

## Division 4. The Role of Soils in Sustaining Society and the Environment

### Commission 4.1 - Soils and the Environment

#### **Description of Commission 4.1**

This Commission will look at the soil as part of the ecosystem. Human activities have a strong impact on the ecosystems and the soil and environment interactions in relation to humans are particularly important. Soils, are a major component of the biosphere at the interface between the lithosphere, atmosphere and biosphere, are investigated through several international programs such as IGBP; in the same way, the soil plays a considerable role in the carbon sequestration (UN Convention on Climate Change) and is the habitat for a number of species covered by the Biodiversity Convention.

During the 2015 International Year of Soils, the IUSS Division 4 will illustrate its main topics through articles written by Division 4 officers or their colleagues. These will each be highlighted every week from October to December 2015.

For this second week, we are displaying an article from the Commission 4.1 vice-chair – Ian Hollingsworth.

#### **Connecting people with soil**

##### **Ian Hollingsworth**

HORIZON Environmental, Soil Survey & Evaluation, Australia

There may be another world called water, but living on earth we use soil to produce food to survive. Soil substrates support the ecosystems surrounding us that provide oxygen and filter water. Eons of time have generated soil pattern and biodiversity that imprint resilience to climate change on ecosystems and agriculture. However, reducing biodiversity and harvesting soil and water resources for agriculture to support growing populations and urbanisation have significant regional impacts that may increase food production but make it less sustainable at the same time.

The risk that an agricultural system will fail translates directly to mortality and community annihilation in subsistence economies. Capital investment and the energy intensity in fossil fuels buffer unsustainable agricultural systems against failure to some extent in an industrial economy. We can run down biodiversity, deplete and contaminate water and soil resources locally until we run out of capital to purchase produce, or land, from somewhere else.

Current needs in developed economies to secure food supply motivate investment and development around the world. However, securing soil and water resources for agriculture could be at a tragic cost to cultural and ecological resources - particularly developing economies in the tropics with large populations to support. Clearing biodiverse forests,

diverting rivers, draining wetlands displacing traditional economies and cultures to develop industrial agriculture in Africa, Asia, Australia and South America does not appear to be based on evidence that these developments will be sustainable.

A large proportion of the world's food is produced from smallholdings, urban gardens, forests, rangelands and aquaculture. Peasants probably have significantly more than half of the world's cropland and may be responsible for 70% of world food production. If we further disturb the global food production system with industrial agriculture we need to be aware of the sustainability implications and mitigate by design against catastrophic failure. Otherwise clearing native vegetation, supplanting small holder agriculture with industrial systems and urbanisation will remove the trace of millions of years of evolution and tens of thousands of years of cultural interaction with the environment and potentially reduce sustainable food production in a changing climate.

Moving communities from subsistence and small holder production to industrial, urbanised economies has pervaded development since the European industrial revolution. However, the impacts of these changes on securing soil to produce food and support sustainable landscapes may be reduced if communities can maintain connections to land. Perhaps urban planning to maintain the capacity to produce food, energy and fibre is as critical as transport and water supply services?

Perhaps designing industrial agricultural developments to the scale and pattern of landscape ecology is worth exploring? Diversifying food production and soil management in the development process is likely to be a more reliable strategy over the long term than expanding agricultural monocultures that industrial agriculture currently relies on.

For instance there is interest in agricultural development across Northern Australia that politics and capital are keen to support. Concerns about the risks from extensive agricultural development to indigenous culture and ecological systems hasn't so far translated into investment in agricultural innovations that use endemic plants and recognise cultural connection to land.

External interests are focused on crops and plantations that are exotic, acquiring land and water resources and developing infrastructure.

There is far less interest in numerous "bush" foods, fibers and medicines that supported a subsistence economy and were integral to the most biodiverse woodland and wetland environments in Australia. Agricultural innovation based on the endemic species and cultural knowledge may add more value.