Establishing high density protein banks in the West Africa context: an innovative contribution to the sustainable intensification of family dairy farming systems

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Background

- Study location (Western of Burkina Faso): Sudano-Sahelian climate (precipitation: 800-1000 mm per year)

- Savannah ecosystem with:
  - an anthropic pressure of 50 inhabitants/km²
  - 40 livestock heads/km²
  - 50% surface occupied by cultures (much higher than the northern region).

- Predominance of integrated mixed-farming system, strong presence of trees and shrubs (15 to 20 trees/ha)

- Traditionally, the ligneous vegetation (trees, shrubs...) play multiple functions (household, agriculture, traditions or religious natures), especially those regarding forage production (pruning branches)
Local pastoral resources are increasingly scarce or have difficult access due to the agricultural expansion.

Local dairy farmers have limited land for forage production (<1 ha).

Livestock feed resources are increasingly expensive, thus very often unavailable for low input livestock keepers.

A diagnosis made last year (2015) showed a problem in animals feeding system during dry season, especially the lack of natural pasture and the increase or the unavailability of livestock feeding resources.
Background

Traditionnal dairy farms

Liveweight estimated by UF

Milk Production

Semi-intensives dairy farms

Liveweight estimated by UF

Milk Production
Local dairy products demand continues to increase with urbanization (especially during the dry season) thus raising milk prices in the market.

The local dairy production is confronted to an increasing quantitative and qualitative deficit.

Alternative technologies using trees and/or shrubs exists and have demonstrated a good potential to overcome this kind of challenge.

Due to particularities of local land tenure practices, and because of other reasons like: cost of establishment, those technologies remain little adopted in the western area of Burkina Faso.
Hypothesis

Milk Price

Milk Prod.

Needs / Inputs

Rainy season Dry season

Deficit

Innovation (Protein bank)

Efficiency

Milk Prod (+) Inputs (-)

Innovate
Objective

- Updating and better valorizing the role of ligneous fodder species looking for the productivity and sustainability of the local dairy farming systems
Material and Methods
Background

- 3 identical protein banks
- Plant density: 20,000 trees/ha (1 m × 0.5 m)
- 5 species combined: 2 for BP design *per se* and 3 for living fence

**Diagram:**
- Mulberry (*Morus alba*)
- *Leucaena leucocephala*

**Legend:**
- Gs: *Gliricidia sepium*
- Al: *Albizia lebbeck*
- Ss: *Samanea saman*
Expected results

Innovative agro-sylvo-pastoral fodder system is planned

- *Morus alba*
- *Leucaena leucocephala*
- *Gliricidia sepium + Samanea saman + Albizia lebbeck*
Climatic variables monitoring (\textit{i.e.} temperature, humidity, solar radiation, wind speed, pluviometry)

Soil variables (physical and chemical characterization - bimonthly)

Plant growth variables (height, stem diameter, average number and length of branches, diseases/attacks and eventual treatments)

Plant quality (\textit{i.e.} through chemical analyzes of plant parts \textit{e.g.} dry and organic matter, protein, fiber and mineral contents)

Standardization cut (once considered established the BP): 100% of plants will be harvested at a height of 45-50cm)

What is ongoing? Monitoring of BP progression during the establishment year
✓ First evidences indicates that this project will be strongly accepted by local farmers and stakeholders

✓ We hopes that initiatives and innovations will be regionally expanded at the medium and long terms (due to the impact of demonstrative « farmers to farmers » extension principles)

✓ Livestock and overall flock productivity are expected to be increased

✓ Farm feed efficiency and autonomy are also expected to be improved
THANKS FOR YOUR ATTENTION

OBRIGADO PARA A ATENÇÃO