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Supplementary Materials

Commentary: on the under-valuing of Australia's expertise in drylands research and practice globally

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Table S1: Some examples of Australia's expertise contributing to global dryland governance.

Policy/strategy area	Example of reference in global assessment report	Year	Cited in:
Resilient drylands agriculture | Sustainable Land Management	"... To cope with the exceptional droughts in Australia, the National Drought Policy was formulated in 1992; it includes a range of measures such as the introduction *of sustainable agriculture*, *drought preparedness*, financial assistance for farmers exposed to exceptional drought circumstances, and drought-related research with an emphasis on drought prediction, monitoring, and management (IDIC, 1995)". (p.164)	1997	UNEP First Global Environment Outlook, GEO-1 (United Nations Environment Programme, 1997)
	Countless policies and actions attempt to address environmental degradation on land. Sustainable management strategies such as conservation agriculture and no-tillage (NT) cultivation in Australia. (p.224)	2019	UNEP Sixth Global Environment Outlook, GEO-6 (UN Environment, 2019)
	the case study of Western Australia, where "..by the late 1970s, arable farming was severely challenged in Western Australia because of drought and soil compaction. Between the 1980s and early 1990s, Australian farmers attempted to identify ways of overcoming the negative consequences of the drought by implementing NT systems. With the seeming benefits of NT, the adoption rate among other farmers increased reaching around 80-90 per cent by 2008 (Bellotti and Rochecouste 2014). The Australian NT implementation was rated effective in soil and water conservation, pest, diseases and weed control, as well as in plant nutrient availability. This is demonstrated in the New South Wales NT programme, where NT contributed to improvement in soil fertility, stabilization of soil acidity, as well as increase in soil organic carbon content". The case is said an exemplar of Sustainable Intensification of Land Use and Integrated Resource Management, driven by technological advancements that ensure increases in crop production through implementation of sustainable land and water practices, such as conservation agriculture and no-tillage cultivation. (p.385)	2019	UNEP Sixth Global Environment Outlook, GEO-6 (UN Environment, 2019)
	"An Integrated Approach to Dryland Farming: A Success Story in South-western Australia. The integrated whole farm—whole landscape-planning system has improved the environment, restored degraded lands and, by being coupled to a more diversified approach to agriculture, has enhanced the economic viability of the farm" (p.162)	1997	UNEP World Atlas of Desertification, 2nd edition (Middleton, Thomas, & UNEP, 1997)
	AusAid funding should focus on agricultural interventions on using Australia's expertise in drylands agriculture', agricultural research and development, and increasing agricultural productivity (chapter 3, p. 56)	2011	World Vision submission to the Inquiry into Australia's Relationship with the Countries of Africa (Parliament of Australia, 2011)

Water management and governance	"Adaptive governance can be applied to manage drought assistance as a common property resource. … can manage complex, interacting goals to create innovative policy options, facilitated through nested and polycentric systems of governance, effected by watershed or catchment management groups in areas of natural resource management (Nelson et al. 2008: Using adaptive governance to rethink the way science supports Australian drought policy)" (p.743)	2019	IPCC-SRCCL Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems[i] (Hurlbert, et al., 2019)
	The managing of groundwater salinity in the Murray Darling Basin as one example of "tradeable quota systems and permits that have emerged as effective tools for encouraging users to develop and use more efficient technologies and techniques to reduce water demand and pollutant emissions, and achieving the sustainable use of common resources and ecosystems" (p.142)	2007	UNEP Fifth Global Environment Outlook, GEO-5 (United Nations Environment Programme, 2012)
	Water allocation and cooperation policies: "In Australia, the Murray-Darling agreement and its implementing agency is another example of basin-level institutional arrangements that have been emulated in other countries" (p.272) Australia as case for policies that "Encourage rainwater harvesting/ storm water management for increased and improved water storage" (p,282) Voluntary sustainability reporting on water in the mining sector. It mentions Australian mining industry's Water Accounting framework (p.412)	2012	UNEP Fifth Global Environment Outlook, GEO-5 (United Nations Environment Programme, 2012)
Indigenous partnerships and incorporation of indigenous knowledge	"…models of polycentric adaptive governance increasingly adopted in Australia (Marshall and Smith 2010; Smith et al. 2010" (p.88) "Australia's protected areas established and managed by indigenous communities comprise nearly a quarter of Australia's national reserve system by area. Indigenous and community-conserved areas (ICCAs) and sacred natural sites (SNSs) have proven successful in conserving a rich biological and biocultural diversity by supporting the maintenance of traditional environmental knowledge and practices" (p.153).	2012	UNEP Fifth Global Environment Outlook, GEO-5 (United Nations Environment Programme, 2012)
	Australia has included *Indigenous Protected Areas* as a key part of the National Reserve System, in recognition that indigenous Australians have managed their country for tens of thousands of years. There are 70 dedicated Indigenous Protected Areas across 65 million hectares – accounting for more than 40% of the area of the National Reserve System – which protect biodiversity and cultural heritage and provide employment, education and training opportunities for indigenous people (The Natural Resource Management Council, 2010). Indigenous law has key connections to sustainable land management. Adult traditional owners of the Girringun in northern Australia (and other indigenous traditional owners	2018	IPBES special report on Land Degradation Restoration Assessment (LDRA). (IPBES, 2018)

	across the country) hold formal legal, cultural and spiritual obligations to care for ancestral lands and waters – based on a worldview and customary planning system with spiritual, social and physical connections between land and people, in addition to their responsibilities under customary law (Guilfoyle & Mitchell, 2015).		
Dryland monitoring systems	National Drought Policy (1992), with an emphasis on drought-related research with an emphasis on drought prediction, monitoring, and management.	1997	UNEP first Global Environment Outlook (GEO-1) (United Nations Environment Programme, 1997)
	It mentions ACRIS (Australian Collaborative Rangeland Information System) as an example of a large-scale network to acquire data on drylands (p.95)	2011	Global Drylands: A UN system-wide response. (UN Environment Management Group, 2011)
Desert knowledge innovation	"In Australia, community voluntary initiatives starting in the early 1970s were given due recognition by government in 1988. The National Farmers' Federation and Australian Conservation Foundation jointly proposed the national land management programme called Landcare (Noble and others 1996). This proliferated in the mid-1990s to include Dune Care, RiverWatch, Bushcare and Coastcare programmes" (p.75)	2002	UNEP Third Global Environment Outlook, GEO-3 (United Nations Environment Programme, 2003)
	Policies and approaches that promote complementary uses of traditional knowledge and western science: … "successful integration of traditional knowledge with modern science, technology and innovation can be seen in the example of a recent tech start-up called Indigital. This Aboriginal-owned and operated social enterprise, based in the Kakadu World Heritage Area in the Northern Territory of Australia, uses digital technology to showcase local sacred sites, knowledge and stories in augmented and virtual realities, contributing to the preservation of heritage while creating jobs in the digital economy". (p.610)	2019	UNEP Sixth Global Environment Outlook, GEO-6 (UN Environment, 2019)

Note: All GEO reports available via: https://www.unenvironment.org/global-environment-outlook/why-global-environment-outlook-matters/global

Table S2: Australian contributions to global reports related to 'land' from 1997 to 2019

Major global Assessment	Publication year	Australian contributors[a]	Type (ie. government agency representative, research centre, University, or independent)
IPCC SRCCL - Special Report on Climate Change and Land	2019	4	No government representatives; all academic[b]
3rd World Atlas of Desertification	2019	2	On advisory committee - no government representative
GEO-6	2019	12	Australian Universities
IPBES LDRA - Assessment Report on Land Degradation and Restoration	2018	10	2 government representatives as reviewers
Global Land Outlook (version 1)	2017	2	Background papers by Australian researchers
GEO-5	2012	13	From Australian Universities
GEO-4	2007	6	
Millennium Ecosystem Assessment: Ecosystems and Human Well-being: Policy Responses, Volume 3; Scenarios, Volume 2; Current State and Trends, Volume 1	2005	5	Government representatives. But NB no Australian representation in the synthesis on desertification or the chapter on drylands (volume 1)
GEO-3	2002	8	
GEO-2	1999	0	Done through Collaborating Centres - none Australian
2nd World atlas of desertification	1997	2	No government representatives
GEO-1	1997	0	Done through Collaborating Centres - none Australian

[a] the number of Australian contributors was collated from the lists of lead and contributing authors and reviewers as published with the reports.

[b] The Australian government provided AUD $18,000 to each Australian that officially participated in the IPCC Land report, though we have found no evidence of financial support for authors collaborating in any of the other major reports such as the GEOs.

Table S3: Evidence of Australia international science diplomacy in relation to drylands in the 2000 decade

Type of activity	Australian Agency and beneficiary country/region	Year and source [government]
International aid for sustainable dryland management	AusAID, supported a range of bilateral programs to combat desertification in developing countries. Through ACIAR (Australian Centre for International Agricultural Research), the Australian Government funded collaborative agricultural research projects in China, India, southern Africa and Southeast Asia.	2006 https://www.dfat.gov.au/sites/default/files/focus-magazine-may-2006.pdf Liberal: Alexander Downer Foreign Affair Minister
Scaling out of Landcare	Australian Landcare International (ALCI)is a non-profit that supports Landcare and projects around the globe including Germany, Iceland, New Zealand, Tonga, the Philippines, Sri Lanka, Indonesia, Bangladesh, Fiji, USA, Canada, Jamaica, Japan and 12 African countries.	2008 (Catacutan, Neely, Johnson, Poussard, & Youl, 2009)
ODA – Aid to Africa	The 2011 Inquiry into Australia's Relationship with the Countries of Africa recommended AusAID focus on agricultural interventions, using Australia‘s expertise in “drylands agriculture‘. It mentions “huge opportunities …. in agriculture because some 60 per cent of arable land in Africa was unused” (p.132).	2011 Inquiry into Australia's Relationship with the Countries of Africa (Parliament of Australia, 2011)
Australian International Food Security Centre	Africa, through the Australian International Security Centre. The Review Panel states: “However, state governments’ budgets have come under increasing pressure, and other expenditure priorities have tended to crowd out the historical importance accorded to agriculture, fisheries and forestry, or have been re-prioritised as a subset of environmental and natural resource management and biodiversity conservation and national parks. The budgetary resources and staffing for agricultural research and extension have as a result been reduced, and research centres consolidated or closed. This has meant a steady decline in the part played by state departments in Australia’s total agricultural, fisheries and forestry research effort, particularly in applied research.”	2013 ACIAR Review Panel (2013, p.87).

Table S4: Australian presence in UNCCD COPs (Compiled by the authors through review of List of participants to COPs 1 to 14)

Showing that the 2000s saw the most senior representations, with considerable continuity (one representative assisting 3 COPs and seniority ranging from Director to Assistant Director of Branches of the Department of Environment that are relevant to 'drylands' management and policy). 2013 onwards has been characterised by lower ranking officers from a variety of Departments (Environment or Foreign Affairs). Australia sent only one representative to the last 2 COPs.

COP	Rep.	Date, Country and source of information.
COP1	none	Rome, Sep-Oct 1997 https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP1_10/10eng.pdf
COP 2	none	Dakar, Senegal, Nov-Dec 1998 https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP2_13_Rev.1/13rev1eng.pdf https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP2_INF.5/inf5eng.pdf
COP3	1	Recife 1999 Ms Rachel Nelson, Policy Officer, Sustainable Landscape Branch, Environment Australia https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP3_INF.6/inf6eng.pdf
COP4	3	Bonn, 2000 Dr Annemarie Watt, Director, National Resource Management Branch, Dept of Environment and Heritage Mr Mark Kitchell, Environment Australia Ms Uma Jatkar , Third Secretary, Embassy of Australia in Germany
COP5	3	Geneva, 2001 Mr Max Kitchell, Environment Australia, Dr Annemarie Watt, Director, Natural Resource Management Branch, Department of Environment and Heritage Ms. Jennifer Meehan, First Secretary, Permanent Mission of Australia to the United Nations in Geneva https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP5_INF.4/inf4eng.pdf
COP6	2	Havana, Aug-Sep 2003 https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP6_INF.5/inf5eng.pdf Dr Annemarie Watt, Natural Resource Management Policy Branch, Department of the Environment and Heritage Ms. Jessica Lucas, Department of Foreign Affairs
COP 7	2	Nairobi, Oct 2005 https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP7_INF.5/inf5eng.pdf Dr Annemarie Watt, Natural Resource Management Policy Branch, Land, Water and Coasts Division, Department of the Environment and Heritage Mr. Brett Aldam, Deputy High Commissioner, Deputy Permanent Representative to UNEP and UN HABITAT, Australian High Commission, Kenya
COP8	3	Madrid, Sep 2007 https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP8_INF.4/inf4eng.pdf H.E. Mr. Noel Campbell, Ambassador to Spain, Embajada de Australia, Madrid Dr Annemarie Watt, Natural Resource Management Policy Branch, Land, Water and Coasts Division, Department of Environment and Natural Resources Mr Edward Palmisano, Tercer Secretario y Agregado Cultural, Embajada de Australia, Madrid
COP1 ES	3	New York, Nov 2007 (first extraordinary session) https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COPES-1_INF.3/inf3eng.pdf Dr David Dutton, Director, Environment Strategies Section, Department of Foreign Affairs and Trade Dr Dean Bialek, Second Secretary, Permanent Mission of Australia to the United Nations, New York Mr Peter Stone, Advisor, Permanent Mission of Australia to the United Nations, New York
COP9	3	Buenos Aires, Sep-Oct 2009 https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP9_INF.3/inf3eng.pdf

		H. E. Mr. John Richardson, Ambassador Embassy of Australia in Argentina Mr Derek White, Director, Regional Water Initiatives, Department of the Environment, Water, Heritage and the Arts Mr Gary Bastin, Scientific Expert ACRIS Coordinator CSIRO Sustainable Ecosystems Department of the Environment, Water, Heritage and the Arts
COP 10	3	Changwon, Korea, Oct 2011 Ms. Tanja Cvijanovic, Head of Delegation, Ministry of Sustainability, Environment, Water Population and Communities Ms. Gayle Partridge, Assistant Director, Ministry of Sustainability, Environment, Water Population and Communities Ms. Michelle Lauder, General Manager, Ministry of Sustainability, Environment, Water Population and Communities https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP10_INF.10/inf10eng.pdf
COP 11	2	Windhoek, Sep 2013 Mr. Tim Fisher, Assistant Secretary, Water Policy Branch, Department of Sustainability, Environment, Water, Population and Communities Mr. Karl Mark Higgins, Director, Water Strategies, Water Policy Branch, Department of Sustainability, Environment, Water, Population and Communities
COP 12	2	Ankara, Oct 2015 Ms. Teena Louise Browning, Head, Environmental Unit, Department of Foreign Affairs and Trade Mr. Daniel Emery, Deputy Head of Mission, Embassy of Australia to Turkey https://www.unccd.int/sites/default/files/sessions/documents/ICCD_COP12_INF.6/INF6eng.pdf
COP 13	1	Ordos, China, Sep 2017 Ms. Melissa Cotterill, Assistant Director, International Policy Section, Department of the Environment and Energy https://www.unccd.int/sites/default/files/sessions/documents/2017-10/ICCD_COP%2813%29_INF.4-1717528E.pdf
COP 14	1	New Delhi, India, Sep 2019 Ms. Cate Setterfield, Assistant Director, International Policy, Department of the Environment and Energy

Table S5: Some entry points of Global Environmental Governance and International Environmental Regimes that Australia could use to leverage expertise in drylands

UN Agency | convention	Committee | Advisory Body | Initiative
UN Convention to Combat Desertification	Committee of Science and Technology (see box 1SI)
	Roster of Independent Experts (see box 1SI)
	Science Policy Interface
	IWG on Drought
	Land Degradation Neutrality Strategic Framework 2018-2030: Objectives 1 to 5. e.g. "To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems
UN Environment Programme - United Nations Environment Assembly	Official Australian Representation at UNEA (Australia is yet to send representatives to UNEA).
	4th UNEA – 2019. Resolution 4/15: Innovations in sustainable rangelands and pastoralism: http://wedocs.unep.org/bitstream/handle/20.500.11822/28479/English.pdf?sequence=3&isAllowed=y
UN Global Environment Facility	Scientific and Technical Advisory Panel (Land Degradation Adviser)
UNEP and FAO	United Nations Decade on Ecosystem Restoration 2021-2030 (Resolution A/RES/73/284 of the UN General Assembly: https://undocs.org/A/RES/73/284)
UN Framework on Climate Change	Article 2, Article 4 (a,d,e,g). e.g. 4 (g) "Promote and cooperate in scientific, technological, technical, socio-economic and other research, …to further the understanding… of climate change …" Cancun Agreement: Building resilience of socio-economic and ecological systems (UN General Assembly, 1994)
UN Convention on Biological Diversity	Aichi Targets: 5, 7,14,15. e.g. enhance "ecosystem resilience and the contribution of biodiversity to carbon stocks… through conservation and restoration… thereby contributing to climate change mitigation and adaptation and to combating desertification…" (UN Convention on Biological Diversity, 2013)
UN 2030 Agenda for Sustainable Development and Goals	SDG 15, target 15.3: "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation neutral world." (UN General Assembly, 2015)
Sendai Framework for Disaster Risk Reduction 2015-2030	Priority 3: Investing in disaster risk reduction for resilience. Importance of "… promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning and management of, inter alia, …drylands… including through the identification of areas that are safe for human settlement, and …. preserving ecosystem functions that help to reduce risks" at national and local levels (paragraph 30g) (UNDRR, 2015).

Table S6: ACIAR funding data for drylands projects 1989-2020 (source: provided by ACIAR, Mar 2020)

Project Title	Country	Start	End	Budget (2020 $Aus)
Economic aspects of raw wool production and marketing in China.	China	3/1989	2/1992	$955,806
Conservation/Zone Tillage Research for Dryland Farming	China	1/1993	12/1995	$812,855
Determination of a methodology for measuring the impact of land degradation in Botswana on crop production and livestock productivity	Botswana	6/1993	10/1994	$177,719
Management of legume N2 fixation for rain-fed cereal production in Pakistan, Nepal and Australia.	Pakistan, Nepal	1/1994	12/1996	$1,666,024
Monitoring vegetation and soil degradation in Botswana	Botswana	10/1994	6/1998	$145,734
Increasing the effectiveness of research on agricultural resource management in the semi-arid tropics by combining cropping systems simulation with farming systems research.	India, Kenya, Zimbabwe	1/1996	12/2000	$1,800,028
The Collaboration on Agricultural/Resource Modelling and Application in the Semi-Arid Tropics	Kenya	1/1996	12/2000	$2,717,018
Overcoming production constraints to sorghum in rainfed environments in India and Australia.	India	7/1996	6/1999	$1,382,589
Tools and Indicators for Planning Sustainable Soil Management on Semi-Arid Farms and Watersheds.	India	7/1996	6/1999	$438,228
Analysis of Socio-Economic and Agribusiness Developments in the Chinese Beef Industry	China	1/1997	12/1999	$1,169,902
Management of irrigation and waterlogging for increased production and reduced environmental degradation in semi-arid Rajasthan and the Murrumbidgee Irrigation Area	India	1/1997	1/1999	$1,205,895
Increasing crop production through biological control of soil-borne root diseases.	China	1/1997	12/1999	$1,343,173
Sustainable mechanised dryland grain production	China	7/1997	6/2000	$1,390,390
Risk management in southern African maize system	Zimbabwe, Malawi	7/1997	6/2000	$1,572,907
Development and conservation of plant genetic resources from the Central Asian republics and associated regions	Azerbaijan/Georgia	1/1998	7/2001	$669,702
Sustainable Grain Legume-Cereal Production Systems through Management of N2 Fixation.	Pakistan, Nepal	1/1998	6/2000	$1,319,196
Traits for yield improvement of chickpea for drought-prone environments of India and Australia	India	7/1998	6/2004	$1,970,235

Project Title	Country	Start	End	Budget (2020 $Aus)
More Efficient Breeding of Drought Resistant Peanuts in India and Australia	India	7/1998	6/2001	$956,558
Tropical forage and ley legume technology for sustainable grazing and cropping systems in southern Africa	South Africa, Zimbabwe	1/1999	12/2002	$1,895,382
Increasing Yield Potential in Wheat: complementing conventional breeding by application of novel physiological and germplasm strategies	India	7/1999	10/2006	$1,618,895
Improving the productivity and sustainability of rainfed farming systems for the western Loess Plateau of Gansu Province	China	7/2000	6/2005	$2,244,451
Integrative technologies for assessing the extent and cause of degradation in arid community rangelands	India	7/2000	6/2004	$609,628
Ruminant production in the red-soils region of southern China and in northern Australia	China	1/2001	12/2003	$1,470,396
Lucerne adapted to adverse environments in China and Australia	China	1/2001	12/2004	$2,012,161
Conservation, Evaluation and Utilization of Plant Genetic Resources from Central Asia and the Caucasus	Kazakhstan, Krygyzstan, Tajikistan, Turkmenistan, Uzbeckistan, Armenia, Azerbaijan, Georgia	7/2001	6/2005	$746,184
Development and scaling out of targeted recommendations for smallholder maize systems in Southern Africa through integrating farmer participatory research and simulation modeling	Zimbabwe, Malawi	7/2001	6/2004	$1,549,072
Stress tolerant wheat and maize for Afghanistan: Seeds of strength	Afghanistan	7/2002	6/2004	$1,520,408
Sustainable land use change in the north west provinces of China	China	1/2003	12/2005	$591,603
Rural Poor and Smallholders in Western China Under WTO: A Regional and Community Level Analysis	China	7/2003	6/2006	$590,388
Increased Productivity of Cool Season Pulses in Rain-Fed Agricultural Systems of China and Australia	China	7/2003	12/2006	$1,668,828
Improved fertiliser recommendations and policy for dry regions of southern Africa	South Africa	7/2003	6/2006	$591,868
Improving the quality of pearl millet residues for livestock	India	1/2004	12/2008	$1,765,385
Intensifying production of grain and fodder in Central Tibet farming systems	China/TAR	1/2004	12/2006	$578,809
Plant Health Management for Faba Bean, Chickpea and Lentils	Afghanistan, Bangladesh, Egypt, Ethiopia, Iran, Iraq, Eritrea, Morocco,	7/2004	6/2007	$577,362

Project Title	Country	Start	End	Budget (2020 $Aus)
	Syria, Turkey, China, India, Nepal, Pakistan			
Genetic Resource Conservation, Documentation and Utilization in Central Asia and the Caucasus	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	7/2004	6/2007	$570,122
Sustainable Development of Grasslands in Western China	China	7/2004	12/2006	$938,540
Wheat and maize productivity improvement in Afghanistan	Afghanistan	7/2004	6/2007	$1,447,022
Increasing milk production from cattle in Tibet (TAR)	China	7/2004	6/2007	$578,318
Ensuring productivity and food security through sustainable control of yellow rust of wheat in Asia	China, India, Pakistan, Nepal, Afghanistan, Iran, Kazaksthan, Uzbekistan, Azerbaijan, Kyrgyzstan, Tajikistan, Iraq	1/2005	12/2009	$1,408,668
Improving the productivity and efficiency of food crop and forestry systems	Iraq	5/2005	6/2008	$1,722,801
Better crop germplasm and management for improved production of wheat, barley and pulse and forage legumes in Iraq	Iraq	5/2005	6/2008	$1,691,359
Wheat and maize productivity improvement in Afghanistan	Afghanistan	10/2007	9/2010	$2,028,698
Improving the Efficiency of Land Use Change Policy in China	China	4/2008	3/2010	$521,078
Integrated crop and dairy systems in Tibet Autonomous Region, PR China	China	4/2008	3/2012	$1,801,203
Evaluation and selection of wheat for dryland farming in NW China	China	6/2008	6/2013	$1,110,196
Development of conservation cropping systems in the drylands of northern Iraq	Iraq	7/2008	6/2011	$5,999,350
Scoping Study on Western China Desertification	China	9/2008	11/2008	$68,743
Botswana Livestock Research and Development: project design study	Botswana	11/2010	1/2011	$72,998
Testing equipment and crop monitoring for Conservation Agriculture in North Africa	Morocco, Tunisia, Algeria	6/2011	5/2012	$176,609
Sustainable Livestock Grazing Systems in Western China	China	7/2011	12/2015	$1,567,785
Integrated catchment management and capacity building for improving livelihoods in Afghanistan	Afghanistan	7/2011	6/2015	$5,389,189
Adapting conservation agriculture for rapid adoption by smallholder farmers in North Africa	Morocco, Tunisia, Algeria	6/2012	6/2016	$3,802,776

Project Title	Country	Start	End	Budget (2020 $Aus)
Competitive Smallholder Livestock in Botswana	Botswana	9/2012	8/2015	$1,588,429
Sustainable Wheat & Maize Production in Afghanistan	Afghanistan	10/2012	9/2016	$7,476,966
Forage options for smallholder livestock in water-scarce environments of Afghanistan	Afghanistan	1/2014	12/2017	$4,016,025
A targeted approach to sorghum improvement in Ethiopia	Ethiopia	6/2014	6/2017	$685,740
Piloting a Farming Systems Approach to Investment Planning for Climate-Smart Smallholder Agriculture in Africa	Tanzania	6/2015	3/2016	$161,179
Strengthening incentives for improved grassland management in China and Mongolia	China, Mongolia	9/2015	12/2019	$1,953,690
Increasing productivity and profitability of pulse production in cereal based cropping systems in Pakistan	Pakistan	11/2016	10/2021	$2,465,848
Potential of new Australian oldman saltbush varieties to fill ruminant feed gaps in arid and saline areas of Pakistan	Pakistan	3/2017	2/2018	$189,258
Faba Bean in Ethiopia – Mitigating disease constraints to improve productivity and sustainability	Ethiopia	12/2018	6/2023	$1,920,911

The Table shows ACIAR grants from 1989-2020 that included work on dryland agriculture, including cropping, livestock or pasture management and relevant breeding programs, as well as relevant policy and systems management activities in countries (often including Australia) with drylands (extracted by manual searching for these criteria). The original grant value was adjusted to consistent 2020 Aus$ values using https://www.officialdata.org/Australia-inflation. To create the graph in Box 5, each grant was allocated equally to the calendar years in which it was operating, and the total for that year summed across all grants. This is imprecise in terms of exact start and end dates, as well as actual budget spreads among years within each project, but these details were not readily available and this analysis was deemed sufficient to show the overall pattern of investment. Data from the earliest dates was hardest to extract and some earlier projects may have been missed; and some later projects include funds from the Department of Foreign Affairs and Trade that were managed through ACIAR. However neither aspect significantly alters the essential trend shown in Box 5.

Box S1: The UNCCD: its composition and a brief story of Australia's engagement

The United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking environment and development to sustainable land management. The text of the Convention was adopted in 1994 and it is made up of 37 articles that describe the objectives, principles, general obligations, obligations of affected and of developed country Parties, and the action programmes, scientific and technical cooperation and supporting measures for implementation, including research and development, transfer, acquisition, adaptation and development of technology, capacity building and institutional setting and mechanisms for its effective implementation.

The Convention addresses specifically the drylands of the world, with the objective of "combating desertification and mitigating the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements" (article 2). It encourages Parties to "adopt an integrated approach for addressing the physical, biological and socio-economic aspects of the processes of desertification and drought" (article 4); and international cooperation in the fields of technology transfer as well as scientific research and development, information collection and dissemination and financial resources (article 12 and 16).

The Conference of the Parties (COP) is the supreme body of the Convention. It is supported by a **Permanent Secretariat** with established functions (article 23). A subsidiary body of the COP is the **Committee on Science and Technology** (CST), tasked with providing information and advice to the COP on scientific and technological matters relating to combating desertification and mitigating the effects of drought (article 24). The CST was envisaged as multidisciplinary and open to the participation of all Parties, and composed of government representatives competent in the relevant fields of expertise. As needed, the CST can appoint **ad hoc panels** to provide information and advice on specific issues regarding science and technology relevant to Convention's objectives. The role and responsibilities of the Committee are actively supported by the work of the **CST Bureau.** Members of the Bureau are appointed considering geographical representation and following the principle of rotation among the regional groups recognized by the practices of the United Nations.

To strengthen the CST, at its 11th session the COP established a **Science-Policy Interface (SPI)** to promote dialogue between scientists and policy makers on desertification/land degradation and drought, with a mandate to provide the CST with thematic guidance on knowledge requirements for implementing the UNCCD. The work of the SPI is guided by bi-annual Programme of Work adopted at the COP.

The COP also maintains a **Roster of independent experts** based on nominations received in writing from the Parties, considering the need for a multidisciplinary approach and broad geographical representation (article 24). To mobilise and channel financial resources, including for the transfer of technology to affected developing country Parties, the COP established the **Global Mechanism** (article 21). In 2010 the Global Environment Facility (GEF) became a financial mechanism of the UNCCD, and it directly contributes to implementation of the Convention, including UNCCD's 2018-2030 Strategic Framework. The **Committee for the Review of the Implementation of the Convention** (CRIC) is the other subsidiary body to the COP that regularly reviews the implementation of the Convention. Five world regions (or Annexes) – Africa, Asia, Latin America and the Caribbean, Northern Mediterranean, Central and Eastern Europe - decide how to implement the Convention, through regional and sub-regional action programmes.

Australia is one of the 197 countries that has ratified the Convention, in 2000. The consultations conducted by the Government of Australia prior to the ratification of the Convention cited that it would: a) benefit Australia's domestic and international credibility and enhance its international reputation in an area where it has much to show; b) bring a possibility of increased commercial opportunities for Australian businesses; c) provide an avenue for Australia to influence and improve the effectiveness with which land management assistance is delivered, and to influence the administration of the UNCCD Secretariat; and, d) signal to the international community Australia's commitment to helping overcome a significant and widespread environmental problem.

Despite the Government recognising the enormous potential to leverage Australia science diplomacy through a pro-active presence in the Convention, it never nominated scientists or experts to the Roster of Independent Experts, nor proposed members to the Commission on Science and Technology. Two Australians have been nominated to the SPI (2014-2019) by an independent process of calling for nominations which emanated from the Secretariat of the Convention. The most recent Australian Government representation is in the Intergovernmental Working Group on Drought (IWG), established in September 2019 during UNCCD COP14.

Since 1997 (COP1) there have been 14 COPs and one Extraordinary Session. The Australian Government has been sending representatives since COP3 (1999) –generally 2 or 3 Australian government representatives from the Department of Foreign Affairs and/or the Department of Environment (see Table 4 SI), though that has dropped to one representative since 2016.

Sources: (United Nations Convention to Combat Desertification, 2020) and (Joint Standing Committee on Treaties, 2000)

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