

CURRICULUM VITAE

Name: COCHRANE, Thomas Thurston

Profession: Tropical Land Resource Specialist and Agronomist

Nationality: New Zealand

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Key experience:

-A Tropical land resource specialist and agronomist with over 40 years experience in the evaluation of the soils, land-use potential and the management and conservation of land in tropical South America, especially Amazonia.

-In-depth knowledge of the agro-ecology, farming systems, agronomy and fertilizer needs of tropical crops.

-Extensive practical experience in carrying out multipurpose tropical soil, land and natural resource surveys and inventories, in identifying limitations for land usage under different agricultural and agro-forestry systems, and evaluating land and forestry degradation problems and conservation needs. Work has ranged from basic to applied research.

-Has an in-depth and proven knowledge of modern remote sensing and computer techniques for the study of natural resources.

-Has extensive knowledge on the extractive and farming systems of tropical America, both traditional and with improved technologies. Has developed and implemented successful agricultural projects in the region, including the installation of a sugar factory in Santa Cruz, Bolivia.

Career History:

1989-to date

Completed a consultancy with the World Bank sponsored agro-ecological zoning project of the Amazonian State of Rondônia, Brazil. Coordinator of the land resource evaluation of that project and actively involved in fieldwork. Developed a PC compatible Geographic Information System of the land and soil resources of Rondônia in addition to writing a detailed report.

Honorary working committee member of the World Soils and Terrain Digital Database SOTER project of the International Society of Soil Science Society and supported by ISRIC, FAO, UNESCO and other organizations world-wide.

Recent technological developments:

- 1) The development of PC Users Packets for the study of natural resources
- 2) A unifying molecular theory of water movements throughout plants and soils, together with a new equation for calculating osmotic potential based on that theory.
- 3) A new equation for fertilizing tropical soils.

Current activity:

In the process of developing an updated Personal Computer version of the Amazonian sector of the study "Land in Tropical America". (Original publication available from Winrock in Washington, DC, and CIAT, Cali, Colombia), see list of publications attached).

Other consultancies during the past ten years have included:

Bolivia: Land resource specialist, World Bank Agricultural Development Program for the Brazil nut region of northern Bolivia, and for the DHV-ITC territorial zoning project of the Pando Department. These two studies included the creation of PC compatible land resource Geographical Information Systems based on the SOTER (Australian land systems) concept. A holistic approach was developed to integrate soils, forestry and other surveys.

Soils Consultant for the British Tropical Agricultural Mission, ODA, to Bolivia, which included the publication of a modern manual on tropical soil and plant analyses.

Brazil: Project leader, SOTER pilot project to develop a computerized land resource evaluation of the Geo-economic Region of Brasilia. (IICA-BID).

Land Resource Consultant to IICA to established a PC compatible, Pan-Amazonian land resource Geographical Information System for the PROCITROPICOS project

Chile: Land Resource Consultant, BID-DHV. Set up a PC compatible Geographical Information system for Chile's Forestry Institute, as a part of BID's Hydrological Basins project (1994-5).

Consultant in land degradation, FAO, 1992.

1982-1989. Tropical South America and Brazil:

Coordinator, South American sector of the “World Map of Status of Human-Induced Soil Degradation”. (ISRIC-UNEP).

Land Resource Consultant to strengthen agricultural research in EMBRAPA-CPAC, Brasilia (IICA -IBRD contract). Carried out a semi-detailed computerized land systems survey of the Geo-economic region of Brasilia. Demonstrated a statistically significant imbalance between calcium and magnesium in the savanna (cerrados) soils that differentiates those lands from adjacent forested lands. Developed a new methodology for the determination of anion exchange capacity in tropical acid soils.

1981-1982 Seychelles:

Soil Scientist with SECID - USAID. Installed a soil- plant laboratory, and carried out studies on the fertilizer needs of tropical tree and vegetable crops, which eventually led to the development of a differential equation to estimate fertilizer response curves of special use in under-developed tropical regions.

1977-1981 Colombia:

Land resource specialist and Agronomist, CIAT. Carried out and published a pioneering computerized land resource inventory of tropical South America including the Amazon basin, titled “Land in Tropical America”, which paved the way for the establishment of the SOTER (World Soils and Terrain digital database) project. Developed an equation for taking to account plant tolerance to soil aluminum toxicity. Demonstrated a statistical relationship between the native vegetation and “wet season potential evapotranspiration” over Amazonia.

1974-1977 Bolivia and Mexico:

Consultant, Tate and Lyle Technical Services, London-Miami. Work included various consultancy projects around the world. Carried out a land use potential survey of the Gulf Coast of Mexico for IBRD. Instrumental in setting up a farmer owned sugar-cane factory project, and developed a 1000 ha commercial sugar-cane farm together with a 50 ha experimental area for that factory.

1963-1974 Bolivia:

Soil Scientist and agronomist, British Tropical Agricultural Mission to Bolivia (1963-73). Head of Mission (1973-74). Carried out and published a land resources survey of Bolivia. Established a soil-plant analytical laboratory in Santa Cruz. Was instrumental in setting-up the sugar-cane research station, “CIMCA”. Carried out field fertilizer trials on sugar cane, bananas, cotton and coffee, and developed a novel methodology for monitoring fertilizer trials by statistically analyzing plot by plot foliar chemical analyses, in the same way as yield data.

1962 St. Lucia - Trinidad:

Agronomist, Regional Research Center, Imperial College of Tropical Agriculture.
Laid down banana trials in the Island of St. Lucia in collaboration with WINBAN.

1960 New Zealand:

Interim manager, Tutira Station, Hawkes Bay, New Zealand (sheep - cattle station, 4000 ewes, 600 beef cows, 90 dairy cows).

Education:

- 1956-59** University of New Zealand, Massey College.
B.Ag.Sc. Specialty: soil and crop science.
- 1960-61** Imperial College of Tropical Agriculture, Trinidad.
A.I.C.T.A. (Associate of the Imperial College of Tropical Agriculture), in tropical agriculture and soil science.
- 1968-69** Imperial College of Tropical Agriculture, University of the West Indies, Trinidad.
Ph.D. in soil science (land resource evaluation). Awarded Currie and Texaco prizes.

Honors:

- 1973** Received the official Bolivian Government decoration "El Condor de los Andes."
- 1992-2000** Who's Who in Science and Engineering
- 1993-2000** Who's Who in the World.

Languages:

English: mother tongue.

	speaking	writing	reading
Spanish	excellent	excellent	excellent
Portuguese	excellent	good	excellent
French	slight	slight	good

Publications:

Three books and over 50 scientific publications, see list attached.

Computer Skills and production of PC Uses Packets:

Produced several PC Users Packets for Land Resource assessment and has set up low cost, PC systems for Soil Survey and Soil-Plant analytical laboratories.

(Skilled in GIS, RDBMS, Word Processing, Electronic Spreadsheet programs and the use of PCs in general.)

Other skills:

Private pilot with international flying experience.

Dependent:

Wife, Rosa Elena (an accomplished pianist).

References:

Prof. (Emeritus) M. F. Baumgardner. Prof. of Agronomy, Dept. of Agronomy, Purdue University, West Lafayette, IN 47907, USA. Tel: 765 494-1457/2226

Prof. (Emeritus) L. B. Swindale. 2910A Nanihale Pl., Honolulu, Hawaii, USA. Tel: (Hawaii) 988-6318

Dr. Elmar Wagner. EMBRAPA, W3 Norte final, 70770, Brasilia, Brazil. Tel: Brasilia) (577-1568.

Prof. C.J. Johannsen, Laboratory for Applications of Remote Sensing, Dept of Agronomy, Lilly Hall, West Lafayette, IN 47907-1150. Tel: 765 4946248.

Prof. (Emeritus) G. H. Hargreaves, 1660 E 1220 N, Logan, UTAH 84321-3040

PUBLICATIONS

Main Publications 1962 to 1979.

- Cochrane, T.T. 1962. A study of the land use potential of the soil types of the island of St. Vincent, the recent soils from recent volcanic ash and the high level yellow earth soils. A.I.C.T.A. thesis. Imperial College of Tropical Agriculture, St. Augustine, Trinidad W.I. 353p and 3 maps.
- Cochrane, T.T. 1967. A land systems map for central tropical Bolivia. British Tropical Agricultural Mission, La Paz, Bolivia. 56p and map.
- Cochrane, T.T. and R. Oros. 1967. Metodos de analisis quimicos para suelos tropicales y muestras de plantas usadas en el laboratorio del Centro Tecnico Agricola, Santa Cruz, Bolivia. British Tropical Agricultural Mission, Santa Cruz, Bolivia. 148p and 9 maps.
- Cochrane, T.T. 1969. A method for the assessment of land use potential in the under-developed regions of the humid tropics. Ph.D. thesis, Imperial College of Tropical Agriculture, U.W.I., St. Augustine, Trinidad W.I. 1042p and 10 maps.
- Cochrane, T.T. 1971. Suggestions for the cultivation of sugar cane in the Santa Cruz district of Bolivia. British Tropical Agricultural Mission, La Paz, Bolivia. 32p.
- Cochrane, T.T. 1973. The land use potential of Bolivia. A land systems map (in Spanish). Ministry of Overseas Development, FCO, London. 827p and map.
- Cochrane, T.T. 1974. Land use classification in the lowlands of Bolivia. In: E. Bornemiza and A. Alvarado (eds.) Manejo de Suelos en la America Tropical. CIAT, Cali, Colombia. p111-128.
- Cochrane, T.T. 1975. The land use potential of the Gulf Zone of Mexico. Plan Nacional Hidraulico, Secretaria de Recursos Hidraulicos, Mexico, D.F. IBRD, Washington, D.C. 307p and 7 maps.

Publications 1979 to present:

- Cochrane, T.T. 1979. Manganese and zinc deficiencies in sugar-cane grown in entisols near Santa Cruz, Bolivia. Trop. Agric. (Trinidad), 56:219-224.
- Cochrane, T.T. 1979. An ongoing appraisal of the savanna ecosystems of tropical America for beef cattle production. In: P.A. Sanchez and L.E. Tergas (eds.) Pasture Production in Acid Soils of the Tropics. CIAT, Cali, Colombia. p1-12.
- Cochrane, T.T., J.A. Porras, L.G. de Azevedo and L.F. Sanchez. 1979. An explanatory manual for CIAT's computerized land resource study of tropical America. CIAT, Cali, Colombia. 131p.
- Sanchez, P.A. and T.T. Cochrane. 1979. Major production systems and soil constraints in humid tropical America. In: Priorities for Alleviating Soil-Related Constraints to Food Production in the Tropics. International Rice Research Institute, Los Banos, Philippines and New York College of Agriculture and Life Sciences, Cornell University. p107-139.

- Cochrane, T.T. and P.G. Jones. 1980. Climate and vegetation in tropical South America. A computerized study of land resources. In: Anais do XXXI Congreso Nacional de Botanica. Ilheus-Itabuna, Brazil.
- Cochrane, T.T., J.G. Salinas and P.A. Sanchez. 1980. An equation for liming acid mineral soils to compensate crop Al tolerance. *Trop. Agric. (Trinidad)*, 59:133-140.
- Cochrane, T.T. and P.A. Sanchez. 1980. Land resources, soil properties and their management in the Amazon region: A state of knowledge report. In: International Conference on Land Use and Agricultural Research in the Amazon. CIAT, Cali, Colombia. p.141-219.
- Cochrane, T.T. 1980. The methodology of CIAT's land resource study of tropical America. In: Proceedings of International Symposia on Machine Processing of Remotely Sensed Data and Soil Information Systems and Soil Survey. Purdue University, West Lafayette. IEEE Catalog No. 80 CH 1533-9M PRSD. p227-223.
- Cochrane, T.T. and L.F. Sanchez. 1981. Estudios del uso potencial de la tierra para la evaluacion y transferencia de agrotecnologia basada en germoplasma en America tropical. Un informe intermedio. Proc. Congreso de la Sociedad Colombiana de la Ciencia del Suelo. Medellin, Colombia. *Suelos Ecuatoriales* X1,(1):1-61.
- Cochrane, T.T., J.A. Porras, P.G. Jones, L.F. Sanchez and L.G. de Azevedo. 1981. Classification, climates and characteristics of soils with variable charge in tropical South America. In: Abstracts of International Conference on Soils with Variable Charge. Massey University, New Zealand. p132-133.
- Cochrane, T.T. 1981. Tropical climate-soil resources. An assessment. In: Food and Climate Review. Aspen Institute for Humanistic Studies, Boulder, Colorado. p356-358.
- Cochrane, T.T. 1981. Savanna ecosystems in tropical South America. Findings from a computerized land resource study. XIV International Grassland Congress, University of Kentucky. p356-358.
- Cochrane, T.T. and L.F. Sanchez. 1981. Climates, landscape and soils of the tropical savannas of South America. Findings from CIAT's computerized land systems evaluation. *Interciencia*. 6 (4):239-224.
- Cochrane, T.T. 1981. Caracterizacion de ecosistemas agricolas para pastos en las tierras bajas de America tropical. In: Adaptacion de Germoplasma de Pastos Tropical. Manual de Evaluacion Agronomica. CIAT, Cali, Colombia.
- Cochrane, T.T. 1982. CIAT's computerized land resource study of tropical America. -An aid to improving soil management and fertilizer recommendations. (Invited paper presented at the 1981 ASA Annual Meeting. ASA Abstracts).
- Cochrane, T.T. and P.G. Jones. 1981. Savannas, forests and wet season potential evaporation in tropical South America. *Trop. Agric. (Trinidad)*, 58(3):185-190.
- Cochrane, T.T. 1982. A computerized land resource inventory for germplasm based agrotechnological development in tropical America. In: Proc. First International Symposium on Soil, Geology and Land forms. -Impact on

- Land Use Planning in Developing Countries. LANDPLAN 1. Asian Institute of Technology; Bangkok, Thailand.
- Cochrane, T.T. and L.G. de Azevedo. 1982. The savannas of central tropical America. An overview of their climate and soil resources for agrotechnological development based on the CIAT-EMBRAPA computerized land systems inventory. In: VI Simposio sobre o Cerrado. EMBRAPA-CPAC, Brasilia.
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- Cochrane, T.T. 1983. An equation for calculating the contribution to osmotic potential of the separate solutes of water solutions. Medical Physics. 10(1):29-34.
- Cochrane, T.T. 1983. Evapotranspiration. Its influence on natural vegetation patterns and importance to crop introductions. In: 9th African Horticultural Symposium. International Society for Horticultural Science.
- Cochrane, T.T. 1984. Land resource inventory for germplasm based agrotechnology transfer in tropical America: An interim report. In: G. Uehara (ed.) A Multidisciplinary Approach to Agrotechnology Transfer: Proc. of Benchmark Soils Project. B.S.P Tech. Report No. 7. HITHR. Research Extension Series 026. ISSN 0271-9916. p53-71.
- Cochrane, T.T. 1984. Improvements in the equation for calculating the contribution to osmotic potential of the separate solutes of water solutions. Medical Physics 11(3):338-340.
- Cochrane, T.T. 1984. Amazonia: A computerized overview of its climate landscape and soil resources. Interciencia 9(5):248-306.
- Sanchez, L.F. and T.T. Cochrane. 1985. Paisajes, suelos y clima de los Llanos Orientales de Colombia. In: R.R. Vera and C Sere R. (eds.) Sistemas de Produccion Pecuaria Extensiva. Brazil, Colombia, Venezuela. Informe Final Proyecto ETES, CIAT, Cali, Colombia. p216-225.
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- Cochrane, T.T. 1989. Land in the Geo-economic Region of Brasilia. A land systems survey (in Portuguese), EMBRAPA-CPAC, Planaltina, D.F. Bol. Tec. 33. 287p and 10 maps.
- Cochrane, T.T. 1989. Soil differentiation at a regional level in the neotropical savannas. In: G. Sarmiento (ed.) *The American Savannas: Biogeography, Ecology and Management* .
- Cochrane, T.T. 1989. Chemical properties of native savanna and forest soils in central Brazil. *Soil Sci. Soc. Am. J.*, 53: (Jan-Feb), 139-141.
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