

Coal-ash: an exploitable resource for management of Australia agricultural soils?

Isa A.M. Yunusa¹, D. L De Silva¹, D. Eamus¹, Brad R. Murray¹ and C. Heidrich²

¹Institute for Water and Environmental Resource Management, University of Technology, Sydney, PO Box 123, Broadway 2007, Australia

²Ash Development Association of Australia, PO Box 1194, Wollongong 2500, Australia

Keywords: soil structure, soil acidity, hydraulic conductivity, plant growth, Australia

Australian agriculture faces major land degradation due to acidification and structural deformation of the soil, with almost half of the 100 million ha of agricultural lands affected. Consequently, significant amounts of lime and gypsum are routinely used as neutralising agents and for improving the structural and nutritional status of the soil. The use of these materials, however, involves significant cost to the farmer both in terms of production and transportation. For instance, production accounts for about 30% of the total cost of liming. There is therefore a need to search for alternative or complimentary materials that are at least as effective and as cheap as lime and gypsum. Coal-ash has many of the functional properties of lime and gypsum including many of the desirable physico-chemical characteristics that can ameliorate soil constraints to low productivity of crops. This has been demonstrated in several studies, including some limited efforts in Australia where power stations produce about 12 million tonnes of coal-ash annually, but more than 91% of which ends up in landfill. Thus, the potential of coal-ash for soil management has remained largely unexplored in Australia. In this paper we discuss characterisation of coal-ashes for their capability to ameliorate identified constraints to crop performance in a number of major Australian agricultural soils. We also present preliminary results from an ongoing trial on crop growth and yield quality in response to coal-ash amendment of two contrasting soil types.

Submitted for consideration in the 2005 World of Coal Ash, April 11-15, 2005, Lexington, Kentucky, USA.