



Diffuse reflectance spectroscopy in soil science: current and future possibilities

R.A. Viscarra Rossel¹, B. Stenberg ² and L. Janik ³

¹Australian Centre for Precision Agriculture, The University of Sydney, NSW 2006, Australia,
²Swedish University of Agricultural Sciences, Skara, Sweden, ³CSIRO Land & Water, Glen Osmond, SA 5064, Australia

Historically, our understanding of the soil and assessment of its quality and function has been gained through routine soil chemical and physical laboratory analysis. There is a global thrust towards the development of more time- and cost-efficient methodologies for soil analysis as there is a great demand for larger amounts of good quality, inexpensive soil data to be used in environmental monitoring, modelling and precision agriculture. Diffuse reflectance spectroscopy (DRS) provides a good alternative that may be used to enhance or replace conventional methods of soil analysis, as it overcomes some of their limitations. DRS is rapid, timely, less expensive, non-destructive, straightforward and can be more accurate than conventional soil analysis. Furthermore, a single spectrum allows for predictions of various soil properties and the techniques are adaptable for use *in-situ* as proximal soil sensors. This paper will show, with examples, current applications of visible-near infrared (vis-NIR) and mid infrared (mid-IR) DRS in soil science and will describe future possible uses of DRS in soil science and land resource assessment.