Studying soil ecological processes in the name of a sustainable environment

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Dr. Tim Cavagnaro in the field.

For most of us it's just dirt, but for ecologists soil is the key to meeting some of the most daunting challenges facing our planet.

Monash ecologist Dr Tim Cavagnaro is one who takes soil seriously, an approach validated by the Australian Research Council, which recently granted him a prestigious Future Fellowship.

"At the base of a lot of the big issues we must deal with – climate change

, food security, environmental quality, biodiversity – are processes that occur in the soil," Dr Cavagnaro said.

"The big question I am interested in is how we can manage soil ecological processes to achieve sustainability in a time of environmental change."

Understanding of those processes is still limited. Scientists can describe at best five per cent of soil's extraordinarily diverse microbial activity despite its role in cycling nutrients, storing carbon and decomposing organic matter, all crucial to a healthy natural environment.

Dr Cavagnaro's fellowship will support his work on expanding that knowledge. The project will complement other research he is engaged in, including work on the merits of growing trees to increase carbon in the soil, a practice that attracts increasing attention as concern rises about atmospheric carbon dioxide.

With members of his team, Dr Cavagnaro has recently published papers in the *Agriculture, Ecosystems and Environment* journal on afforestation. Although substantial changes in soil carbon were not recorded even after 30 years of forest-growing, a changing ratio with nitrogen indicated that the carbon was developing into a more stable and beneficial form, and the researchers noted potential for carbon levels to continue rising over time.

Increasing knowledge is only part of the story for Dr Cavagnaro. He will be using his Future Fellowship to develop ways to make scientific information easily available to the policy makers whose decisions have such significance for environmental health.

Linking knowledge about what is going on at the microbe level to activity at a much larger scale is difficult but essential.

"We have to deal with the question of providing enough food for the world's population, which is increasing rapidly; we have to deal with sequestering carbon in soil," Dr Cavagnaro said.

"These are challenges we can't ignore."

Provided by Monash University