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Acceptability and market potential of forage plants grown in treatment wetlands in Dakar-Sénégal

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Introduction

The treatment of faecal sludge in planted drying beds with *Echinochloa pyramidalis* offer many advantages:

- an environmental and economic technology ;
- solid-liquid separation and purifying sludge are important;
- an production of nutriments to support agricultural production and improve livestock productivity while protecting the health of populations.

Objectives

After the studies for Master aimed at assessing the potentials of sludge drying beds vegetated with *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase for faecal sludge (FS) treatment who conducted at the Station of Cambérène from november 2008 to march 2009,

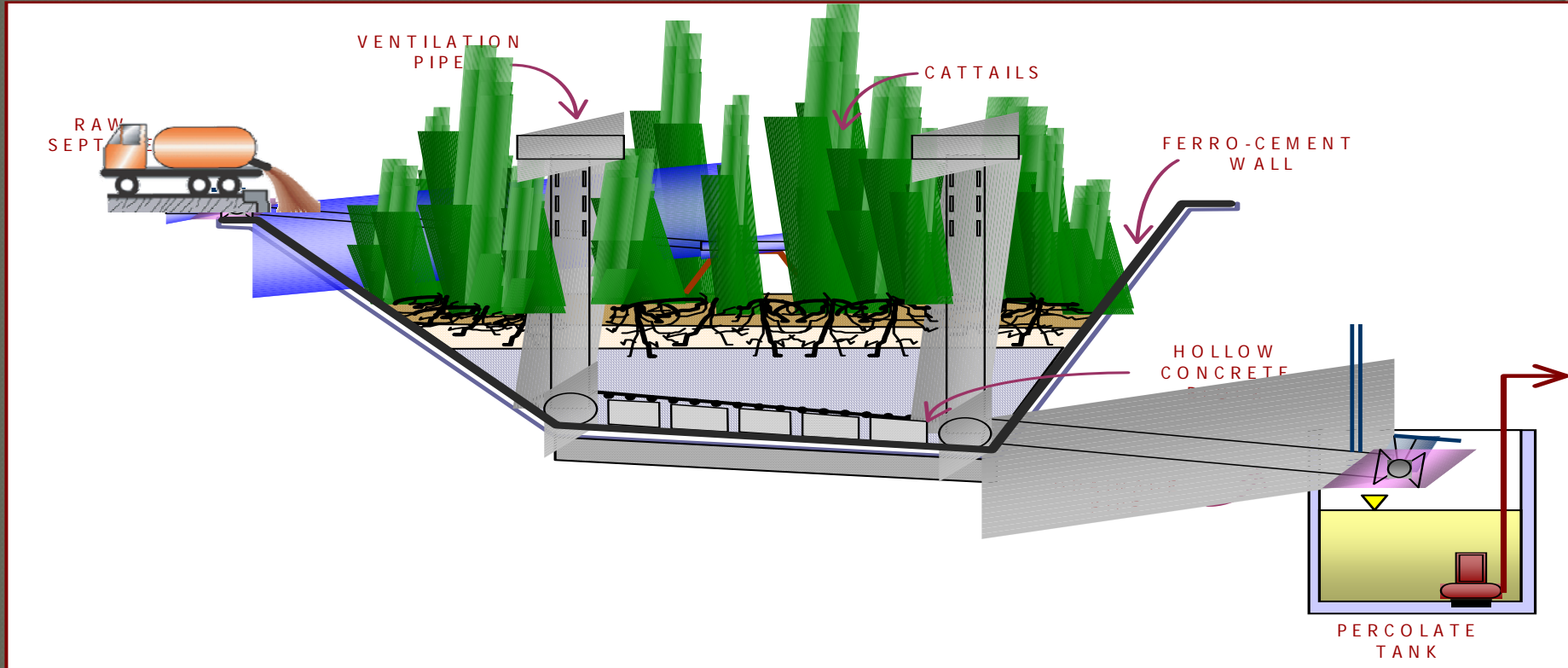
This study aims to assess the safety and nutritional value of *Echinochloa pyramidalis* from the drying beds, social acceptability levels of farmers and consumers and the potential of its economic and financial adjustment.

Specifics Objectives

1. : Conduct a market study on the recovery of forage grown in drying planted beds in urban and suburban;
2. : Evaluating the social acceptability of plants grown under artificial fodder by farmers and consumers;
3. : Analyze the effect of conditioning on the nutritional value and health (applying the method QMRA) Forage *Echinochloa pyramidalis* from drying beds planted and compare them to their natural ecosystem;
4. : Evaluate ways to optimize the treatment of sludge from the beds planted at the filer (Application of the material flow analysis)

- Faecal sludge(FS) is defined as sludge of variable consistency collected from so-called on-site sanitation systems, such as latrines, non-sewered public toilets, septic tanks and aqua privies. is derived from human excreta.
- Planted sludge drying beds can be define as an artificial system composed of selected media supporting emergent vegetation purposely constructed by humans for sludge dewatering

Illustration



Source: AIT- SANDEC

Materiel

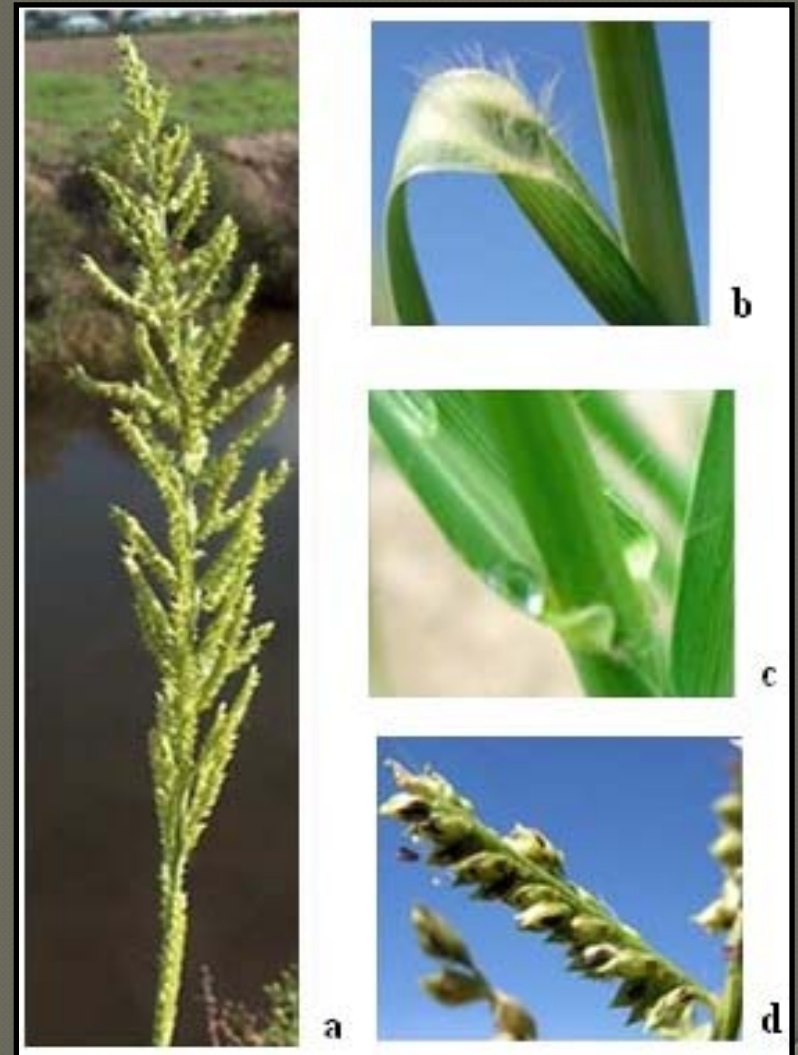
- Echinochloa pyramidalis is a reedlike perennial up to 300 cm high, with solid stems, rarely to 450 cm, ligules of the lower leaves a fringe of hairs often absent on the upper. Inflorescence 15-30 cm long with racemes up to 8 cm long having purplish, acute, awnless spikelets 3-4 mm long (Napper, 1965).

Is particularly rich fodder for livestock both as green fodder and hay in tropical Africa.

No toxicity has been reported.

Illustration

Genus: *Echinochloa*
Family: *Poaceae* (alt.
Gramineae)
subfamily: *Panicoideae*
tribe: *Paniceae*.



Illustration



November 2008



March 2009

Methods

The study will be divided in two parts: one part experimental and other part socio-economic.

The methodology used is based on "ecosystem approach to human health" or EcoHealth approach.

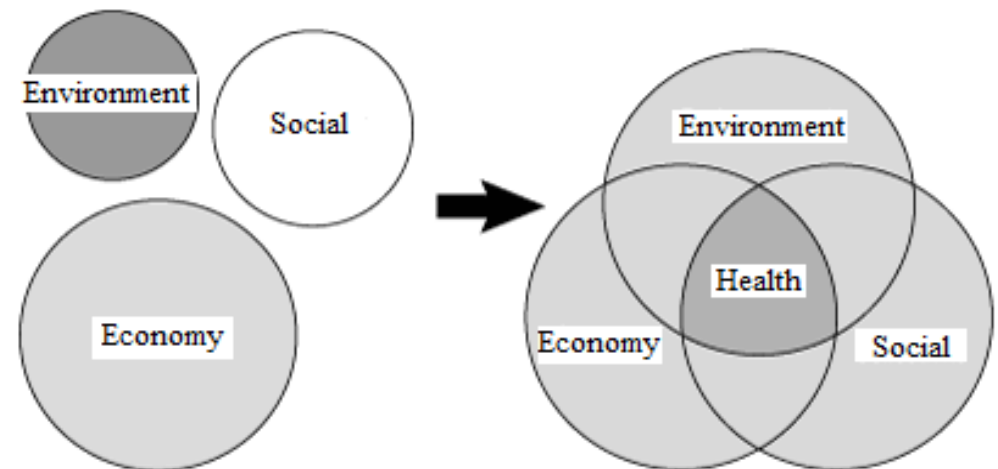


Figure. 1. Ecosystem approach t (CRDI)

Experimental study

1. Safety of *Echinochloa pyramidalis* by the Quantitative microbial risk assessment (QMRA): 4 stages
 - Hazard Identification: Describe a microorganism and the disease it causes
 - Dose-Response: The relationship between the dose (number of microbes) received and the resulting health effects
 - Exposure Assessment: Determine the size and duration of exposure by each pathway. Estimate the number of people exposed and the categories of people effected.
 - Risk Characterization: Integrate the information from steps 1, 2, and 3 into a single mathematical model to calculate risk -- the probability of an outcome like infection, illness or death. Since steps 1, 2 and 3 will not provide a single value, but a range of values for exposure, dose, and hazard, risk needs to be calculated for all values across those ranges.

2. Nutritional value of *Echinochloa pyramidalis*

The nutrient content of forages varies greatly depending on the type of forage, degree of maturity at cutting and capacity preservation.

Quantifies:

- the energy from food and food needs ,
- the digestible protein in the intestine
- The digestibility of forage.

Socio-economic study

- *Evaluating the social acceptability of the use of *Echinochloa pyramidalis* by stakeholders*

a questionnaire applied and interview guidelines distributed according to the importance of the role in society of stakeholders. Both tools will be developed just after an observation phase.

Method

- *Conduct a market research and assess the economic viability of the use of byproducts of planted drying beds*

This activity will be done with the collaboration of the entire team. The test of acceptability, factor analysis and typological analysis will be performed.

- *Use Material flows analysis in the treatment of faecal sludge*

It uses Input/Output methodologies, including both material and economic information. It is an accounting system that captures the mass balances in an economy, where inputs (extractions + imports) equal outputs (consumptions + exports + accumulation + wastes), and thus is based on the laws of thermodynamics.

Expected Results

- Characterization of *Echinochloa pyramidalis* as forage: safety and nutrition values
- Acceptability of *Echinochloa pyramidalis* by stakeholders
- Economic values of *Echinochloa pyramidalis* in livestock in urban and peri urban area.

Conclusion

This project aims at linking sanitation service and infrastructure provision to cities economic development agenda. It links : (i) sanitation improvement and (ii) food security in poor urban and peri-urban areas of developing countries. Hence, this project introduces a new paradigm: making excreta and wastewater management a profitable business for cities planners and stakeholders.