Friendly Fruit

Jan 2018-Dec 2020

Introduction sur le projet Friendly fruit

Supported by:

Climate-KIC

Climate-KIC is supported by the EIT, a body of the European Union

Objectifs

- **Definir & mettre en place des pratiques culturales** dans différentes regions pour développer des **productions de fraises et de pommes respecteuses de l'environnement**

WP1. Test/use practices

- **Evaluer l'impact de ces pratiques** sur les performances agronomiques environmentales et sociales

WP2.Impact assessment

- **Faire évoluer durablement les pratiques** en se basant sur l'expertise scientifique et technique

WP3. Transfer-Dissemination

WP4. Training

Participants

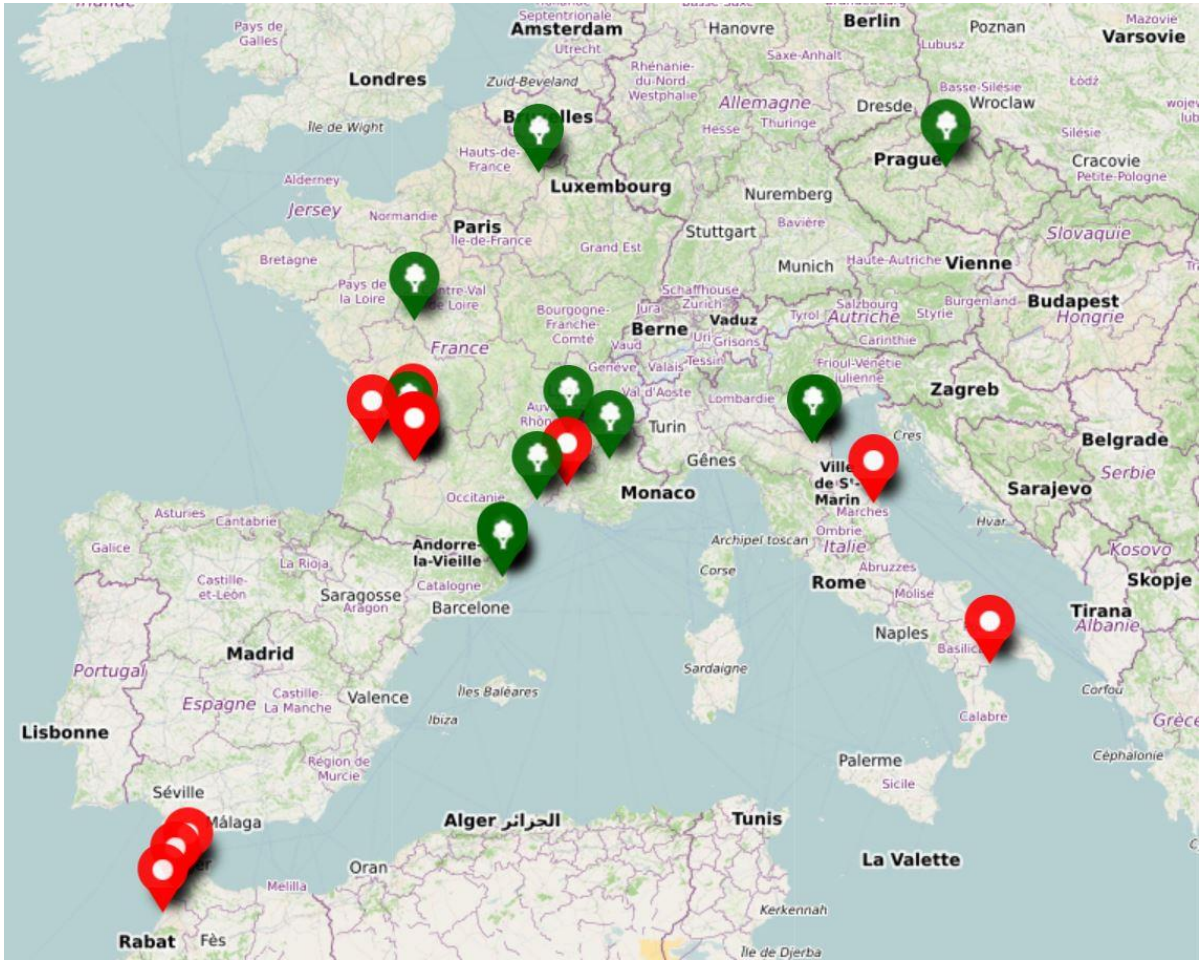
Essais mis en place sur pomme et fraise

Sites POMMES

- Rep. Tcheque
- France
- Italie
- Espagne

Sites FRAISE

- France
- Italie
- Maroc (5 lab farms)



Pratiques mises en place sur la fraise et sites expérimentaux

ST1 : Innovative Sprayer
Improve Sprayer efficiency and treatment on soil strawberry cultures
INVENIO
Douville (France)

ST2: Integrated Pest Management (IPM) in soilless production
impact of a decrease in nitrogen nutrition on powdery mildew and on fruit yield
strategy based on biocontrol / synthetic fungicides
INVENIO
Sainte-Livrade (France)

ST4: Water management
reduce water use by monitoring soil water potential with sensors, reduce nutrient leaching and improve fruit quality
INVENIO
Sainte-Livrade (France)

ST7: Strawberry renewable energy
Evaluate the possibility to produce electricity from photovoltaic systems to support different needs of the strawberry production in greenhouse
UNIVPM
Morocco ? Italy ?

ST6: Soil chemical fumigation
alternatives to pre-plant soil chemical fumigation
CREA
Commercial farm : Scanzano Ionico (Italy)

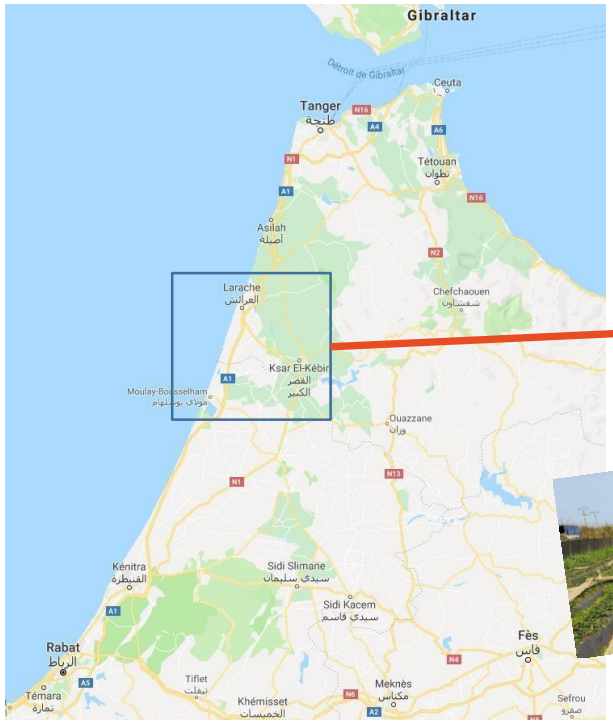
ST2: Integrated Pest Management (IPM)
Effect of nitrogen nutrition on the efficacy of biocontrol
INRA
Avignon (France)

ST2-ST4: IPM, nutrients, water under soil production Morocco
Pest and disease control
Biocontrol
INRA
5 Farm Labs in Larrache (Morocco)

ST9- Plant architecture
Role of the origin of the mother plants on the floral initiation of daughter plants
INRA
Douville (France)

ST5: Cultivars
Identifying resilient cultivars for increasing strawberry pedo-climatic adaptation
UNIVPM
Italy, Spain, Morocco

5 FARM LABs
Larrache - Maroc



Focus sur la gestion de l'irrigation, la fertilisation et le biocontrôle

Friendly Fruit est terminé depuis décembre 2021

Climate-KIC

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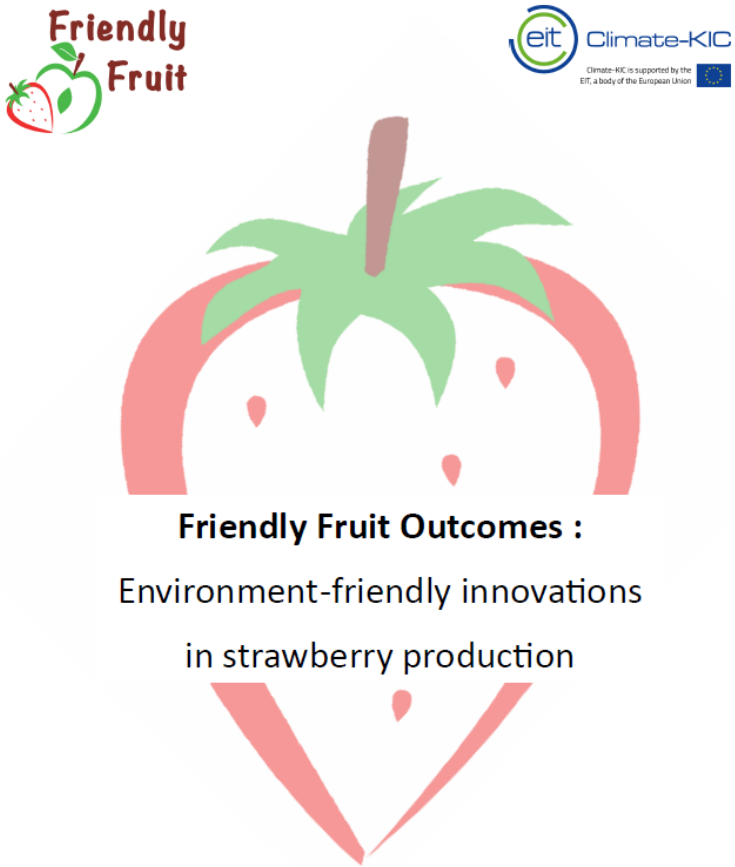
Mais les travaux vont continuer …

WP3. Transfer-Dissémination-Adoption

WP4. Training

A partir de janvier, ce sera à vous (Danone, Frezna, farmer representatives, …)
De mettre en place et développer les pratiques prometteuses dans les vraies conditions de production
Berry center, … , Leaflets….

Booklet/leaflet



Friendly Fruit

Optimization of the mineral nutrition of strawberry crops: Monitoring using a theoretical fertilization schedule and soil bioavailability tests

Promising but needs to be confirmed

What? Monitor the fertilization of strawberry field crops based on: (i) a theoretical fertilization schedule, (ii) a P and K test at the beginning of the season and (iii) N tests during the cycle.

Why? To preserve nutrient resources and limit losses to the environment and pollution by adapting inputs to the crop's needs while maintaining performance levels.

Credits: Leaflet authors: Lecompte F., Bonnel S., Casagrande M., INRAE; EL Mrini S., Hamim A., INRA Maroc; Lamahli D., Essrifi H., Messem; Taleb A., Danone, Didichelkh A., GIZ. Design & coordination: Alaphilippe A., INRAE. Design & layout: Rosies B., Chiane B., INRAE.

Tested implementation

Implementation (main steps):

1. Create a theoretical **fertilization schedule** (N, P, K) based on the expected biomass and nutrient levels.
2. Obtain a **maximum quantity to be provided per element** which is fractionated into theoretical doses according to the development kinetics of the culture (see table).
3. These theoretical doses are adjusted according to an initial test for P and K in soil, and during the cycle for nitrogen using a portable reflectometer (Nitrachek®).

Nitrate concentration in soil solution (mg/l)	Multiplier Coefficient
< 100	1,5
100-150	1
150-200	0.8
C > 200	0.5

Conditions of use:
Practice adapted to field-grown strawberry plants. The nitrate test is performed with a soil sample and distilled water.

Practice performance

Practice performance assessed in comparison with a fertilization schedule established from the development stages of the crop, without considering bioavailability at the beginning or during the cycle.

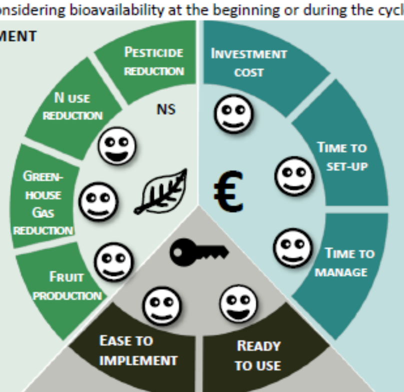
AGRONOMY & ENVIRONMENT

Pesticide reduction has not been studied.

Reduction in the use of N and P (less GHGs) and energy related to the pump injecting the fertilizers.

No loss of yield but the results have to be consolidated.

Reduction in the consumption of fertilizers, and potentially their loss in the environment.



COSTS & BENEFITS

Low investment cost and quickly amortized.

Little time required to set up the schedule.

Little time required for monitoring; distributed over the production period.

Reduced fertilization costs.

OPERATIONALITY

A well-known alternative practice that has already proven success.
Easy to set-up but requiring a short assistance for the tests' handling and interpretation.

Positive outcome | Neutral to positive outcome | Areas of improvement | Critical points | NS Not studied

Detailed information on the practice

The experiment was conducted in 5 farm labs in the area of the Gharb-Loukkos in Morocco on several strawberry varieties. Each farm was monitored with a programme based on data on soil and plant status and adjustment of fertilizer inputs ("low input" plots) in comparison to a "traditional" static fertilization programme ("farm" plots). Nitrate concentration in soil, quantity of inputs used (N, P, K), yields and fruit quality were monitored on both plots compared (farm/low inputs). To obtain nitrate concentration: (i) Collect 8 soil samples on every ridge to make a mixed sample; (ii) Collect 100g of this last sample, add 100 mL of distilled water (or KCl), mix and strain; (iii) dip a strip in the filtrate and measure nitrate concentration (mg/L) using a mobile reflectometer (Nitrachek®).

Information on the mode of action

Example of the farm n°3 (February 2020)	
Theoretical dose/strawberry plant needs (kg/ha/wk)	6
Nitrate concentration in soil solution (ppm)	321
Coefficient to apply to the theoretical dose	0,5
Actual dose for the "low input" plot (kg/ha/wk)	3
Actual dose for the "farm" plot (kg/ha/wk)	6

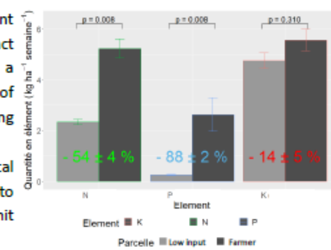
The creation of a **theoretical fertilization schedule** (N, P, K) requires the potential needs of the crop to be defined in relation to quantitative nutrients and expected biomass. Taking into account effectiveness and fertilizer analysis, one obtains a maximum amount to apply per nutrient, which is divided into theoretical doses in relation to the crop growth kinetics. These theoretical doses are adjusted, based on an initial test for P and K, and throughout the nitrogen cycle (see example table).

Results of the experiments

In Morocco, with the pedoclimatic conditions and farming practices of the farms studied, this practice allows an average significant reduction of 88% for Phosphorus and 54% for Nitrogen over the first 6 months of the crop season, with low variability between farms. Results on K nutrients are encouraging and could be improved thanks to foliar tests on ongoing crops. Likewise, nitrogen foliar tests allow potential plant stress to be verified. The efficiency of each nutrient input is improved because the decrease of inputs does not impact marketable yields. It is necessary to redo the experiment over a complete season, with a farm sample exploring a diversity of pedoclimatic contexts. Theoretical doses could be refined, depending on varieties.

Message to take home: Monitoring with the help of theoretical fertilization planning and bioavailability tests makes it possible to reduce fertilizer consumption, maintain yields and limit environmental pollution.

Values over 6 months	Low inputs	Farmer
Nitrogen (kg/ha)	54.2 ± 5.2	127.1 ± 8.1
Phosphorus (kg/ha)	5.7 ± 0.3	63.3 ± 14.8
Potassium (kg/ha)	108.4 ± 5.7	135.2 ± 8.3
Marketable yield (g/plant)	379 ± 63	392 ± 63



For further information

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Thibault, C, Lecompte, F. 2018, Gestion de la fertilité des sols en culture légumières et maraîchères. GIS Piclég.

The project partners thank the 5 volunteering farmers that collaborated to the experiment in Morocco.

Experiment conditions

Scale | Validity

Duration: 1 year (early season 2020)

Nb of repetitions: 5

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Une autre valeur ajoutée du projet Friendly Fruit :
↗ liens avec les chercheurs, ingénieurs, techniciens
Continuez à garder ces liens !!!

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Un grand merci à vous toutes et tous
Bonne réunion

Frezna

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ISHS

The 9th symposium is now Hybrid. Stay tuned for more information.

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WELCOME

TO THE 9TH ISHS INTERNATIONAL STRAWBERRY SYMPOSIUM

The **Polytechnic University of Marche** and the **Council for Agricultural Research and** and 40 countries representing the five continents. A pavilion will be fully dedicated to ISS