CURRICULUM VITAE; DR STEPHEN JOSEPH

PERSONAL INFORMATION

Date of birth:	01 October, 1950
Marital status:	Married
Postal Address:	5 Kenneth Avenue, Saratoga, NSW, 2250
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QUALIFICATIONS AND HONOUR

PhD, Department Architecture and Anthropology, University of NSW, 1988.
BSc (Hons), Metallurgical Engineering, University of NSW, 1972.
Member of the Order of Australia (AM)
Top 1% of academic citations 2018

AFFILIATIONS

Visiting Professor, School of Materials Science, University of NSW, Sydney, Australia
Visiting Professor, Nanjing Agricultural University, Nanjing, China
Visiting Professor, University of New England, Armidale, NSW
Visiting Professor, School of Applied Physics, University of Wollongong

PROFESSIONAL MEMBERSHIPS, DIRECTOR AND VOLUNTARY POSITIONS

Chartered Engineer
Fellow Australian Institute of Energy
Founding Vice Chair International Biochar Initiative (2006-2012)
Member of Save the Children Technical Advisory Board (2000-2006)
Chairman Community Aid Abroad Uni. of NSW (1970-1972)
Member Australian Govern. Renewable Energy Policy Committee (ex)
Member of NSW Government Wood Waste Working Group (1995-2000)
Member FAO Regional Wood Energy Working Group (1982-1995).
International Biochar Initiative Board Member (2016-)

RECENT GRANTS CONSULTANCIES AND INTERNATIONAL TRAINING COURSE PARTICIPATION

ARC Linkage grant, Renewed Carbon Pty Ltd., $750,000
U of Newcastle/Department of Agriculture, Forestry and Fisheries ($1,000,000)
3rd International Biochar Training Course; Nanjing Agricultural University
Global Environment Fund Biochar for Sustainable Soils

AREAS OF EXPERTISE

Technical

- Development of processes that recycle or value add to waste especially those that produce energy and a stable carbon that can be utilised to increase food production and help remediate degraded land
- Design and evaluation of biogas, biodiesel, bioethanol and bio-oil plants
- Design and commercialisation of biochar and energy technology from stoves to large scale continuous plant
- Design and evaluation of waste minimisation processes and plant.

- Development of biochar based integrated vermiculture/ aquaculture /hydroponics systems
- Design and testing, stoves, dryers, small kilns, furnaces, steam plant, pyrolysis and gasifiers that use biomass, coal, liquid or gaseous fuels
- Evaluation of biomass feed stocks and processed products
- Design and testing of advanced gas combustion equipment for turbines and for industrial processes
- Design of landfill energy systems.
- Design, development and testing of air emissions control systems
- Impact assessment of toxic wastes and indoor air pollution.

Market Research

- Various market research projects including biomass energy, biofertilisers, biomass derived liquid fuels, charcoal and plastic wood composites

Social Science

- Economic feasibility studies on Waste to Energy and Value Added projects.
- Development of funding documents/project plans for Rural and Urban bioenergy projects with emphasis on small scale stove and oven development and dissemination
- Development of monitoring and evaluation procedures for biochar technology and other rural bioenergy projects
- Design and implementation of rural resource/needs assessment studies
- Developing innovative income generating projects for rural areas
- Assessment of community forestry programs
- Feasibility studies on wood conservation in rural industries
- Evaluation of rural technology programs
- Design of extension and training programs

Publications, Presentations, Consultancies and Conferences Organised as Visiting Professor or in Association with other University Researchers

Peer Reviewed Journal Papers

1. Weng Z., Van Zwieten L., Singh B. P., E. Tavakkoli, Joseph S., Macdonald L. M., Rose, M. T. Rose T. J,. Kimber S. W. L, Morris S., Cozzolino D., Araujo J. R., Archanjo B. S. and Cowie A., (2017) Biochar builds soil carbon over a decade by stabilising rhizodeposits; *Nature Climate Change*; 7, (5) 371-376

2. Hagemann N., Joseph S., Schmidt H.P., Kammann C. I.,et al. (2017) Organic coating on biochar explains its nutrient retention and stimulation of soil fertility. *Nature Communications* 18, 1089

3. Ye J., Joseph S., Ji M., Nielsen S., Joseph S., Mitchell D. R. G., Donne S., Wang J., Horvat J., Munroe P., Thomas T. (2016) Chemolithotrophic processes in the bacterial communities on the surface of mineral enriched biochars, ISME journal, 1, 1-15

4. Woolf D., Amonette J.E., Alayne Street-Perrott F., Lehmann J., and S. Joseph. (2010).

Sustainable biochar to mitigate global climate change. *Nature Communication* 1:56 doi: 10.1038/ncomms1053

5. Lukas Van Zeiten, S Joseph et al (2019) Biochar improves diary pasture yields by alleviating P and K constraints with no influence on soil respiration or N2O emissions; *Biochar Journal* (accepted)

6. Rongjun Bian, Stephen Joseph, Wei Shi, Lu Li, Sara Taherymoosavi, Genxing Pan (2018) Biochar for plant promotion but not residual biochar for metal immobilisation depends on pyrolysis temperature Pyrolysis. *STOTEN*, 662, 571-580

7. Abhay Kumar A., Joseph S. , et al. (2018) Biochar-mediated immobilization and organo-mineral reaction with zinc in soil. *STOTEN*, 626, 953-961

8. M. B. Farrar H. M. Wallace, C. Xu, Z, S. Joseph, et al (2018) Short-term effects of organo-mineral enriched biochar fertiliser on ginger yield and nutrient cycling. *Journal of Soils and Sediments*, (https://doi.org/10.1007/s11368-018-2061-9

9. Olivier Husson , Alain Audebert, Stephen Joseph et al. (2018) Leaf Eh and pH: a novel indicator of plant stress. Spatial, temporal and genotypic variability in rice (Oryza sativa L.) *Agronomy* ,8, 209

10. Rongjun Bian, Stephen Joseph, Lianqing Li, Genxing Pan et al 2018 Pyrolysis of contaminated wheat straw to stabilize toxic metals in biochar and recycle the extract for use in agriculture. *Biomass and Bioenergy* Accepted

11. Ali Mohammadi a, , Maria Sandberg , G. Venkatesh , Samieh Eskandari , Tommy Dalgaard , Stepen Joseph, Karin Granström (2018) Comparative environmental analysis of alternative technologies for biochar production and energy recovery from pulp and paper mill biosludge, *Journal of Industrial Ecology* (Accepted)

12. Ben Pace, Paul Munroe, Christopher E. Marjo, Paul Thomas, Bin Gong, Jessica Shepherd, Wolfram Buss, Stephen Joseph (2018) The mechanisms and consequences of inorganic reactions during the production of ferrous sulphate enriched bamboo biochars. *Journal of Applied Pyrolysis*, 133, 22-29

13. De Chen, Xiaoyu Liu, Rongjun Bian, Kun Cheng, Xuhui Zhang, Jufeng Zheng, Stephen Joseph, David Crowley, Genxing Pan, Lianqing Li . 2018. Effects of biochar on availability and plant uptake of heavy metals – A meta-analysis. *Journal of Environmental Management* 222, 76–85

14. Taherymoosavi S.,. Joseph S., Pace B., Munroe P., (2018) A comparison between the characteristics of single- and mixed-feedstock biochars generated from wheat straw and basalt, *Journal of Analytical and Applied Pyrolysis*, 129, 123-133

15. Van Minh Dang, Stephen Joseph, Huu Tap Van, Thi Lan Anh Mai, Thi Minh Hoa Duong, Simon Weldon, Paul Munroe, David Mitchell & Sarasadat Taherymoosavi (2018) Immobilization of heavy metals in contaminated soil after mining activity by using biochar and other industrial by-products: the significant role of minerals on the biochar surfaces, Environmental Technology, DOI: 10.1080/09593330.2018.1468487

16. S. Joseph, C. I. Kammann, J. G. Shepherd, P. Conte, H-P. Schmidt, N. Hagemann, A. M. Rich, C. E. Marjo, J. Allan, P. Munroe, D.R.G. Mitchell, S. Donne, K. Spokas and E. R.

Graber 2107 Microstructural and associated chemical changes during the composting of a high temperature biochar: Mechanisms for nitrate, phosphate and other nutrient retention and release . *STOTEN* , 618, 1210–1223

17. Nielsen S., Joseph S., Ye J., Munroe P., Van Zwieten L., Thomas T . (2017) Crop-season and residual effects of sequentially applied mineral enhanced biochar and N fertiliser on crop yield, soil chemistry and microbial communities. *Agriculture Ecosystems and Environment* 255, 52-61.

18. Shepherd J., Joseph S., Sohi S., Heal K. (2017) Biochar and enhanced phosphate capture: Mapping mechanisms to functional properties. *Chemosphere*, 179. 57-74

19. Taherymoosavi S., Verheyen V. Joseph S., Munroe P., Reynolds A. (2017) Characterisation of organic compounds in biochars derived from municipal solid waste; *Waste Management*, 67, pp.131-142

20. T. T. Nhan Nguyen, H. M. Wallace, C. Xu, Z. Xu, M. B. Farrar, S. Joseph, L. Van Zwieten, S. Hosseini Bai (2017) Short-term effects of organo-mineral biochar and organic fertilisers on nitrogen cycling, plant photosynthesis, and nitrogen use efficiency. *Journal or Soils and Sediments*, Volume 17, Issue 12, pp 2763–277

21. Vithanage, M., Herath, I., Joseph, S., Bundschuh, J., Bolan, N., Ok, Y.S., Kirkham, M.B., Rinklebe, J., 2017. Interaction of arsenic with biochar in soil and water: A critical review. Carbon N. Y. 113, 219–230

22. Mohammadi, A. Annette Cowie A., Mai T., de la Rosa R., Kristiansen P., Brandão M., Joseph S. (2017) Below ground volatiles facilitate interactions between plant roots and soil organisms. *Energy* (Accepted)

23. Mohammadi, A. Annette Cowie A., Mai T., de la Rosa R., Kristiansen P., Brandão M., Joseph S. (2017) Climate-change and health effects of using rice husk for biochar-compost: comparing three pyrolysis systems. *Journal of Cleaner Production* ***(Accepted)***

24. Nahayo A., Omondi M. , Zhang X., Li L., Pan G., Stephen Joseph (2017) Factors influencing farmers' participation in crop intensification program in Rwanda. Journal of Integrative Agriculture, 16(6): 1406–1416

25. Woolf D., Lehmann J., Joseph S., Campbell C., & Christo, F. C. 2017. An open source biomass pyrolysis reactor. *Biofuel, Bioproducts and Biorefinery*. Accepted

26. Chen, D., Li, R., Bian, R., Li, L., Joseph, S., Crowley, D., Pan, G., 2017. Contribution of Soluble Minerals in Biochar to Pb^{2+}Adsorption in Aqueous 457 Solutions. *BioResources*12(1), 1662-1679

27. Rafiq Z. M., Joseph S. , et al.. 2017 Pyrolysis of Attapulgite Clay Blended with Yak Dung Enhances Pasture Growth and Soil Health; Characterization and Initial field trials. Science of the Total Environment 607–608 (2017) 184–194

28. Agyarko-Mintah E., Cowie A., Bhupinder Pal Singh, Joseph S., Van Zwieten L., Cowie A., Harden S., Smillie R. (2016) Biochar increases nitrogen retention and lowers greenhouse gas emissions when added to composting poultry litter. *Waste Management*. 61, 138-149

29. Archanjo B.S., Mendoza M.E., Albu M. S. Joseph et al. (2017) Nanoscale analyses of the surface structure and composition of biochars extracted from field trials or after co-composting using advanced analytical electron microscopy. *Geoderma* . 295,70-79

30. Mohammadi, A. Annette Cowie A., Mai T., de la Rosa R., Kristiansen P., Brandão M., Joseph S. (2016) Quantifying the greenhouse gas reduction benefits of utilising straw biochar and enriched biochar. *Energy Procedia* 97, 254 – 261

31. Rawal A., Joseph S. , Hook J., Chia C., Munroe P., Donne S., Y. Lin Y., Mitchell D. , Pace B., Horvat J., Webber J. B. W (2016) Mineral-Biochar Composites: Molecular Structure and Porosity. *Environmental Science and Technology 50* (14), pp 7706–7714

32. Bian, R., Ma, B., Zhu, X., Wang, W., Li, L., Joseph, S., Liu, X., Pan, G., 2016. Pyrolysis of crop residues in a mobile bench-scale pyrolyser: Product characterization and environmental performance. *J. Anal. Appl. Pyrol*. 119, 52-59.

33. Darby I., Xu C-Y. M. Wallace H., Joseph S., B. Pace B. & Bai S.H. (2016) Short-term dynamics of carbon and nitrogen using compost, compost-biochar mixture and organo-mineral biochar. *Environ. Sci Pollut Res.* Volume 23, Issue 11, pp 11267-11278

34. Ye J., Zhang R., Nielsen S., Joseph S., Huang D., Thomas T. (2016) A combination of biochar-mineral complexes and compost improves soil bacterial processes, soil quality and plant properties. *Frontiers in Microbiology* March 2016 | Volume 7 | Article 372

35. Ye J., Nielsen S., Joseph S., Thomas T. (2016) High-Resolution and Specific Detection of Bacteria on Complex Surfaces Using Nanoparticle Probes and Electron Microscopy. *PLOS ONE* | DOI:10.1371/journal.pone.0126404

36. Taherymoosavi S., S. Joseph S., P. Munroe P. (2016) Characterization of organic compounds in a mixed feedstock biochar generated from Australian agricultural. *Journal of Analytical and Applied Pyrolysis*. 120 (2016) 441–449

37. Joseph S, Xu C, Wallace H, Farrar M, Nguyen TN, Bai S, Solaiman Z (2016) Biochar production from agricultural and forestry wastes and microbial interactions. In: Wong JWC, Tyagi RD, Pandey A (eds) Current developments in biotechnology and bioengineering: solid waste management, 1st edn. Elsevier, Amsterdam, pp 443–474

38. Rafiq Z. M.., Robert Thomas Bachmann R. T., Rafiq M. T., Shang Z., Joseph S. , Long R. 2016 Influence of Pyrolysis Temperature on Physicochemical Properties of Corn Stover biochar and feasibility for Carbon Capture and Energy Balance. *PLOS ONE* .June pp 1-17

39. Nayaho A., Joseph S., Pan GX. 2016 Factors influencing the adoption of soil conservation techniques in Northern Rwanda. *Journal of Plant Nutrition and Soil Science*. Volume 179, Issue 3, pages 367-375,

40. Liu X., Zheng J., Zhang D., Cheng K., Liu D., Zhou H.; Zhang, PA., Bian R., Li, Joseph S. Smith P., Crowley D.; Kuzyakov Y.; Hussain Q. (2016) Biochar has no effect on soil respiration across Chinese croplands. *Science of the Total Environment;* 554–555: 259–265

41. Mohammadi, A. Annette Cowie A., Mai T., de la Rosa R., Kristiansen P., Brandão M., Joseph S. (2016) Biochar use for climate-change mitigation in rice cropping system. *Journal of Cleaner Production.* Volume 116, Pages 61–70

42. Zhang, D., Pan, G., Wu, G., Kibue, G.W., Li, L., Zhang, X., Zheng, J., Zheng, J., Cheng, K., Joseph, S., (2016) Biochar helps enhance maize productivity and reduce greenhouse gas emissions under balanced fertilization in a rainfed low fertility inceptisol. *Chemosphere.* 142, 106–113.

43. Quin P., Joseph S., Husson O., Donne S., Mitchell D., Munroe P., Phelan D. Cowie A, Van Zwieten L. (2015) Lowering the N2O emissions from soils using eucalyptus biochar, the importance of redox reactions. *Science Reports*. 5:16773

44. Wang P., Liu W., Li L. , Cheng K. , Zheng J., Zhang X. , Zheng J., Joseph S. & Genxing Pan (2015) Long-term rice cultivation stabilizes soil organic carbon and promotes soil microbial activity in a salt marsh derived soil chronosequence; *Science Reports*. 5:15704

45. Taherymoosavi, S., Joseph, S., Munroe, P., Characterization of organic compounds in a mixed feedstock biochar generated from Australian agricultural residues. Journal of Analytical and Applied Pyrolysis, 2016. 120: pp. 441-449.

46. Kammann C. I., Schmidt H., Messerschmidt N., Linsel S., Steffens D., Müller C., Koyro1 H.W., Conte P. & Joseph S. (2015) Plant growth improvement mediated by nitrate capture in cocomposted biochar. *Science Reports*, 5: 11080

47. Blackwell P., Joseph S, Munroe P., Anawar H. M., Storer P., and Solaiman Z. M. (2015) Influence of biochar, mineral fertilisers and biochar mineral complexes on mycorrhizal colonisation, growth and nutrition of wheat and sorghum. *Pedosphere* 25(5):686-695.

48. Lou Y, Joseph S., Li L. Q., Pan G X., Graber E., Liu X. (2016). Water Extract from Straw Biochar Used for Plant Growth Promotion: An Initial Test. *Bioresources Technology* 11(1), 249-266

49. Yao C X.., Joseph S, Li L Q, Pan G X, Lin Y, Munroe P, Pace B, Taherymoosavi S, Van Zwieten L, Thomas T, Nielsen S, Jun Y, Donne S. (2015). Developing more effective enhanced biochar fertilisers for improvement of pepper yield and quality. *Pedosphere*. 25(5): 703--712

50. Joseph S, Anawar H M, Storer P, Blackwell P, Chia C, Lin Y, Munroe P, Donne S, Hovart J, Wang J, Solaiman Z M. (2015) Effects of enriched biochars containing magnetic iron nanoparticles on mycorrhizal colonisation, plant growth, nutrient uptake and soil quality improvement. *Pedosphere*. 25(5): 745–760.

51. Joseph S., Husson O., Graber E., Van Zwieten L., Taherymoosavi S., Thomas T., Nielsen S., Ye J., Pan G. X. , Chia C., Munroe P., Allen J., Lin Y.,. Fan X and Donne S. (2015) The Electrochemical Properties of Biochars and How They Affect Soil Redox Properties and Processes. *Agronomy*, 5 (3): 322-340

52. Joseph S, Pow D, Dawson K, Mitchell D R G, Rawal A, Hook J, Taherymoosavi S, Van Zwieten L, Rust J, Donne S, Munroe P, Pace B, Graber E, Thomas T, Nielsen S, Ye J, Lin Y, Pan G X, Li L Q and Solaiman Z M. (2015). Feeding biochar to cows: An innovative solution for improving soil fertility and farm productivity. *Pedosphere*. 25(5): 666–679.

53. Haifei L. H., Lashari M. S., Liu X., Ji H., Li L., Zheng J., Kibue G. W., Joseph S., Pan G., (2015) Effect of boichar poultry-manure compost with conjunction of pyroligneous solution on soil microbial community structure, soil enzymes activity in saline soil of Central China.

Great European Journal of Soil Biology. 70: 67-76

54. Li M., Liu M., Joseph S., Chun-Yu J. , Wu M. and Li Z. (2015) Change in water extractable organic carbon and microbial PLFAs of biochar during incubation with an acidic paddy soil. *Soil Research* . 53(7).763-771

55. Zhang D, Pan G, Wu G, Kibue GW, Li L, Zhang X, Zheng J, Zheng J, Cheng K, Joseph S, Liu X. (2015) Biochar helps enhance maize productivity and reduce greenhouse gas emissions under balanced fertilization in a rainfed low fertility Inceptisol. *Chemosphere* (in press)
56. Ji H., Ding Y., Liu X., Li L., Zhang D., Li Z., Sun L., Lashari M., Joseph S., Meng Y., Kuzyakov Y., Pan G. (2015) Root-Derived Short-Chain Suberin Diacids from Rice and Rape Seed in a Paddy Soil under Rice Cultivar Treatments. *PLOS ONE* | DOI:10.1371/journal.pone.0127474 May 11

57. Singh, B., Macdonald, L., Kookana, R., Van Zwieten, L., Butler, G., Joseph, S., Weatherley, A., Kaudal, B., Regan, A., Cattle, J., Dijkstra, F., Keith, A., et al (2014). Opportunities and constraints for biochar technology in Australian agriculture: looking beyond carbon sequestration. *Soil Research*, 52(8), 739-750

58. Clare A., Shackley S., Joseph S. Hammond J. Pan G. and Bloom A. (2014) Competing uses for China's straw: the economic and carbon abatement potential of biochar . *GCB Bioenergy*, 7: 1272–1282.

59. Latham, K., Jambu, G., Joseph, S., and S. Donne. (2014) The nitrogen doping of hydrochars produced hydrothermal treatment of sucrose in H_2O, H_2SO_4 and NaOH. *Sustainable Chemistry & Engineering* 2 (4):755-764.

60. Nielsen S., Minchin T., Kimber S., van Zwieten L., Caporaso G., Gilbert J., Munroe P., Joseph S., and T. Thomas. (2014). Enhanced biochar causes complex shifts in soil microbial communities. *Agriculture Ecosystems & Environment* 191:73-82.

61. Chia C., Singh B.P., Joseph S., Graber E.R., and P. Munroe. (2014). The characterisation of an enriched biochar. *Journal of Analytical and Applied Pyrolysis*.108:26-34

62. Qian L., Chen L., Joseph S., Pan G.X., Li L., Zheng J., Zhang X., Zheng J., Yu X., and J. Wang. (2014). Biochar compound fertilizer as an option to reach high productivity but low carbon intensity in rice agriculture of China. *Carbon Management.* 5(2):pp 145-158

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64. Vinh N.C., Hien N.V., Anh M.T.L., Lehmann J., and S. Joseph. (2014). Biochar treatment and its effects on rice and vegetable yields in mountainous areas of northern Vietnam. *International Journal of Agricultural and Soil Science* 2(1):5-13.

65. Bian, R., Zhang, A., Li, L., Pan, G., Zheng, J., Zhang, X., Zheng, J., Joseph, S., Chang, A., 2013. Effect of municipal biowaste biochar on greenhouse gas emissions and metal bioaccumulation in a slightly acidic clay rice paddy. *Bioresources* 9, 685–703. Borchard, N., Spokas,

66. Joseph S., Graber E.R., Chia C., Munroe P., Donne S., Thomas T., Nielsen S., Marjo C., Rutlidge H., Pan, G.X., Xiaorong F., Taylor P., Rawal A., and J. Hook. (2013) Shifting paradigms on biochar: micro/nano-structures and soluble components are responsible for its plant-growth promoting ability. *Carbon Management* 4(3): pp323-343.

67. Lin Y., Munroe P.R., Joseph S., van Zweiten L., Kimber S., and A. Ziolkowski. (2013). Chemical and structural analysis of enhanced biochars: thermally treated mixtures of biochar, chicken litter, clay and minerals. *Chemosphere* 91:35–40.

68. Liu, X.Y., Zhang, A.F., Ji, C.Y., Joseph, S., Bian, R.J., Li, L.Q., Pan, G.X., and J. Paz-Ferreiro. (2013). Biochar's effect on crop productivity and the dependence on experimental conditions—a metal-analysis of literature data. *Plant and Soil* 291(1):275-290.

69. Thi, L.A.M, Joseph, S., van Zwieten, L., Trung K.H., Pan G., Li L., and T.M. Van. (2013). Effect of enhanced biochar on green house gas emission and paddy rice yield from loamy sand soil after first year trial in Thai Nguyen, Viet Nam. Paper presented at the workshop *Biochar: Potential Use for Agriculture and Climate Change Mitigation*. Hanoi,Vietnam. 14-15th November, 2013.

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72. Lin, Y., Munroe, P., Joseph S., and R. Henderson. (2012). Migration of dissolved organic carbon in biochars and biochar-mineral complexes. *Pesquisa Agropecuária Brasileira* 47:677-686.

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78. Joseph S.D., Camps-Arbestain M., Lin Y., Munroe P., Chia C.H., Hook J., van Zweiten L., Kimber S., Cowie A., Singh B.P., Lehmann J., Foidl N., Smernik R.J., and J.E. Amonette (2010). An investigation into the reactions of biochars in soil. *Australian Journal of Soil Research* 48:501-515.

79. Nguyen B.T., Lehmann J., Hockaday W.C., Joseph S., and C.A. Masiello. (2010). Temperature sensitivity of black carbon decomposition and oxidation. *Environmental Science and Technology* 44:3324–3331.

80. Roberts K., Gloy B., Joseph S., Scott N., and J. Lehmann. (2010). Life cycle assessment of biochar systems: estimating the energetic, economic and climate change potential. *Environmental Science and Technology* 44:827-83.

81. van Zwieten L., Kimber S., Morris S., Chan K.Y., Downie A., Rus, J., Joseph S., and A. Cowie. (2010). Effects of biochar from slow pyrolysis of papermill waste on agronomic performance and soil fertility. *Plant and Soil* 27:235-246.

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83. Chan. K. Y., Van Zwieten L., Meszaros I., Downie A., and S. Joseph. (2007). Agronomic values of greenwaste biochar as a soil amendment. *Australian Journal of Soil Research* 45:629-634.

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Book and Book Chapters

1. Biochar for Environmental Management: (2015) J. Lehmann and S Joseph(eds.). Routledge/Taylor and Francis London

2. Biochar for environmental management: an introduction. (2015) In *Biochar for Environmental Management: Science and Technology* J. Lehmann and S Joseph(eds.). Routledge/Taylor and Francis London. pp:1-15.

3. Joseph S., Lan Anh M., Clare A. and Shackley S. (2015) Socio-economic feasibility, implementation and evaluation of small-scale biochar projects In *Biochar for Environmental Management: Science and Technology* J. Lehmann and S Joseph(eds.). Routledge/Taylor and Francis London pp:789-810.

4. Shackley S, , Lan Anh M., Clare A. Joseph S., Mc Call B. and Scmidt H.P. (2015) Economic evaluation of Biochar Systems In *Biochar for Environmental Management: Science and Technology* J. Lehmann and S Joseph(eds.). Routledge/Taylor and Francis London. pp: 811-844.

5. Lukas Van Zwieten Claudia Kammann, MariaLuz Cayuela, Bhupinder Pal Singh, Stephen Joseph, Stephen Kimber, Scott Donne, Tim Clough, Kurt Spokas(2015) Biochar effects on nitrous oxide and methane emissions from soil In *Biochar for Environmental Management: Science and Technology* J. Lehmann and S Joseph(eds.). Routledge/Taylor and Francis London. pp: 541-561.

6. Joseph S., van Zwieten L., Chia C., Kimber S., Munroe P., Lin Y., Marjo C., Hook J., Thomas T., Neilsen S., Donne S., and P Taylor. (2013). Designing specific biochars to address soil constraints: a developing industry. In *Biochar and Soil Biota*. N. Ladygina and F. Rineau (eds.). CRC Press. pp:165-202.

7. Amonette J., and S. Joseph. (2009). Characteristics of biochar: microchemical properties. In *Biochar for Environmental Management: Science and Technology*. J. Lehmann and S Joseph(eds.). Earthscan Publications. pp:33-52.

8. Joseph S. (2009). Socioeconomic assessment and implementation of small scale biochar projects. In *Biochar for Environmental Management: Science and Technology*. J. Lehmann and S Joseph(eds.) (eds.). Earthscan Publications. pp:359-374.

9. Joseph, S., and J. Lehmann. (2009. Biochar for environmental management: an introduction. In *Biochar for Environmental Management: Science and Technology* J. Lehmann and S Josep(eds.). Earthscan Publications. pp:1-12.

10. Joseph S., Lehmann, J., Amonette, J., and P. Munroe. (2009). Developing a biochar classification and test methods. In *Biochar for Environmental Management: Science and Technology*" J. Lehmann and S Joseph (eds.). Earthscan Publications. pp:107-126.

11. van Zweiten L., Singh B.P., Joseph S., Kimber S., Cowie A., and Y. Chan. (2009). Biochar and emissions of non-CO_2 greenhouse gases from soil. In *Biochar for Environmental Management: Science and Technology* J. Lehmann and S Joseph (eds.). Earthscan Publications, 227-250.

COUNTRY WORK EXPERIENCE

Nepal, Australia, India, Sri Lanka, Bangladesh, Thailand, Malaysia, Philippines, Indonesia, Vietnam, PNG, Vanuatu, Fiji, Tonga, Kenya, Tanzania, Zimbabwe, Ethiopia, Sudan, Burkina Faso, Guatemala, Malaysia, Tonga , Fiji, China, Gambia, USA, Canada, Peru, Chile, Bolivia, U.K., Germany, Holland, Denmark, France, USA and Vanuatu.

CLIENT BASE

Rentek LLC, Energy Farmers Pty, CARE Denmark, Asian Development Bank, Cornell University, South Australia No Till Farmers Association (SANTFA) Renewed Carbons Pty, BHP, Ignite Energy Resources Pty, ALCOA, Pacific Power, CRA/WIM, GHD Pty, Sinclair Knight Merz, CSIRO, Universities of Sydney and NSW, ERDC, Austrade, Commonwealth Bank; Australian federal and state governments, British, Dutch, German, Canadian and Danish Government Agencies; United Nations Agencies including FAO, UNIDO, UNICEF, ILO, UNSO; International Agencies including, World Bank and the Foundation for Wood Stove Dissemination, Energy Developments Limited, Australian Green House Office, US AID.

Courses and Conferences where I was on the organising and scientific committee and gave key note speeches and presentations

1. International Biochar Initiative Conferences in, 2012, 2010, 2008 and 2007
2. Asia-Pacific Biochar Conference 2017, 2016, 2010 and 2012
3. China National Biochar Conference 2009 and 2011
4. Organiser and principal trainer; 1st and 2nd International Biochar Training Course; Nanjing Agricultural University 2012/2013/2014

Recent Consultancies and Research Projects

Further details of consultancies provided at end of the CV

China

- Development of agricultural waste to energy technology and charcoal- NPK fertilisers 2011-2016

Malaysia

- Advising a commercial company on development of an integrate waste management process to convert palm oil waste to energy (biogas and pyrolysis), charcoal fuel briquettes and fertiliser 2011-2012

Nepal

- Consultant to ADB Biochar and Green Ecology Project 2011-2015

Vietnam/Laos/Cambodia

- Development of biochar cook stoves and ovens; 2011+; CARE Denmark.
- Development of kilns and biochar formulations for Asian Development Bank Regional Project

USA

- Development of biochar and pyrolysis kilns and stoves for Cornell University Kenya Biochar Research Project

Australia

- Development of farm open source pyrolysers and development of fit for purpose biochars for BES Pty, Energy Farmers Pty, Clean Carbon Pty
- Development of high efficiency biochars for Newcastle University, University of NSW, Griffith University, SANTFA, Monash University

EMPLOYMENT HISTORY

June 2011 +

Corporate and Technical Adviser/Consultant Bioenergy and Biochar

September 2008 to May 2011

Executive Chairman Anthroterra Pty Ltd
Developing carbon negative strategies for improving soil health and increasing crop productivity. Involved developing new biochar products and large and medium sized pyrolysis equipment

Director; Quantum Bioenergy Pty; Biogas to Electricity company

July 2007 -2010

Corporate Advisor/Technical Advisor
Undertake research work and consultancy on solid fuel combustion gasification and pyrolysis.

- Biochar and biomass analysis and characterisation.
- Development of low emissions burners to reduce CH4 emissions from coal mines
- Consultant Ignite Pty Ltd developing technology to produce a clean liquid fuel and char from lignite and biomass.
- Market research in bioenergy

1983 to 2007

Managing Director Biomass Energy Services and Technology Pty. Limited
Director Energy For Sustainable Development Plc

- Development of Biochar process technology
- Renewable energy and waste management policy formulation.
- Market research on Renewable Energy Systems and Waste Recycling.
- Design, appraisal and evaluation of biomass energy, biofuels and rural technology.
- Design and evaluation of biofuels processes and plants.
- Design and evaluation of liquid waste to methane plants
- Design/Feasibility studies of small-scale sugar, lime, ricemill and briquetting plant.
- Design and testing of biomass/waste dryers, furnaces; pyrolysis and gasifiers.
- Feasibility studies, design and testing of biomass fuelled CHP systems.
- Development and testing of solar cookers and solar steam generating systems.
- Modelling of fixed, suspended and fluid bed combustors.
- Developing and commercialising wind turbines and microhydro plant.
- Design, testing and commercialising clinical waste Gasifier.
- Design and manufacture of air emission clean up systems.
- Design and manufacture of advance gas turbine combustors and flares using calorific value gases.
- Design of small landfill gas power stations.
- Project design and appraisal.
- Developing and implementing training courses and manuals.
- Management of engineering, consultancy and contract R and D Company.

1978 to 1983

Biomass Programme Manager Intermediate Technology Development Group U.K.

- Responsible for design testing and technical services on a range of biomass fuelled household and small industrial heating and processing appliances.
- Development of innovation biomass waste to solid and liquid fuels technologies
- Development and implementation of biomass market research and monitoring evaluation studies
- Assisted overseas organisations and business manufacture and market biomass fuelled equipment.
- Carried out rural energy studies.
- Assistance Earthscan prepare publications on biomass energy

1975 to 1977

Director of the Longana Rural Industries Training Centre (Vanuatu).

- Design and manufacture of small bio-ethanol
- Designed, built the school, developed the syllabus to train builders, mechanics, blacksmiths, water supply engineers
- Developed maintenance programme and all manuals, training aids and textbooks. Assisted small business and helped establish a number of new enterprises.

1968 to 1974

BHP, Australia - Trainee and then Graduate Metallurgical Engineer

CONSULTANCIES:

- Grease Trap Waste to Biodiesel Plant design and Evaluation, SEDA 2003-2005

- Evaluation of ABG Biodiesel Plant, SEDA 2003-2004
- Evaluation of Canadian bio-oil and char plant, CADC 2004-2005
- Development of a Paper Sludge to Char and Energy Plant, Renewed Fuels 2003-2005
- Development of Low Cost Bio-methanation Plant, SEAV, 2004
- Biomass cogeneration study; Thora Saw Mill, 2003
- Conversion of Agricultural Residues to Energy and Agricultural Char, NSW Dept of Environment and Conservation, 2003-2004
- Conversion of Dairy and GreenWaste to fertiliser and Energy, Glenelg Hopkins Development Authority, 2002-2003.
- Novel technique for growth of Algae from the flue gas of cement kilns, Boral Pty, 2002
- Design of Pyrolysis Plant for A cotton Gin, Novera Energy, 2001-2002
- Feasibility of utilising Mimosa Pigra Weed as an energy source, N.T.Government, 1998. Following design of a Power plant 2002-2003
- Design of landfill gas power station, Kogarah Council, 1997/8.
- Assessment of renewable energy showcase projects, Australian Government Greenhouse Office, 1998.
- Appraisal of liquid fuel from biomass pilot plant, NSW State Forests, 1998.
- Feasibility of utilising green waste for energy, Energetics, 1998.
- Conversion of waste paper and packaging to briquettes, Assoc. of Liquid Paperboard Manufacturers, 1997/1998.
- Design review of EDL/Brightstar Gasifier and MSW processing plant, EDL Pty, 1997/98.
- Agglomeration of liquid waste and cotton hulls as a coal replacement, Cargill Oil Mills, 1997.
- Development of a drier/separator for MSW pulp, EDL Pty, 1998.
- Development of a 3MWth Cotton Waste Gasifier, EDL Pty, 1996/1998.
- Development of a Stirling engine heat exchanger and gasifier, SES, 1997/98.
- Development of low emissions landfill gas flares, EDL Pty, 1996/97.
- Biochemical conversion of green waste to fertiliser, Energy Australia, 1997/1998.
- Development of Low emissions porous burners, Sustainable Energy Dev. Authority, 1996/97.
- Design of a low cost waste heat boiler for landfill gas power stations, EDL Pty, 1996.
- Design and manufacture of 8MWth gas turbine combustor, EDL Pty, 1996/1998.
- Design and manufacture of 350kW microhydro turbine, Delta Electric, 1997.
- Design and monitoring of biomass fired FBC CHP plant, Sinclair Knight Merz Pty, 1995-1998.
- Development 50kW steam engine, Sinclair Knight Merz Pty, 1995-1998.
- Assistance to the Ethiopian National Biomass Energy Programme, World Bank, 1990-1994.
- Development of mineral processing and pollution control equipment for CSIRO and Pacific Power, 1990-1994.
- Coal Utilisation Studies, World Bank/ Min. of Energy, Ethiopia 1992-94.
- Assessment of Grain Grinding Need and Income generation in Tigray; Christian Aid, 1992.
- Training for Various Companies on use of computers for project Management and Preparation of Training manuals, 1988-1990 .
- Evaluation of the Brick Industry in Thailand, AIDAB, 1989-90.

- Evaluation of the Market for Evacuated Tube Solar Collectors in Developing Countries, Pacific Dunlop P/L, 1989.
- Development of Bread Ovens and production systems VIRTU, P.N.G, 1988.
- Training in Biomass Furnace Production Management and Methods FAO, 1988.
- Development of a gasifier and a direct combustion drier for use with grain storage bins. University of NSW 1988.
- Development of Two.
- Chamber Furnace for Wet Sawdust, to Power Steam Engines. ANU 1987.
- Preparation of Training Material and Manuals on Biomass Energy Planning and Programme Implementation and Resource Person for Training Programmes. FAO. 1985, 1986, 1987.
- Feasibility of using biomass for CHP plants in ASEAN region, Australian Gov., 1994.
- Preparation of a Review for UNHABITAT on "The Issues and Implications of Inter-fuel Substitution in the Domestic and Agricultural Sector "1985 and "State of the Art review on Biomass Gasification", 1993.
- Women Energy and the Environment; A study of the Brick Industry in Thailand
- AIDAB 1992/3.
- Development of two prototype fish dryers for the Institute of Fisheries and University of New South Wales, 1986-1988.
- Development of Rice Husk Furnace for drying of rice. IRRI. 1986.
- Director of a Wood Energy Training Course for ITDG 1985, 1986.
- Compilation of a Wood Energy Bibliography for FAO. 1985.
- Modelling of a Wood Fired Steam Generating System. TSL Engineering, UK. 1985.
- Development of Biomass Energy Programme (Assistance) Ministry of Energy/KENGO, Kenya. 1984, 1985.
- Assistance with Stove Design and Programme Review for the FAO/Community Forestry.
- Development Project's Stove Programme in Nepal. January 1981 and October 1982, 1983, 1984, 1985.
- Development of Portable Wood Stoves for Kenya. USAID/Ministry of Energy. 1983, 1984, 1985.
- Development of a viable biomass briquetting process; Enertec; Kenya 1983.
- Development of Stove Programmes in Sudan and the Gambia. UN Sahelian Office.1982, 1983.
- Assistance to VITA/CILSS Stove Programme in Upper Volta. February 1981.
- Design of Small Scale Sugar Furnaces, for the Indian Government. 1979.
- Design of a Solar Powered Co-generation Plant, Uni. of Sydney and Pacific Power.
- Development of a simple fish drying system; Department of Agriculture; Vila New Hebrides 1976.