

# STRIVE Projects Listing

## Land Use, Soils & Transport

### April 2009

#### Table of Contents:

Interactions of soil Hydrology, land use and climate change and their impact on soil quality (SoilH) .....	2
ISIS: Developing 1:250,000 soil mapping for Ireland with associated Soil Information System .....	3
Characterising variation of heavy metal pollution in urban soils .....	4
Nematode community structure analysis and its function as an indicator of heavy metal soil contamination in Ireland.....	5
Assessing the impact of conventional and decision based fertilizer inputs on rhizosphere microbial diversity and activity of three commercial crops. ....	6
Characterisation of physical properties of soils using geophysics.....	7
Identification, mapping assessment and quantification of the effects disturbance on the peat soil C stock in Ireland.....	8

For more information, please contact [research@epa.ie](mailto:research@epa.ie)

# **Interactions of soil Hydrology, land use and climate change and their impact on soil quality (SoilH)**

---

## **Lead Organisation**

University College Cork

## **Principal Investigator**

Gerard Kiely

## **Project Type**

Large Scale

## **Funded under:**

STRIVE Soils Call 2007

## **Project Description**

The project proposes to establish a network of benchmark sites throughout Ireland using existing national sites for the measurement of soil hydrological properties and the establishment of a hydrological classification of Irish soils. A process based soil hydrological model (GEOTOP) will be employed and developed with modules for erosion, surface sealing, compaction, landslides and loss of organic matter. The model will be used to elucidate the interactions between soil hydrology, land use and climate change (with climate projections from the IPCC fourth assessment). These outputs will be combined with Irish geo-spatial data to develop a GIS-based risk assessment tool to predict impacts on soil quality based on hydrology, land use and climate change.

# **ISIS: Developing 1:250,000 soil mapping for Ireland with associated Soil Information System**

---

## **Lead Organisation**

Teagasc

## **Principal Investigator**

Rogier Schulte

## **Project Type**

Capability-Development

## **Funded under:**

STRIVE Soils Call 2007

## **Project Description**

The demise of the national Soil Survey in Ireland has left a serious data deficit in the soils thematic area. This project will address this issue through the application of modern digital soil mapping techniques deployed in tandem with traditional field survey techniques for sampling and validation. A representative profile description database will be created for the 56% of Ireland that remains unsurveyed beyond general reconnaissance level. This complex project is built on the inclusion of participants with the best experience and skill sets that can be employed to produce high quality output to specification. The final products will provide a strengthened Irish national response to emergent policy and legislative developments in the environmental area.

# Characterising variation of heavy metal pollution in urban soils

---

**Lead Organisation**

National University of Ireland, Maynooth

**Principal Investigator**

Dao Ligang

**Supervisor**

Dr Chaosheng Zhang

**Project Type**

Doctoral Scholarship

**Funded under:**

STRIVE Doctoral Scholarship Scheme 2007

**Project Description**

Urban soils are recipients of pollutants from various sources, causing strong variation in both horizontal and vertical directions. In this project, soils will be sampled from chosen typical areas such as a residential park, an industrial site, a roadside land, and a reclaimed rubbish-dumping site, and heavy metal concentrations will be measured. Advanced spatial analyses, including hotspot analyses, spatial structure analyses, spatial interpolation and hazard assessment under a GIS environment will be carried out to characterise the variation and to aid to develop a hazard assessment framework for heavy metal pollution in urban soils.

# **Nematode community structure analysis and its function as an indicator of heavy metal soil contamination in Ireland**

---

## **Lead Organisation**

Institute of Technology Carlow

## **Principal Investigator**

Ngyuen Van Thanh

## **Supervisor**

Dr Thomaé Kakouli-Duarte

## **Project Type**

Doctoral Scholarship

## **Funded under:**

STRIVE Doctoral Scholarship Scheme 2007

## **Project Description**

Nematodes are the most wide spread multicellular animals in Nature occupying key positions in soil food webs, and as such are useful bioindicator organisms for environmental monitoring. This project aims to study the effects of long-term lead, cadmium and zinc exposure on nematode communities at Silvermines, Co. Tipperrary, and to test the hypothesis that long-term exposure to heavy metals results in loss of nematode biodiversity. This study will demonstrate heavy metal pollution impact on soil meiofauna. The value of this bioindication system will be also investigated for the monitoring of the remediation process undertaken by the Silvermines Rehabilitation Project.

# **Assessing the impact of conventional and decision based fertilizer inputs on rhizosphere microbial diversity and activity of three commercial crops.**

---

## **Lead Organisation**

University College Cork

## **Principal Investigator**

Tan, Hao

## **Supervisor**

Prof Fergal O'Gara

## **Project Type**

Doctoral Scholarship

## **Funded under:**

STRIVE Doctoral Scholarship Scheme 2007

## **Project Description**

Modern agricultural practices have increasingly become dependent on the addition of chemical fertiliser (N and P) for the return of high-yield crops, despite negative consequences like leaching and run-off. Taking account of this and the need for more sustainable crop production systems with reduced environmental pollution, this training project will incorporate ongoing research in our centre to assess the impact, of a conventional (High) & decision based (Low) management fertilizer input regime, on the rhizospheric microbial community structure of three commercial crops. With particular focus on the multitude of interacting, genotypically diverse, microorganisms involved in nitrogen cycling and phosphate utilization.

# **Characterisation of physical properties of soils using geophysics**

---

## **Lead Organisation**

University College Dublin

## **Principal Investigator**

Shane Donohue

## **Project Type**

Research Fellowship

## **Funded under:**

STRIVE Research Fellowship Scheme 2008

## **Project Description**

This project will improve our ability to rapidly and non-invasively determine soil physical properties and result in improved identification of areas at risk of compaction, salinisation, landslides and contamination. A novel sensor will be developed leading to more accurate, efficient and cost effective determination of water content and salinity. Significant laboratory calibration of the new sensor with Irish soil physical properties will be carried out. In-situ monitoring of a number of Irish threatened soils will then be performed using a range of geophysical methods, leading to the development of a geophysical testing framework for use on Irish soils.

# **Identification, mapping assessment and quantification of the effects disturbance on the peat soil C stock in Ireland**

---

## **Lead Organisation**

University College Dublin

## **Principal Investigator**

John Connolly

## **Project Type**

Research Fellowship

## **Funded under:**

STRIVE Research Fellowship Scheme 2008

## **Project Description**

Peatlands in Ireland contain between 53 % and 62 % of the national soil carbon (C) stock. Many peatlands throughout the country have been and are currently disturbed. Peatland disturbance impacts on the resource's ability to sequester C. It is essential that disturbance of peatlands be examined and quantified in order to manage this critical C resource. This project will use high resolution satellite imagery along with ground based indicators to develop a method to quantify the effect of disturbance and climate change on peatland C stock. This research will enable policymakers to identify critical peatland areas requiring management intervention.