

11th July 2009

Committee Secretary
Parliamentary Joint Committee on Corporations and Financial Services
Department of the Senate
PO Box 6100 Parliament House
Canberra ACT 2600

Dear Sir / Madam,

Re: Enquiry into Agribusiness Managed Investment Schemes

I wish to address some of the issues raised in submissions presented by D McKenzie, A Cass and J Rasic. Messrs McKenzie, Cass and Rasic are commercial consultants who may have worked directly or indirectly for Timbercorp and Great Southern. I have worked in the field of soil science since 1984. I hold a Doctorate of Philosophy (PhD) in Soil Science for which I received the CG Stephens PhD award in soil science in 2008. I also hold a Master of Science in Pedology and Soil Survey and Bachelor of Agricultural Science.

Background to the development of the ICMS methodology

The method developed by the Irrigated Crop Management Service (ICMS) of the Department of Agriculture in Loxton South Australia in the 1970's was in response to over irrigation in the Riverland district. A method to determine the potential waterholding capacity of the soil profile based on standard field soil survey criteria (McDonald et al 1990) and potential crop rootzone depth was established. The method has been recognised by the Irrigation Association of Australia through the awarding of Ken Wetherby as the major contributor to the method with the McLean – IEDEMP Award for Excellence in Irrigation in 2000.

Comments by D McKenzie

D McKenzie alleges several problems with the ICMS methodology in his submission. I will address these in the order in which he listed them.

- The “registered soil surveyors” is a list of individuals who have undertaken field based pedological training within the Sunraysia District in Victoria using standard field soil survey criteria (McDonald et al 1990). The need for these individuals to work with other soil scientists may arise if they have only work in the “Mallee” environment of the Sunraysia. I and other soil science professionals in South Australia have assisted trainees using the ICMS methodology on projects outside the “Mallee” environment of the Sunraysia or Riverland districts. Therefore the statement of McKenzie that this has not occurred is false.

- Soil structure was not overlooked. Soil structure was assessed, recorded and used to determine a potential plant rootzone depth which will influence the readily available waterholding capacity (RAW) of a soil profile when using the ICMS methodology. Plant roots are restricted by prismatic, columnar or lenticular soil structures and these are identified and potential plant rootzone depth adjusted accordingly. Therefore the statement of McKenzie that structure is overlooked is false.
- The predicted rootzone depth is based on an ameliorated profile and no adjustment of RAW is required. Therefore the statement of McKenzie that anticipated improvement in RAW is overlooked is false.
- Subsoil compaction and low permeability clay bands in sandy soils are identified and mapped allowing targeting of ripping and other amelioration treatments. Sodicity may restrict potential plant rootzone depths and this is addressed in the assessment of potential rootzone depth and rate and placement of gypsum amelioration. Water repellency is addressed by recommendations on inter-row cover management, which is an ongoing area of research as documented in Australian viticulture journals.
- The ICMS methodology is based on soil description using the guidelines of McDonald et al (1990) and includes soil texture, structure, consistence, coarse fragment content, soil segregations, pH and moisture content. The principal of determining a potential rootzone depth and applying RAW values has been successfully applied to many soil types in Australia. Examples can be provided if required. In highly managed agricultural systems such as irrigated vines, olives and almonds soil acidity will be addressed by amelioration with agricultural lime.
- The ICMS methodology can be used to improve the reliability of electromagnetic (EM) and radiometric remote sensing data. Variability within EM surveys due to clay and water content, salinity and density of the medium examined can be identified from soil profile descriptions from a backhoe pit which include assessment of soil texture, structure and moisture content. This is the approach of the ICMS method. Radiometrics examines the uranium (U), potassium (K) and thorium (TH) signal within the top 20 cm of the soil profile only. Soil descriptions from backhoe pits are required to determine the structure and texture of subsoil layers which is the benefit of the ICMS method.
- The ICMS-procedures developed prior to the publication of the CSIRO “brown” and “blue” books has a clear connection to these publications. Water retention values used in the ICMS methodology were determined from intact soil cores placed on pressure plates within a closed chamber at known pressures. This procedure is well established in the international soil science literature and a version of it is outlined in the “brown” book. The ICMS method therefore follows established protocol. A very brief outline of the ICMS methodology is outlined in the “blue” book itself.

As a member of the Australian Soil Science Society (ASSSI) and certified practicing soil scientist (stage 3) I agree training should be discussed. This however should be done by an independent body other than commercial consultants and state and federal government bodies such as the CSIRO.

Comments by A. Cass

I will address below the three alleged deficiencies outlined by Mr Cass on land evaluation practices by some consultants. He infers these deficiencies resulted in flawed land suitability assessments.

- The data used for the determination of the relationship between field hand texture and readily available waterholding capacity (RAW) is based not only on “Mallee” soils but on acidic and non-calcareous soils from the Barossa Valley and Adelaide Hills (Kew et al 2004). Soil Structure is assessed in the ICMS methodology in the determination of a potential rootzone depth. Soil layers with a structure that restricts permeability will restrict the potential plant rootzone depth, consequently affecting the RAW value.
- As stated above acidic and other non-calcareous soils were assessed in the determination of RAW values (Kew et al 2004) and land evaluation is not based solely on “Mallee” soils. In-appropriate use of any soil survey results may contribute to the use of land not otherwise suitable or only marginally suitable for irrigated agriculture.
- The ICMS method is based on internationally documented procedures for determining relationships between field hand texture and water retention. Soil structure is assessed from backhoe pits and potential plant rootzone depths determined.

There are many cases of successful developments of irrigated agriculture throughout Australia using the ICMS method. Details of successful developments can be provided if required. The Irrigation Association of Australia recognised the ICMS methodology as a significant contribution to improving irrigation efficiency by awarding Ken Wetherby in 2000 with the McLean - IEDEMP Award for Excellence in Irrigation.

Comments by Rasic

Please refer to my responses to the submissions made by Messrs McKenzie and Cass.

Summary

The ICMS method is based on established soil science principals that remain current. The waterholding capacity of soil samples can be determined from water retention curves derived from the relationship between water content and matric potential (or suction) (Childs 1940). This relationship is dependent on soil texture and structure (Hillel 1982). Kew et al (2004)

have shown field hand texture and not percentage clay derived from particle size analysis can be used to determine waterholding capacity. The ICMS method then uses backhoe pits to describe the soil profile and assess soil structure in the field. On this basis I dispute the criticisms of McKenzie, Cass and Rasic.

Proposal to address these issues

I propose that a round-table discussion be implemented that will allow the presentation of soil survey methods for irrigated agriculture. Full disclosure of each method will be required to achieve an outcome. This has not happened in previous meetings conducted in South Australia. Some consultants cited commercial advantage as the reason for non-disclosure previously. This meeting should be run by an independent body and not a commercial soil surveyor, government department or federal entity such as the CSIRO.

Discussion of the role of the Australian Soil Science Society and the certified practicing soil scientist scheme should be included in this round-table meeting.

Thank you for the opportunity to comment on the Inquiry into Agribusiness Managed Investment Schemes.

Dr Geoff Kew

Pedologist and soil scientist

PS. Please note. I have my own soil survey company and I have worked in association with Ken Wetherby but we are separate entities.

References

Childs EC (1940). The use of soil moisture characteristics in soil studies. *Soil Science* **50**, 239-242.

Hillel D (1982). Introduction to soil physics. (Academic Press, London).

Kew G, Wetherby K, Zimmermann T, Meissner T (2004). Estimation of readily available waterholding capacity using field hand texture. (Proceedings Supersoil conference, Sydney, Australia).