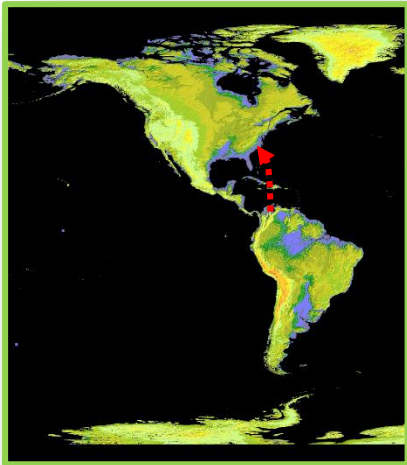


Pasture pork production: a journey to sustainability

Silvana Pietrosevoli
April, 3rd 2018

About me ...

UNIQUELY
BARN
RAISED
LIMITED EDITION



Pathway toward a more sustainable pasture pork production system

- Issues to be addressed in our journey to sustainability
- The pasture pork production systems we are looking for
- Experiences that have proven successful
- Summary of CEFS research- Environmental impact reduction in pasture pork production systems



Issues to be addressed in our path toward more sustainable systems

Environmental impact
Water and soil pollution,
Eutrophication
Acidification
Greenhouses gases
Ground cover deterioration
Soil erosion
Desertification
Lost of biodiversity
Water and land scarcity
Carbon foot print
Non- renewable energy use

Animal wellbeing and welfare
Parasites
Predators

Regulations

Consumers demand and expect
Safe,
Healthy,
Nutritious,
Affordable meat
Fair trade
Ethically sourced

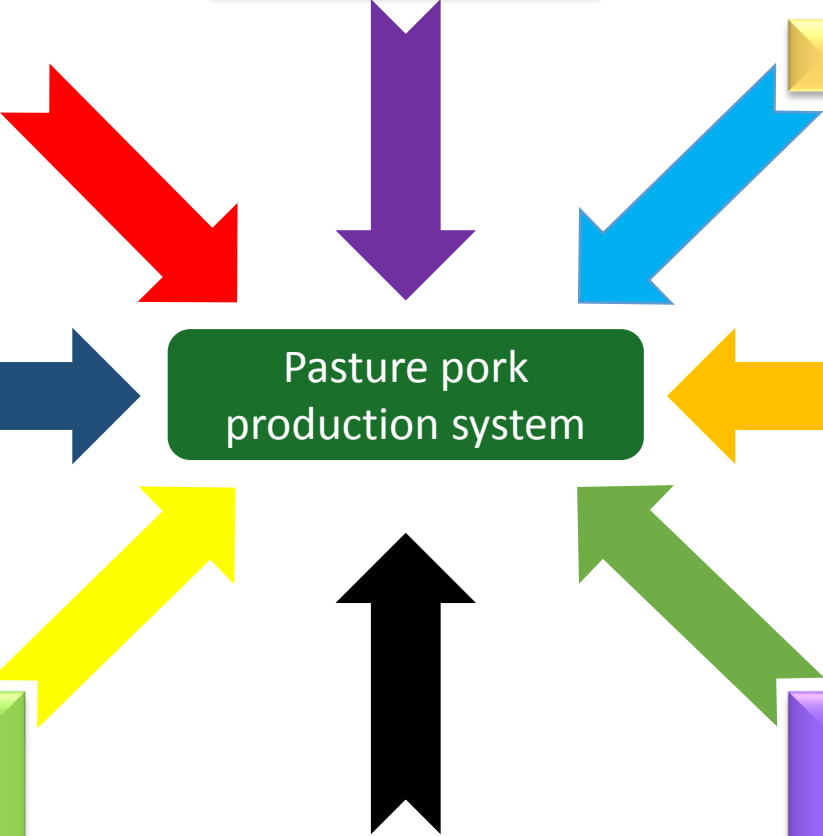
Climate change

Pasture pork production system

Improving and maintaining communities.
Safeguarding the health, well-being, and social rights of workers, farm managers, and their families.

Food safety and public health
Responsible use of veterinary medicines

Farmers profitability



What kind of pasture pork production systems are we looking for?

- Flexible
- Resilient
- Innovative approaches
- Commitment to continuous improvement
- Improve resource efficiency
- Diversification of resources
- Make better use of local resources
- Reduce dependence of external inputs
- Adopt best management practices
- Improve the management of forages
- Improve feeding and breeding practices
- Foster the use of renewable energies
- Develop a record keeping culture
- Explore emerging markets
- Benefit from environmental services payments



Our goal:

Design pasture pork production systems

**More productive
more efficient
more resilient
more sustainable**



There is no “one-size-fits-all” solution

Need to develop production systems adapted to each farm unique circumstances

Path toward a more sustainable pasture pork production system

- 
- **Better use of local resources (alternative feedstuffs, heritage breeds, traditional systems)**
 - **Traditional and new technologies (genetics, breeding)**
 - **Increase resources efficiency (animals, feed supply chains)**
 - **Implement best management practices**

Make a better use of local resources

Improve breeding programs



“Breeding innovations are necessary to obtain animals that are both productive and adapted to a broad range of local contexts and diversity of systems.”

- Pure vs crossed.
- Specialty niche markets
 - Pure breed
 - Control inbreeding.

“Genetic Biodiversity”

Rydhmer, Gourdine, de Greef and Bonneau, 2014

Phocas et al., 2016

Increase survival rate on pre and post weaning periods



Breeding – Maternal abilities.

Baxter et al., 2011a

Optimize farrowing hut and creep design

Baxter et al., 2011b

Piglet protection features:

Sloped wall, rails, raised bars

Provision of substrate (10-15 cm) and nesting material

Improve Feed efficiency, Zero feed wastage, Feeding strategies



- Single diet, blend feeding or three-phase feeding
 - Sex-split
- Lower nutrient excretion
Lower costs

Niemi et al., 2010; Schulz and Hadrich, 2014; Moore, Mullan and Kim, 2016

Alternative feed resources and by-products, food waste recycling



Diener et al., 2009;
Van Huis, 2013

Image www.changemakers.com



Be aware of potential impact on performance, carcass and pork quality

Make a better use of local resources, multispecies pastures (Grasses, legumes and herbs)

Barley and Austrian winter pea



“Seeds are cheaper than supplemental feed”.

Options to consider: grasses, legumes, brassicas, chicory, plantain, amaranth, Jerusalem artichoke, millets, and other forages.

Ryegrass, chicory and clover

To encourage pasture consumption:

Provide new grazing areas (Andresen and Redbo, 1999)

Supplemental feed restriction [FR] (Kanga et al. 2012; Kongsted et al. 2015)

To avoid impact on performance

FR ≤ 20 to 30% for growing pigs

FR ≤ 30% for replacement gilts

FR ≤ 25% Lactating sow

FR ≤ 50 to 70% Gestating sow (Bauza, 2005;2007; Bochicchio et al., 2012)



Improve pasture management, establish adequate stocking rates

Referential Stocking Rates to Maintain Vegetation Cover

Annual species * 10 to 20 weaned to finishing head/acre
* 2 to 4 sows + litter/acre

Perennial species * 15 to 30 weaned to finishing head/acre
* 6 to 8 sows + litter/acre

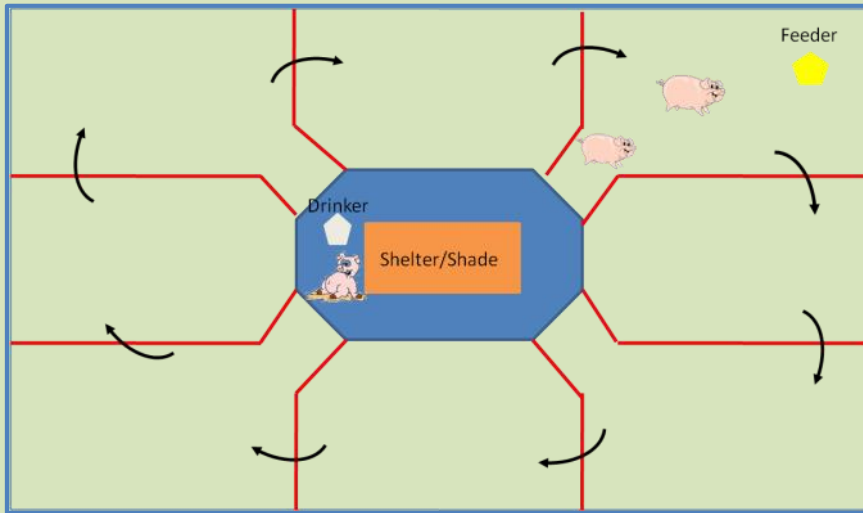
Natural vegetation * 4 to 10 weaned to finishing head/acre
* 0.5 to 1 sows + litter/acre



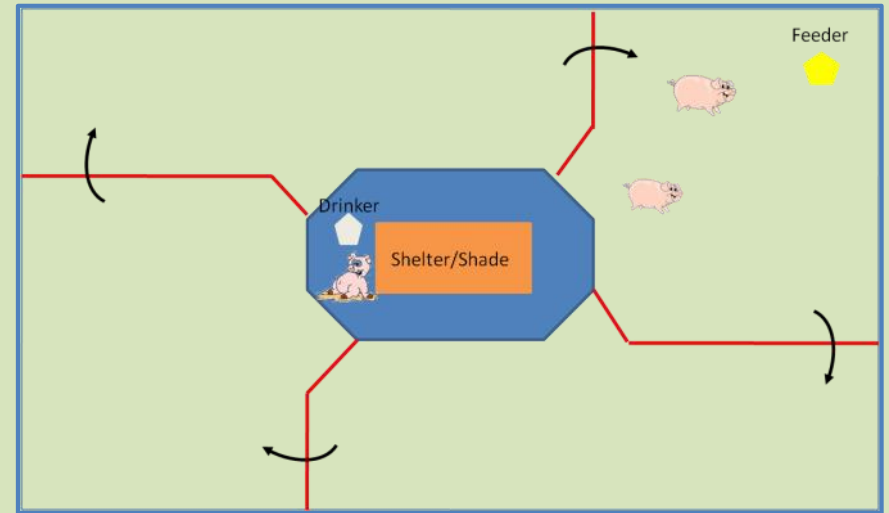
Stocking rates must be adjusted according to forage species, climate, soil, drainage and managers' skills.

Improve pasture management, implement rotational stocking systems

Rotational Stocking



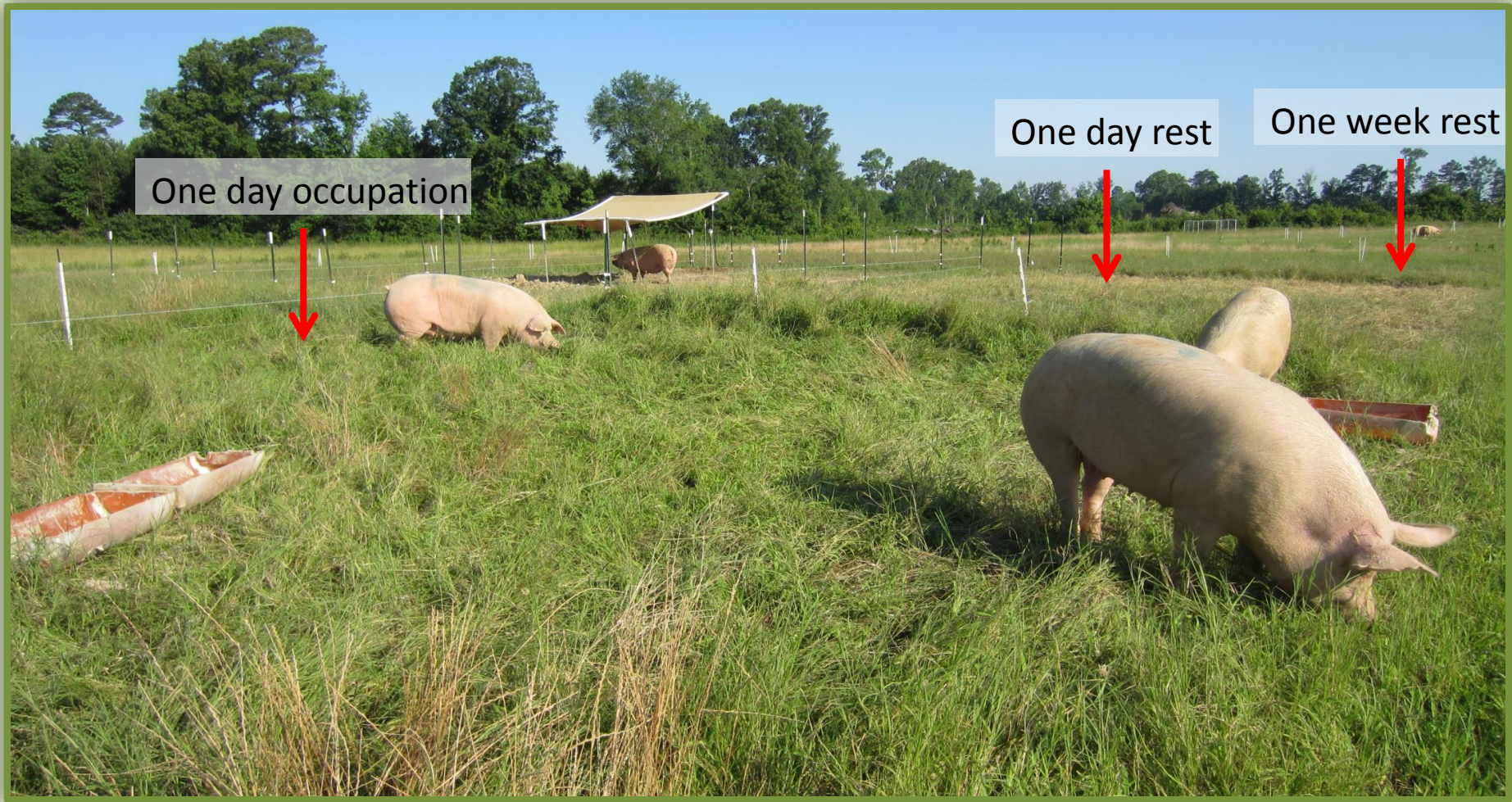
Weeks 1 to 8



Weeks 9 to 12

Same paddock, changes are consequence of internal fences removal

Rotationally managed bermudagrass paddock

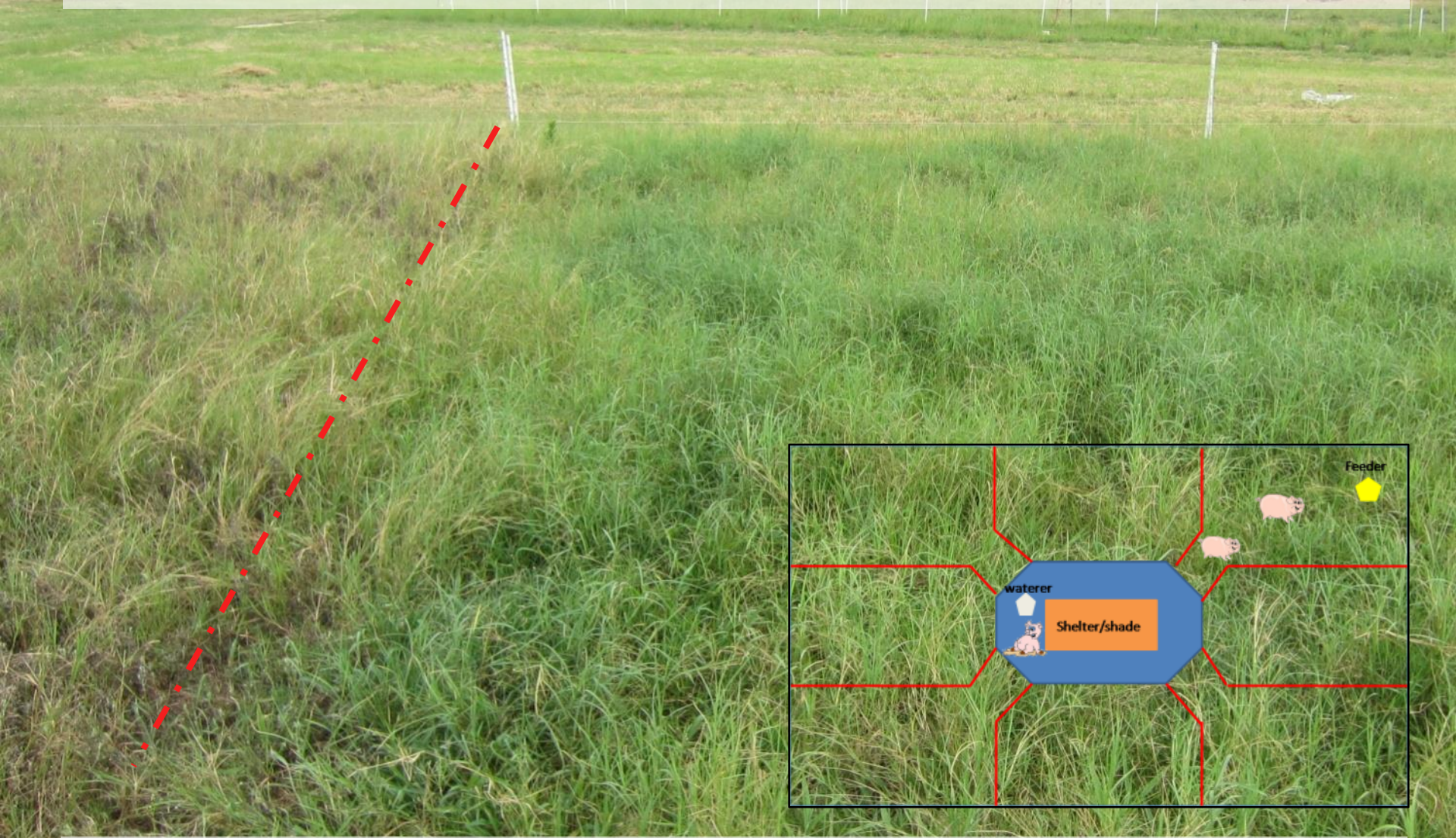


0.37 acre bermudagrass pasture divided in 9 sections: 1 HUA and 8 grazing paddocks

Period of occupation per section: 1 week

Stocking rate: 4 sows per paddock, equivalent to 11 sows/acre

Rotating hogs between paddocks provides rest periods for forages to recover and helps to avoid the build-up of parasites and diseases

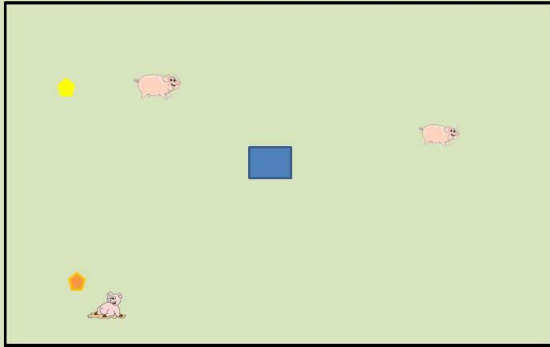


Recovery of bermudagrass managed with a stocking rate of 11 sows/acre after 3 weeks of rest. Note the difference in color with the section at left that has not been grazed yet.

Stocking Systems

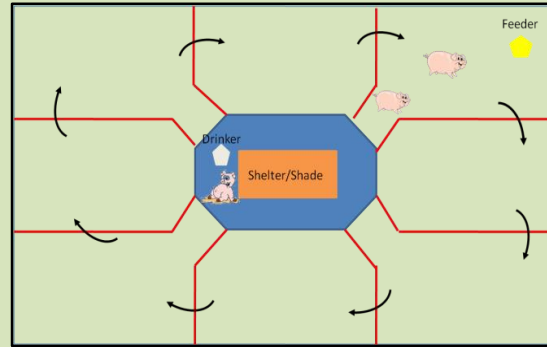
Continuous stocking

Weeks 1- 12

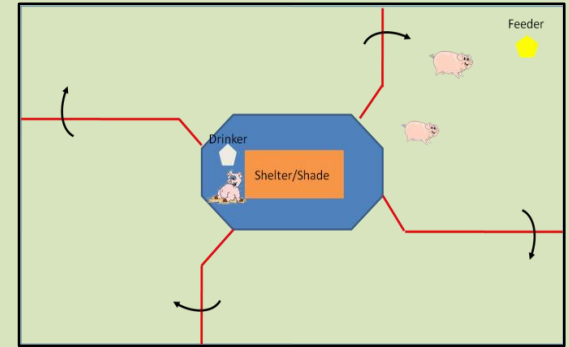


Rotational stocking

Weeks 1- 8

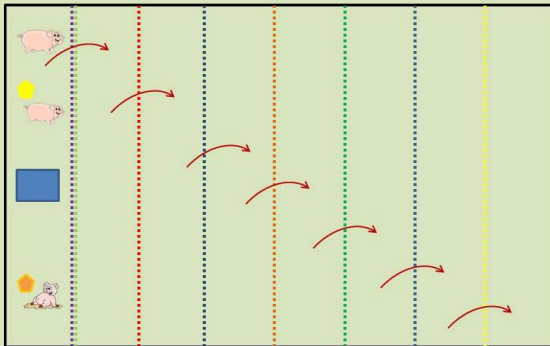


Weeks 9- 12

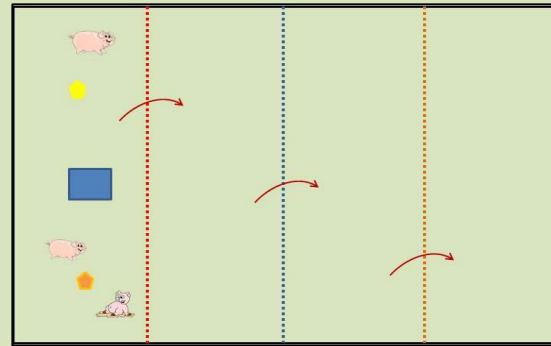


Rotational strip

Weeks 1- 8



Weeks 9- 12



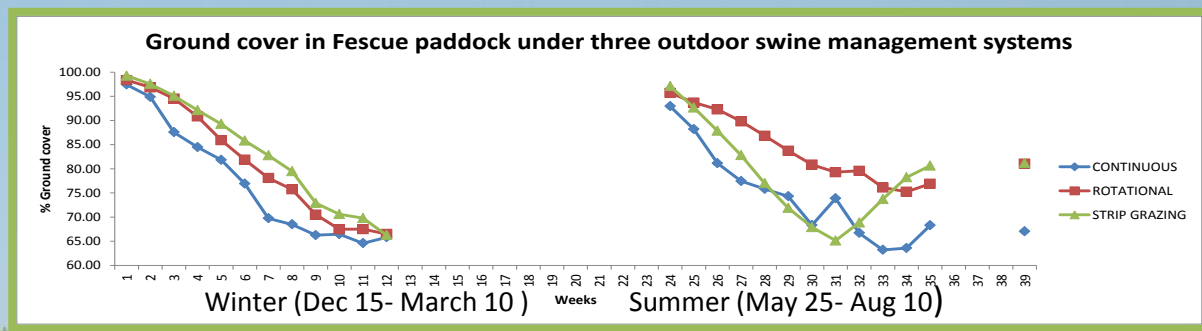
	Treatments	Area in use	Ft ² /pig
Weeks 1-8	Continuous	100 %	2274
	Rotational	22.2 %	505
	Strip grazing	12.5 %	284
Weeks 9-12	Continuous	100 %	2274
	Rotational	33.3 %	758
	Strip grazing	25.0 %	568

Stocking rate equivalent to 20 hogs/ac (2600 lb/ac)

Paddock size 18192 ft²

In the Rotational Stocking system pigs have permanent access to the central area

Tall fescue under three stocking systems



20 pigs/ac.
Soil NO₃ (22.5%), P (18.6%), K (19.5%), Mn (8.1%), Zn (14.3%) , and Cu (8.3%) higher in the continuous system.
Same pig growth (1.61 lb/d), feed intake (4.32 lb DM/pig/d) and gain to feed (0.37 lb gain/lb feed).
Changes in sward botanical composition: tall fescue (65%), other grasses, (30.3%) and broadleaf species (4.7%)

Sylvopastoral systems



Image courtesy J-M Luginbuhl



Image courtesy ARSIA



“Preliminary analysis suggests that the financial performance of this agroforestry enterprise could be superior to that of a pasture-based enterprise”.

Brownlow, Dorward, and Carruthers, 2005

Sylvopastoral systems, AGFORWARD project

Pigs integrated with energy crops, poplar (*Populus* spp) and willows (*Salix* spp)



AGFORWARD, Denmark



AGFORWARD, Italy

Evaluation of trees as fodder source, mulberry (*Morus* spp)



AGFORWARD, Spain

Waste recycling, business diversification



Composting



Anaerobic digester



Vermicomposting



Explore emerging niche markets, charcuterie



Explore new marketing strategies: on farm sales, INTERNET, Social Media



Farmer markets, restaurants, wholesaler/distributor, processing plants, small retailers, CSA, farm stand, online, aggregators

Multifunctionality and Ecosystem service delivery

“ ... livestock sustainability assessments tend to focus primarily on **environmental and economic dimensions**; therefore, these valuations might be limited because they do not consider the **complete set of associated goods and services** (soil fertility, farmland biodiversity, food security, rural vitality and culture).

Hence, a need exists to recognize the **multiple contributions provided by livestock to human well-being and society.** “

Ryschawy, Disenhaus, Bertrand and Allaire, 2017



Possibility to establish payment for ecosystem services. United nations program.

Öhlund, Hammer and Björklund, 2017.

Take home ideas

Sustainability is not a finish line, rather is a journey enriched by our commitment to continuous improvement.

This continuous transformation implies a change in the way we conceive our rapport with the environment, with the territory and with the surrounding community.

Farmers should shape their production system in a way to find a balance among the three aspect of sustainability: environmental impact, animal welfare and economy/profitability. Sometimes, this would imply accepting some trade offs.

To guaranty system and farm survival over time, **profitability goals need to be achieved.**



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Silvana_Pietrosemoli@ncsu.edu

For a Sustainable Pasture Pork Operation:

Design a flexible production system adapted to the unique circumstances of your farm.

Select an animal breed suitable for outdoor production.

Select a site that minimizes potential runoff to waterways.

Use appropriate vegetation.

Build vegetation buffer filters to limit runoff to waterways or drainage ditches.

Include locally-available feedstuffs in your feeding program.

Implement management practices to reduce environmental impact and adapt them to the season

- **Adjust stocking rate and length of animals stay according to climate, soil, drainage and managers' skills.**
- **Allow your paddock a resting period**
- **Protect areas sensitive to soil compaction**
- **Reduce feed wastage**
- **Plan periodic movements of structures and equipment**
- **Utilize crops to remove soil nutrients**
- **Conduct periodic soil tests**

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