CONCEPT NOTE

Project title

Agrotraining Proofing GBIF use on agrobiodiversity through needs assessment and training (**Project ID:** CESP2016007)

Project outline

Summary

A GBIF goal is to enlarge its biodiversity databases use by researchers and technicians working in agrobiodiversity. Providing quality information on biodiversity to be applied in research and development will benefit livelihoods, including food security. A Task Group was recently commissioned to assess the fitness for use of data related to biodiversity, published through GBIF. The task group's report includes a series of recommendations that, when implemented, would enhance their intended operational use by the main players in agrobiodiversity and their broader community, including breeders, farmers and farmer associations. This project aims at building on and expanding this expectation. In this project, we intend to respond effectively to new challenges in food production and security that rely on sustainable exploitation of crop wild relatives, landraces and neglected or underutilized species. Sustainable diets use local biodiversity, including traditional foods of indigenous and local ecosystems with their many sources of nutrient rich species and varieties as readily accessible and locally empowering. Moreover, non-crops wild biodiversity is also of paramount importance to assist food production systems. For instance, in terms of European organic food public policy, one recognizes the urgency of robust information systems, which may rely on diversity patterns of indicator species. Agricultural systems and ecosystem services that farms provide to the surrounding landscape enhance the resilience to pressures and, for that, biodiversity information is essential to assess current status of agrobiodiversity, support the development of tools, such as predictive models, and test scenarios. In order to assess the response of GBIF to the agrobiodiversity community information needs, it is mandatory to crosscheck GBIF data types and functionalities, including the existing and needed features on biodiversity information and biodiversity informatics, and, when needed, identifying alternatives, and adapt its tools to new applications. Arguably,

one of the most effective means of outreaching the agrobiodiversity community is through training workshops on the use of GBIF tools. The workshops can not only be designed to train researchers in using these underexploited information tools as means to access a diversity of agrobiodiversity data, but also i) to test and demonstrate the strengths and usefulness of the GBIF global and national portals that facilitate the access to information and documentation on biodiversity information in food and farming; and ii) to identify the pitfalls of the current tools and/or of the information (data types, indexed terms) available in the portal. We will use this process of setting up a training workshop to perform a needs assessment exercise that will report the achievements and requirements for maximising the use of agrobiodiversity information for sustainable food production. In order to accomplish these goals, this proposal gathers three participants: GBIF Portugal, GBIF Spain and College Food, Farming and Forestry (F3) of the University of Lisboa.

Statement of capacity needs

On the GBIF Public Library in Mendeley, from the about 3600 scientific articles that use/cite GBIF, only a few relate to agrobiodiversity, by including keywords on this subject. This is a surprisingly low number, compared to other fields like biogeography, niche modelling or biodiversity conservation. The reasons why scientists and practitioners are not using (or citing) GBIF need to be determined and assessed. Could it be that: the community is not fully aware of the potential that occurrence data served through GBIF represents; or data features available are not fulfilling the requirements of the application in agrobiodiversity field; or the access to data and processing tools are too difficult and causing a barrier data use; other factors (e.g. licensing) These and other factors will be investigated through a **needs assessment analysis on agrobiodiversity** , on the initial phase of the project. Building on the fitness for use in agrobiodiversity report recently published by GBIF, we will promote a participatory meeting and questionnaires within agriculture and forestry stakeholder communities from Portugal and Spain, from which data feature needs will be determined and crosschecked with current support by GBIF. This phase of the project will help to identify types of data and tools related to agrobiodiversity that are required by that community. While based on examples from the Iberian Peninsula, the assessment report will aim at providing an assessment valid also in other regions. The interaction with the community will also help to shape the training workshop on agrobiodiversity applications using biodiversity data that should be covered on the training workshop. A **training workshop on agrobiodiversity information** will be designed and performed targeting directly the agrobiodiversity community. From our records, no previous training course was run in

Portugal and Spain with this goal, and examples from other geographies are scarce. The course will explore the use of biodiversity information in twofold goals: i) promote crops production, using related resources like crop wild relatives, landraces or underutilized species; ii) promote wild biodiversity benefits to farming activities, as ecosystem services or environmental bio-indicator indexes. In both approaches, the use of biodiversity information with be extensively explored, either from GBIF (including the infrastructure of software tools) or other sources, in which case links with GBIF with be promoted or tested. The course will use and take advantage of real context examples, of which Companhia das Lezirias (http://www.cl.pt/htmls/en/home.shtml) a "natural laboratory/research infrastructure" of College F3 is highlighted. Companhia das Lezírias is the largest agriculture, cattle and forest farmstead in Portugal, totaling about 18,000 hectares with a consolidated situation in both technological and financial terms, based on a philosophy of sustainable development.

Types of action

With this proposal we aim at running two main types of action:

- **Needs assessment on support to agrobiodiversity applications:** A Needs Assessment Report will be produced, reporting the needs of improvement of GBIF capabilities (e.g. pathogens interaction with host species, distribution of cultivated crops, introductions of vernacular names). The needs assessment will be run in Portugal and Spain, though we will keep the scope as wide as possible to be applicable to other geographies. The following actions will be accomplished: i) Onsite (Lisbon) workshop for stakeholders on agrobiodiversity requirements of biodiversity information. This one full day workshop will provide the identification of main potential applications of biodiversity data and its requirements, through participatory approaches by stakeholders; ii) Online questionnaire for Portuguese and Spanish agriculture communities and their stakeholders to assess agrobiodiversity data and requirements; iii) Crosscheck of biodiversity data/features requirements reported by stakeholders with functionalities provided by GBIF (data features and tools) or other sources; iv) Report on needs assessment to support agrobiodiversity applications, with identification of existing and required data features, tools, linkages to other data sources. The report will indicate solutions for the needs identified. Bottlenecks possible to be removed within the timeframe available for the preparation of the training course will be addresses and included to guide the preparation of the regional training course. The report will also identify improvements to be future implemented, aiming at shaping the either the GBIF portal or national data portals as a user-friendly and useful platform for

agrobiodiversity searches. GBIF Portugal and GBIF Spain will promote the creation of a working group on the GBIF Community Site to facilitate communication with the other GBIF nodes and network about the identified issues, and promote possible solutions, including ways to mainstream them to the Regional or Global nodes work programme. Finally, on future editions of the training course in Portugal and Spain the Needs Assessement Report will be revisited to monitor and follow-up the improvements and to guide further solutions.

- **Training course on agrobiodiversity information use:** From the needs assessment phase, the content of the training course will be defined to answer to main applications identified by the stakeholders. At an initial stage of the project, a **two day training workshop** will be given to the College F3 trainers on agrobiodiversity to ensure that full capabilities of GBIF and GBIF tools are fully recognised and learned. The course will provide an overview about GBIF data flow, but will focus on data access and data usage through GBIF.org and national data portals (e.g. datos.gbif.es), available 3 tools to retrieve and use (including the API), data formats, issues on data quality, data licensing, among others. The College F3 trainers, in collaboration with GBIF Portugal and GBIF Spain will then design an accredited training course for researchers and technicians in agrobiodiversity that, in three modules, that will cover the following main areas (which may be further adjusted, trimmed and/or complemented according to the results of the participatory stakeholders' consultation):

  MODULE I) Information analysis tools for biodiversity and environmental data in the context of agrobiodiversity: a) Explore tailor-made data visualization tools based on existing systems like national data portals; b) Integration of thematic platforms to aggregate several types of data (e.g. nutrition value, soil requirements, in situ conservation institutional networks); c) Modelling of species distribution in different scenarios (e.g. irrigation) and assess effects of drivers of change; d) Mobilize information on distribution of landraces and declining varieties and publish through GBIF as a future repository. These tools will then be used in practical examples in modules II) and III).

  MODULE II) Agrobiodiversity for crop systems: e) Distribution of crop wild relatives, landraces and neglected and underutilized species; f) Overlay distribution of occurrences within agro ecological zones and systems and temporal shifts in distribution; g) Nutrition sensitive agriculture and medicinal value; h) Invasive alien species that might be of particular concern to no cultivated agrobiodiversity in its natural habitats.

MODULE III) Wild species biodiversity benefits to farming activities: i) Ecosystem services I: services provided and auxiliaries to farming: distribution of pollinators, biological control of pests, organic matter recycling, etc; j) Ecosystem services II: environment bio indicators (plants, vertebrates, macroinvertebrates and lichens) (e.g. phosphorus pollution); and food resources for crop pollinators and natural enemies; k) Distribution / taxonomic diversity of pests and pathogens (e.g. Stramenopila, Fungi, Bacteria, Viruses, Nematodes); l) Monitoring invasive alien species (e.g. resulting from nitrogen pollution).

The workshop sessions will be video recorded, providing materials for an online training, in order to reach a broad range of professionals and academic and nonacademic stakeholders.

Objectives

The main goal of the proposed project is to design and develop a training course on the use of agrobiodiversity information that will use GBIF and other relevant data sources. This goal will be reached following a three step process that includes: 1. identify agrobiodiversity stakeholders' main needs on biodiversity database tools in order to provide guidance in the development of training direct to the agrobiodiversity community, through participatory approaches; 2. to develop a complete package of learning activities and outreach materials, designed to achieve the objectives of the training program, including a general assessment of the currently available tools and functionalities on biodiversity information and biodiversity informatics resources; 3. to organize a regional training workshop, with proof verification of GBIF (and other sources) tools with respect to required formal specifications, in order to evaluate the system global effectiveness and identifying gaps limiting its use, either on types of essential information, or on the accessibility to it (e.g. taxonomic information, vernacular names, socioeconomic, nutritional or medical uses, mechanisms of pollination and seed dispersal, data visualisation, integration of other platforms, and so forth).