

CURRICULUM VITAE

COLIN JOHN CHARTRES

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EMPLOYMENT HISTORY

2007 –

International Water Management Institute Colombo, Sri Lanka;
Director General.

2005 - 2007

National Water Commission

Chief Science Advisor (seconded from CSIRO Aug 05-Aug 06;
permanent appointment from Sept 07)

2002 – 2005

CSIRO Land and Water

Director Government Interactions and International 2004 -
Business Director/Deputy Chief, 2002-2004

1999 – 2002

Bureau of Rural Sciences, Department of Agriculture
Fisheries and Forestry, Australia.

Chief Scientist 2000 - 2002

Chief, Land and Water Sciences Division 1999 -2000

1997- 1998

Australian Geological Survey Organisation,

Chief, Geohazards, Land and Water Resources Division (Division
partially moved to DAFF in 1998)

1984- 1997

CSIRO, Division of Soils, Canberra.

1993 Senior Principal Research Scientist

1992 (Sept.)-1993 (Feb.) Acting Assistant Chief

1988-92 Principal Research Scientist

1984-88 Senior Research Scientist.

[1987-1997 Program Manager for Divisional Soil and Land
Resources Program in 1993]

1978-84

University of New South Wales, Sydney. Lecturer in Pedology.

[1982-84 Member of Faculty of Applied Science Executive
Committee]

1976-78

Booker Agriculture International Ltd., London.

Soil scientist.

EDUCATION/PROFESSIONAL QUALIFICATIONS

AICD

2005 Passed Australian Institute of Company Directors
Examination

Doctor of Philosophy 1972-75 University of Reading, U.K. (Pedology)

Bachelor of Science 1969-72 University of Bristol, U.K., BSc Ili(Hons.) Physical Geography with subsidiary Geology

1963-69 Hertford Grammar School, Hertford, U.K

BIOGRAPHICAL DATA

DATE OF BIRTH 10th December, 1951

MARITAL STATUS: Married (2 children)

NATIONALITY Joint Australian/British citizenship

LANGUAGES English (native speaker), French (read well, speak and write reasonably) and Spanish (basic knowledge including speaking, reading and writing).

CAREER SUMMARY

Over the last 10 years:

- Chief Science Adviser to the National Water Commission contributing to science strategy, knowledge and capacity building, design of the Baseline Assessment of Water Resources and assessment of Australian Government Water Fund project proposals.
- Business Director/Deputy Chief (Director Government Interactions and International from Aug, 04) of CSIRO Land and Water, a Division of over 500 staff with 10 Laboratories around Australia. Senior level management including strategic planning, resource management, policy advice and international relations. Member of the Steering Committee of the CGIAR Challenge Programme for Water and Food. Past Chair of the Global Research Alliance Water Action Council. Past Chair of Australia's National Radioactive Waste Repository Advisory Committee.
- Chief Scientist of the Bureau of Rural Sciences, part of the Australian Government Department of Agriculture, Fisheries and Forestry. Provision of policy advice to government on surface and groundwater resources. Director of a major groundwater-irrigation feasibility study in San Luis Province, Argentina.
- Chief of Division of Geohazards, Land and Water Resources at the Australian Geological Survey Organisation. Leading research and providing advice to government on earthquake risks, groundwater resources and resource survey.
- Program Manager in the CSIRO Division of Soils. Leading research into acidification, soil structural decline and soil and land resource survey methodology.

Previous experience:

University teaching, individual and team research, international agricultural consultancy.

MAJOR COMPETENCIES AND EXPERIENCE

Major competencies in organisational leadership and successful management of government research and development agencies including CSIRO, the Australian Geological Survey Organisation and the Bureau of Rural Sciences. This has included organisational policy development, human resource management and development, budgetary and strategic planning responsibilities.

Major science/policy experience over the last 8 years in dealing with water management issues in Australia and overseas. These include:

- development of a Science Framework for the National Water Commission;
- key science leadership role in the NWC Baseline Assessment of Water Resources (Now Australian Water Resources 2005);
- collation of scientific evidence regarding salinity in the Murray-Darlin Basin in the face of strong public debate and challenges by the Institute of Public Affairs (e.g. Chartres et al., 2004. River Murray Water Quality: A Salinity Perspective 2003);
- publication of a review on Water in Mining in 2003;
- preparation of a paper on Emerging National Water Issues for the Programs and Policies Committee of the NRM Ministerial Council (Feb 2005);
- serving on the Steering Committee of the CGIAR Challenge Programme for Water and Food has led to a high degree of understanding of the world's upcoming food and water issues and how R&D can assist in developing solutions;
- the presentation of several papers including a keynote paper on "More Crop for your Drop – making science relevant for policy development" for the US Soil Science/Agronomy/Crop Sciences meeting in Seattle, Nov. 2004. This paper led the Symposium about the CGIAR Challenge Programme for Water and Food at the Congress;
- development of The Status of Water Resources in ASEAN and The ASEAN Strategic Plan of Action for Water Resources Management for the ASEAN Secretariat (AusAID funded);
- key contributor to GRA publication on Sub-Saharan African Water Scenarios;
- presentation of a Keynote paper at the 2005 Water and Sewage in Asia conference in Singapore (Feb 25th) entitled Strategic Challenges in Water Resources management in south-east Asia;
- membership of steering committee of AusAID's Water Research Facility.

In 2004 led the Review of Science in the National Action Plan and National Heritage Trust on behalf of CSIRO and the Bureau of Meteorology for the Ministers of Agriculture Fisheries and Forestry and Environment and Heritage. This review considered to what degree catchment management agencies were basing actions on scientific knowledge and needs and what areas of developing R&D would enhance catchment management.

Demonstrated achievements in the public policy area include leading the scientific aspects of the development of the \$1.4 billion National Action Plan for Salinity and Water Quality in 2001 - 2002, including the preparation of a presentation on natural resources management to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC). Contributor to a similar

PMSEIC presentation and report on salinity and a previous (1991) review of the role of the Australian Research and Development Corporation model and its impact on CSIRO.

Considerable expertise across the agricultural/natural resource management disciplinary spectrum, including how biophysical and economic information can be integrated and used in the policy and planning processes at a range of scales. Demonstrated experience of intergovernmental and community relationships in natural resource management through serving on NRM Ministerial Council Committees and the NRM Community Forum.

Considerable experience of CRCs and their governance as a Director of eWater, Coastal Zone, Catchment Hydrology, Freshwater Ecology, Rice and Landscape Environment and Mineral Exploration CRCs at various stages over the last 6 years.

Additional demonstrated experience in international land and water development issues in Africa, South America, Papua New Guinea and South-east Asia. In Argentina, demonstrated how biophysical and economic factors can be integrated to deliver feasibility analyses for irrigation development in a \$5m project of which I was the Director.

Contributed to the establishment of the National Land and Water Resources Audit and has supervised several of the Audit's projects on groundwater salinity, soil resources, land use mapping and vegetation inventory.

Publication of over 120 papers, book chapters, reports and conference papers on soil, water and agricultural management issues. Published work is held in high regard internationally as evidenced by a high citation rate and numerous invitations to present at conferences and workshop. Successfully served as a Chairman of a Subcommission of the International Society of Soil Science.

OTHER CAREER HIGHLIGHTS

- Invited in 1999 by the NSW Minister of Agriculture to sit on the State's Salinity R&D Research Committee.
- Assisted AusAID as a panel member for its Water Fund in 2003-04.
- Contributions to the management of radio-active waste via work for the Office of the Supervising Scientist at Ranger and as Chairman of the National Low-level Radioactive Waste Repository Advisory Committee of DISR (now under DEST). In 2001 Dr Chartres was appointed Chairman of the Intermediate Level Radioactive Waste Advisory Group by the Minister of Industry, Science and Resources.
- Leading large multidisciplinary teams in research and development and applied studies including the Sustainable Agricultural Systems in south-eastern Australia component of the CSIRO Land and Water Care Program.
- A major contribution to the development of the sugar industry in Papua New Guinea as scientist responsible for site selection.
- Mineralogical identification of aeolian inputs to soils in the UK, Australia and Papua New Guinea.
- Contributions to the literature on soil survey and land evaluation and assisting with the development of the Australian Collaborative Land Evaluation Program.
- Significant improvements in the understanding of soil acidification and soil structural degradation processes and their amelioration in Australian soils.
- Advances in the understanding of soil formation processes using mineralogy, micromorphology and associated methods.

- Identification of the role of amorphous silica and amorphous aluminosilicates in hard-setting and volcanic ash soils.

MANAGEMENT COURSES

- Successfully completed Australian Institute of Company Directors course (March, 2005)
- AFFA Corporate Leadership Program (2000)
- DPIE Leading People Program Mt Eliza Business Management School) (1998)
- 1990-1993 CSIRO Leadership Development Program for senior managers (Intake 1)
- 1991 CSIRO Research Leadership Course, Australian Graduate School of Management, University of New South Wales

MAJOR HONOURS

- 2001 Australia Day Achievement Award, Agriculture Fisheries and Forestry Australia.
- 1992-1996 1988 Elected Chair, Subcommission B (Soil Micromorphology) of the International Society of Soil Science
- 1991 Winner of the NSW Research Category Landcare Award for collaborative work with NSW Agric. and Fisheries, DARA Vic., NSW SCS and Charles Sturt Univ. on soil acidification.
- 1988 Awarded Best Poster Prize at International Working meeting on Soil Micromorphology, San Antonio, Texas.
- 1983 Awarded the Publication Medal of the Australian Society of Soil Science.

MEMBERSHIP OF SCIENTIFIC SOCIETIES

- Australian Society of Soil Science (President ACT Branch, 1986-88, 1996-98) Secretary NSW Branch 1981-82)
- British Society of Soil Science
- American Society of Soil Science
- International Society of Soil Science

BOARD MEMBERSHIPS

- 2005 - 2007 Elected Board Member to eWater CRC
- 2002 - 2007 Member of CRC LEME Land Use Advisory Council
- 2003 -2005 Member of Board of Cooperative Research Centres(CRCs) for Coastal Zone, Estuaries and Waterway Management; Rice; Catchment Hydrology; and Freshwater Ecology
- 2003 - 2004 Member of Board of β Environmental Technologies International (CSIRO)
- 2000 - 2002 Member of Board of CRC for Landscape Evolution and Mineral Environments

PUBLICATIONS

Refereed journal papers

1. Chartres, C.J. and Whalley, W.B. 1975. Evidence for late Quaternary solution of Chalk at Basingstoke, Hants. *Proc. Geol. Ass.* 86, 365-372.
2. Whalley, W.B. and Chartres, C.J. 1976. Preliminary observations on the origin and sedimentological nature of Sarsen stones. *Geol. Mijnbouw* 55, 68-72.
3. Chartres, C.J. 1980. A Quaternary soil sequence in the Kennet Valley, central southern England. *Geoderma*, 23, 125-146.
4. Chartres, C.J. 1981. The mineralogy of Quaternary deposits in the Kennet Valley, Berkshire. *Proc. Geol. Ass.* 912, 93-103.
5. Chartres, C.J. 1981. Land resources assessment for sugar-cane cultivation in Papua New Guinea. *Appl. Geogr.* 1, 259-271.
6. Chartres, C.J. and Costin, A.G. 1981. Buried soil cracks in alluvium near Braidwood, NSW. *Aust. J. Soil Res.* 19, 255-263.
7. Chartres, C.J. 1982. The use of landform-soil associations in irrigation soil surveys in northern Nigeria. *J. Soil Sci.* 33, 317-328.
8. Chartres, C.J. 1982. The role of geomorphology in land evaluation for tropical agriculture. *Zeit. Geomorph. Suppl. Bd.* 44, 21-32.
9. Chartres, C.J. 1982. The pedogenesis of desert loam soils in the Barrier Range, northwest NSW. I. Soil parent materials. *Aust. J. Soil Res.* 20, 269-81.
10. Chartres, C.J. 1983. The pedogenesis of desert loam soils in the Barrier Range, western NSW. II. Weathering and soil development. *Aust. J. Soil Res.* 21, 1-13.
11. Parker, C.J. and Chartres, C.J. 1983. The effect of recent land use changes on red podzolic soils near Sydney, NSW, Australia. *Catena* 10, 61-76.
12. Chartres, C.J. and Pain, C.F. 1984. A climosequence of soils developed on volcanic ash in Enga Province, Papua New Guinea. *Geoderma*, 32, 131-155.
13. Chartres, C.J. 1984. The micromorphology of Quaternary river terrace soils in the Kennet Valley, Berkshire. *Earth Surface Processes and Landforms* 10, 343-56.
14. Chartres, C.J. and van Reuler, H. 1985. Mineralogical changes with depth in a layered Andosol near Bandung, Java, Indonesia. *J. Soil Sci.* 35, 173-836.
15. Chartres, C.J., Wood, A. and Pain, C.F. 1985. Some micromorphological, mineralogical and chemical properties of volcanic ash soils in highland Papua New Guinea. *Aust. J. Soil Res.* 23, 339-354.
16. Chartres, C.J. 1985. A preliminary investigation of hardpan horizons in northwest NSW. *Aust. J. Soil Res.* 23, 325-337.
17. Chartres, C.J., Greene, R.S.B., Ford, G.W. and Rengasamy, P. 1985. The effects of gypsum on macroporosity and crusting of two red duplex soils. *Aust. J. Soil Res.* 23, 467-479.
18. Chartres, C.J. 1987. The composition and formation of grainy void cutans in some soils with textural contrast in south eastern Australia. *Geoderma* 39, 209-234.
19. Walker, P.H., Chartres, C.J. and Hutka, J. 1988. The development of soils with textural contrast on granitic rocks in south eastern Australia. I. Soil morphology and particle size distributions. *Aust. J. Soil Res.* 26, 1-16.
20. Chartres, C.J., Chivas, A.R. and Walker, P.H. 1988. The development of soils with textural contrast on granitic rocks in south eastern Australia. II. Oxygen isotope, mineralogical and geochemical evidence for aeolian deposition. *Aust. J. Soil Res.* 26, 17-31.
21. Chartres, C.J. and Walker, P.H. 1988. The development of soils with textural contrast on granitic rocks in south eastern Australia. III. Micromorphological and geochemical evidence of weathering and soil development. *Aust. J. Soil Res.* 26, 33-53.
22. Willett, I.R., Chartres, C.J. and Nguyen, T.T. 1988. Migration of phosphate into aggregated particles of ferrihydrite. *J. Soil Sci.* 39 275-282.
23. Greene, R.S.B., Rengasamy, P., Ford, G.W., Chartres, C.J. and Millar, J.J. 1988. The effects of sodium and calcium on hydraulic conductivity and modulus of rupture of two red duplex soils. *J. Soil Sci.* 39, 639-648.
24. Mùcher, H.J., Chartres, C.J., Tongway, D.J. and Greene, R.S.B. 1988. Micromorphology and significance of the surface crusts of soils in rangelands near Cobar, Australia. *Geoderma*. 42, 227-244.

25. Chartres, C.J. and Mücher, H.J. 1989. The effects of fire on the surface properties and seed germination in two shallow monoliths from a rangeland soil subjected to simulated raindrop impact and water erosion. *Earth Surface Processes and Landforms*. 14, 407-417.
26. Moran, C.J., McBratney, A.B., Ringrose-Voase, A.J. and Chartres, C.J. 1989. A method for the dehydration and impregnation of clay soil. *J. Soil Sci.* 40, 569-576.
26. Chartres, C.J., Ringrose-Voase, A.J., and Raupach, M. 1989. A comparison between acetone and dioxane for water replacement prior to impregnation of undisturbed samples. *J. Soil Sci.* 40, 849-863.
27. Greene, R.S.B., Chartres, C.J. and Hodgkinson, K.C. 1990. The effect of fire on soil properties in a degraded semi-arid rangeland. I. Introduction, Soil physical and micromorphological properties. *Aust J. Soil Res.* 28, 755-777.
28. Kinnell, P.I.A., Chartres, C.J. and Watson, C.L. 1990. The effect of fire on soil properties in a degraded semi-arid rangeland. II. Erodibility. *Aust J. Soil Res.* 28, 779-794.
29. Chartres, C.J., Cumming, R.W., Beattie, J.A. and Bowman, G.M. 1990. Acidification of soils on a transect from plains to slopes, south-western NSW. *Aust. J. Soil Res.* 28, 539-548.
30. Chartres, C.J., Kirby, J.M. and Raupach, M. 1990. Poorly crystalline silica and aluminosilicates as temporary cementing agents in hard-setting soils. *Soil Sci. Soc. Am J.* 54, 1060-1068.
31. Taylor, R.M., Raupach, M. and Chartres, C.J. 1990. The association of iron and aluminium with silica in soil processes. *Clay Minerals* 25, 375-389.
32. Chartres, C.J. and Geeves, G.W. 1990. Pedological controls on soil acidification in south-eastern N.S.W. *Trans. 14th Int. Cong. Soil Sci.* Vol. VIII Suppl. p.85.
33. Williams, J. and Chartres, C.J. 1991 Managing the soil resource under grazing in the Australian tropics. *Tropical Grasslands* 25, 73-84.
34. Chartres, C.J. (1992) Soil Crusting in Australia. 1992 *In M.E. Sumner and B.A. Stewart (Eds.) "Soil Crusting: chemical and physical processes". Advances in Soil Science.* Lewis Publishers, Boca Raton, Fla, USA. pp.339-365.
35. Little, I.P., Chartres, C.J. and Young, R.J. 1992. Numerical classification of a set of 79 soil profiles with respect to attributes related to pH, and its relationship to the growth of barrel medic in the Lachlan Shire. *Aust. J. Soil Res.* 30:371-382.
36. Chartres, C.J. and Geeves, G.W. 1992 Soil acidification in the south-eastern wheatbelt. *Aust. J. Soil And Water Conserv.* 5 (4): 39-43
37. Rengasamy, P., Naidu, R., Beech, T.A., Chan, K.Y. and Chartres, C.J. 1993. Rupture strength as related to dispersive potential in Australian soils. *Catena Suppl.* 24, 65-75.
38. Chartres, C.J. 1993. Sodic soils: An Introduction to their Formation and Distribution in Australia. *Aust. J. Soil Res.* 31, 751-760.
39. Robinson, B., Malfroy, H., Chartres, C.J., Helyar, K.R. and Ayers, G. 1995. The sensitivity of ecosystems to acid inputs in the Hunter Valley, Australia. *Water, Air and Soil Pollution* 85, 1721-1726.
40. Franzmeier, D.W., Chartres, C.J. and Wood, J.T. (1996). Hardsetting Soils in Southeast Australia: Landscape and Profile Processes. *J. Soil Sci. Soc. Am.* 60, 1178-1187.
41. Cook, S.E., Corner, R.J., Grealish, G., Gessler, P.E. and Chartres, C.J. 1996. A rule-based system to map soil properties at catchment scale. *J. Soil Sci. Soc. Am.* 60, 1893-1900.
42. Chartres, C.J. and Geeves, G.W. 1997. The impact of soil seals and crusts on soil water balance and runoff and their relationship with land management practices. *Advances in GeoEcology* 31, 539-548.
43. Greene, R.S.B., Nettleton, W.D. and Chartres, C.J. 1998. Runoff and micromorphological properties from a grazed haplargid near Cobar, N.S.W., Australia. *Aust J. Soil Res.* 36, 87-98.

44. Young, R., Alston, C., Chartres, C.J. and Little, I.P. 1999. Variation in the acidity of cropped and virgin infertile red soils of central, western New South Wales. *Aust J. Exp. Agric.* 39, 981-993.
45. Budd, K.L., Chartres, C.J., Ivkovic, K.M. and Bauld, J. 2002. Identifying and managing natural and anthropogenic contaminants in Australian groundwaters in non-urban environments. *Aust J. Envirotoxicology* 8, 35-40.
46. Chartres, C.J. and Williams, J. 2006. Can Australia overcome its water scarcity problems? *J. Sustainable Developments in Agriculture* 1, 17-24. http://www.istage.ist.go.jp/article/jdsa/1/1/1_17/article

Refereed Chapters in Books

47. Chartres, C.J., Cheetham, G.H. and Fenwick, I.M. 1976. Excursion to the Kennet Valley. In "Field Guide to the Oxford Region" (Ed. D. Roe). Quaternary Research Association pp.23-31.
48. Mabbutt, J.A., Chartres, C.J., Fitzpatrick, E.A. and Melville, M.D. 1982. Physical Bases of Mallee Landscapes. In "Threats to Mallee in NSW" (Ed. J.A. Mabbutt). NSW Dept. of Environment and Planning.
49. Chartres, C.J. 1983. The identification of aeolian dust mantle soils in the Barrier Range, western NSW. In "Quaternary Dust Mantles of Australia, China and New Zealand" (Ed. R. Wasson). Aust. Nat. Univ. pp.153-160.
50. Chartres, C.J. 1984. Parna in northwest NSW. Record of 1983/27, Bureau of Mineral Resources, Canberra.
51. Chartres, C.J. 1983. The micromorphology of desert loam soils and implications for Quaternary studies in western NSW, Australia. In "Soil Micromorphology" (Eds. P.Bullock and C.P. Murphy). AB Academic, Berkhamsted, U.K. pp.273-9.
52. Chartres, C.J., Mabbutt, J.A., Stanley, R.J., Walker, P. and Johnston, 1984. Methodology for the assessment and mapping of desertification. FAO/UNEP, Rome (Contributed Australian section).
53. Landon, J.R. (Ed.) 1984. Booker Tropical Soil Manual, Longman, Harlow, UK. (contributed to several chapters).
54. Chartres, C.J. and Walker, P.H. 1986. The development of a soil with textural contrast on granite in south eastern Australia. In "Soil Micromorphology" (Fedoroff, N., Bresson, L.M. and Courty, M.A. Eds.), Ass. Franc. Etude du Sol., Paris. pp.125-130.
55. Chartres, C.J. and Chivas, A.R. 1986. The identification of aeolian deposits in a soil developed on granite in south east Australia. In Aspects of Loess Research" (Ed.) Liu Tungsheng, China Ocean Press, Beijing, China. pp.303-310.
56. Chartres, C.J. 1987. Australia's land resources at risk. In "Land Degradation and Public Policy" (Eds. A. Chisholm and R. Dumsday), Cambridge Univ. Press, Melbourne. pp.7-26.
57. Chartres, C.J. (1987). The role of micromorphology in studies of soil physical and structural properties: a review. In "Soil Structure and Aggregate Stability" (Ed.) P. Rengasamy. Conf. Proc. No.12 Victorian Dept. of Agric. pp.103-120.
58. Chartres, C.J. and Fitzgerald, J.D. (1990). Siliceous cements in some Australian soils and saprolites. In "Soil micromorphology: a basic and applied science" Ed. L.A. Douglas. *Developments in Soil Science* 19, 199-207. Elsevier.

59. Chartres, C.J., Walker, P.H., Willett, I.R., East, T.J., Cull, R.F., Talsma, T. and Bond, W.J. (1991). Soils and hydrology of the Ranger Uranium Mine in relation to application of retention pond water. *Technical Memorandum 34*, Supervising Scientist for the Alligator Rivers Region, AGPS. pp.61.
60. Chartres, C.J., Helyar, K.R., Williams, J. and Fitzpatrick, R.W. 1992 Land degradation as a result of European settlement of Australia and its influence on soil properties. In *Australia's renewable resources: sustainability and global change* (Eds. R.M. Gifford and M.M. Barson). Bureau of Rural Resources Proc. 14. pp. 3-33.
61. Willett, I.R., Chartres, C.J. and Bond, W.J. (1993). Soils and hydrology of the Ranger Uranium Mine Land Application Site. Proceedings of OSS Conference on waste disposal from Ranger Uranium Mine. Office of the Supervising Scientist. AGPS.
62. Chartres, C.J. and Norton, L.D. (1994). Micromorphological and chemical properties of some Australian soils with hard-setting and duric horizons. In A.J. Ringrose-Voase and G. Humphreys (Eds.) "Soil Micromorphology: studies in management and genesis". *Developments in Soil Sci.* 22, 825-834. Elsevier, Amsterdam.
63. Eldredge, D., Chartres, C.J., Greene, R.S.B. and Mott, J. 1(994). Management of soil crusting in rangeland soils. In So, H.B. (Ed), *Proc. 2nd Int. Conf. on Soil crusting*.
64. Murphy, B.W., Geeves, G., Cresswell, H.P. and Chartres C.J.. (1994). The use of readily observable soil and vegetative features to predict some surface soil properties of lighter textures hardsetting soils. In So, H.B. (Ed), *Proc. 2nd Int. Conf on Soil Crusting*.
65. Chartres, C.J., Bresson, L.-M., Valentin, C. and Norton L.D. 1994. Micromorphological indicators of anthropogenically induced soil structural degradation. *Proc. XV Congress of Int. Soc. Soil Sci.*, Vol. 6a, 206 -228. ISSS. Acapulco, Mexico.
66. Miedema, R., Chartres, C.J., Courty, M.A. McSweeney, K, Olescko, K. and Rabenhorst, M.C. 1994. Soil Micromorphology: towards an analytical and quantitative tool for assessing anthropogenic influences on soils. *Proc. XV Congress of Int. Soc. Soil Sci.*, Vol. 1, 143-162. ISSS. Acapulco, Mexico.
67. Chartres, C.J. and Isbell, R.F. 1994. Soil Resources. Chapter in *Agriculture in Australia*. Morescope Publishing, Camberwell, Vic.
68. Chartres, C.J. and Webb, A.A. 1998. Introduction: Perspectives on the problem. In *Farming Action Catchment Reaction – The effect of dryland farming on the natural environment*. pp2-10 Eds. J. Williams, R. Hook and H. Gascoigne, CSIRO Publishing, Melbourne.
69. Chartres, C.J. 1998. Land degradation processes and water quality effects: soil acidification. Chpt. 16, pp158-161 In *Farming Action Catchment Reaction – The effect of dryland farming on the natural environment*. pp2-10 Eds. J. Williams, R. Hook and H. Gascoigne, CSIRO Publishing, Melbourne.
70. Chartres, C.J. 2001. Foreword. In *Godwana to Greenhouse – Australian Environmental Geoscience*. Ed. V.A. Gostin. Geol. Soc. Aust. Special Publ. No. 21. p.ix. Geol. Soc. Aust, Sydney, NSW.
71. Chartres, C.J. and Williams J. 2003. Competition for Australia's Diminishing Water Resource -agriculture versus industry versus environment. In *Water in Mining* D. McNee (ed). Aust. Inst. Mining and Metallurgy, Pub Series 6, 15-24.
72. Chartres, C.J., Stauffacher, M., Walker, G. and Hatton T. 2003. River Murray Water Quality: A Salinity Perspective 2003. CSIRO Land and Water internet

73. Chartres, C.J. 2006. Water scarcity impacts and policy and management responses – examples from Australia. In Press OECD, Paris.

Confidential reports and miscellaneous publications

74. Booker Agriculture International. 1976. An investigation into the potential of wadi-spate irrigation potential in the Wadi Dhamad, Saudi Arabia.
75. Booker Agriculture International. 1976. The Juba River Soil Survey Report (Somalia: investigations for irrigated sugar-cane).
76. Booker Agriculture International. 1977. The Kano River Project Phase II: investigation for irrigated wheat cropping (Nigeria).
77. Booker Agriculture International. 1978. Papua New Guinea Sugar Study, Volume II. Land resources of the Gusap-Ramu area: a feasibility study to determine the optimum location for a sugar-cane estate in the Markham-Ramu valleys of Papua New Guinea.
78. Chartres, C.J., Mabbutt, J.A., Stanley, R.J., Walker, P.A. and Johnston, D. 1982. Land systems as a basis for desertification assessment and mapping in NSW, Australia. FAO, Rome.
79. Chartres, C.J., Walker, P.H. and Hutka, J. 1986. Particle size and total chemical composition data for four soils developed on granitic rocks in south-eastern NSW. Tech. Memo. 71/1986. CSIRO Division of Soils.
80. Riley, G.G. and Chartres, C.J. 1987. X-Ray diffraction studies on 48 clays from eight sites being investigated under the National Soil Conservation Program. Tech. Memo 65/1987. CSIRO Division of Soils.
81. Chartres, C.J. 1987. The future of soil science. *Soils News* 71:1-2.
82. Cumming, R.W. and Chartres, C.J. 1988. Morphological, chemical, physical and mineralogical characteristics of acidifying soils in Victoria and NSW. Tech. Memo 26/1988. CSIRO Division of Soils.
83. Chartres, C.J. 1986. Land Degradation: an insidious threat to our landscape. *Heritage Australia* 5, 6-8.
84. Chartres, C.J. 1990. Reversing the degradation of the farm landscape. In "Shaping tomorrow's farm" Ed. M. Wyeth. Aust. Farm Management Soc. Proc. of 17th Nat. Conf.
85. Chartres, C.J. 1991. Issues in the allocation of rural industry research funds. Paper prepared for J.W. Stocker (CEO CSIRO) to present to the Primary Industries and Energy Res. Council (Dec., 1991). pp.20.
86. Chartres, C.J., Cresswell, H.P., Murphy, B.W., Geeves, G.W., Little, I.P. and Gessler, P.E. 1992. Distribution of physical and chemical subsoil constraints and their prediction in landscapes. *Proceedings of National Workshop on subsoil constraints to root growth and high soil water and nutrient use by plants*. Tanunda, S.A.
87. Geeves, G.W., Cresswell, H.P., Murphy, B.W., Gessler, P.E., Chartres, C.J., Little, I.P., and Bowman, G.M. (1995). The characteristics of soils in the wheatbelt of southern NSW and northern Victoria. NSW Conservation and Land Management/ CSIRO Division of Soils, Occasional report.
88. Webb, A.A. and Chartres, C.J. 1996, Environmental Management Issues of Coastal Floodplains of New South Wales. Report to the Fisheries, Sugar, Dairy and Land and

- Water Research and Development Corporations. Webbnnet Land Resource Services Pty. Ltd.
89. Reeves, G., Chartres, C.J. and Breckwoldt, R. 1997. Does the answer lie in the soil? A national review of soil health issues. Centre for Int. Economics/Roland Breckwoldt Consulting. Report to LWRRDC. pp.101.
 90. Cullen, P., Chartres, C.J. et al. 1998. Dryland salinity and its impact on rural industries and the landscape. Occasional paper No 1. Prime Minister's Science, Engineering and Innovation Council. DSIR .
 91. Natural Resource Management Task Force. (CJ Chartres key contributor). 1999. Managing Natural Resources in Rural Australia for a Sustainable Future: a discussion paper for developing a national policy. Agriculture Fisheries and Forestry Australia, Canberra. pp90.
 92. Ivkovic, K.I., Kingham, R, Lawrence, C.R.L., Chartres, C.J., Mullen, I., Johnston, R., Please, P., Pestov, I., INA (Argentina), Miro, R., Zavalía E. (Snr) and Zavalía E. (Jnr). 2000. Evaluación de Posibilidades físicas y económicas de riego con aguas subterráneas en la Provincia de San Luis. Informe No. 6. Los recursos Hidrológicos Subterráneos de la provincia de San Luis. BRS, Australia pp. 40.
 93. Chartres, C.J., Kingham, R.A., Ivkovic, K.M. and Mullen, I.E. 2001. Boron, fluoride and arsenic availability and potential toxicity problems under irrigation in the soils of San Luis. Informe No. 7. Los Recursos Hidrológicos Subterráneos de la provincia de San Luis. BRS, Australia pp. 17.
 94. Johnston R.M., Barry, S.J., Bley E., Bui, E., Carlile, P., Henderson, B., McDonald, W., Moran, C. Simon, D. and Chartres, C.J. 2001. ASRIS – New soil datasets for Australia. Proceedings of a European Union Workshop on new methodologies for soil mapping, L. Velence, Hungary, Oct , 2001.
 95. Chartres, C.J., Overkamp, T. and Matthews, R. 2003. Center commissioned external review of spatial analysis at the Centre for Tropical Agriculture, Cali, Colombia.
 96. Chartres, C.J., Stewart, B and Bowmer, K. 2004. Report on Science in the National Action Plan for Salinity and Water Quality and Natural Heritage Trust. Commissioned by the Natural Resource Management Ministerial Council.
 97. Chartres, C.J. 2005. Emerging Water Policy Issues: Research and Development and Associated National Needs and Responses. Paper for NRM Policy and Programs Committee.
 98. Chartres, C.J. Haisman, B., Syme, G. Roux, D. and Louw K.S. 2005. ASEAN Strategic Plan of Action for Water Resources Management. ASEAN Secretariat, Jakarta.
 99. Chartres, C.J. Haisman, B., Syme, G. Roux, D. and Louw K.S. 2005. State of Water Resources Management in ASEAN. Report for ASEAN. ASEAN Secretariat, Jakarta.
 100. Chartres, C.J. and Khan, S. 2004. Managing land productivity reductions in rainfed and irrigated systems – the Australian experience. Paper for Stockholm International Water Institute Working Meeting in preparation for CSD 13.
 101. Chartres, C.J. 2006. A Strategic Science Framework for the National Water Commission. <http://www.nwc.gov.au/science.cfm>
 102. Co-author (in press) of Australian Water Resources 2005: Key Findings of the National Water Initiative Starting Point Water Stocktake: National Water Commission, Canberra

Book Reviews

103. Silcrete in Australia. 1978. T. Langford Smith (Ed.). Univ. of New England, Armidale. In *Australian Geographer*. 1979
104. Soils of Papua New Guinea. 1983. P. Bleeker, A.N.U. Press. In *Geoderma* 37, 688-69.
105. Enga: Foundations for Development. B. Carrad, D. Lea and K. Talyaga (Eds.) Univ. of New England, Armidale. In *Australian Geographer*, 1984.
106. Soil Spatial Variability. 1985 D.R. Nielsen and J. Bouma (Eds.). Pudoc, Wageningen. In *Geoderma* 39, 158-159.
107. Principles of Geographical Information Systems for Land Evaluation. 1986. P.A. Burrough (Ed.). Oxford Univ. Press. In *Geoderma* 42, 371-372.

Conference Papers (post 1987) (not all indicated)

108. Chartres, C.J., Cumming, R.W. and Bekunda, M.A. 1988. Fingerprinting soil types with respect to soil acidification. National Soils Conference, Canberra. Abstracts p.16.
109. Cumming, R.W. and Chartres, C.J. 1988. Variability of pH, aluminium and manganese affecting acidification in south-eastern Australia. National Soils Conference, Canberra. Abstracts p.17.
110. Greene, R.S.B. and Chartres, C.J. 1988. Consequences of prescribed fire on the physical and micromorphological properties of a massive red earth surface soil in the semi-arid woodlands. Australian Rangeland Society, 5th Biennial Conference, Longreach.
111. Chartres, C.J., Ringrose-Voase, A.J., Raupach, M. and Salins, I. 1988. A method for thin-sectioning using dioxane to replace water. Int. Working Meeting on Soil Micromorph., San Antonio, Texas, USA. Abstracts p.25. (*Awarded best poster prize Section B*)
112. Chartres, C.J. and Fitzgerald, J.D. 1988. Properties of siliceous cements in some Australian soils and saprolites. Int. Working Meeting on Soil Micromorph., San Antonio, Texas. Abstracts p. 46.
113. Chartres, C.J. 1990. Reversing the degradation of the farm landscape. Aust. Farm Management Society, Horsham. Published in "Shaping tomorrow's farm today", 24.1-24.13. AFMS, Longrenong.
114. Chartres, C.J. and Geeves, G.W. Pedological controls on acidification in south-eastern Australia. Int. Soc. of Soil Sci. Congress, Kyoto, Japan.
115. Chartres, C.J., Geeves, G.W. and Wood, J.T. 1991. Variability of chemical properties related to acidification in some Australian Soils. Amer. Soc. Soil Sci. Annual Conf., Denver, Co. November.
116. Chartres, C.J. and Norton, L.D. 1991. Aluminosilicate cementation in some Australian Alfisols. Amer. Soc. Soil Sci. Annual Conf., Denver, Co. November.
117. Geeves, G.W., Cresswell, H.E., Murphy, B.W. and Chartres, C.J. 1994. A runoff index for assessing soil structural degradation. XVth Int. Congress Soil Science, Acapulco, Mexico.

118. Chartres, C.J. Bresson, L.-M., Valentin, C. and Norton, L.D. 1994. Soil structural degradation: microscope to process to impact. Aust. Soil Science Society, WA Branch "Soils '94", Busselton, WA (Sept).
119. Chartres, C. J., G. Jacobson, W. R. Evans, J. Bauld, R. Brodie and J. R. Kellett. 1997. Contamination and Sustainability of Australia's Groundwater Resources. IGU Chapman Conference, Riverside, Ca., USA .
120. Chartres, C.J and Courty, M.A. 1998. Contribution of micromorphology to the study of the temporal behaviour of soil structural and water systems. Proceedings of the World Congress of Soil Science, Montpellier, France. CD ROM.
121. Ivkovic, K.M., Chartres, C.J., Kingham, R.A. and Mullen, I.E. 2001. Water quality limitations for groundwater irrigation in San Luis Province Argentina. IUSS/Bouyoucos Conference, Riverside, Ca. USA.
122. Chartres, C.J. and Johnston, R.M. 2001. Soil classification in Australia – its role in land evaluation and management. IUSS Soil Classification 2001. L. Velence, Hungary.
123. Ivkovic, K.M., Chartres, C.J. Kingham, R. and Mullen, I. 2002. Water quality limitations for groundwater irrigation in San Luis Province, Argentina. Proceedings of IUSS, Bangkok, Thailand.
124. Kingham, R.A. Chartres, C.J., Ivkovic, K.M., Mullen, I., Sims, J., Johnston, R.M. and Kirby, J.M. 2002. Integrating biophysical and economic data using GIS/ DSS to assess irrigation suitability for specific crops. Proceedings of IUSS, Bangkok, Thailand.
125. Ivkovic, K.M., Chartres, C.J., Kingham, R., and Mullen, I. 2002 A methodology to identify areas for groundwater irrigation based on combined assessment of groundwater and soil potential, as applied in San Luis province, Argentina. Int. Ass. Geohydrol, Darwin.
126. Ivkovic, K.I., Lawrence, C.R.L., Wetten, C., Mullen, I.E., Kingham, R.A. and Chartres, C.J. 2002. Groundwater quality limitations in San Luis Province, Argentina. Int. Ass. Geohydrol, Darwin.
127. Lunter, SM, Lawrence, CRL, Chartres, CJ, Ivkovic KM. 2002. Their Daily Drop: Involving Communities in Irrigation and Groundwater Management Issues in San Luis Province, Argentina. International Association of Hydrogeologists Conference Balancing the Groundwater Budget, 13-17 May 2002. Darwin, Northern Territory.
128. Ivkovic, KM, Kingham, RA, Mullen, I.C, Chartres, CJ, Lawrence, CRL, and Wetten, C, 2002. Integrating hydrogeological, land, agronomic and economic data in groundwater irrigation feasibility studies. International Association of Hydrogeologists Conference Balancing the Groundwater Budget, 13-17 May 2002. Darwin, Northern Territory.
129. Chartres, C.J.. From Geophysics to Land Use Change – Issues Confronting the National Action Plan for Salinity and Water Quality. "Victoria Under Cover", Benalla, Vic. April 2002.
130. Chartres, C.J. and Williams, J., M. McLaughlin and R. Naidu. 2002. Australian Farming Systems for Environmental Sustainability. Invited Keynote address – First International Conference on Pollution, Ecochemistry and Ecological Processes, Aug 27-31st, Shenyang, People's Republic of China.
131. Chartres, C.J. and Molden D. 2004. More Crop for your Drop – making science relevant for policy development". Keynote address at the CGIAR Challenge Programme for Water and Food Symposium, US Soil Science/Agronomy/Crop Sciences meeting in Seattle, Nov. 04.

132. Khan S. and Chartres, C.J. 2005. Stakeholder driven initiatives to manage triple bottom line productivity of Catchments – the Australian experience. River Symposium, Brisbane, Sept 6-9th.
133. Chartres, C.J. 2006. Water scarcity and feeding a growing world population. Rivers Symposium, Brisbane.
134. Chartres, C.J., Kendall, M. and Hagan J. 2006. A Water Resources Assessment to underpin the National Water Initiative. Rivers Symposium, Brisbane.

CONSULTANCIES

February 1994 Soil and land resource investigations for Harcourt Hill Golf Course (Canberra) for Thiess Constructions Pty Ltd..

1993 Investigations into the potential impact of acid deposition from Hunter Valley Power Plants for Pacific Power in collaboration with NSW Agric. and CSIRO Divisions of Atmospheric Research, Water Resources and Soils.

June 1992. Indonesia: Visited Centre for Soil and Agroclimate Research for AACM International Pty. Ltd. to discuss terms of reference for Second Land Resource and Planning Project, Part C.

1989 Sept. Indonesia: Acted as consultant to ACIL Australia Ltd. on a World Bank funded project (Nusa Tenggara Development Study) in Indonesia. Investigated the causes for cotton root bending in soils developed in volcanic ashes and other soils (field studies on Lombok, Flores, W. Timor, plus discussions in Bogor Centre for Soil and Agroclimate Research and Malang).

1983- Undertook chemical and physical soil analyses of soils developed on volcanic ash and basaltic parent materials for the Zamboanga del Sur (Philippines) development project for SMEC/ACIL Int.

1982- Australian coordinator for an FAO project on the Assessment and Mapping of Desertification. Invited to Rome to present the final report at the 3rd Expert Consultation on Desertification.

1981- "Threats to Mallee": study of the effects of clearance of mallee landscapes in south west NSW for the Dept. of Environment and Planning.

1979- Soil studies for the development of a "city forest" for Orange City Council.

1976-78 Booker Agriculture International Projects:

- Indonesia: 1 month field studies of soil distribution for combined transmigrant settlement and extension of the Danau Salak Rubber Estate, S. Kalimantan (World Bank funded).
- Nigeria: 9 months field work including semi-detailed soil survey and land evaluation for cropping systems for the Kano River Phase II Project for the Hadeja-Jamare River Development Board.
- Papua New Guinea: 4 months field and desk studies to locate potential sites for a new sugar estate, followed by reconnaissance soil survey and land evaluation. A site was chosen in near the Markham-Ramu divide and is now a fully operational sugar estate.

- Somalia: 4 months field and desk studies for the Juba Sugar Study. Included detailed soil survey work and the running of a field laboratory to determine pH and electrical conductivity.

OTHER OVERSEAS EXPERIENCE

- 2005 Invited speaker at UNESCO Tsukuba Asian Seminar on Agricultural Education, Tsukuba, Japan.
- 2005 Keynote invited speaker at Water and Sewage 2005 Conference held by Asia Business Forum in Singapore.
- 2003 Led review of Spatial Science Program at CGIAR Centre for Tropical Agriculture, Cali, Colombia
- 2003 Presented keynote address (Theme 2 Upper Catchments) to Challenge Programme for Water and Food Baseline Conference in Nairobi.
- 2002- Attended Steering Committee Meetings of CGIAR Challenge Programme for Water and Food, Colombo, Penang, Paris, Delhi Salvador (Brazil) and Cairo.
- 2002 June. Attended and presented paper at the WorldBank Partner Exchange Conference, Washington.
- 2001 June. Attended and co-presented paper at the IUSS/Bouyoucos Conference on Salinity and Trace Elements in Irrigated Agriculture. Riverside, Ca., USA
- 1997-2002. 12 visits to Buenos Aires, central and western Argentina with respect to the San Luis Groundwater Irrigation Feasibility Study of BRS.
- 2000 August Visited BGR (German Geological Survey) to discuss hydrogeology collaboration in Argentina.
- 1998 August Attended and was a member of the Organising Committee of the International Congress of Soil Science in Montpellier, France
- 1997 July Member of Australian Marine Science and Technology (AMSAT) Delegation visiting Malaysia and Indonesia to present results of marine geological investigations.
- 1997 Sept. Invited attendee to UN Economic and Social Commission for South East Asia and the Pacific meeting on Coastal Land Use Issues in SE Asia. and acted as rapporteur.
- 1997 Oct. Visited Japanese Geological Survey for discussions on collaboration on geohazards R&D.
- 1997 Oct. Attended US Soil Science Society Annual Meeting and American Geophysical Union Chapman Conference on Geographic Information Systems in Environmental R&D.
- 1996 August Attended International Soil Conservation Program (ISCO) Conference Bonn, Germany as Invited Keynote Speaker.
- 1994 July Attended International Soil Science Congress in Acapulco, Mexico (presented one invited paper and one poster paper and was co-author of one of six keynote plenary papers).
- 1993 June Attended USA Agricultural Eng. Symposium on use of GIS in natural resource management (Spokane).
- 1991 Oct/Nov. Attended and presented two papers at the US Soil Science Society annual meeting in Denver, Colorado.
- 1991 May-June. Invited keynote speaker at the International Symposium on Soil Crusting, University of Athens, Georgia, USA.
- 1990 August. Attended and presented poster paper at the International Society of Soil Science Congress in Kyoto, Japan.
- 1990 June-July. Visited USA (US Forest Service, Alaska, Iowa State University, Ames, Iowa, USDA Soil Erosion Laboratory, W. Lafayette, Indiana and Texas A & M University, College Station) Presented poster paper on soil acidification in south-eastern Australia at a conference on "Plant-Soil Interactions at low pH",

- Beckley, W. Virginia. Also lectured on hard-setting soils at Ames and College Station.
- 1990 Jan. Visited the University of California, Davis and presented two lectures on soil acidification and aeolian deposits in soils in south-eastern Australia.
- 1988 June-July. Invited to give a lecture on soil acidification to the Department of Soil Science, University of Wisconsin, USA and attended the International Working Meeting on Soil Micromorphology in San Antonio, Texas.
- 1987 Dec. Visited the Department of Physical Geography and Soil Science at the University of Amsterdam to continue work with Dr. H.J. Mùcher on crusting of soils in the Australian rangelands. Also presented a two hour seminar on " Soil Acidification in southeastern Australia".
- 1985 Oct. Attended and presented paper to the International Loess Symposium in Xian, China (Invited and expenses paid by the Chinese Quaternary Res. Ass.)
- 1985 June/July. Visited Rothamsted Experimental Station, U.K.. and attended the International Working Meeting on Soil Micromorphology, Paris, France (two papers presented).
1983. Attended Pacific Science Congress, New Zealand (1 paper presented). Also visited DSIR Soils Bureau at Gore, New Zealand.
- 1982 Attended one week Expert Consultation on Desertification at the FAO, Rome.
- 1981-82. University Study Leave: worked at the University of East Anglia on soil survey and land evaluation methodology (3 months); visited Beijing and Xian, China as a guest of the Chinese Quat. Res. Assoc. (fares paid by Australia-China Council grant) to meet Chinese loess workers and to examine loess deposits (14 days); visited the Department of Land Development, Bangkok, Thailand to examine a range of tropical soils (14 days); visited the Centre for Soil Research, Bogor, Indonesia to further studies on volcanic ash (6 weeks).