

Oasys

an agroecological dairy system
adapted to climate change





an agroecological dairy system
adapted to climate change

An innovative system, breaking from existing systems

designed through a collaborative approach

experimented at the farm-scale = system experiment

Main objectives of this new dairy cattle system:

- to permit farmers to live from their dairy system
- in a context of climate change
- while saving water and fossil energy resources
- and contributing to a sustainable agriculture



An agroecological approach

to valorise

natural resources
all the spatial and temporal dimensions

Plant

Animal

Diversified forage resources

Productive and robust herd

Diversification of plants
species, cultivars, mixtures

Multilayer cropping
agroforestry

Long crop rotations

Drought-adapted crops

Large use of legumes

Priority to grazing
1 entirely grazed crop rotation

2 calving periods

Extension of lactation length
+ of cow lifetime performance

3-way cross-breeding

Holstein
Scandinavian Red
Jersey

Recycling of effluents
Dual purpose crops

- Main innovations of the system

To diversify

species, cultivars, mixtures



breeds, calving periods



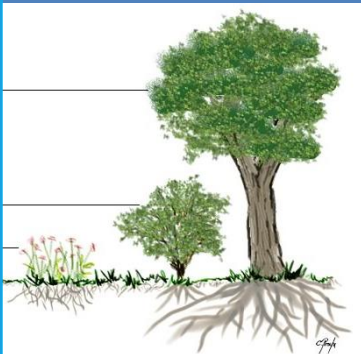
functions



Hypothesis: the increase of diversity in a dairy production system allows to conciliate good production levels and high environmental performance and to improve the resilience of the whole system

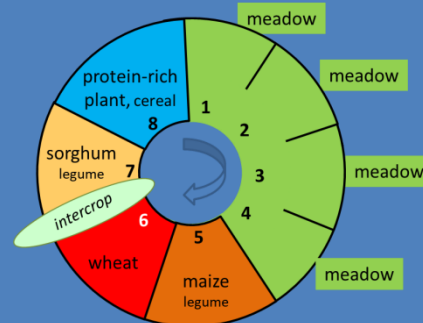
To valorise all dimensions

vertical 3D



Time 4D

crop rotation



cow lifetime



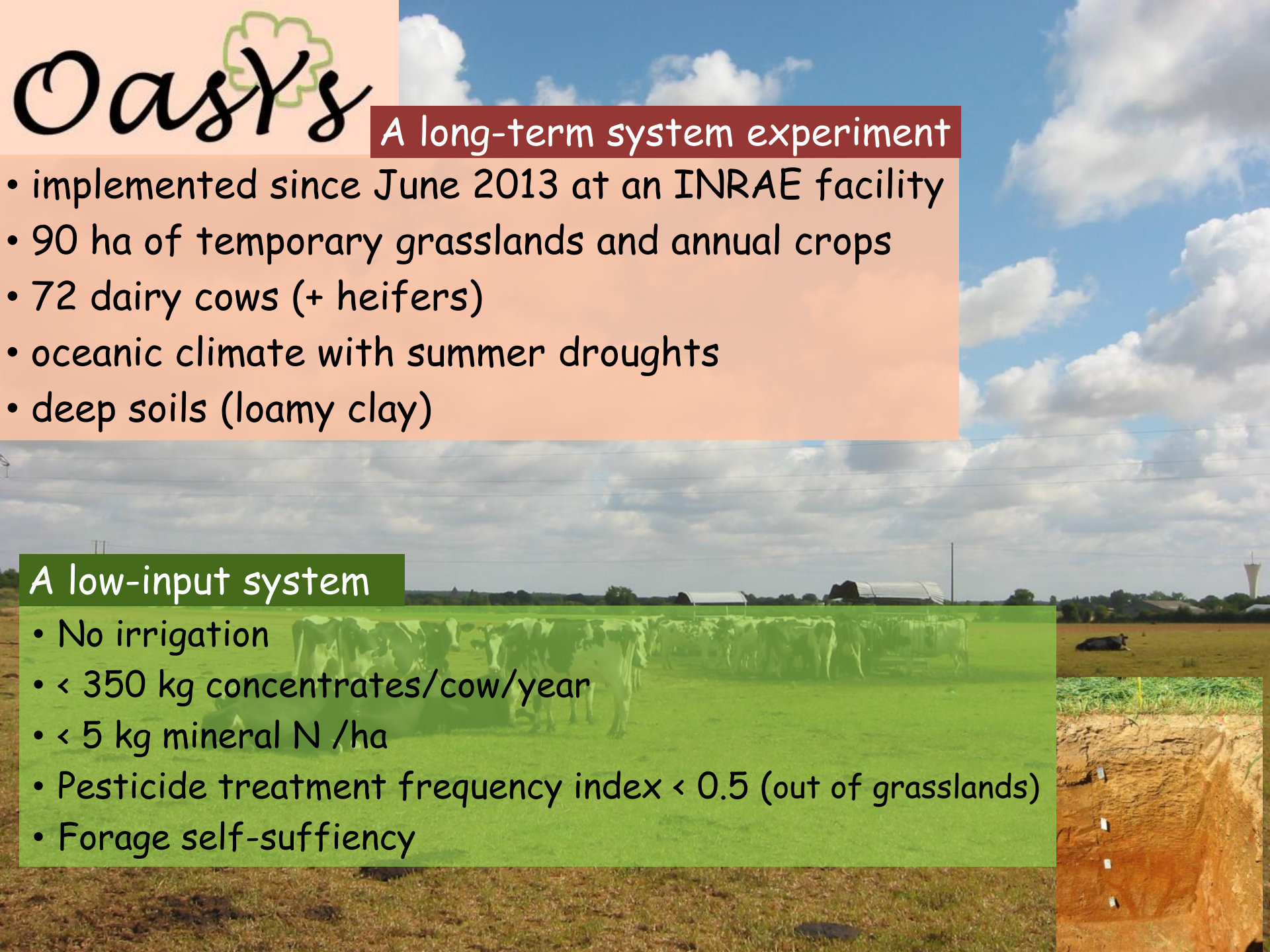
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A long-term system experiment

- implemented since June 2013 at an INRAE facility
- 90 ha of temporary grasslands and annual crops
- 72 dairy cows (+ heifers)
- oceanic climate with summer droughts
- deep soils (loamy clay)

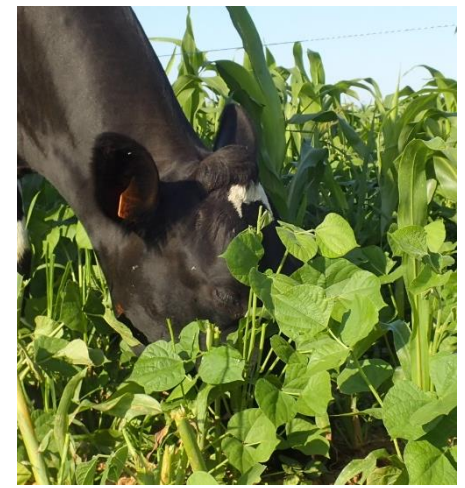
A low-input system

- No irrigation
- < 350 kg concentrates/cow/year
- < 5 kg mineral N /ha
- Pesticide treatment frequency index < 0.5 (out of grasslands)
- Forage self-sufficiency



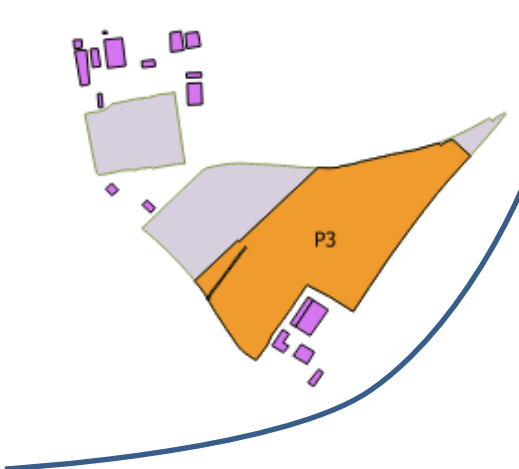
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Maximize grazing ... in a context
of climate change !

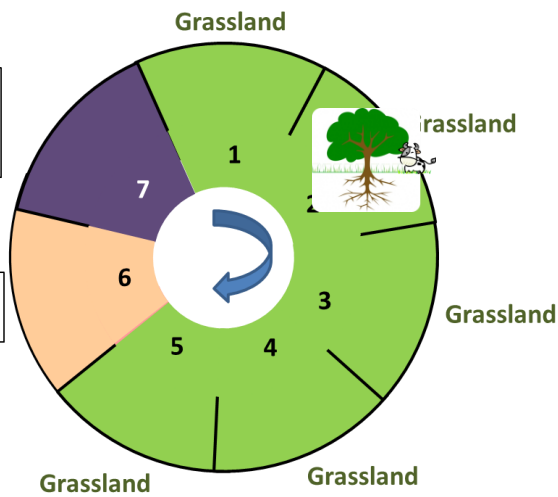


Each year of the rotation is present on 1 plot (3-4.5 ha)

OasYs : 90 ha



Mainly grazed crop rotation



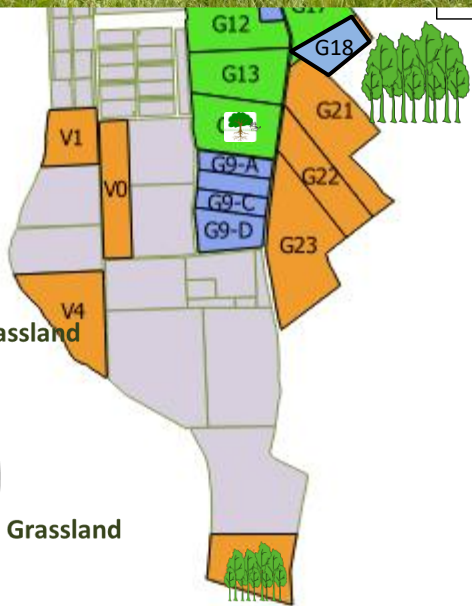
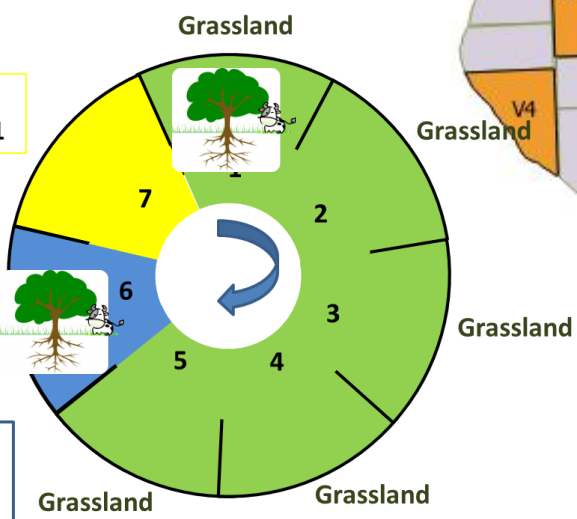
Totally grazed crop rotation

Grazed annual forage crop 1

to address the shortage of grass in summer and winter

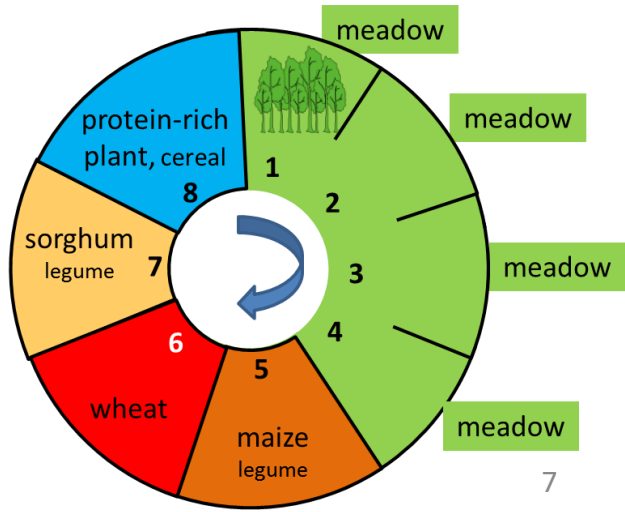
Grazed annual forage crop 2

- Millet + Alexandrian clover Chicory
- Fodder beet
- Cereal-legume mixtures



Other rotations

Ungrazed crop rotation



Oasy's How to integrate agroforestry into dairy farming?

Alley cropping agroforestry

High stem trees + fodder pollards + fodder liana = multipurpose trees



300 trees
Feb. 2014



200 trees Feb. 2014
Arboretum
50 species, Dec. 2014



1100 plants
April 2015

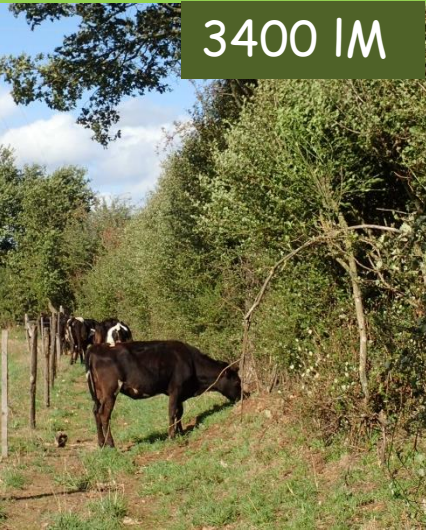


600 trees
Feb. 2015

Boundary hedgerows (old - new)

3400 IM

willows, March 2017



Wood (old) or grove of trees (new)

0,3 ha grove
March 2017



Oasy's How to integrate agroforestry into dairy farming?

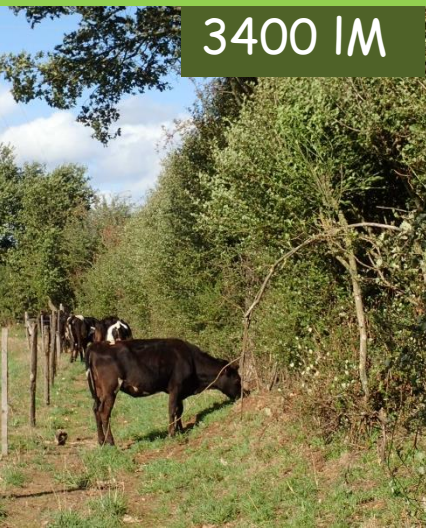
Alley cropping agroforestry

High stem trees + fodder pollards + fodder liana = multipurpose trees



Objectives:

- to test and evaluate AF practices at field scale and on the long term
- to determine coherent ways of integrating AF in a **productive** dairy cattle farm.



3400 IM

willows, March 2017



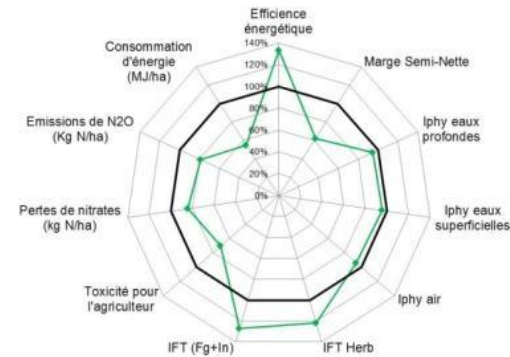
0,3 ha grove
March 2017



Multicriteria assessment at the farm level

A lot of data available regarding:

- **weather and agricultural practices**
- **agronomic and zootechnical performances**
 - crops yield and quality
 - grazing practices
 - daily feeding amount and individual milk production and quality
 - cattle conformation, reproduction, health
- **environment:**
 - water and energy consumptions,
 - biodiversity (pollinators, flora, weeds, avifauna, lepidoptera, odonata, amphibians, reptiles)
 - soil fertility (physico-chemical properties, earthworms, nematodes, enzymes)
- **economic data:** costs, incomes, subsidies



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Many thanks for your attention !