

# SUSTAINABLE CIRCULAR BIOECONOMY IN REGULATING THE ECOLOGICAL CYCLES

## THE ITALIAN EXPERIENCE OF AGRICOLA CIRCE

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Farm: Agricola Circe

ITALY

Animal Task Force seminar:

Animal production, the Key in a European Sustainable Circular Bioeconomy

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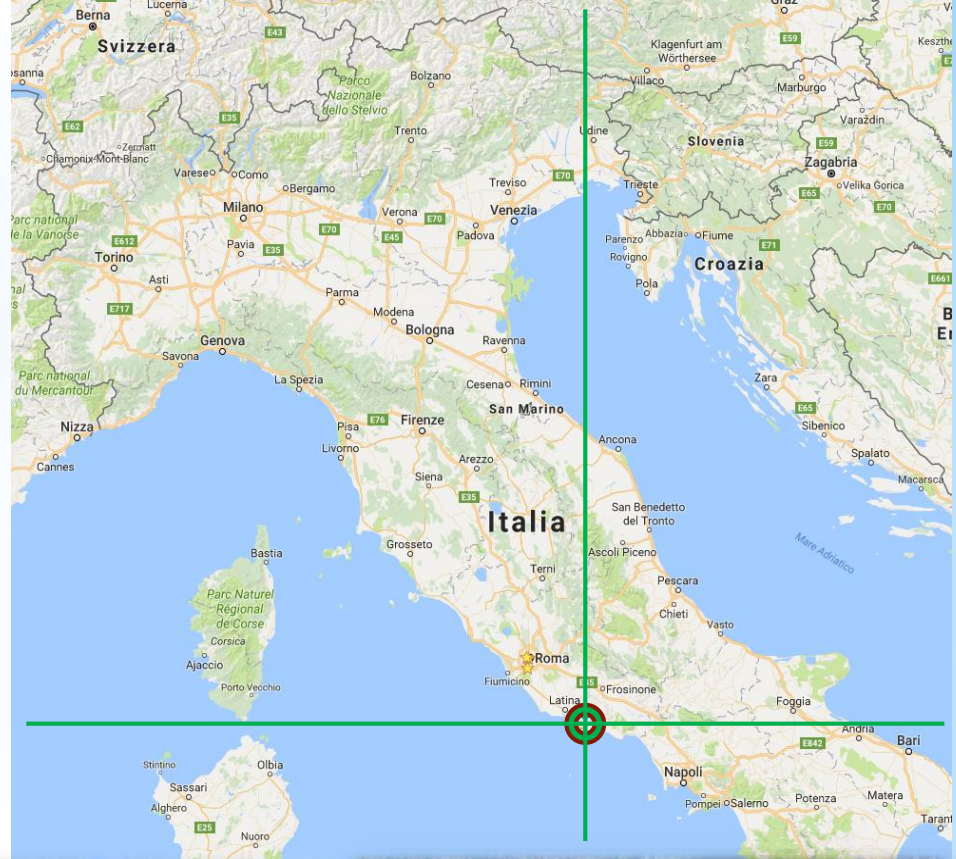


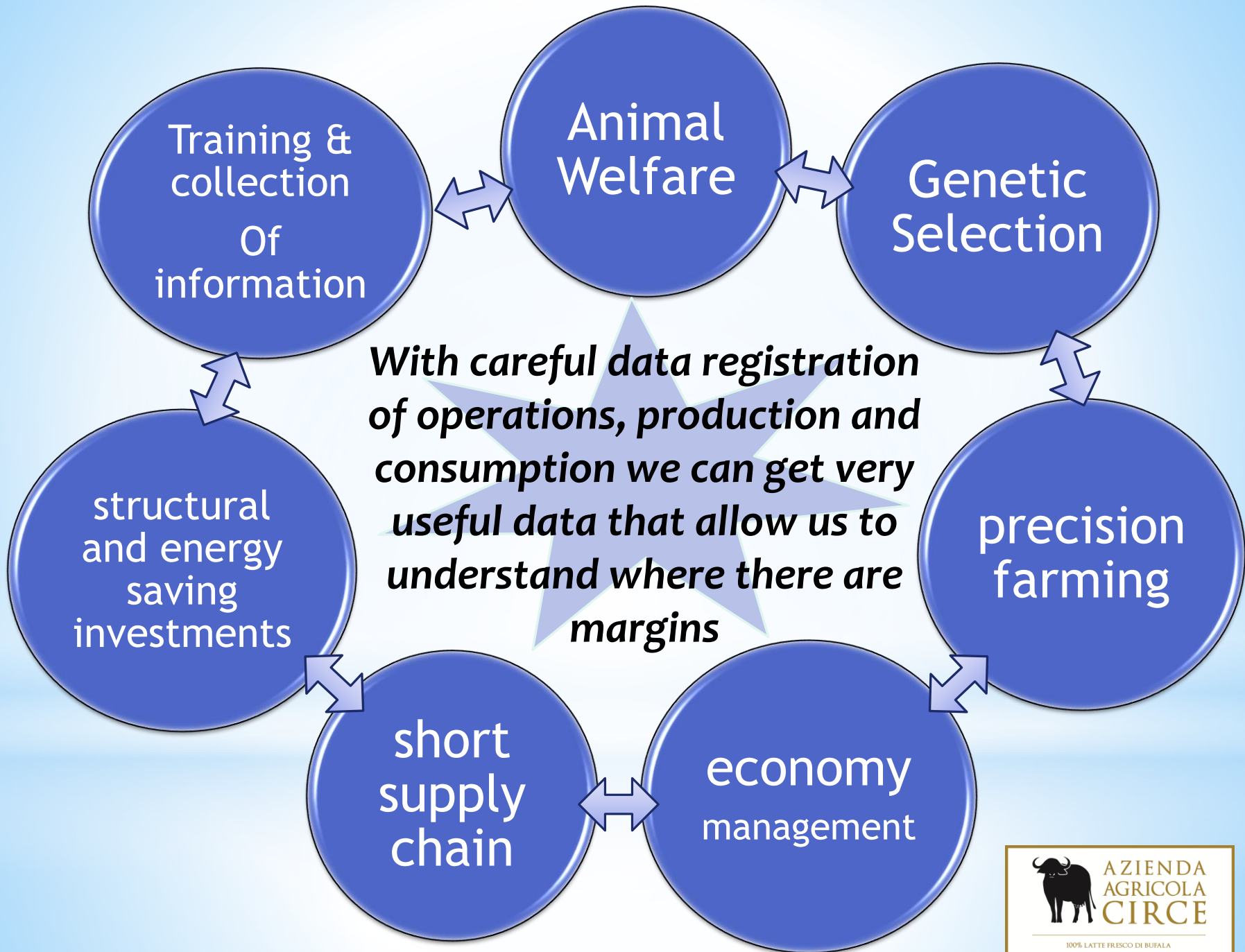


Founded  
in  
1986

## Main activities:

- 300 ha / different crops
- Conservation agriculture
- Animal breeding: 1300 buffaloes
- Products: dairy & meat
- Sales: direct & mass retailers
- Renewable energy production





# - CAREFUL MANAGEMENT - Leads to higher production & Lower greenhouse gas emissions

- **Animal welfare:** The increase in fertility and the reduction of diseases will increase the amount of product generated by an animal during the span of his life.
- **Proper management:** Dividing livestock in groups based on their physiological status allows to provide a more focused supply, improving feed efficiency. **In the last 8 years buffalo calves were nursed by cows instead of the use of powder milk.**
- **Precision farming:** Proper management of agrochemicals and water, minimum tillage, healthy and quality forages are key factor to improve efficiency.

## AVERAGE RATES IN CIRCE

**2006 Fertility: 32% - Replaced 35% - Dead calves 35%**

**2016 Fertility: 45% - Replaced 20% - Dead calves < 6%**



A group of water buffaloes are swimming in a pond. In the background, there is a long wooden structure with a roof, possibly a walkway or a covered area, surrounded by trees. The scene is outdoors and appears to be a farm or a park.

Their happiness is always paid back 😊



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# - UPDATING ON EVIDENCE BASED DATA -

## Mantaining tradition with innovation

- Genetic & epigenetic improvements of the herd are one of the main aims of a farmer
  - A healthier animal provides more kg of fat and protein, generating more income.
  - A buffalo that produces 340kg of fat and 180Kg of protein in 270 days will have the same maintaining costs and emissions of a buffalo that produces half.

### **MEDIUM ANNUAL PRODUCTION OF MILK PER BUFFALO IN CIRCE**

**2006 - A very good morphological base: 23,5 ql.**

**2011 - Improving from a great selection in the female line: 29ql.**

**2016 - First results of artificial insemination on a large scale: 31ql.**



# - LOOKING FOR A BULL TO USE IN ART. INSEMINATION -



## To not stop our progress

DAUGHTERS OF	TOTAL DAUGHTERS	LACTATION DAYS	MEDIUM PRODUCTION PER DAY	FAT PER DAY	PROTEIN PER DAY	AGE - MONTH
PASSATORE	20	220	14,5 kg	1,1 kg	0,65 kg	40,6
JESCE SOLE	22	198	10,7 kg	0,8 kg	0,49 kg	41,6
GOKU	18	176	10,6 kg	0,8 kg	0,47 kg	39,2
8/10	6	186	10,4 kg	0,8 kg	0,47 kg	36,7
<b><u>MEDIUM FIRST LACT.</u></b>	<b><u>170</u></b>	<b><u>191</u></b>	<b><u>10,8 kg</u></b>	<b><u>0,8 kg</u></b>	<b><u>0,49 kg</u></b>	<b><u>39,6</u></b>

**PASSATORE** had the best results in **CIRCE**, unlike the other three bulls it was in progeny testing, then generated daughters from buffaloes below average giving an extraordinary result.

DAUGHTERS	FATHER	MEDIUM PRODUCTION PER DAY	MEDIUM PRODUCTION 270 DAYS	LACTATION	MOTHER	MEDIUM PRODUCTION PER DAY	MEDIUM PRODUCTION 270 DAYS	LACTATION
20	PASSATORE	14,50 kg	36 q l	1	20	9 kg	24 q l	1

*In our farm* **PASSATORE** improved medium milk production + 12 q l.

## Looking for more evidence, with Mastrominico Elvira farm

DAUGHTER	GAVE BIRTH	FATHER	HIGHEST PRODUCTION PEAK	FORECAST PRODUCTION	LACTATION	MOTHER	HIGHEST PRODUCTION PEAK	MEDIUM PRODUCTION	LACTATION
A	156 days	PASSATORE	14,4 kg	30 q l	1	M-A	13 kg	25,5 q l	2
B	178 days	PASSATORE	13,4 kg	24 q l	1	M-B	REMOVED		
C	96 days	PASSATORE	11,7 kg	23 q l	1	M-C	11,2 kg	17,9 q l	3
D	152 days	PASSATORE	13,2 kg	30 q l	1	M-D	14,7 kg	20,8 q l	2



**Daughter (A) was 15 cm higher than her mother (M-A)**



Winner of the first prize in its category  
Buffaloes between the second & the fourth calving



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# - A SHORT PRODUCTION CHAIN -

## A key factor in achieving quality products

- **Production of forage made & supervised by the farmer**
  - In-depth knowledge of the forage that the farmer uses to feed the herd.
  - Made near the farm, lower pollution due to transportation.
- **Processing milk and meat in the farm & applying direct sales**
  - Generate an income that could help support substantial investments in improved management.
  - Allows the company to generate social welfare diversifying its activities (hiring more staff).

Gradually improving quality of our dairy products we are now yearly working **1300 tons** of our **fresh buffalo milk**, with a production of **352 tons** of **mozzarella**, **10 tons** of **ricotta** and **5 tons** of other dairy products. we noticed a slow but steady growth in **demand for farm products**.



## Distribution of employees in the farm

- 7 for the dairy
- 8 for the buffaloes
- 3 for administration
- 2 for agriculture
- 2 for mechanical repairs

The short chain is essential to ensure optimum levels of quality in craftsmanship for characteristic products



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# - ORGANIC FERTILIZATION -

## Improve Bacterial flora & cutback chemical fertilizer

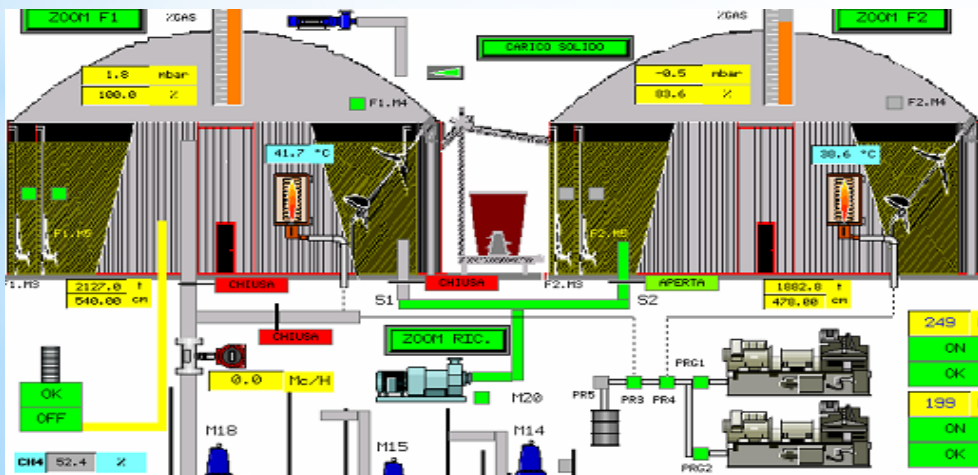
- **Classical organic fertilization with manure and slurry**
  - Good amount of organic matter.
  - Soil fertility improvement.
- **Biogas digestate**
  - Greater environmental compatibility through efficient prevention of land contamination
  - Simple application and greater agricultural output (weed control).
  - Content of nutrients and organic matter. Reduction of chemical fertilizer.

From November to January after the first ryegrass cut we spread **biogas digestate** on the fields, and the the regrowth is fast and extremely satisfying.



# - RENEWABLE ENERGY ON FARM - The biogas opportunity

- Biogas to produce electricity & hot water.
- A 1000 cows or buffaloes farm could easily produce 200KWh per hour and drastically reduce the cost and emissions, also for the production of hot water and steam for other farm activity, as a dairy or for washing of the milking parlor.
- Productive use of organic farm waste : bedding, manure and slurry; discard of food ration; and agriculture by-product.
- Reduction of energy consumption and CO<sub>2</sub> emissions and cutback of methane emissions.



With more than **15 megawatts per day** produced from renewable sources our farm produces 11 times the energy used



# - RENEWABLE ENERGY ON FARM -

## Other ways

- **Solar panels**

- Solar panels on sheds and stables to produce electricity and hot water, Use existing structures to apply for savings and energy production systems.



- **Rainwater harvesting**

- On sheds and stables could be a good way to save on irrigation water or to fill and maintain clean pools for buffaloes and cows.

- **Hydrogen production by Biogas**

- In future a Biogas digester will give the possibility to produce bio-hydrogen or directly convert methane (CH<sub>4</sub>) to hydrogen.



**We are considering the possibility of generating hydrogen from photovoltaic panels for use at night**



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Thank you!