



Hope in a changing climate

Ethiopia: all in the soil

Professor Legesse Negash

Well, this was a spot when, about five years ago, there was a pile of tarmac from an old highway, and we removed this tarmac and planted it with a number of indigenous tree species, as you can see. And within five years, this spot has been transformed from one which was sterile, to one which is full of life. So, now this was soil which hardly had any organic matter. About six years ago, when we started restoring this centre, now we see a lot of organic matter. And possibly, we can't see it, a lot of microorganisms.

John Liu

So, this area here had no soils, really.

Professor Legesse Negash

It had soils, but the soils were poor. Productivity, especially in Africa, in the third world, has declined drastically, and we are putting a lot of man-made fertiliser into the soil, and I'm afraid this is not sustainable. We are putting three major nutrient elements back into the soil, namely, phosphorus, nitrogen and potassium. What about the remaining 14 nutrient elements, like zinc, micronutrients, okay?

John Liu

Yeah.

Professor Legesse Negash

People in the Third World are becoming increasingly weak because the food we eat are deficient in essential, critical, micronutrients, such as iron. We are restoring phosphorus by planting native trees, indigenous trees, which, in turn, are associated with a variety of microorganisms.

It is now more humid beneath this canopy. Natural regeneration is possible here, as you can see.

John Liu

So, this is really exciting. What is it? Show me what we're seeing here.

Professor Legesse Negash

Yeah, these are litter from *Hagenia abyssinica*, a very important tree, thriving in mountainous regions. So when the leaves fall to the ground they get decomposed by a variety of microorganisms, including fungi. And they get decomposed and they release nutrients. And that's how our culture is sustained. The decaying material accumulates, year after year, month after month, day after month, so you have a huge, huge amount of carbon getting accumulated in the soil. So, soil carbon is very important in sequestering carbon dioxide, not only through photosynthesis, which takes place in live leaves, but also through decomposed litter, dead material incorporated in the soil. There are organisms which colonise harsher -

John Liu

Like lichens.

Professor Legesse Negash

Ecosystems, like lichens, bacteria.

John Liu

Fungus.

Professor Legesse Negash

Bryophytes, fungi. So, you need to follow the biological principles, to restore a degraded ecosystem. You need to employ biological principles, ecological principles. What tree to plant where. We need to take the genetic make-up of given tree species, where is it suitable, where is it not suitable. So, you know, just planting trees en masse anywhere is not useful. We have noticed that – there are certain indigenous trees which I think are good for combatting climate change. One set of species is Acacias. We can grow Acacias where water is limiting, we can grow Acacias where the temperature is elevated. In short, Acacias are very good for restoring degraded ecosystems.

Professor Legesse Negash

In my opinion, trees which are indigenous to an area, are more useful than trees which are introduced from elsewhere, in the name of fast growth and so on. A tree which has evolved in an area, in a given landscape, has taken millions, tens of millions of years, to evolve, and so we have to respect this evolution.