Integrated Modelling under the RECORD platform

H.Raynal – E.Casellas   U875 MIAT – INRA Toulouse

INRA
SCIENCE & IMPACT

Objectives

Task 4.2: Integrated modelling under the RECORD platform

- Implement successive versions of the integrated model

  AICHA 2D prototype → ATCHA V1: semi distributed version of the model

  ATCHA V1 → ATCHA V2: fully distributed model

  ATCHA V2 → ATCHA V3: by including nutrient cycle

- Information system (datawarehouse) in order to:
  - manage data used to feed models and for pseudo validation.
  - manage the different software version of the models
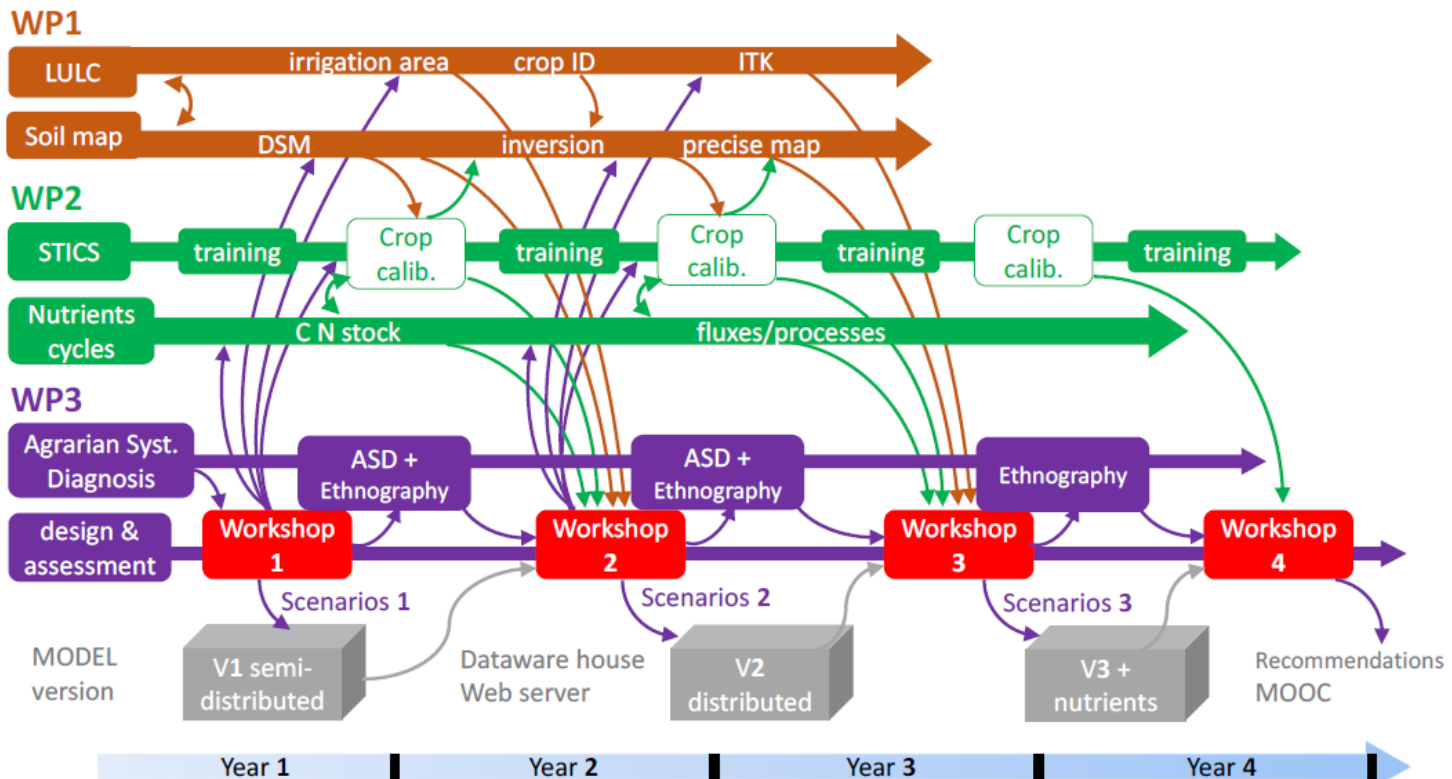
Human resources

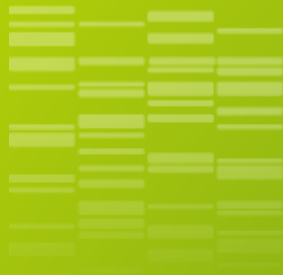**Software engineer** – 24 months – April 2017 → March 2019
- Packaging of software components
- Participation to software development ATCHAV1 & ATCHAV2
- Development of the information system
- Participation to the scenario simulations

+

Engineers RECORD platform (Eric & Helene)
+
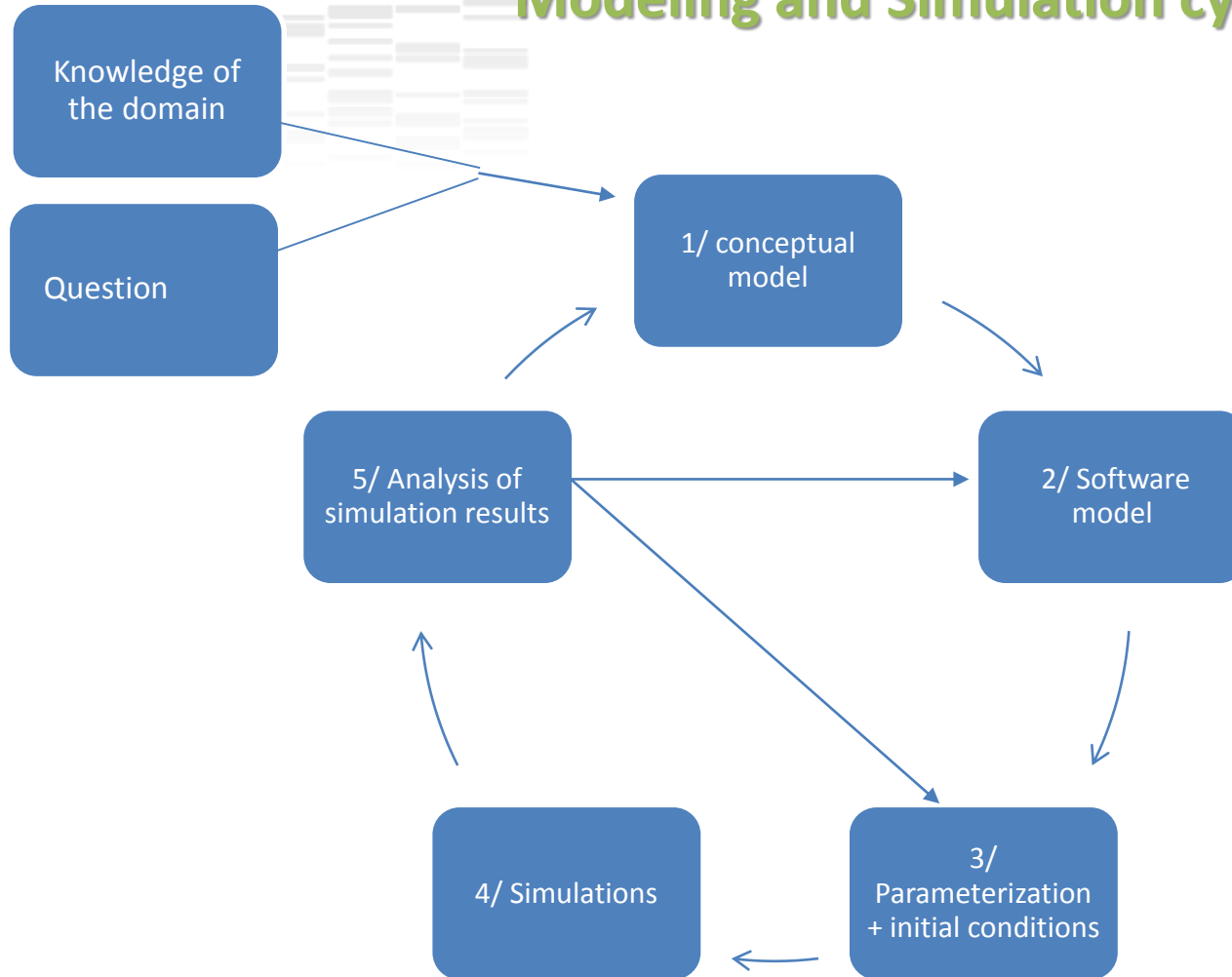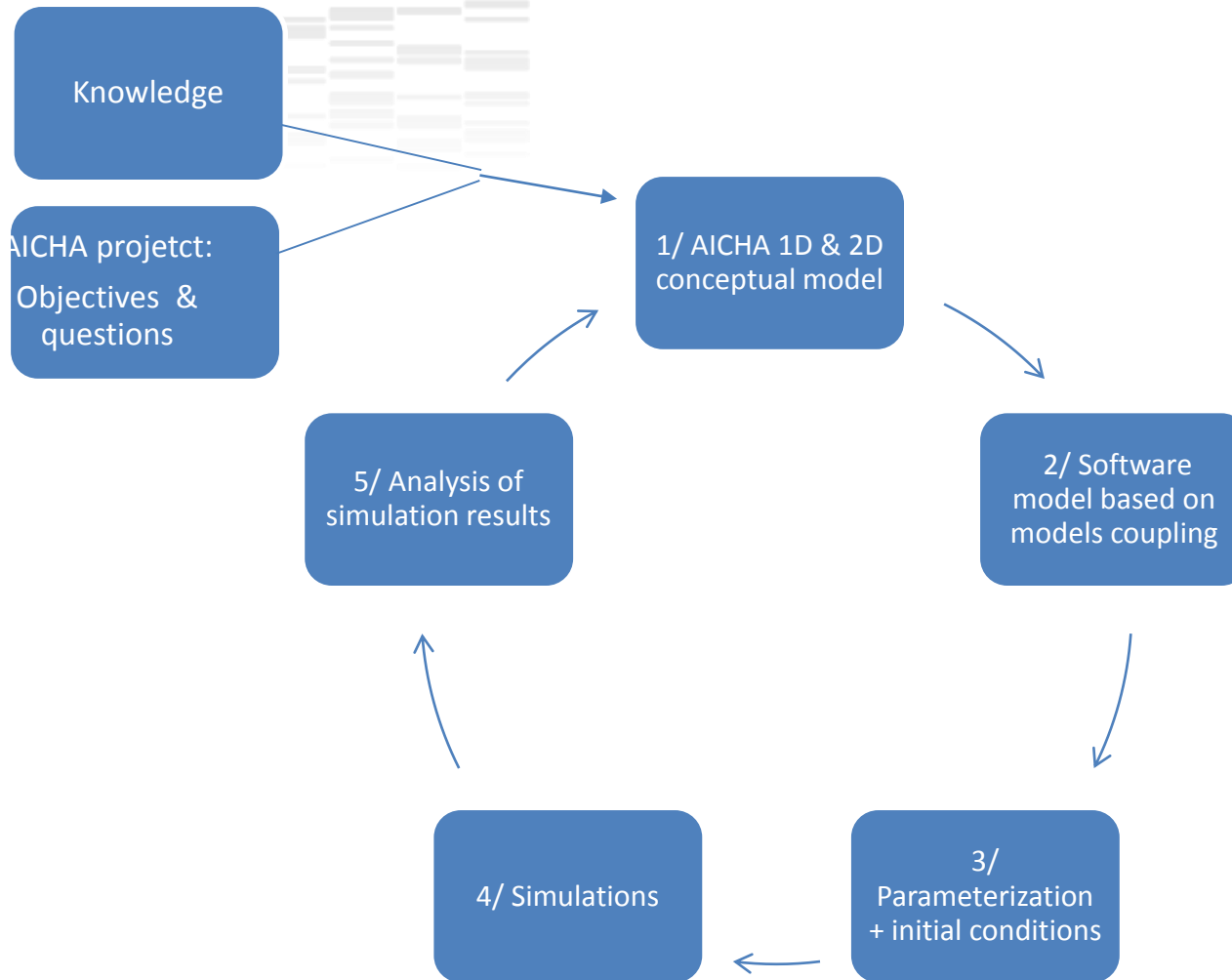**Other software engineers involved in AICHA and/or ATCHA** (P.Casel, S.Cézera)

Modelling activity

Methodology used to develop the different coupled model version: Modeling and Simulation cycle
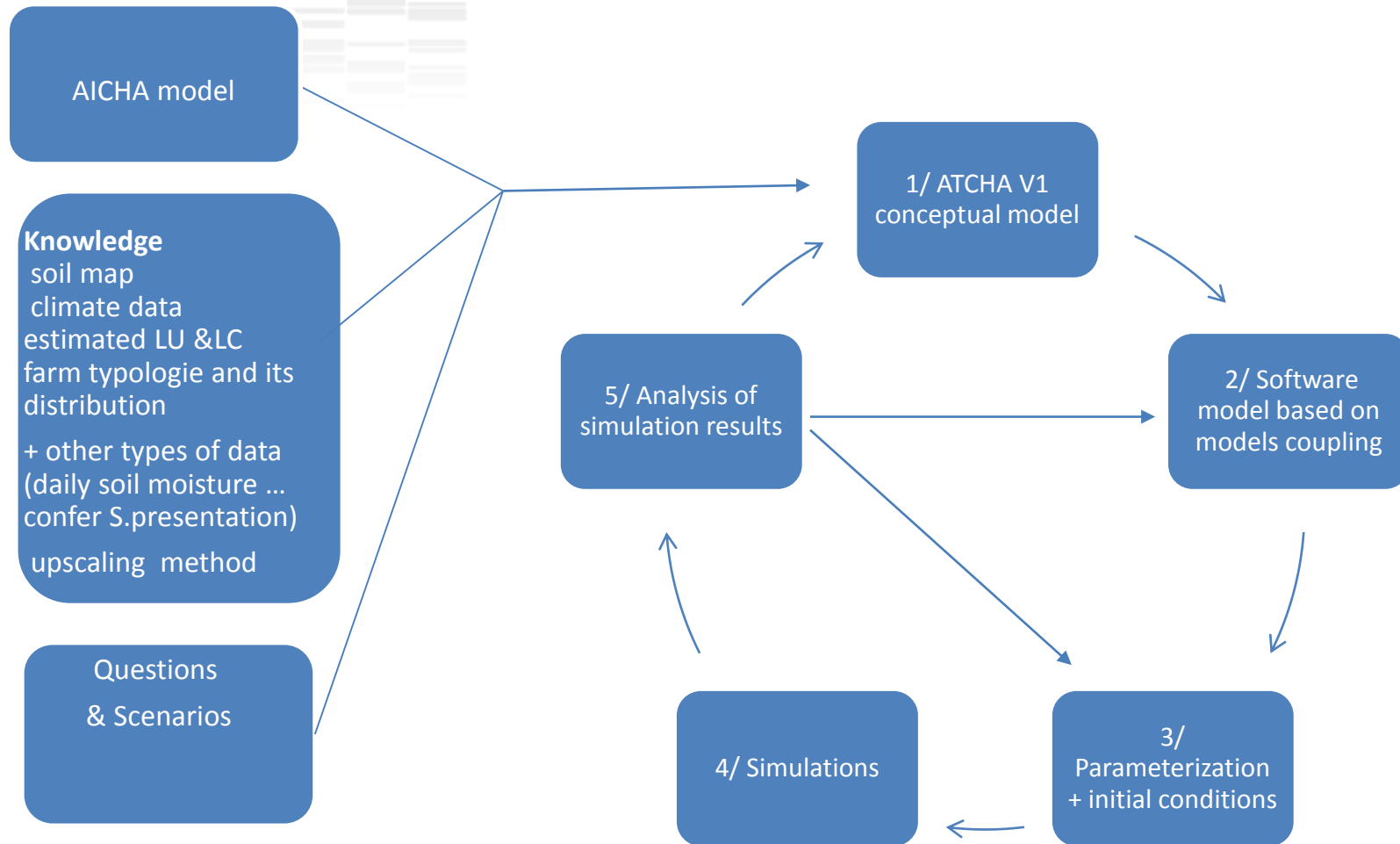

Knowledge of the domain

Question

1/ conceptual model

2/ Software model

3/ Parameterization + initial conditions

4/ Simulations

5/ Analysis of simulation results

INRA
SCIENCE & IMPACT

Applied to AICHA Model

Knowledge

AICHA projetct:
Objectives &
questions

1/ AICHA 1D & 2D
conceptual model

5/ Analysis of
simulation results

2/ Software
model based on
models coupling

4/ Simulations
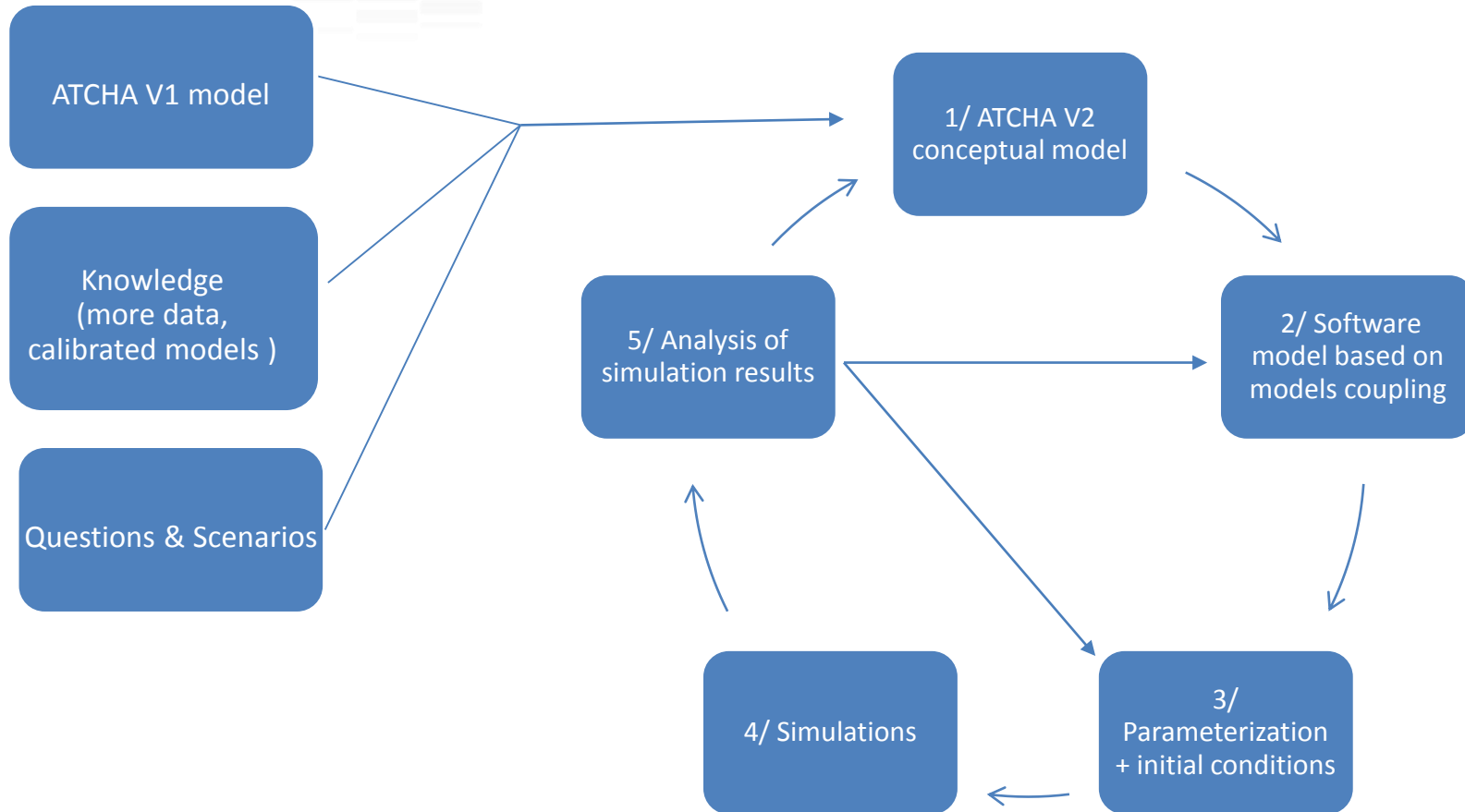
3/
Parameterization
+ initial conditions

proof of concept
1rst round not completely
done

Questions?
 to run simulations on past
data
 to run simulations based on
a simple scenario (example
« change the ratio
rainfed/irrigated crops)

Applied to ATCHA V1 Model

AICHA model

Knowledge
 soil map
 climate data
estimated LU &LC
farm typologie and its
distribution

+ other types of data
(daily soil moisture …
confer S.presentation)

 upscaling method

Questions
& Scenarios

1/ ATCHA V1
conceptual model

2/ Software
model based on
models coupling

5/ Analysis of
simulation results

4/ Simulations

3/
Parameterization
+ initial conditions

Applied to ATCHA V2 Model

Partnership and connections with other tasks

- **Strong interactions with WP3** , task 3.1: scenario design and assessment
    - → To design scenarios to be simulated by the different coupled models
    - → To specify (if needed) interfaces to the coupled model, in order to ease its use
    - → For results analysis

- **Interactions with modellers and people who will calibrate models**:
    - → STICS:

new crops, calibration of the model including nitrogen – Tasks 2.1 and 2.2
new salinity module and its calibration – Task 2.2

    → AMBHAS: calibration, values for parameters. Who is in charge of this model?

- **Interactions with WP1 « data providers »**

    → to provide data for initialisation, parameterization, and validation of the coupled models
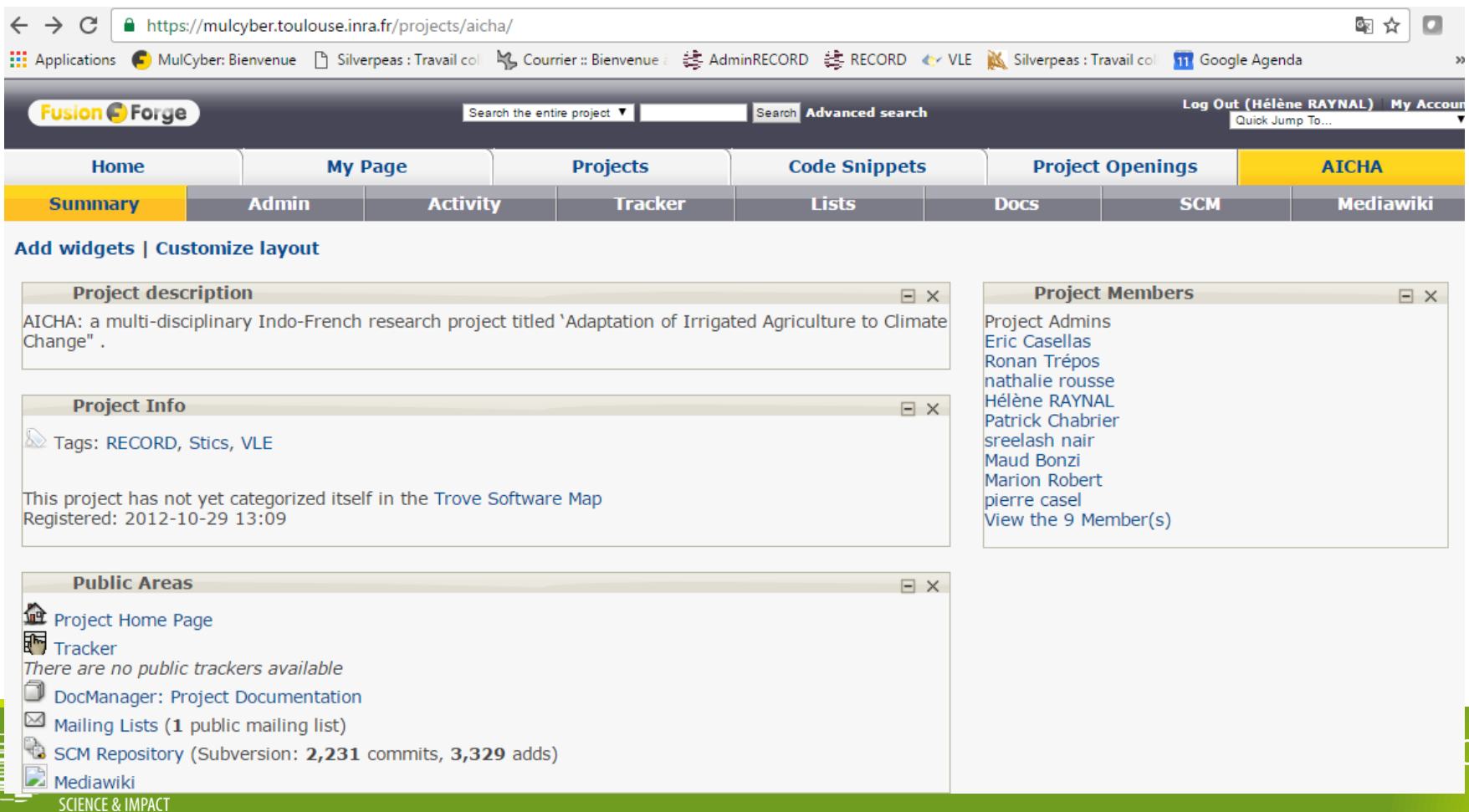Land Use and land cover → Task 1.1
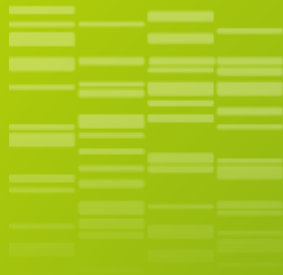Improved soil map → Task 1.2

Collaborative tools

- **"Forge ATCHA"**

Forge: a web-based collaborative software platform for both developing and sharing computer applications.
Includes the versioning of the different models.
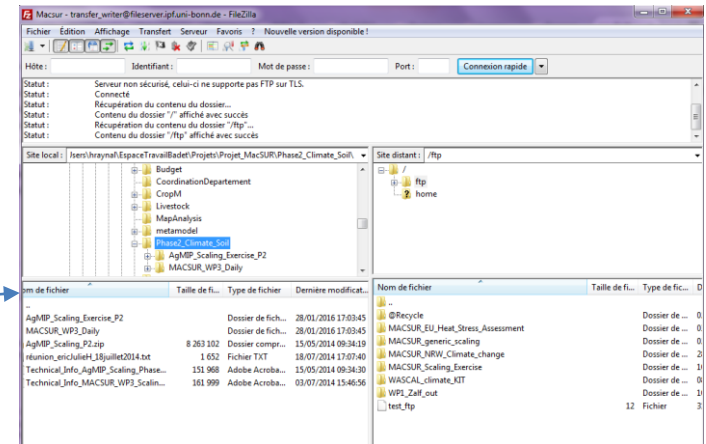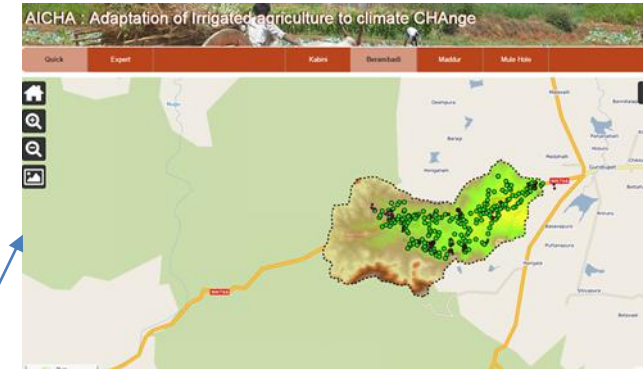
Data for models

Data

- **Information system will be developped in order to**:
  - Have an **inventory of data** available for the project

  - **Share data**:
    - data required by the modelling activity (and beyond)
    - simulations results

  - **Gather data** required by modelling activity on identified locations.
    - GeoSAS → for spatialized data
    - ftp server → for others.
   (access to define- Web interface)

  - **Check quality of data**
    - R routines will be developed

Data

- **Organize and characterize data**

    - By associating **metadata** to the data
        - metadata are informations that provide information about other data
        - These metadata characterize when and how the data have been collected, units and also semantic of the data.

    - Try **to be compliant with standards** shared by different communities. Some examples of standards:
        - Inspire: http://inspire.ec.europa.eu/ to combine spatial data and services from different sources across the European Community in a consistent way without involving specific efforts of humans or machines.
        - AGROVOC http://aims.fao.org/vest-registry/vocabularies/agrovoc-multilingual-agricultural-thesaurus.
        AGROVOC is a controlled vocabulary covering all areas of interest of the Food and Agriculture Organization (FAO) of the United Nations, including food, nutrition, agriculture, fisheries, forestry, environment etc
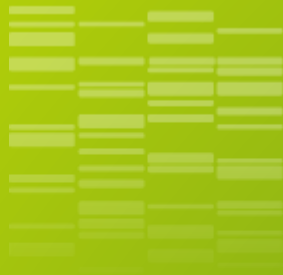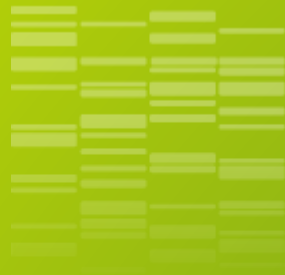
Dissemination and building capacity

(linked to task 4.3
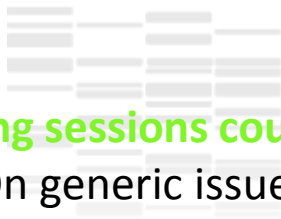
- **Training sessions could be organized**:
    - On generic issues such as coupling models, develop decision model ...
    - On specific issues linked to the use of ATCHA model (or simplified version of ATCHA models)

- **Different types:**
    - MOOC (on line courses)
    - In Bangalore, connected to WS event.

Thank you for your attention