



Meeting with testing countries

14/09/2020



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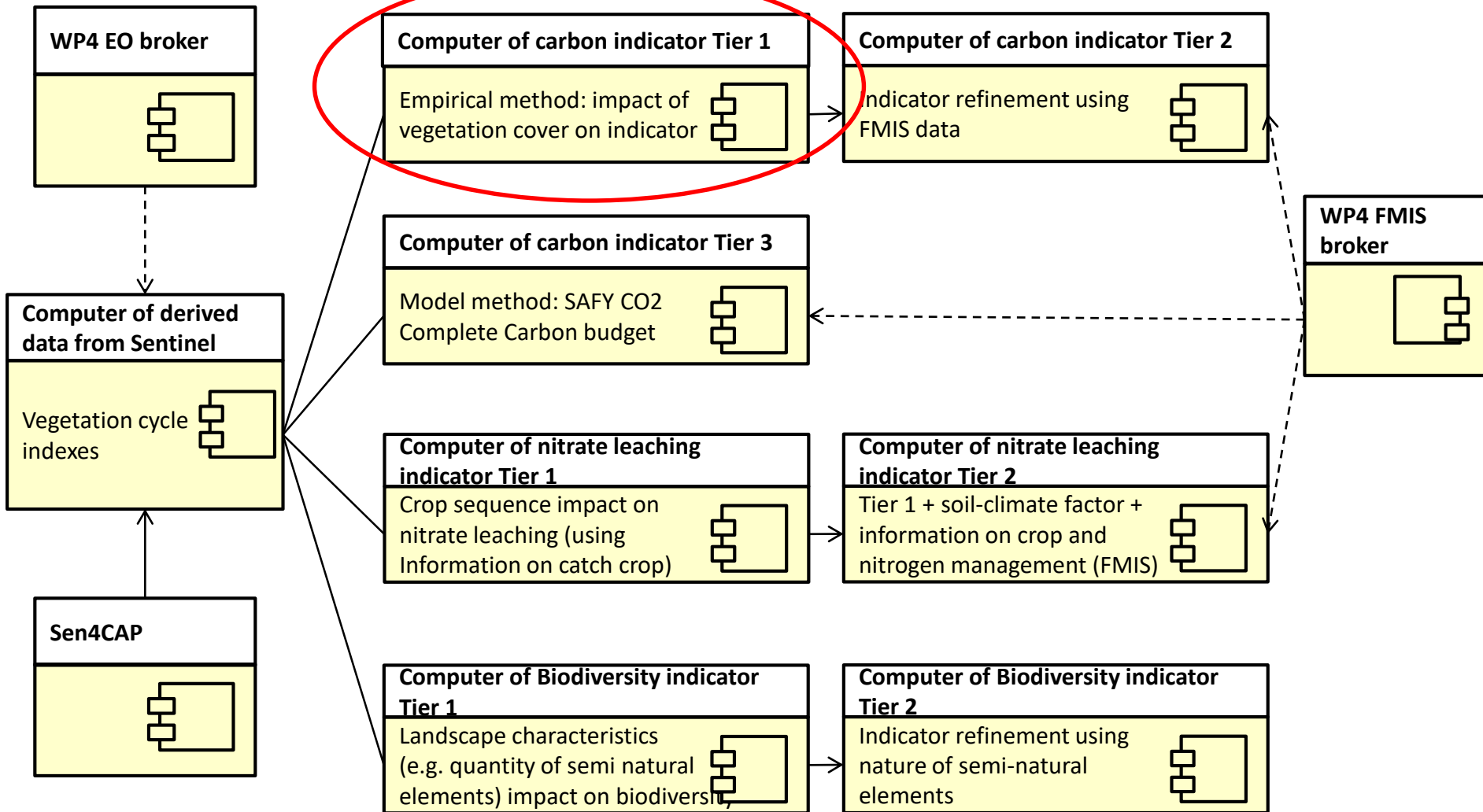
Agenda

- State-of-play in tool development
- Questions and answers
- KPI and innovation
 - Involvement of testing countries

State-of-play in UC1b tool development

- **On going work on the methodological definition of 3 indicators:**
 - Carbon storage Tier 2
 - Nitrate leaching Tier 1 and 2
 - Biodiversity Tier 1 and 2
- **A prototype developed for carbon storage Tier 1**
 - Based on empirical method
 - Already tested in 5 French departments
 - First version on NIVA Gitlab with documentation (user guide and code documentation)
- **A model method for carbon storage Tier 3 (SafyCO2) being refined**

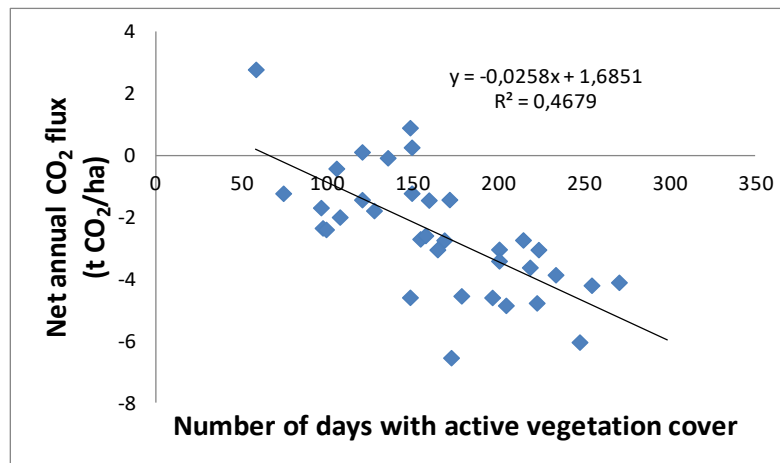
Component list



State-of-play in UC1b tool development

Carbon indicator Tier 1

- **Objective: estimate empirically the Net Ecosystem Exchange (NEE) at parcel level**
 - carbon storage is related to number of days of vegetation
 - calculation only in arable land on 15 family crops



simple relation between number of days with vegetation and carbon storage

class Agricultural Parcels

| «codeList» | |
|------------------------------|-----------------|
| EmpiricalCarbonCropTypeValue | |
| + | winterBarley |
| + | springBarley |
| + | maïze |
| + | sorgho |
| + | pea |
| + | rapeseed |
| + | sunflower |
| + | potatoe |
| + | beet |
| + | springSoftWheat |
| + | winterSoftWheat |
| + | springHardWheat |
| + | winterHardWheat |

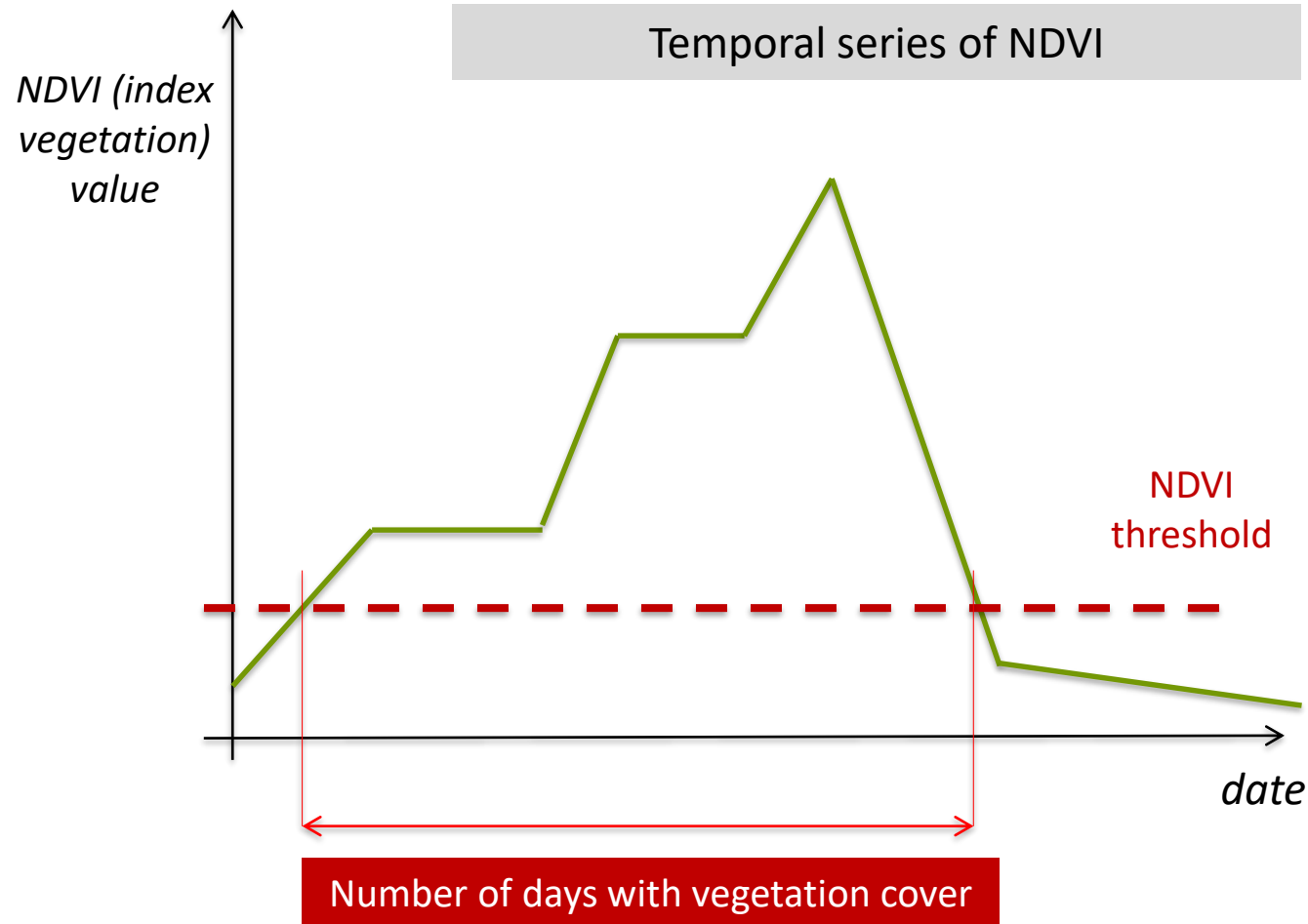
State-of-play in UC1b tool development

Carbon indicator Tier 1

- **Input data**
 - **NDVI temporal series (.csv table) at parcel level with average and standard deviation**
 - Coming from Sentinel 2
 - But other sources possible if similar format
 - **IACS data (agricultural parcel with crop codes)**
- **Output data**
 - **Excel file with the mass of carbon stored per plot of land (t CO₂/ha)**

State-of-play in UC1b tool development

Carbon indicator Tier 1: threshold crossing (parameter)



To obtain the net CO₂ flow, we look for the number of days on which a threshold value of NDVI has been crossed.

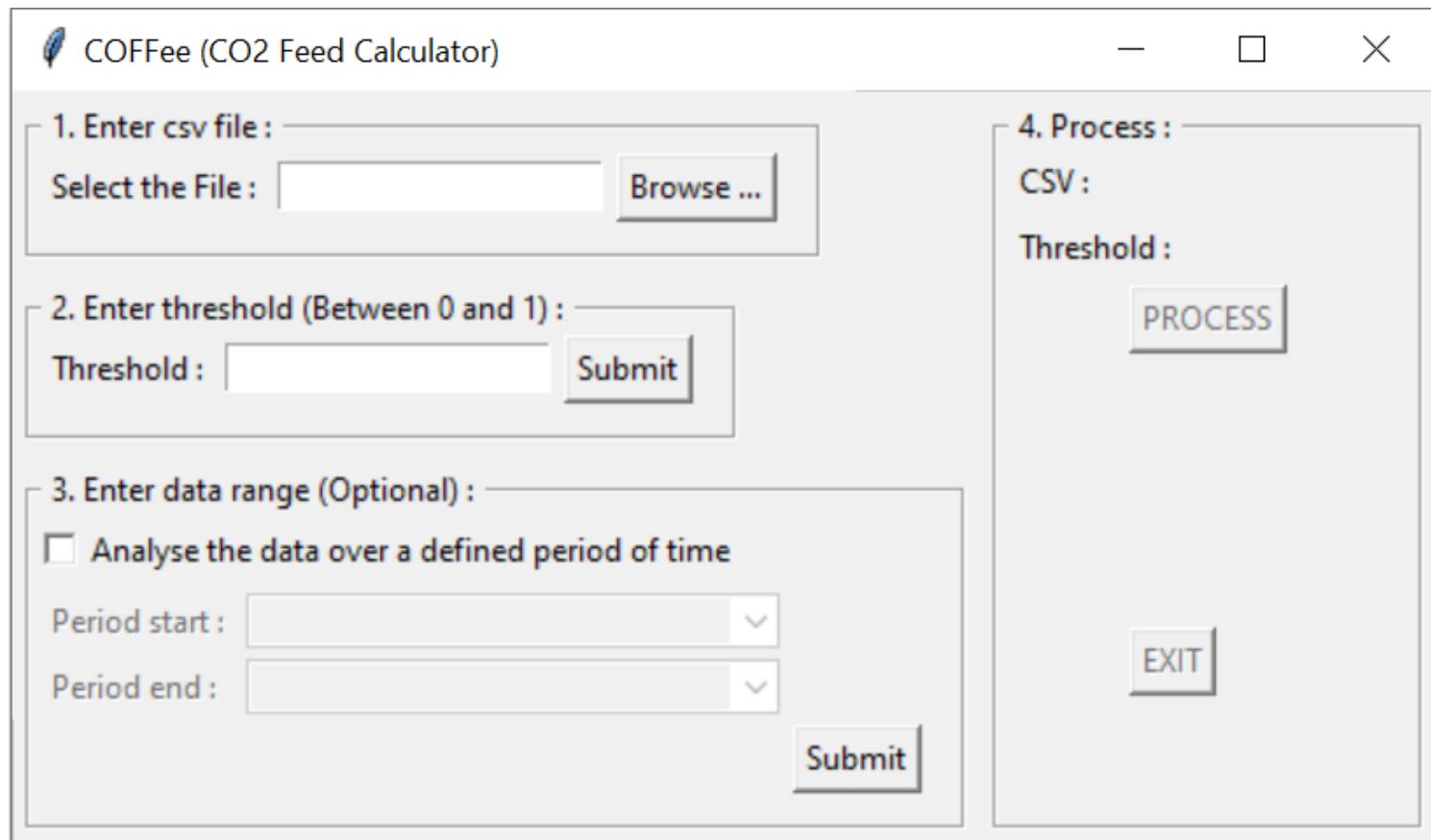
State-of-play in UC1b tool development

Carbon indicator Tier 1 issue : lack of data for an NDVI time series

- Generally due to cloud effect on images
- Identification of the lack of data (holes)
- Linear interpolation of NDVI values at threshold crossings (day-by-day interpolation)
- To allow this interpolation at the beginning and at the end of the agricultural campaign it is necessary to have images over a period greater than the calculation period

How to run the prototype carbon indicator Tier1 ?

- Open .bat to install open library and open software (Python)
all components are in the same folder
- Open another .bat to run the tool and fill out boxes



The screenshot shows a Windows application window titled "COFFee (CO2 Feed Calculator)". The window contains four main sections for user input:

- 1. Enter csv file :** A text box labeled "Select the File :" with a "Browse ..." button next to it.
- 2. Enter threshold (Between 0 and 1) :** A text box labeled "Threshold :" with a "Submit" button next to it.
- 3. Enter data range (Optional) :** A section containing a checkbox labeled "Analyse the data over a defined period of time". Below the checkbox are two dropdown menus labeled "Period start :" and "Period end :". A "Submit" button is located at the bottom right of this section.
- 4. Process :** A section containing a "CSV :" label, a "Threshold :" label, a "PROCESS" button, and an "EXIT" button at the bottom.

How to run the prototype carbon indicator Tier1 ?

1. Select NDVI temporal series (.csv Sen4CAP like format)

COFFee (CO2 Feed Calculator)

1. Enter csv file :
Select the File : C:/Users/Arthur/Desktop Browse ...

2. Enter threshold (Between 0 and 1) :
Threshold : Submit

3. Enter data range (Optional) :
☐ Analyse the data over a defined period of time
Period start :
Period end : Submit

4. Process :
CSV : OK
Threshold :
PROCESS
EXIT

How to run the prototype carbon indicator Tier1 ?

1. Enter the csv file link (raw format from Sen4CAP)

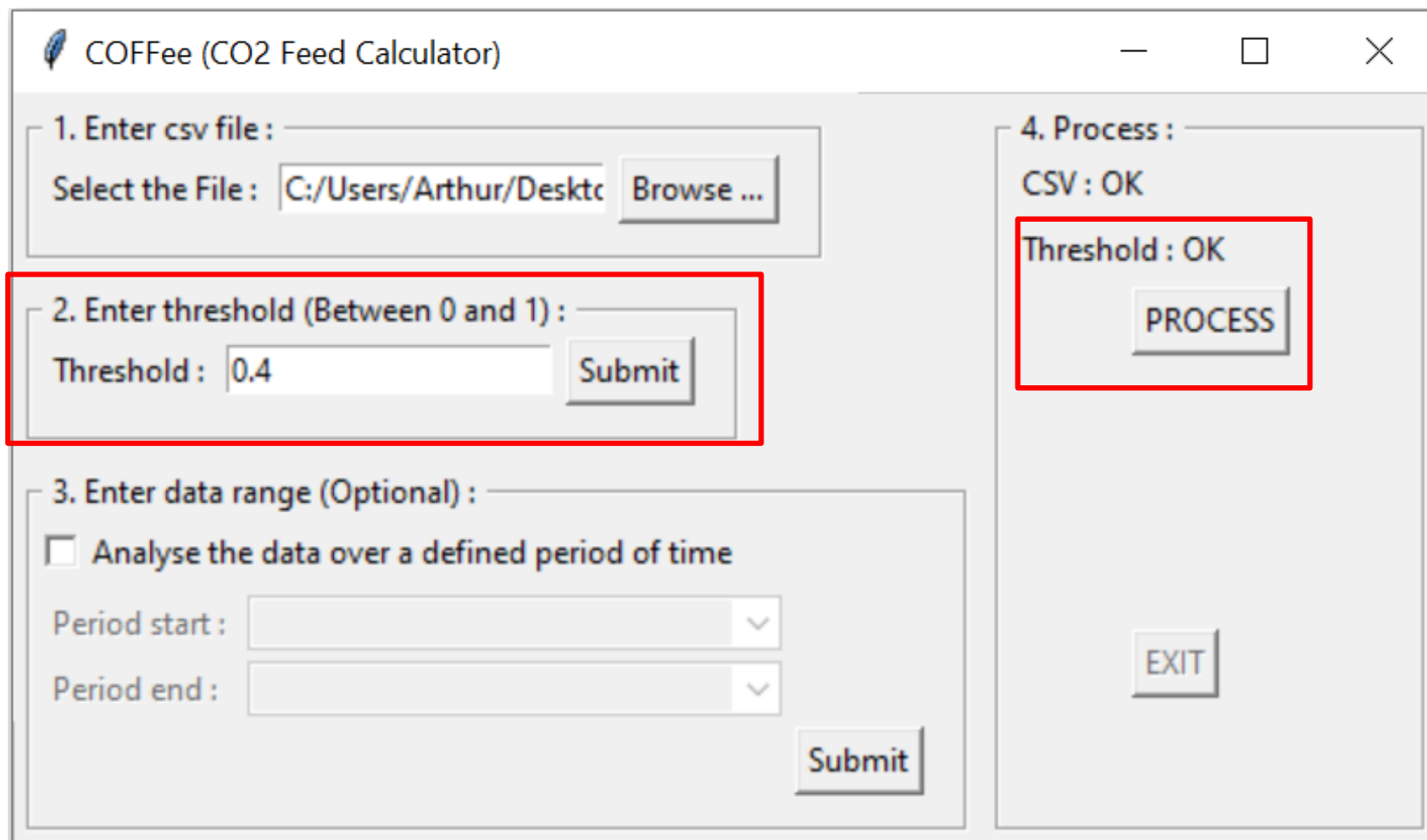
| KOD_PB | suffix | date | mean | stdev | | |
|--------|--------|------------|-------------|-------------------------|-------------|--------------------------|
| 10069 | NDVI | 03/01/2019 | 385.0000000 | 41.0626065 2019-01-15 | 405.7137097 | 41.1377991 2019-02-12 |
| 10072 | NDVI | 03/01/2019 | 804.7838617 | 67.6041861 2019-01-15 | 821.9020173 | 59.5221013 2019-02-12 |
| 10073 | NDVI | 03/01/2019 | 799.3844086 | 60.5738957 2019-01-15 | 810.8198925 | 60.8681340 2019-02-12 |
| 10074 | NDVI | 03/01/2019 | 296.6823529 | 81.2002539 2019-01-15 | 353.7647059 | 110.1443476 2019-02-12 |

-> Automatically formatted with one separator

| KOD_PB | suffix | date | mean | stdev | | | | |
|--------|--------|------------|-------------|------------|------------|-------------|-------------|------------|
| 10069 | NDVI | 03/01/2019 | 385.0000000 | 41.0626065 | 15/01/2019 | 405.7137097 | 41.1377991 | 12/02/2019 |
| 10072 | NDVI | 03/01/2019 | 804.7838617 | 67.6041861 | 15/01/2019 | 821.9020173 | 59.5221013 | 12/02/2019 |
| 10073 | NDVI | 03/01/2019 | 799.3844086 | 60.5738957 | 15/01/2019 | 810.8198925 | 60.8681340 | 12/02/2019 |
| 10074 | NDVI | 03/01/2019 | 296.6823529 | 81.2002539 | 15/01/2019 | 353.7647059 | 110.1443476 | 12/02/2019 |

How to run the prototype carbon indicator Tier1 ?

2. Enter the NDVI threshold

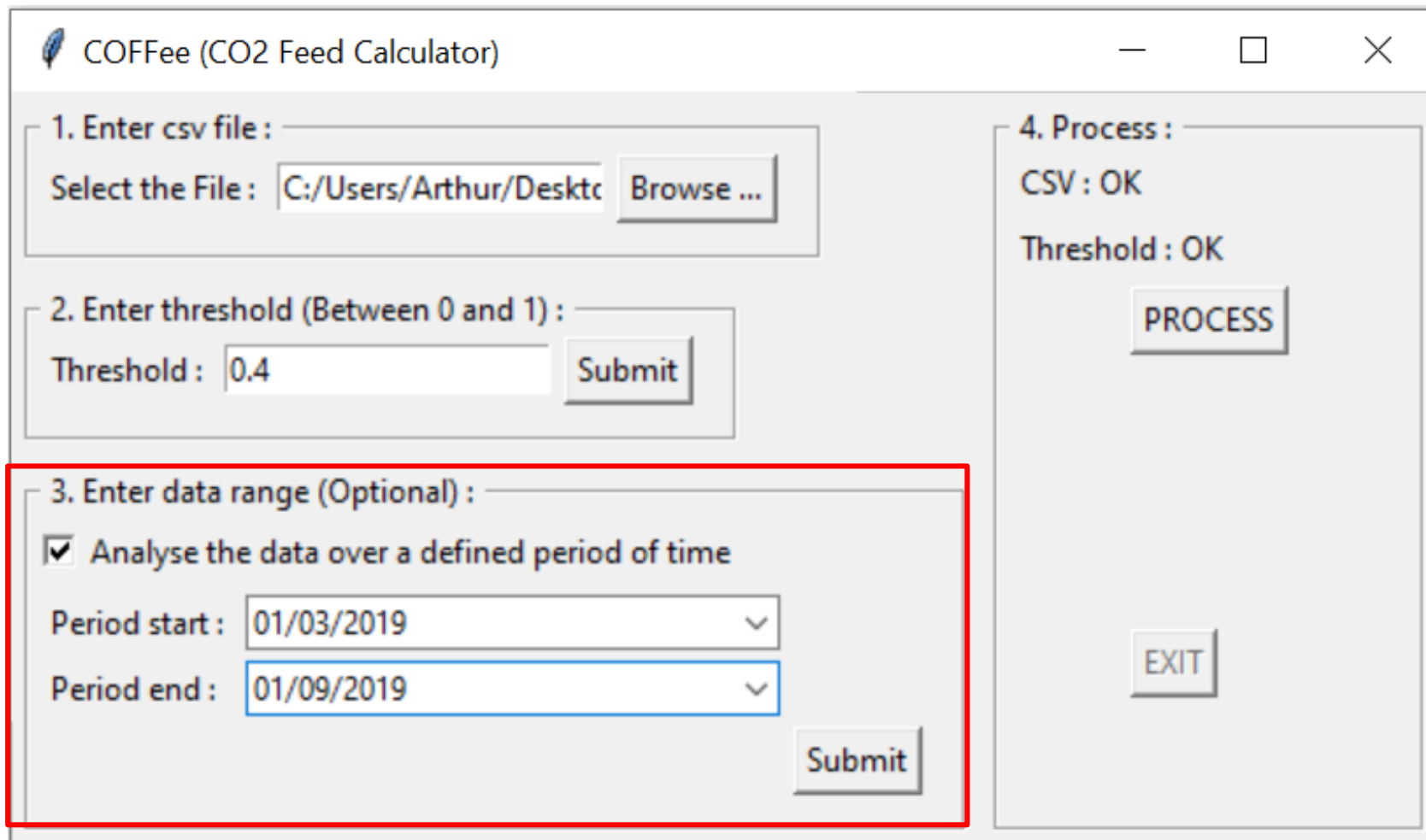


The screenshot shows the 'COFFee (CO2 Feed Calculator)' application window. It has a title bar with a feather icon, the text 'COFFee (CO2 Feed Calculator)', and standard window controls (minimize, maximize, close). The main area is divided into four sections:

- 1. Enter csv file :** Includes a text field 'Select the File : C:/Users/Arthur/Desktop' and a 'Browse ...' button.
- 2. Enter threshold (Between 0 and 1) :** This section is highlighted with a red rectangle. It contains a 'Threshold : 0.4' text field and a 'Submit' button.
- 3. Enter data range (Optional) :** Includes a checkbox 'Analyse the data over a defined period of time', two dropdown menus for 'Period start' and 'Period end', and a 'Submit' button.
- 4. Process :** This section is also highlighted with a red rectangle. It shows 'CSV : OK' and 'Threshold : OK', followed by a 'PROCESS' button. At the bottom of this section is an 'EXIT' button.

How to run the prototype carbon indicator Tier1 ?

3. Enter the cultural period (in option)



COFFee (CO2 Feed Calculator)

1. Enter csv file :
Select the File :

2. Enter threshold (Between 0 and 1) :
Threshold :

3. Enter data range (Optional) :
☒ Analyse the data over a defined period of time
Period start :
Period end :

4. Process :
CSV : OK
Threshold : OK

How to run the prototype carbon indicator Tier1 ?

4. Processing to generate result file

COFFee (CO2 Feed Calculator)

1. Enter csv file :
Select the File : C:/Users/Arthur/Desktop Browse ...

2. Enter threshold (Between 0 and 1) :
Threshold : 0.4 Submit

3. Enter data range (Optional) :
☒ Analyse the data over a defined period of time
Period start : 01/03/2019
Period end : 01/09/2019 Submit

4. Process :
CSV : OK
Threshold : OK
PROCESS
CSV has been created
EXIT

How to run the prototype carbon indicator Tier1 ?

- **Result file (Excel format)**

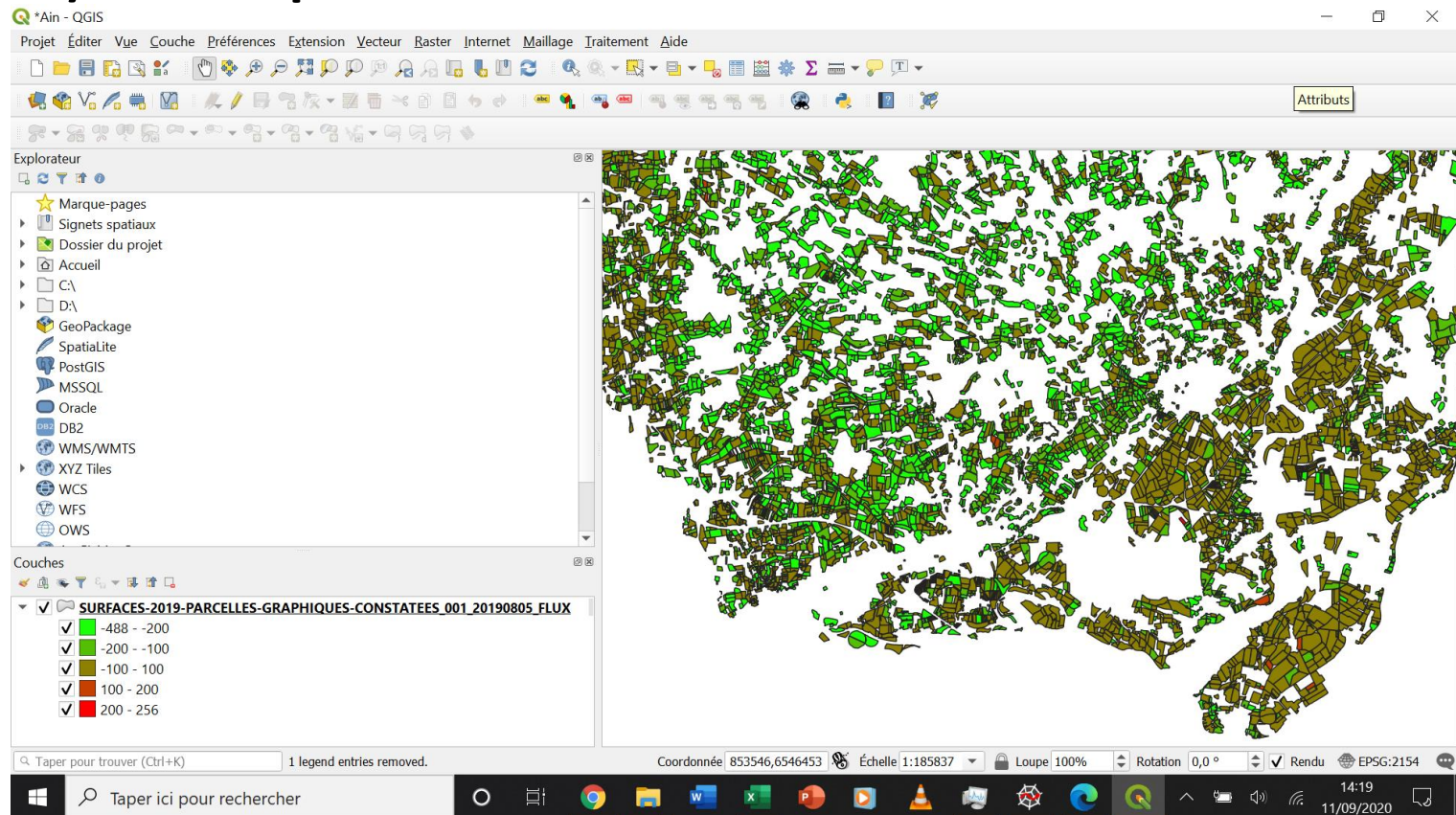
| KOD_PB | suffix | CO2_FEED | NB_DAYS_VEG | NB_ACQS | FIRST_ACQ | LAST_ACQ | NB_CYCLES | LST_CYCLES |
|--------|--------|----------|-------------|---------|------------|------------|-----------|----------------------------------------------|
| 10069 | NDVI | -39,9 | 128 | 38 | 16/03/2019 | 31/08/2019 | | [['01/03/2019', '07/07/2019', 10.91]] |
| 10072 | NDVI | -123,06 | 164 | 36 | 16/03/2019 | 31/08/2019 | | [['01/03/2019', '08/07/2019', 10.87]] |

| NB_HOLES | LST_HOLES | MIN_VAL | MOY_VAL | MAX_VAL | MIN_STD | MOY_STD | MAX_STD |
|----------|-------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|
| 4 | [['01/03/2019', '16/03/2019', 15], ['31/03/2019', '15/04/2019', | 0,11 | 0,53 | 0,91 | 19,96 | 44,03 | 76,19 |
| 4 | | 0,31 | 0,69 | 0,87 | 17,59 | 45,65 | 97,43 |

How to run the prototype carbon indicator Tier1 ?

5. Carry out an attribute join with the agricultural parcel

6. Create a shape in order to aggregate (farm or administrative level) and map the results



T cO₂/ha (< -200 / to -200 to -100 / to -100 to 100 / to 100 to 200 / > 200)

Questions and answers

Stakeholder involved

| Stakeholder | Title/Role | Communication Vehicles | Stake in Project |
|-------------------------------------|----------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------|
| Ministry of Agriculture (FR) | Policy maker | Meeting | Setting up of CAP national strategic plan |
| APCA (Chambers of Agriculture) (FR) | Advisory service | Meeting | Contact with professional organisation IT providers (interoperability) Provide technical advices to farmers |
| Agence BIO (FR) | Organic farming promotion | Meeting | Interaction between organic farming certification process and tools and IACS process |
| French Biodiversity Agency OFB (FR) | Biodiversity protection and management | Meeting | Environmental data user |
| INRAe (FR) | Research Institute | Meeting | Agronomic approach to validate scientifically methods and indicators computation |

Stakeholder involved

| Stakeholder | Title/Role | Communication Vehicles | Stake in Project |
|--------------------|-------------------------------------------------------|------------------------|---------------------------------------------------------------|
| Sen4CAP (EU) | Sentinels for Common Agriculture Policy | Meeting | Provide Sentinel processing chain reused in UC1b components |
| Copernicus (EU) | High Resolution Vegetation Phenology and Productivity | Meeting | Provide European phenological data and services from Sentinel |
| EEB (EU) | Environmental NGO | Workshop | Potential user |
| DG Agri (EU) | EC | Workshop | Potential user |
| DG Clima (EU) | EC | Workshop | Potential user |
| JRC (EU) | EC | Workshop | Potential user |
| DG Connect (EU) | EC | Workshop | Potential user |
| WUR (NL) | Research university and project management | Workshop | NIVA consortium |
| RVO (NL) | Testing NIVA partner | Meeting and Workshop | NIVA consortium |
| DAA (DK) | Testing NIVA partner | Meeting and Workshop | NIVA consortium |
| FEGA (TRAGSA) (ES) | Testing NIVA partner and WP2 management | Meeting and Workshop | NIVA consortium |

KPI and innovation

- **Context**

Meeting between Tomaso and UC1b team on 11/06/2020

⇒ Clarification on UC1b objectives & impacts

⇒ New KPIs

- **testing countries involved to achieve some of them**

- **Meeting objectives**

- Present where we are
- Initiate discussion

KPI and innovation

NIVA
OUTPUT

New methods,
application,
processes

KPI 1

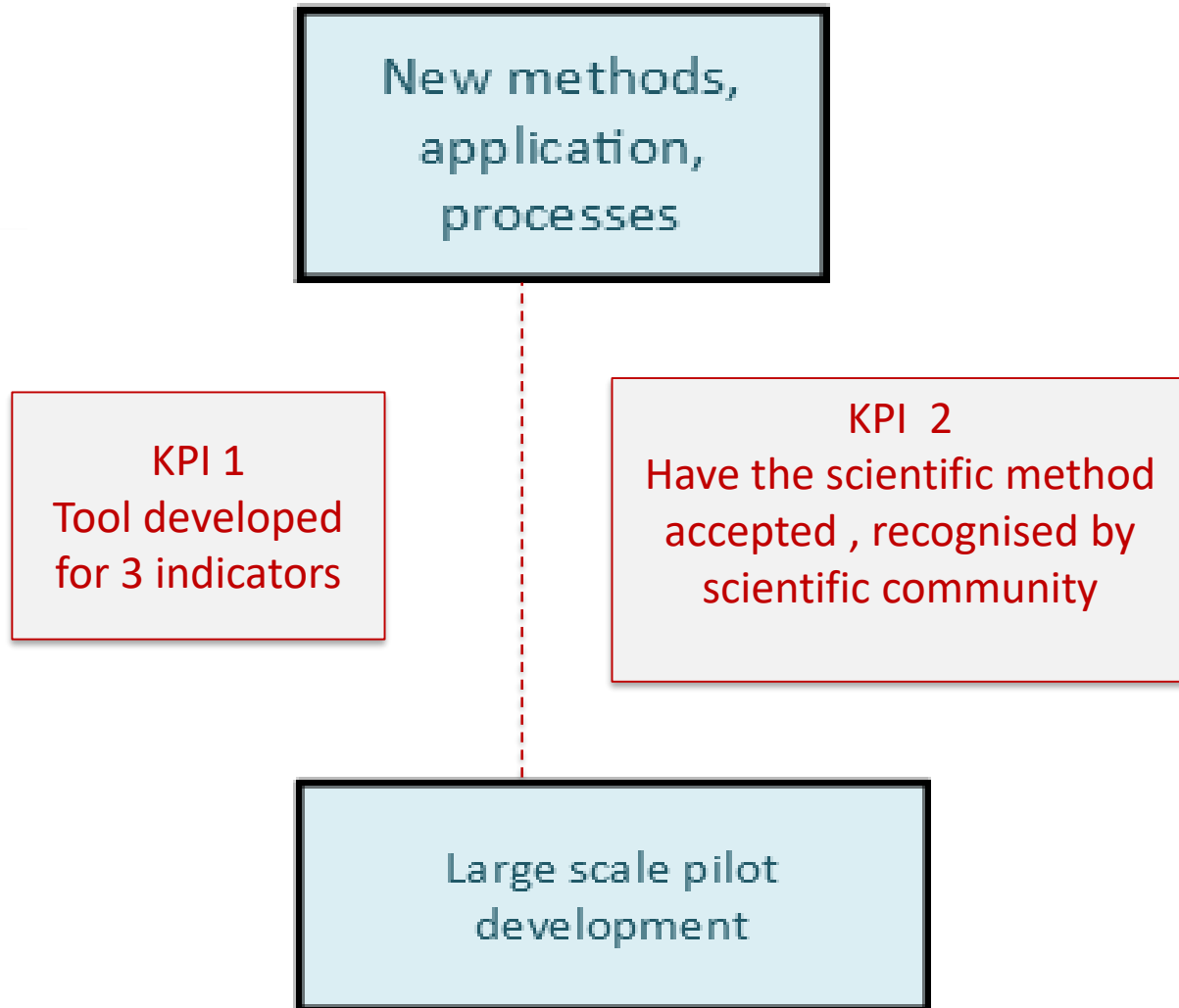
Tool developed
for 3 indicators

KPI 2

Have the scientific method
accepted , recognised by
scientific community

NIVA
ACTIVITIES

Large scale pilot
development



KPI and innovation

Strength : easy computation at European level (at least Tier I)

NIVA
OUTPUT

Test and
evaluation events

*Involving
strongly
testing
countries*

KPI 1

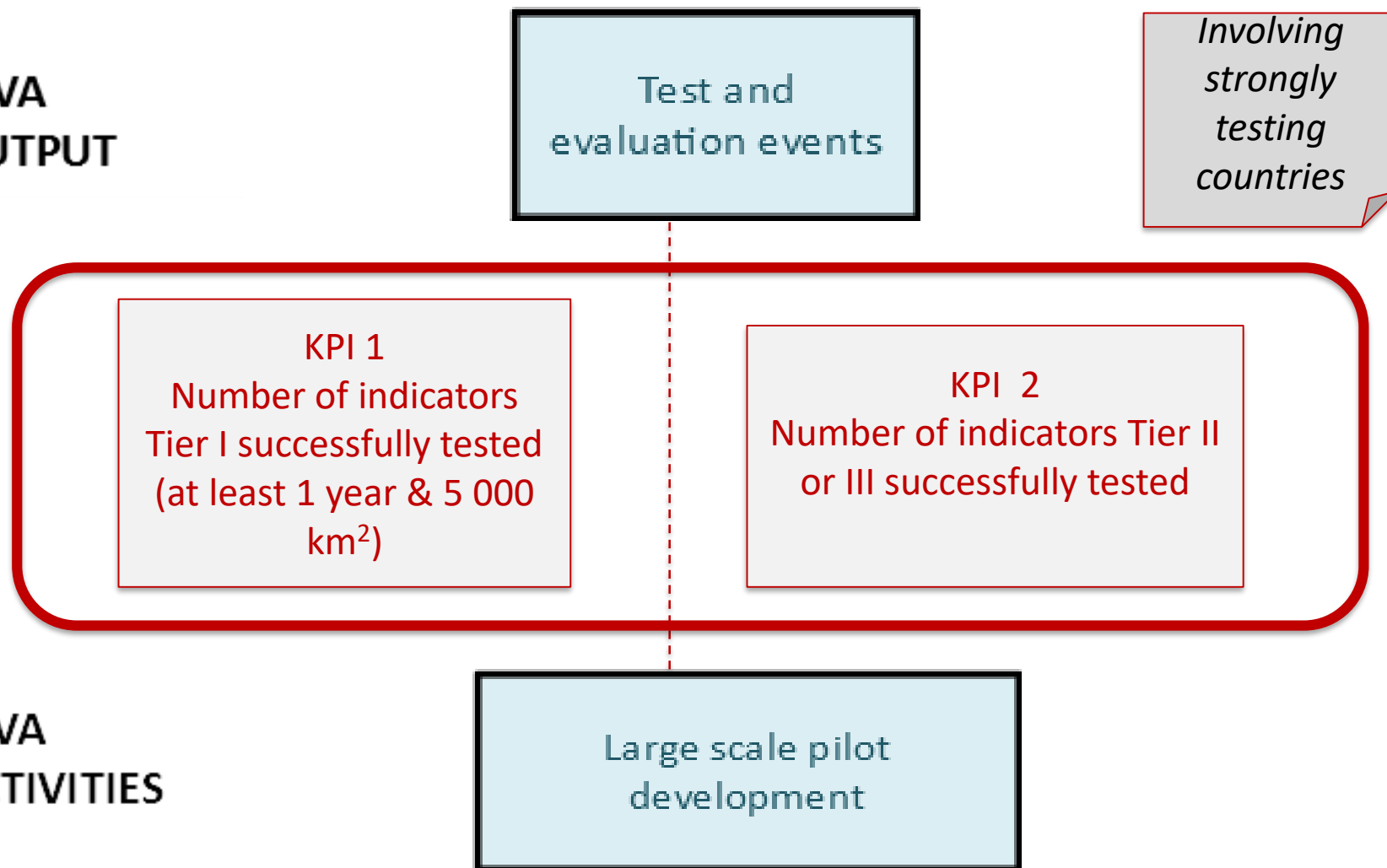
Number of indicators
Tier I successfully tested
(at least 1 year & 5 000
km²)

KPI 2

Number of indicators Tier II
or III successfully tested

NIVA
ACTIVITIES

Large scale pilot
development



KPI and innovation

NIVA
OUTPUT

Open or reusable
datasets

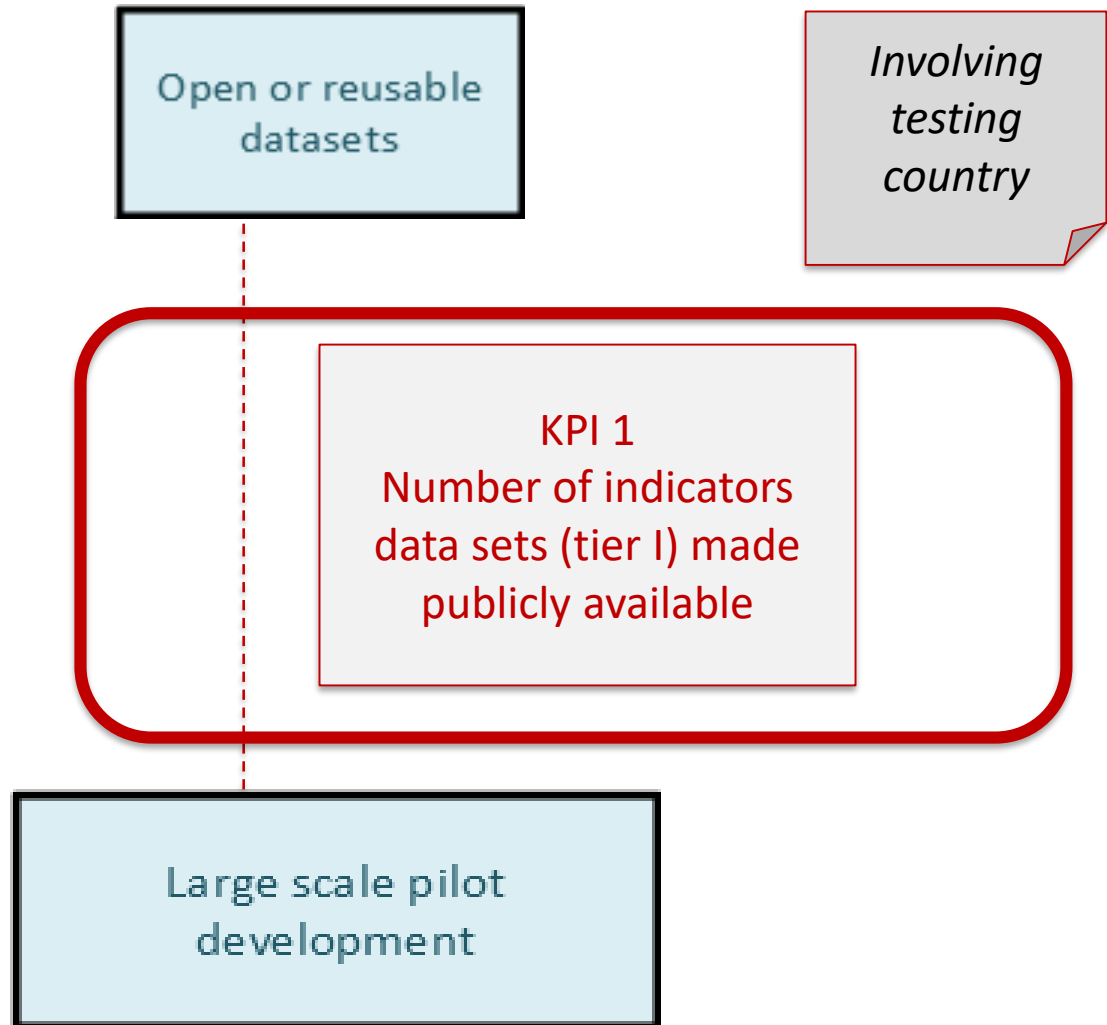
*Involving
testing
country*

KPI 1

Number of indicators
data sets (tier I) made
publicly available

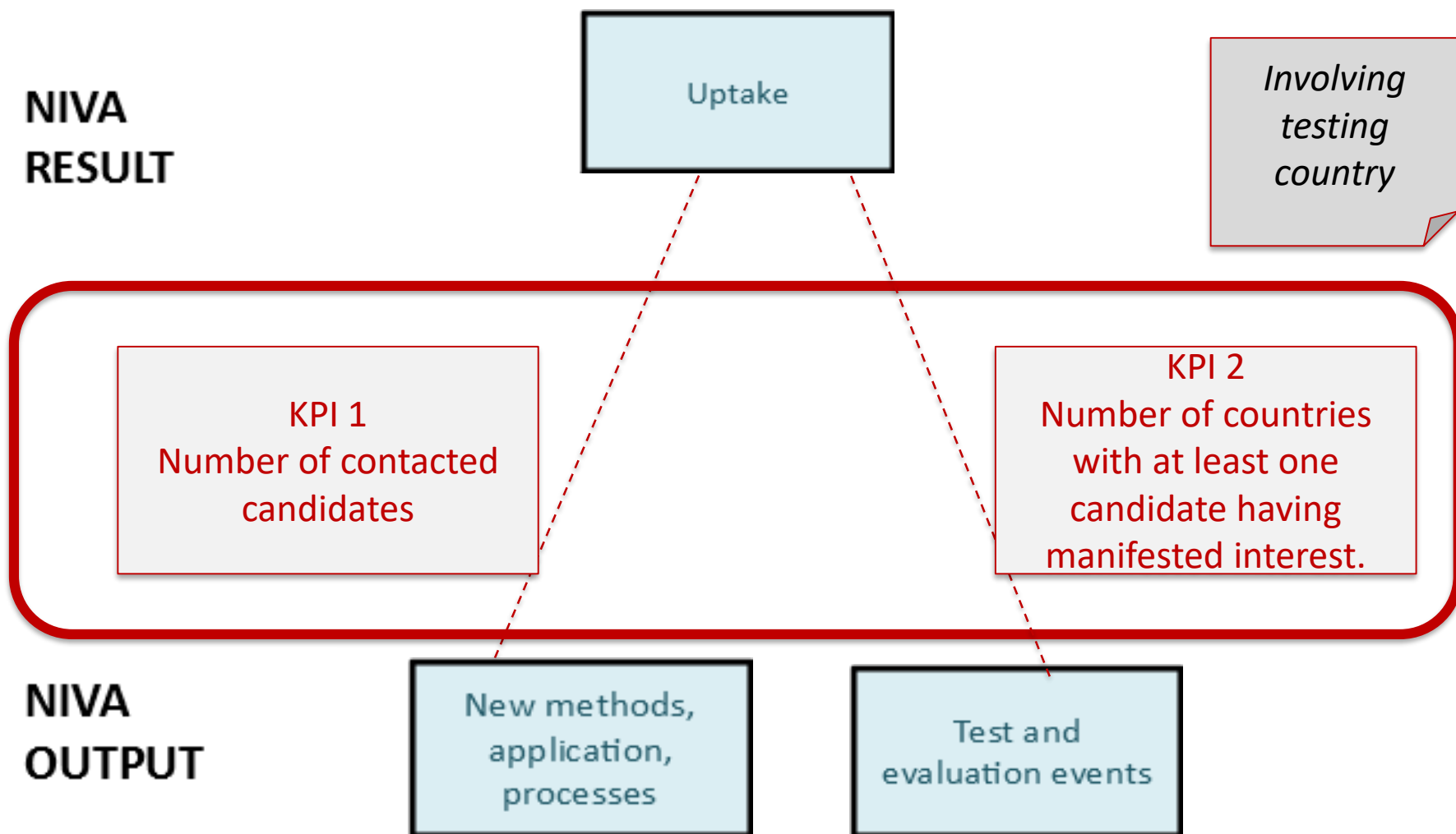
NIVA
ACTIVITIES

Large scale pilot
development



KPI and innovation

Weakness: not yet any public body in charge of computing UC1b indicators



KPI and innovation

NIVA
OUTPUT

IACS and CAP
reuse &
valorisation

*Involving
testing
country*

KPI 1
Number of
communication actions

NIVA
ACTIVITIES

Open or reusable
datasets

