Chapter 9

Scientific research and technology development

> The countries of the Indian Ocean rim also share a truly great resource: the Indian Ocean itself. There is a common responsibility to care and manage this resource…in a manner compatible with the principles of sustainable development.[1]

Research and the Indian Ocean rim

9.1 The committee has noted that the great unifying force in the Indian Ocean rim is the ocean itself including its coasts—the climate, oceanography, marine life—the character of which affects trade, tourism, fisheries, and many other aspects of life for countries on the rim.

9.2 The committee has touched on activities in the Indian Ocean rim that involve scientific research and improved technology, including the Indian Ocean Tsunami Warning and Mitigation System and Australia's work with Indonesia on establishing a real time earthquake impact estimation system. It has also mentioned programs that involve institutions such as CSIRO and ACIAR that are collaborating with overseas organisations to help build more resilient communities in the region through improved ways of farming, fishing and water use. Importantly, CSIRO is working on practical applications of new technologies in India—solar cooling facilities for refrigeration in areas without electricity. CSIRO is also engaged in collaborative work with Indian Ocean rim partners particularly in developing new technologies for oil and gas exploration and production. The committee has mentioned the establishment of the International Mining for Development Centre in the University of Western Australia's Energy and Mineral Institute.

9.3 In this chapter, the committee recognises the essential role that scientific research—whether seismology, oceanography, meteorology, climate change science, land use and marine biology—has in the region and the links between the various and many research activities in the Indian Ocean rim.

Role of research in Indian Ocean rim

9.4 There are many associations and organisations that focus on a particular aspect of the Indian Ocean. Indeed, a number of the IOR-ARC's flagship projects tie directly in with marine activity—Maritime Transport Council and the Fisheries Support Unit (FSU). The work of a number of other projects such as the Regional Centre for Science and Transfer of Technology (RCSTT), the University Student Mobility Program for the Indian Ocean rim region and the Tourism Feasibility Study Project may have direct relevance and feed into the activities of other projects concerned solely with scientific research and technology development.

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1 DFAT, *Submission 30*, p. 55.

9.5 At their 2011 meeting, the members of IOR-ARC, however, agreed with the view that the whole IOR-ARC academic effort needed 'close attention with a recalibration of methodology and approach'. As noted in chapter 3, at the last IOR-ARC ministerial meeting, participants highlighted the need for a better understanding of the region's shared domain. They spoke of meteorology, the study of monsoons, marine biology and management of the coastal zones.[2]

9.6 Clearly, countries in the region recognise the importance of, and the need for, more and better research. Drs Bateman and Bergin explained that the 'unique oceanographic and tectonic features of the Indian Ocean help to explain the Indian Ocean rim's relatively high incidence of natural disasters and hazards'. But, in their view:

> Despite the benefits of better oceanographic knowledge of the IOR, it remains under-researched compared with other oceans.[3]

9.7 They noted that there have been several attempts during the past twenty years or so to manage the diversity of the Indian Ocean rim, exploit common interests and build cooperative frameworks, but progress had been difficult. For example, they concluded that the relative paucity of comprehensive oceanographic research in the Indian Ocean was partly a consequence of the political sensitivities and difficulties that have inhibited more general cooperation in the region.[4]

IOR-ARC and scientific research

9.8 DFAT also recognised that scientific knowledge about the Indian Ocean was a uniting interest for all Indian Ocean rim countries. In its submission, DFAT enumerated Australia's areas of current and potential collaboration within IOR-ARC which included science cooperation as a key priority.[5] IOR-ARC has identified key areas of medium to long term interest, including: research and management, aquaculture, energy, protection of the environment and agriculture. The committee has referred to some of the IOR-ARC's flagship projects such as the Regional Centre for Science and Transfer of Technology and the Fisheries Support Unit.

Regional Centre for Science and Transfer of Technology for IOR-ARC

9.9 Proposed by the Islamic Republic of Iran, the Regional Centre for Science and Transfer of Technology for IOR-ARC was inaugurated on 28th October 2008 after the Council of Ministers Meeting in 2008. The Centre has held numerous workshops and exhibitions. For example the Regional Expert Meeting/Training Workshop on 'Monitoring Global Environmental Changes through the Application of Remote

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2 Eleventh Meeting of the Council of Ministers of IOR-ARC Bengaluru communiqué and see paragraph 3.41 of committee's report.

3 Sam Bateman and Anthony Bergin, *Our western front: Australia and the Indian Ocean,* Australian Strategic Policy Institute, March 2010, p. 3.

4 Sam Bateman and Anthony Bergin, *Our western front: Australia and the Indian Ocean,* Australian Strategic Policy Institute, March 2010, p. 13.

5 *Submission 30,* p. 55.

Sensing for OIC [Organisation of Islamic Cooperation] and IOR-ARC Member Countries', (2010). The meeting was jointly organized by the IOR-ARC RCSTT, the Iranian Research Organization for Science and Technology, and the Islamic Development Bank. Ten participants from IOR-ARC Member States including Bangladesh, Sri Lanka, Thailand, Yemen, Tanzania, Indonesia, Malaysia and Oman and several participants from Islamic Republic of Iran attended the workshop.[6]

Fisheries Support Unit

9.10 The Fisheries Support Unit, discussed in the previous chapter, has held a number of meetings including a workshop in January 2011 on Fisheries Biology and Stock Assessment. DAFF informed the committee that it 'is also increasingly engaging through the unit and with Oman would co-chair a meeting of the FSU in February 2013 in Muscat, Oman. The objective of the meeting was to identify fisheries issues of mutual interest to Indian Ocean rim countries and set a strategic work plan for the organisation.[7]

9.11 The committee has noted, however, Professor Rumley's observation about the level of support for the Unit.[8]

University Mobility in the Indian Ocean Region Programme

9.12 The University Mobility in the Indian Ocean Region (UMIOR) programme was established in June 2000. At the first general conference held in July 2001, participants from fourteen Member States of IOR-ARC agreed to launch a new university student and staff mobility programme for the region.[9]

9.13 Professor Rumley advised the committee that the UMIOR Scheme is one means of providing collaborative training and capacity development. He noted that India has been working through IOR-ARC to try to revive the UMIOR Scheme—he believed that it was an area in which, during its time as IOR-ARC chair, Australia could promote. While the Scheme could be highly beneficial in facilitating the exchange of expertise in agriculture, education and service technology, Dr Rumley believed that it had faltered due to a lack of resources allocated through IOR-ARC.[10]

The committee asked other witnesses if they were aware of the UMIOR scheme, but in general the response was in the negative.

9.14 While IOR-ARC recognises the importance of collaboration and research, and has talked about developing nodal centres of excellence, its flagship projects do not have the regional or international standing approaching such a status.

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6 IOR-ARC, 'RCSTT', http://www.iorarc.org/projects/flagship-projects/rcstt.aspx (accessed 6 May 2013).

7 DAFF, *Submission 40*, p. 4.

8 *Committee Hansard*, 2 October 2012, p. 5.

9 IOR-ARC, 'UMIOR', http://www.iorarc.org/projects/flagship-projects/umior.aspx (accessed 6 May 2013).

10 *Committee Hansard*, 2 October 2012, p. 5.

Australia's contribution

9.15 The preceding chapters have provided some indications of the type and nature of research and technology development being undertaken in the region and Australia's contribution.

9.16 Marine research has particular significance for Australia as it has one of the largest ocean territories in the world. The ocean dictates Australia's climate and weather, generates employment, provides food and resources, and offers lifestyle and recreational opportunities. Australia's ocean territory contributes nearly $40 billion to Australia's economy each year through a variety of industries, such as tourism, offshore oil and gas, aquaculture, commercial and recreational fishing, and shipping.[11]

9.17 In recognition of the importance of the Indian Ocean, the Australian Government announced that it would provide $1.3 million (including $1.1 million from AusAID) to support initiatives that include improving ocean forecasting, strengthening adaptation to climate variability and developing capacity in marine and fisheries management.[12] The former Parliamentary Secretary for Foreign Affairs in November 2012 explained that these initiatives would:

> …help Indian Ocean countries address the common and intersecting challenges of food and water security, maritime safety, healthy oceans, changing climate, economic integration, and disaster preparedness.[13]

9.18 As noted previously, although countries in the region recognise the importance of research and development focused on the particular needs of the region, there is scope and, indeed, the imperative to do more.

CSIRO

9.19 The CSIRO highlighted the importance of sharing scientific knowledge about the Indian Ocean, including its physical, biological, chemical and geological properties, with neighbouring countries. In its view, this scientific collaboration is critical for the safe, efficient and sustainable use of marine wealth as well as for climate-sensitive terrestrial industries. It would help scientists:

- predict and prepare for global climate change;

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11 CSIRO, *Submission 11*, p. 8.

12 AusAID, 'Australia working to increase sustainability and regional cooperation in the Indian Ocean', 6 November 2012, http://www.ausaid.gov.au/HotTopics/Pages/Display.aspx?QID=862 (accessed 6 May 2013).

13 Australian Parliamentary Secretary for Pacific Island Affairs, Parliamentary Secretary for Foreign Affairs, the Hon Richard Marles MP, 'Australia commits to supporting Indian Ocean sustainability', Media release, 3 November 2012, http://ministers.dfat.gov.au/marles/releases/2012/rm_mr_121103.html; and AusAID, 'Australia working to increase sustainability and regional cooperation in the Indian Ocean', 6 November 2012, http://www.ausaid.gov.au/HotTopics/Pages/Display.aspx?QID=862 (accessed 6 May 2013).

- support defence, offshore engineering, shipping, ecosystem conservation and management, search and rescue, environmental disaster response and more; and
- conserve Australia's marine biodiversity, which would lead to triple-bottom-line benefits for the nation.[14]

9.20 CSIRO cited its involvement in the Australia-New Zealand Integrated Ocean Drilling Program Consortium (ANZIC). Through ANZIC, Australian researchers are members of the Integrated Ocean Drilling Program (IODP), the world's largest geoscientific collaboration, involving 27 countries, including countries such as France, Germany, Japan, New Zealand, UK and the US, with India and Australia taking a particular interest.[15]

9.21 Importantly, an Indian Ocean IODP workshop in Goa in 2011 noted that there had been no scientific ocean drilling in the Indian Ocean for almost a decade and that a major gap existed in the understanding of global geoscientific processes. Initiated by Australian and Indian scientists, the program aims to improve existing proposals, build new ones and initiate international scientific alliances for strong drilling proposals. Participants in the workshop 'stressed the importance of the Indian Ocean in the planned new phase of scientific ocean drilling.[16] They noted that 'Numerous global science problems remain to be addressed here, with a better understanding of the Asian monsoon high on the list'.[17] The IODP plans to focus on the Indian Ocean basin in 2014. CSIRO, Australian universities and Indian institutions will work through ANZIC and Indian agencies to generate high quality Indian Ocean drilling proposals, addressing global scientific issues.[18]

9.22 The CSIRO also cited other significant research collaboration interests in the Indian Ocean rim, including bilateral connections with India, Indonesia, Malaysia and Singapore, and multilateral connections with East Africa and roles in several international commissions.[19] For example, the CSIRO is a member of the Global Research Alliance (GRA), a group of nine applied research organisations (four from the Indian Ocean rim), which draws on over 60,000 experts from a range of disciplines. The GRA includes as members CSIR (South Africa), CSIR (India) and SIRIM Berhad (Malaysia). Its aim is 'to generate and implement appropriate,

14 CSIRO, *Submission 11*, p. 9.

15 The Integrated Ocean Drilling Program (IODP) is an international research organization that conducts seagoing expeditions to study the history of the Earth recorded in sediments and rocks beneath the seafloor.

16 Integrated Ocean Drilling Program, *Detailed Report on International Workshop on Scientific Drilling in the Indian Ocean*, Goa, India, 17–18 October 2011, p. 2.

17 Integrated Ocean Drilling Program, *Detailed Report on International Workshop on Scientific Drilling in the Indian Ocean*, Goa, India, 17–18 October 2011, p. 2.

18 *Submission 11*, pp. 6–7.

19 *Submission 11*, p. 2.

affordable and sustainable solutions to global challenges through the delivery of inclusive science and technology'.[20]

9.23 According to the CSIRO, many benefits derive from collaboration between researchers cross the region including:

- stronger relationships with international research organisations;
- capacity strengthening opportunities for CSIRO staff by accessing international talent and complementary science capabilities;
- improved networks to address issues of regional and global significance;
- access to important science infrastructure; and
- further maximisation of the impact of CSIRO's world class technologies and systems research.[21]

The Solar Observatory near the Learmonth RAAF base is a joint US-Australia centre. The observations made here are used in both military and civilian applications. The committee was able to see this example of scientific research based on the Indian Ocean rim during its visit to the Pilbara region.

20 *Submission 11*, p. 2.

21 *Submission 11*, p. 2.

9.24 Australia is helping to build these institutional links across the Indian Ocean rim in diverse sectors. The committee has considered work in the areas of disaster risk reduction, climate change and food security. It has referred to the activities of Geoscience Australia, ACIAR, CSIRO and DAFF. But there are numerous other agencies engaged in research and capacity building in the region, including the Australian Federal Police.

Australian Federal Police

9.25 The Australian Federal Police (AFP) informed the committee that it received $4.8 million to assist in the development of the application of forensic science in Africa. This program forms part of the Australian Government's 'Increasing Australia's Law Enforcement Presence and Strengthening the rule of law in Africa New Policy Initiative'.[22]

9.26 As part of this initiative, the AFP co-hosted with the Victorian Institute of Forensic Medicine (VIFM) an 'African Forum on Forensic Pathology' in Botswana in 2010. Planned and delivered by VIFM, this forum was attended by 35 representatives from 13 African countries and international bodies such as the International Committee of the Red Cross, the International Criminal Court, the World Health Organisation and the United Nations Office on Drugs and Crime. The AFP funded this forum at a cost of $173 000. As a result of this event, the African Network of Forensic Medicine (ANFM) was established.[23] Since then another two meetings have been held.

9.27 The second forum was held in Uganda in March 2012 with VIFM involved in its planning and delivery and the AFP providing $130,000 in funding. Approximately 50 delegates attended the three day event, plus two days of workshops, from 11 African countries. During this meeting, the ANFM Committee voted to formally create the African Society of Forensic Medicine (ASFM). According to the APF, the ASFM is run by an Executive Committee of seven members from Botswana, Namibia, South Africa, Uganda and Kenya with the Chairperson and Secretariat hosted in Nigeria. The society has been registered as a legal entity in Uganda and has its own website.

9.28 The third gathering was an ASFM event hosted in South Africa in March 2013 with the AFP providing $90,000 in funding on behalf of the ASFM Executive Committee who took ownership for the delivery of this forum. The event was the largest held to date with 80 participants representing close to half of all African nations including Liberia, Tunisia, Senegal, Lesotho and Kenya. The forum aimed to set minimum standards for forensic medicine practice across the entire region.[24]

9.29 The AFP informed the committee that with the completion of the AFP's initiative as at 30 June 2013 funding to support the 4th ASFM Forum was being

22 AFP, answer to written question on notice no. 2.

23 AFP, answer to written question on notice no. 2.

24 AFP, answer to written question on notice no. 2.

sought from other international partners.[25] It was hoped that the African Union (AU) may have a presence at this forum. It also noted:

> In addition to providing funding of the ASFM forums the AFP…sponsored and hosted three Executive Committee members to attend the Australian and New Zealand Forensic Science Society's (ANZFSS) 21st International Symposium in Hobart in September 2012. This provided the committee members an opportunity to experience a world class gathering of forensic professionals in preparation for their own forum as well as an insight into the best practices in forensic medicine.[26]

9.30 The AFP has also provided ongoing mentoring and advice on society governance issues, particularly throughout 2012/13. This example from the AFP provides some insight into the wide range of capacity building and research activities in which Australia is engaged with countries of the Indian Ocean rim.

Academic group—new centre in Western Australia

9.31 Professor Rumley spoke of 'the need to revive an Australian national tertiary focus for Indian Ocean social science and natural science studies and research'. In his view, there was considerable support not only within but outside of Australia for financial support for such a venture. He mentioned locating a new centre in Western Australia. He believed that research centred on the Indian Ocean was 'potentially a very important issue'. He observed that a stage had been reached 'where there are things happening both on the science side in Western Australia with an ocean emphasis'.[27] Professor Rumley informed the committee that:

> At the University of Western Australia there is a new Oceans Institute, which is a science base organisation at the moment. There is enormous scope to revive in a more concrete way with appropriate support an Indian Ocean social science and humanities arm of that in Western Australia.[28]

9.32 Drs Bateman and Bergin also advocated for the re-establishment of an academic centre of excellence for Indian Ocean studies at a Western Australian University.[29]

9.33 The committee notes the Government's commitment to developing Asia-capable institutions, as outlined in the Asian Century White Paper, and suggests that stronger engagement with the Indian Ocean rim countries through research and scientific endeavour would complement this aim.

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25 AFP, answer to written question on notice no. 2.

26 AFP, answer to written question on notice no. 2.

27 *Committee Hansard*, 2 October 2012, p. 3.

28 *Committee Hansard*, 2 October 2012, p. 3.

29 Sam Bateman and Anthony Bergin, *Our western front: Australia and the Indian Ocean*, Australian Strategic Policy Institute, March 2010, p. 60.

Conclusion

9.34 IOR-ARC has identified disaster risk reduction, fisheries management and academic and science and technology as priority areas. Clearly, much scientific and research work is being done in specific areas in and around the Indian Ocean rim and often by specialist institutes. The Indian Ocean IODP program is an example of an international collaborative effort with both Australian and Indian scientists taking a predominant interest. In this case, although the Indian Ocean is the focus of the research, those engaged in the research reach beyond Indian Ocean rim countries.

9.35 There is no doubt, however, that scientific research on the Indian Ocean needs much greater attention. The results of this research could lead to improved understanding of climate, to a reduction in the devastating effects of natural disasters; to more productive land use, better management of the region's marine life and more efficient use of energy.

9.36 The committee agrees with Professor Rumley, Dr Bateman and Dr Bergin's suggestion about reviving an Australian national tertiary focus for Indian Ocean social and natural science in Western Australia. The committee believes that an important component of such a centre of excellence would be to have a strong research stream that is able to link into the work being done on the more practical application of science and technology research such as the collaborative work between the CSIRO and their counterparts in India. Indeed, the committee believes that the great strength of such a centre in Western Australia would be its ability to become part of a regional network of centres exchanging knowledge and sharing in the benefits deriving from research being undertaken in the many institutes already operating in the region. It would be part of a regional effort to consolidate, strengthen and expand on the collaborative research taking place—to recognise, work alongside and support projects such as the FSU and the University Mobility in the Indian Ocean program. Engagement with the private sector would also be crucial especially tapping into, and being part of, the research and innovation that is happening in Western Australia in particular in the mining sector. Further, the committee understands that there is an opportunity for collaboration between institutions in Australia. For example, the Indo-Pacific Governance Research Centre at the University of Adelaide would be one institution which could work in cooperation with an Institute for Indian Ocean Research located in Western Australia.

Recommendation 5

The committee recommends that the Australian Government consider establishing an Institute for Indian Ocean Research in a Western Australian University.

9.37 The committee believes that, with adequate promotion (both within the region and in Australia) and leadership, Australia as chair of IOR-ARC is in a good position to renew the push for connecting Indian Ocean rim countries through research and sharing of expertise.

Recommendation 6

The committee recommends that DFAT work with other agencies to make an audit of research projects which already have country to country links. Further, the committee recommends that DFAT engage with Australian universities and the research community to find ways in which to link Australian institutions to Indian Ocean rim institutions.