Sampling for soil carbon, paddock scale

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Basic Guidelines

- Not recommendations
- Just some of the factors that need to be considered in developing sampling protocols at the paddock scale.

Basic Guidelines

- Purpose of sampling
  - Soil condition, how is my soil going?
  - Carbon trading, getting payment, $$$
- Paddock scale is the basic unit of management
- Measurement of soil carbon levels essential at some point in time,
  - estimates based on management history etc inadequate

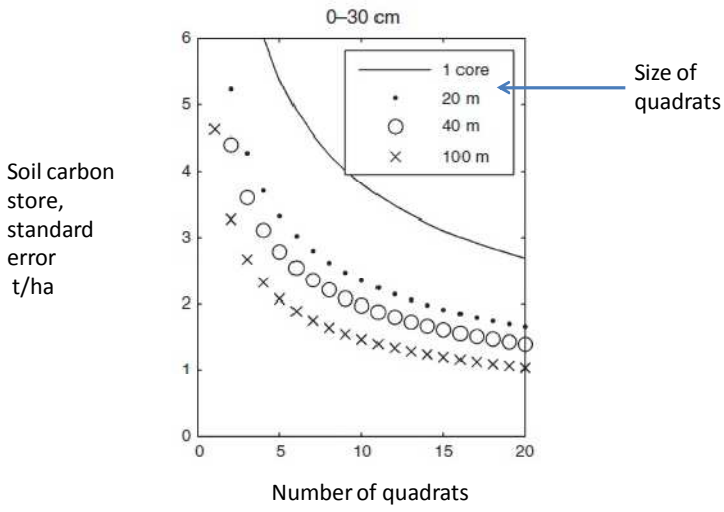
Basic Guidelines 2

- Basic statistical design indicates stratification and “equal areas” design most efficient. “Tessellated” sample design.
- Nature of soil carbon variability indicates a large amount of the variation is short range, < 100 m. Bulking in quadrats it is possible to account for this effectively. Potential $ saving.

Basic Guidelines 3

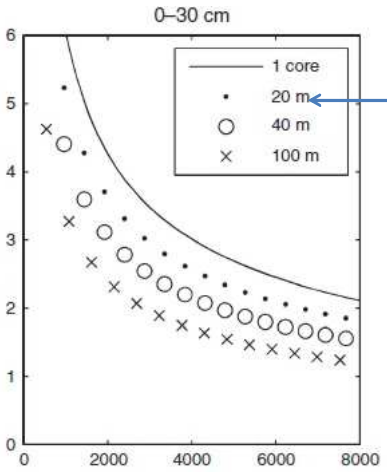
- When comparing changes in soil carbon levels, using the same sampling "quadrats", sampling "areas" is the most efficient.
  - Var (t1+t2) = var(t1) + var(t2) – 2 * covar (t1, t2)
  - Need for auditing procedure
- Account for changes in bulk density and soil settlement. 0 – 30 cm is not static.

Basic Guidelines 4



Basic Guidelines 5

Soil carbon store, standard error t/ha



Size of quadrats

Cost AUD$

Guidelines 5

Figure 1 An example of a sample design for a paddock that is 100 ha with 28 ha of midslope and 65 ha of footslope. Areas of rock outcrop and creek flat are excluded. The midslope area is divided into 3 equal areas and three 40 m quadrats chosen at random within the equal areas as shown. The equal areas can be generated by GIS (preferred) or approximated manually. Similarly, seven 40 m quadrats are chosen within the footslope area. Within each quadrat, 8 cores are sampled and the soil bulked at each depth (i.e. all 0-10 cm bulked, 10–20 cm bulked and 20–30 cm bulked).