Subsoil Carbon and Nitrogen Dynamics in Grazing Systems of Northeast NSW

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Background

Soil carbon studies, both in Australia, and globally, have focussed on the top 30cm of soil. Few studies have considered carbon (C) and nitrogen (N) dynamics at depths greater than 30cm, referred to as subsoil.

More than 60% of total organic C stocks are found deeper than 30cm, highlighting a need to better understand subsoil C and N dynamics, the factors of influence, and vulnerability to global change.

Evidence suggests the influence of soil properties increase with depth, informing the projects focus on soil mineral properties.

Aims

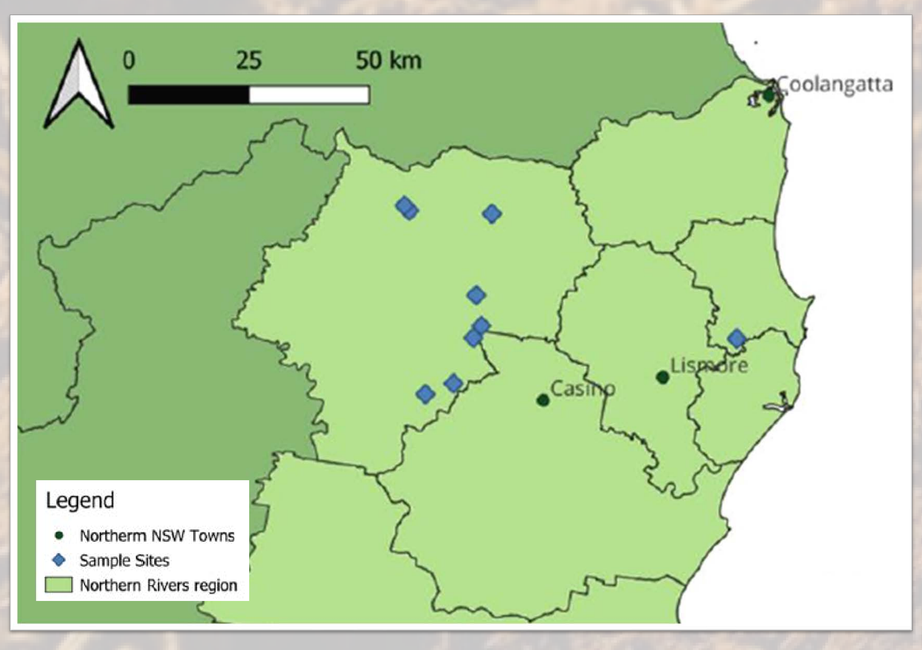
1. Determine the distribution and drivers of subsoil C and N stocks in a regional context

2. Develop an understanding of the mechanisms controlling the formation and stabilisation of subsoil C and N stocks, with a focus on soil properties, to understand spatial variations in stocks

3. Assess the vulnerability of subsoil C and N stocks to global change

Research Approach

1. Regional survey of current subsoil C and N stocks across grazing properties in Northern NSW, comparing grazing management and soil types. This will be followed by correlation analysis to determine the importance of factors influencing subsoil C and N stocks.



2. Determine the importance of soil clay and mineral properties in the stabilisation of subsoil C.

Batch sorption experiments will be conducted, to develop a mechanistic understanding of interactions between soil mineral properties and dissolved organic carbon substrates.

3. Manipulation experiments will be conducted to determine the vulnerability of subsoil C and N stocks to changes in soil properties and conditions.

Labelled substrates will be used to trace the fate of added inputs throughout the profile.

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