UMR Herbivores (INRAE / VetAgro Sup)

Thesis Offer

Assessment of recreational ecosystem services associated to livestock farming in Auvergne from crowdsourced data

Organisation

This PhD is proposed by the 'Herbivores' research unit of INRAE/VetAgro Sup (https://umrh-bioinfo.clermont.inrae.fr/Intranet/web/UMRH). The PhD student will join the 'COMETE' team that works on the design of livestock farming systems aiming for high productive, economic and environmental performances, based on the use of forages and feeds that are not in competition with human food. The student will be supervised by:

- Frédéric Joly (agro-ecologist – researcher): frederic.joly@inrae.fr
- Gilles Brunschwig (livestock farming systems – professor): gilles.brunschwig@vetagro-sup.fr
- Sandro Bimonte (database – researcher): sandro.bimonte@inrae.fr

Position

Context

Ecosystem services (ES) are features, functions and processes of the ecosystems that contribute to human well-being. They include recreational ES (RES), associated with the use of sites by hikers, sportsmen and naturalists for leisure. RES are less well quantified than those relying on a biophysical basis such as carbon sequestration, which is measurable in tons of C per ha. RES are increasingly assessed through "crowdsourced" data, i.e. data from social networks and specific mobile applications. This data makes it possible to map and assess the consumption of RES by users of a given site. For example, the number of persons who enjoyed the esthetical quality of a site can be assessed through the number of pictures uploaded on the picture sharing site "Flickr".

However, this type of data is generated « off-protocol », i.e. when users feel like using their dedicated application or social network. The data is therefore not produced according to a specific spatial or temporal predefined grid, which can cause representativeness flaws. The data is in addition used in a rather descriptive manner, mainly through mapping of RES fluxes.

Objective

The purpose of this PhD to go a step further and establish explicative models of RES consumption, based on adjusted crowdsourced data. It will focus on the former French region of Auvergne, for its relative agricultural and landscape homogeneity.

In this aim, corrected crowdsourced will be compared with habitat data, to establish patterns of SER consumption. The PhD will assess whether ruminant livestock farming, through maintaining pastures and other open habitats, shapes diversified landscapes with a high recreational value. The PhD will also assess the impact of farming practices on pasture value, by distinguishing management intensity (for example hay pasture vs rangeland). If crowdsourced data is meaningful enough, certain aspects such as livestock races, buildings, accessibility of trails, fences, eco-friendly practices and product quality will be studied as well.

Methodology
The student will identify the pertinent spatial crowdsourced data to assess RES consumption (e.g. data of applications like Strava, ViewRanger, NaturaList). He/she will compare this data to other spatial sources describing landscape characteristics, and associated human activity (e.g. Corine Land Cover and digital elevation model of the French Geographical Institute). These sources will provide the explicative variable of the SER consumption.

To assess the quality of the crowdsourced data identified, the student will use the available current metrics, and he/she will have the possibility to propose new ones. He/she will propose spatial models of probability or abundance of SER users, based on the found explicative variables.

Requirements
- Master or equivalent in geography, agronomy or agro-ecology
- Sound competences in Geographical Information Systems (GIS)
- Good knowledge of computer science and/or strong interests for mobile applications
- Knowledge of theories and concepts of ecosystem services
- A minimal knowledge of the functioning of livestock farming systems would be an advantage
- Writing and synthesis skills
- Organisational skills, autonomy and flexibility
- Fluent written and spoken English and French

Conditions
- Location: INRAE Clermont-Ferrand, Theix, 63122 St Genès-Champanelle, FRANCE
- Start: Autumn 2020
- Net salary: approximately 1,420 euros/month
- The student will have the opportunity to get trainings in statistics, database management and GIS

Application

Send CV, cover letter and the contact of one reference person before September 20, 2020 to Frédéric Joly frederic.joly@inrae.fr (+33 473 62 41 14)