program, Commonwealth of Australia, Canberra, April 2006, p. 3.
Conclusion

Over the last twenty years, international organisations, governments and communities have increasingly recognised that “[a]n integrated, multi-hazard, inclusive approach to address vulnerability, risk assessment and disaster management, including prevention, mitigation, preparedness, response and recovery, is an essential element of a safer world in the twenty-first century.” Given that the conception and implementation of DRM frameworks at the national, regional and international level has occurred only relatively recently, there is strong potential for collaboration between Australia and China in a wide array of DRM initiatives and programs to be greatly improved in the future.

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