

**Local Perspective on Legume Based  
Technology: A Holistic Approach to  
Target and to Promote the Utilisation  
of Herbaceous Legumes in the Derived  
and Northern Guinea Savannas of  
West Africa**

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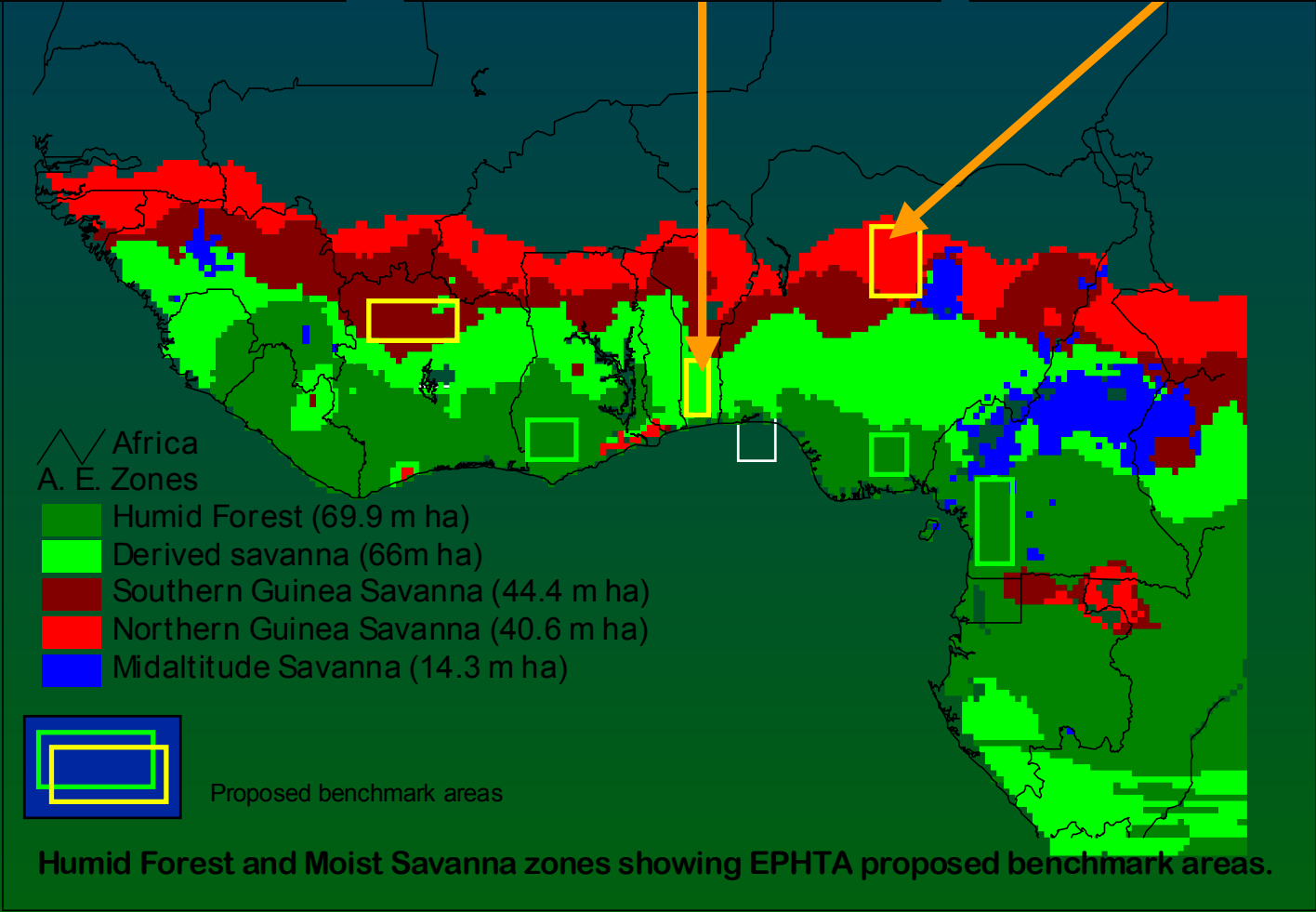
# Outlines

- **Introduction**
- **Materials and methods**
- **Results per agro-ecological zone**
  - **Situation analysis**
  - **Adoption patterns**
- **Conclusions**

Funding: BMZ/GTZ  
Key partners: UH, IITA, ILRI

Derived/coastal Savanna  
Key partner: INRAB

Northern Guinea Savanna  
Key partners: IAR, NAPRI

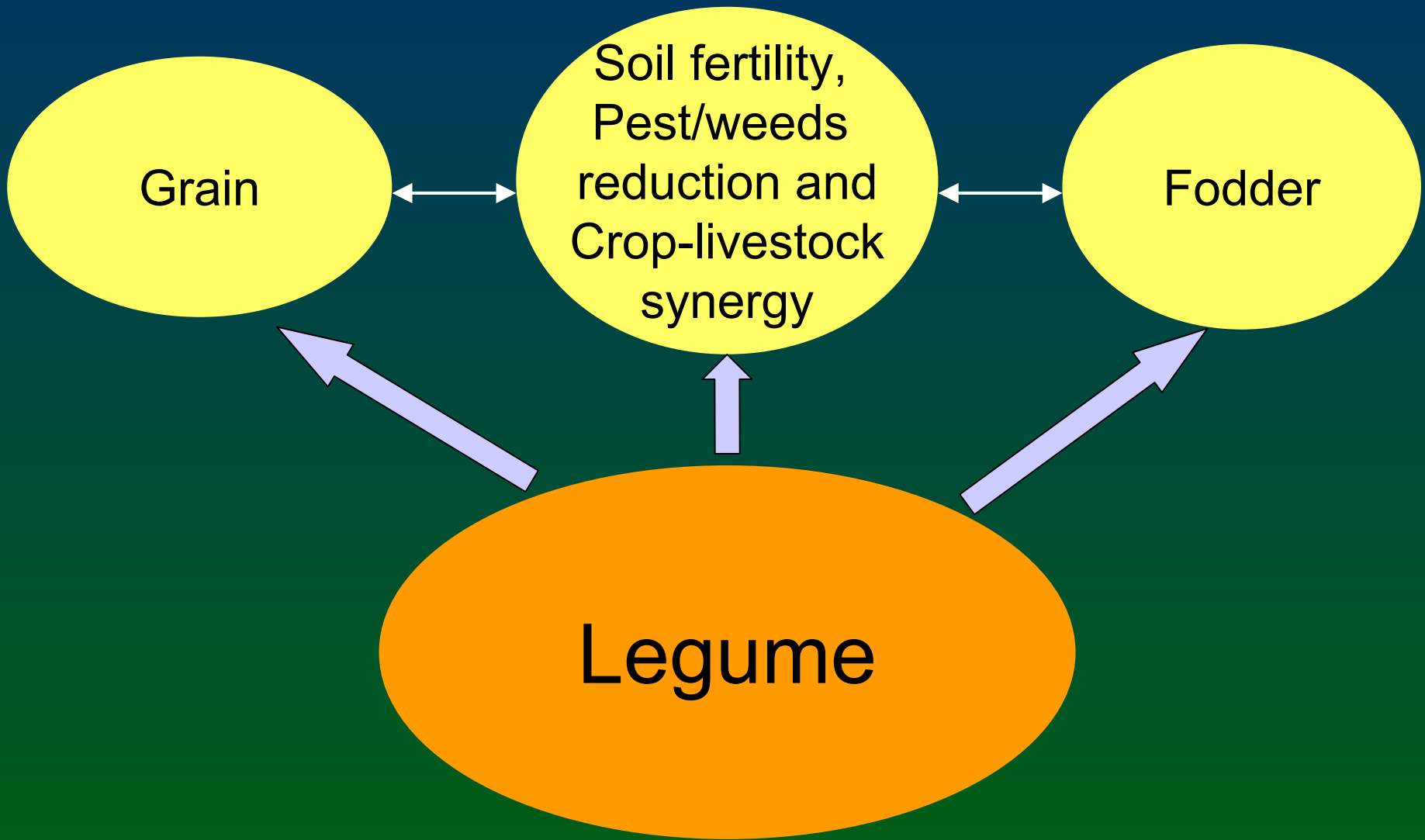


# Background

# **Intensification constraints in West African savannas**

- **Increasing human and livestock population**
- **Increasing land scarcity**
- **degradation of natural resource base**

# Potentials benefits of legumes



# Research question and objectives

- **Despite legume potentials:**
- **Farmers' utilisation of legume is still limited**
- **How to promote legume utilisation?**
- **Where does legume utilisation make sense?**



# From positivist to constructive approach

**Technology as hardware,  
which is culturally neutral  
and works value free**

- ▶ **Technology transfer**
  - ▶ **limited adoption**

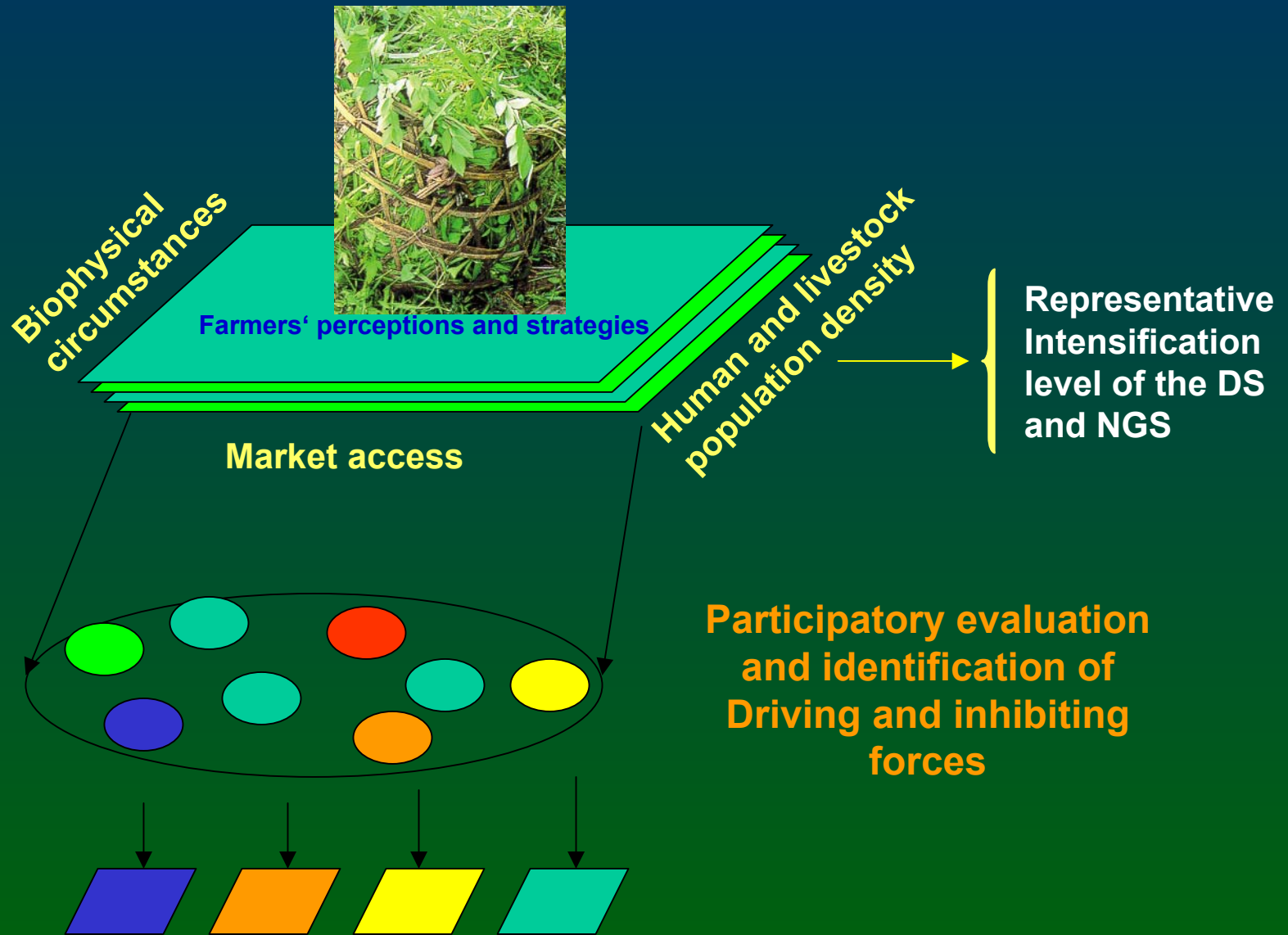
**Technology  
as an iterative interaction  
process between researchers  
and stakeholders**

- ▶ **Participatory Technology  
Development**
  - ▶ **Improved adoption**

**Better adaptation to  
farmers' perspectives  
Improved adoption**

# Research approach

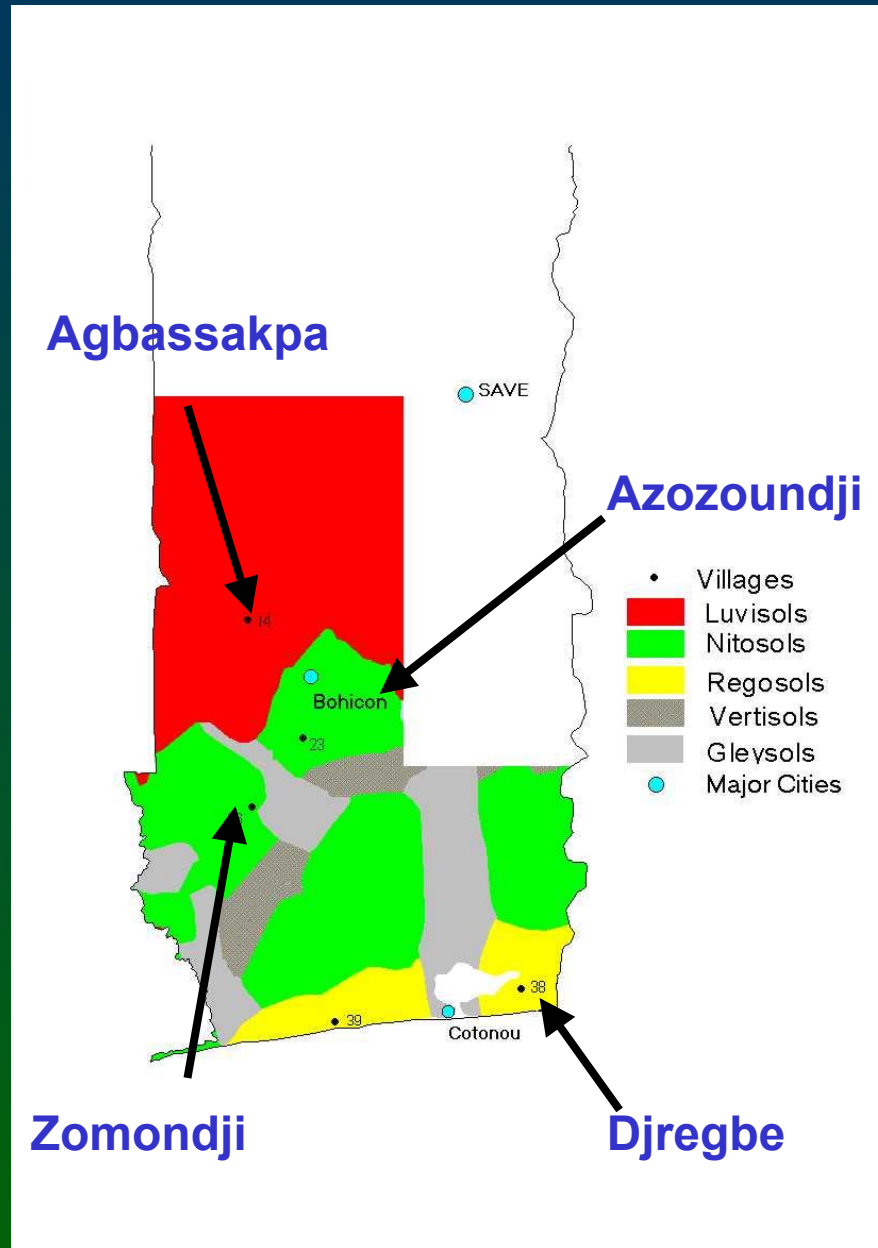
# Agronomically selected basket of legume options



**Targeted Dissemination in the Derived and Northern Guinea Savannas**

# Materials and methods

# Site location and circumstances in the DS



## “Basket” of options for the DS

| Genus               | Species             | Accessions    |
|---------------------|---------------------|---------------|
| <i>Aeschynomene</i> | <i>histris</i>      | I.12463       |
| <i>Arachis</i>      | <i>hypogaea</i>     | TS32-1        |
| <i>Centrosema</i>   | <i>pubescens</i>    | I.152         |
| <i>Glycine</i>      | <i>max</i>          | TGX 1448-2E   |
| <i>Mucuna</i>       | <i>pruriens</i>     | <i>Utilis</i> |
| <i>Pueraria</i>     | <i>phaseoloides</i> |               |
| <i>Stylosanthes</i> | <i>guianensis</i>   | I.15557       |
| <i>Vigna</i>        | <i>unguiculata</i>  | IT84D-449     |
| <i>Vigna</i>        | <i>unguiculata</i>  | *“Mawuwena”   |

\* God’s gift: Local variety reintroduced from different village

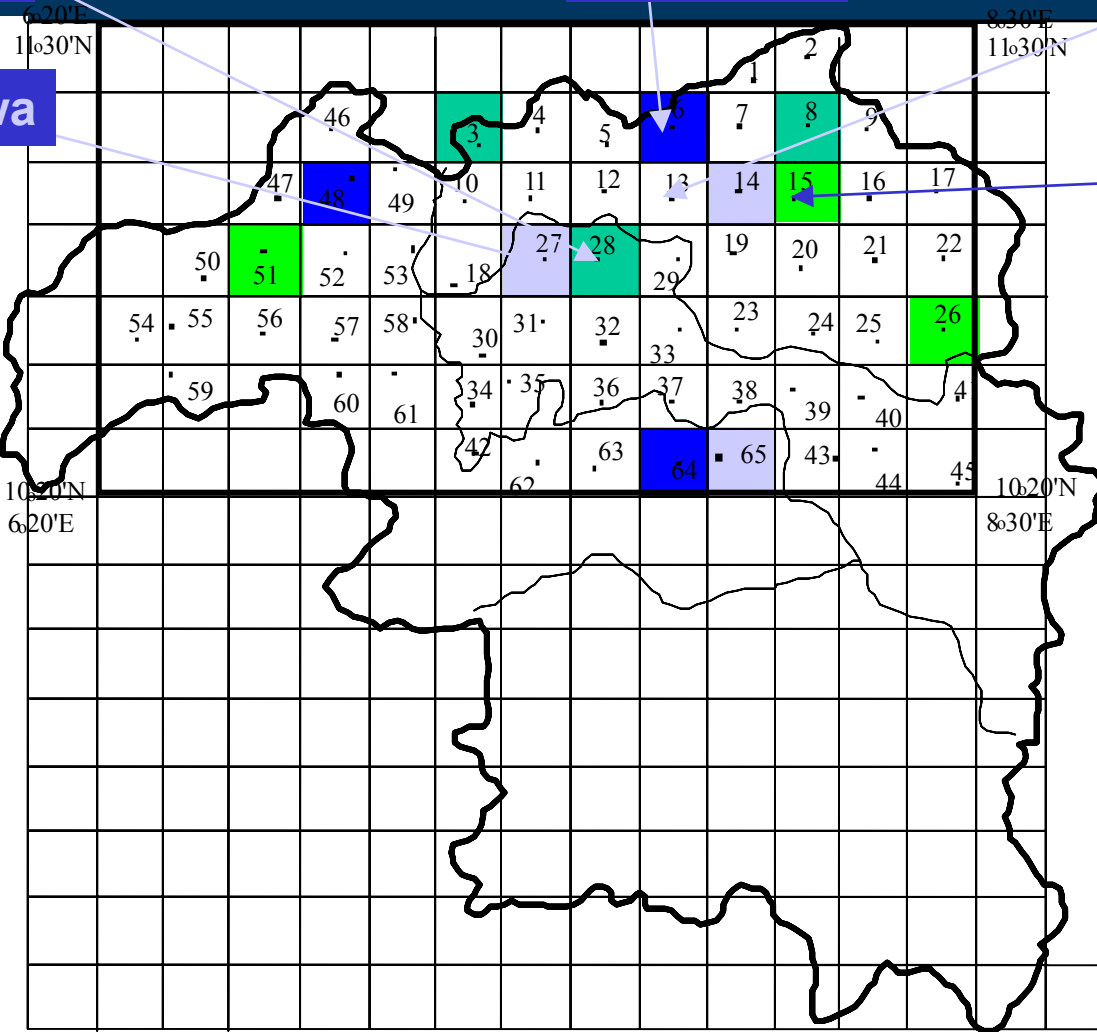
Dunki

Dan Birnin

Zaria

Gobirawa

Turawa



Domain 1



Domain 2



Domain 3



Domain 4



State boundary



AD boundary



Benchmark boundary

1,2,3,4 Villagenumber

## **“Basket” of options for the NGS**

| <b>Genus</b>               | <b>Species</b>             | <b>Assessments</b> |
|----------------------------|----------------------------|--------------------|
| <b><i>Aeschynomene</i></b> | <b><i>histris</i></b>      | <b>I.12463</b>     |
| <b><i>Arachis</i></b>      | <b><i>hypogaea</i></b>     | <b>M572-80-I</b>   |
| <b><i>Centrosema</i></b>   | <b><i>pascuorum</i></b>    | <b>I.152</b>       |
| <b><i>Chamaecrista</i></b> | <b><i>rotundifolia</i></b> |                    |
| <b><i>Glycine</i></b>      | <b><i>max</i></b>          | <b>TGX 1448-2E</b> |
| <b><i>Lablab</i></b>       | <b><i>purpureus</i></b>    |                    |
| <b><i>Macrotyloma</i></b>  | <b><i>uniflorum</i></b>    |                    |
| <b><i>Stylosanthes</i></b> | <b><i>hamata</i></b>       |                    |
| <b><i>Vigna</i></b>        | <b><i>ungulculata</i></b>  |                    |
| <b><i>Vigna</i></b>        | <b><i>ungulculata</i></b>  |                    |



## **List of activities**

**Zonation and selection of research villages (using discriminant and principal component analysis)**

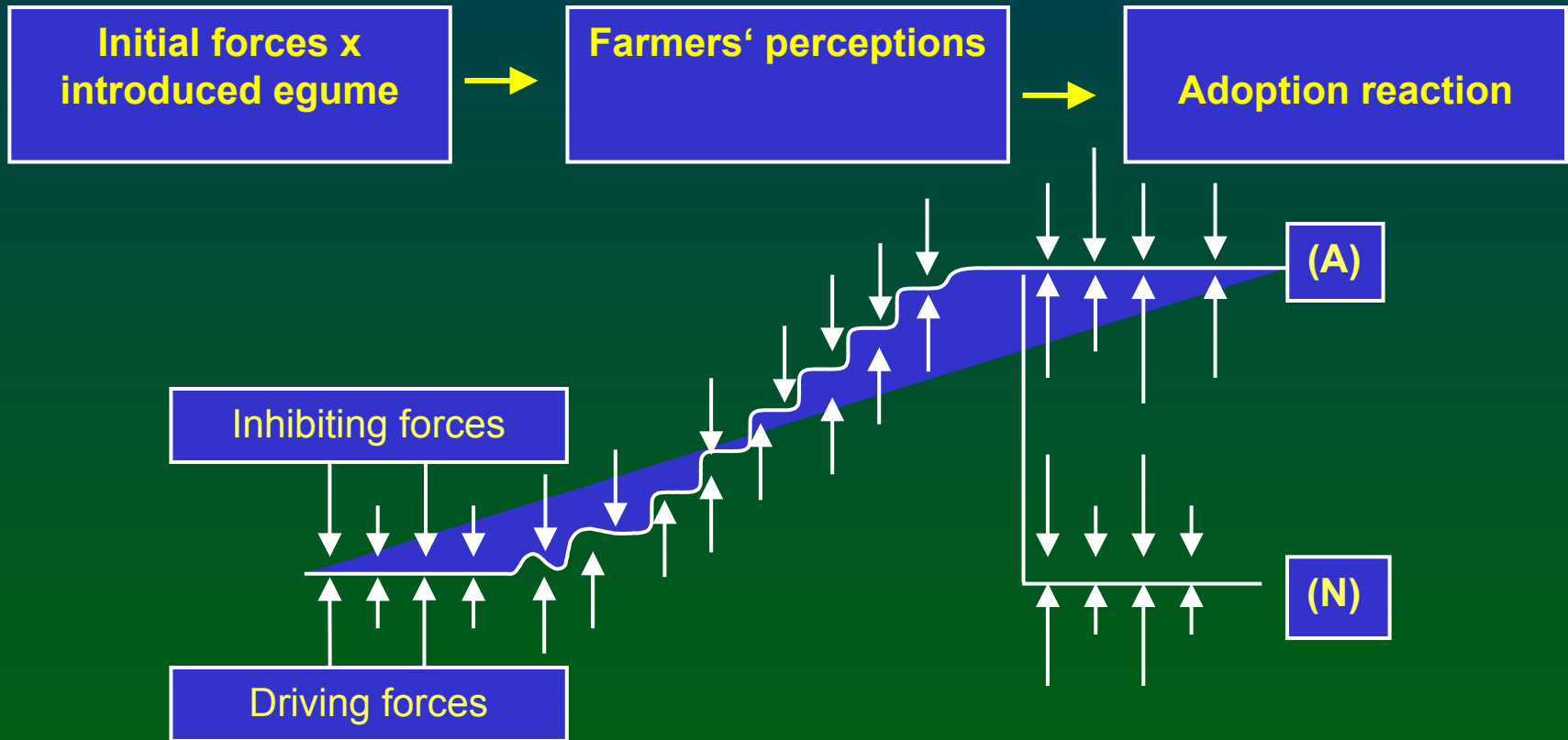
**Field discussions, constraints analysis to design basket of legumes options and to guide the emphasis of the message for legume introduction**

**Workshop for legume introduction, establishment of demonstration plots with farmers, farmers self-selection and participatory testing of chosen species**

**Continuous monitoring of farmers' perceptions and evaluation of legume options using field discussions, workshops and field days in the middle of both rainy and dry seasons and at harvest time**

**Evaluation survey after three seasons of participatory testing, total population sampling**

# Model



Adapted from the model of behaviour change of Lewin (1962)

# Results from the Derived Savanna

# Situational forces

# Agbassakpa Azozoundji Zomondji Djrègbé

**Gradient of land constraints with increasing population density**  
**Majors constraints: decreasing soil fertility, availability/cost of fertiliser**  
**incidence of *Imperata cylindrica***

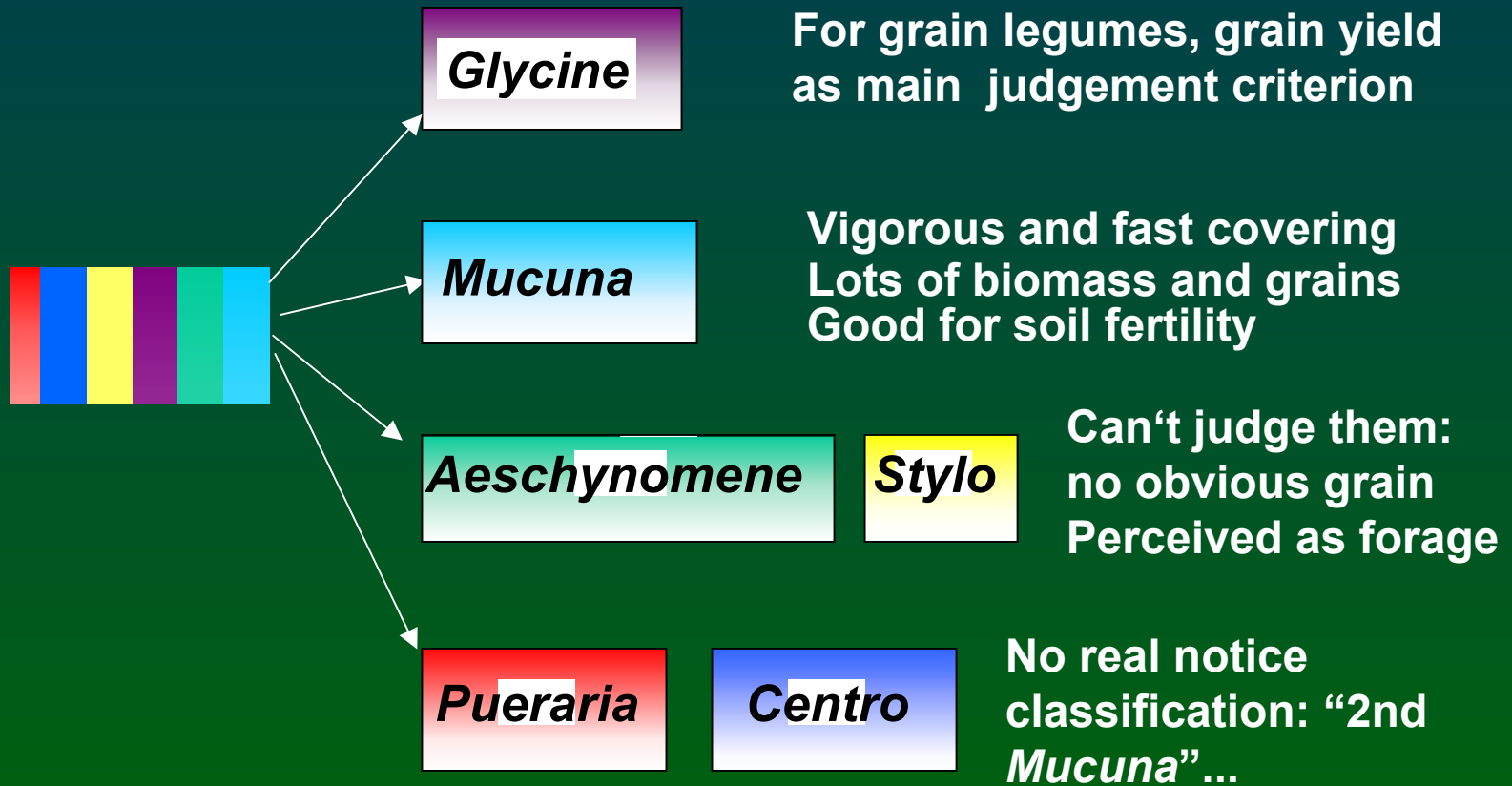
**Differentiated strategies and knowledge to cope with soil fertility:**  
**In Agbassakpa and Azozoundji the “Fon” have developed the strategies to use the biomass of local legumes (with/without fertiliser) to improve soil fertility**

**In Zomondji maize (staple food) cultivation only possible with fertiliser**  
**No specific use of local legume biomass**

**On Djregbe’s sandy soil, farmers believe crop production is only possible with the use of manure preferably from poultry and pigs**

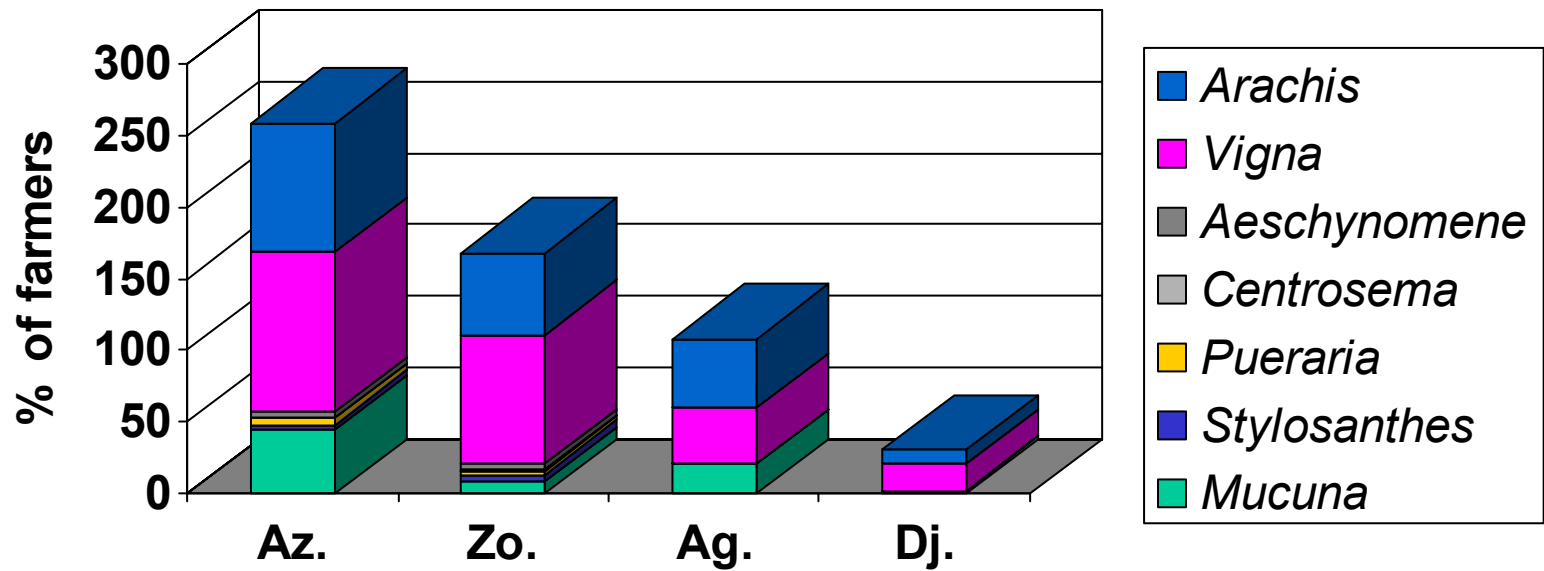
**Large ruminants found only in Agbassakpa, small ruminants, poultry in all others. In many instances, goats have increased since incidence of pig disease. Manure increasingly important, especially Djrègbé**

# Farmers' classification and judgement of introduced basket in the DS



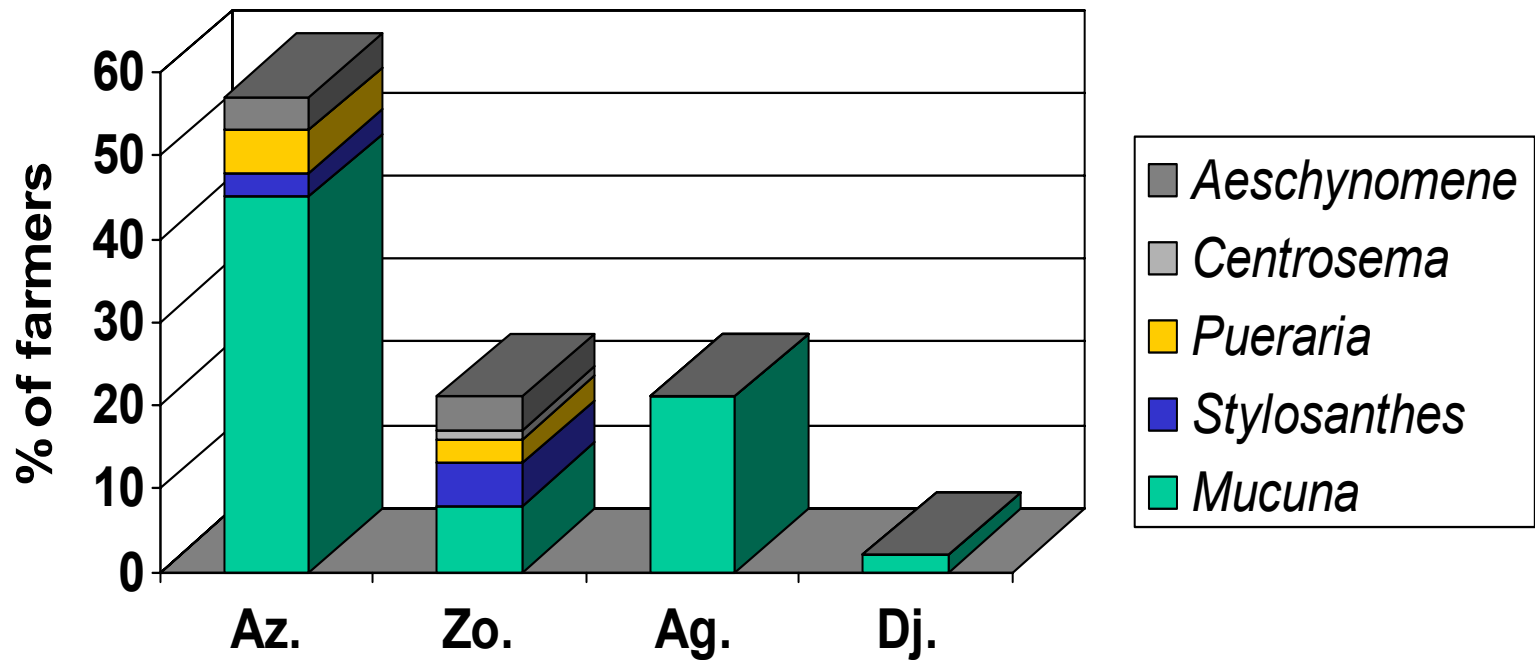
# Legume choice

Choice structure-2001



# Legume choice

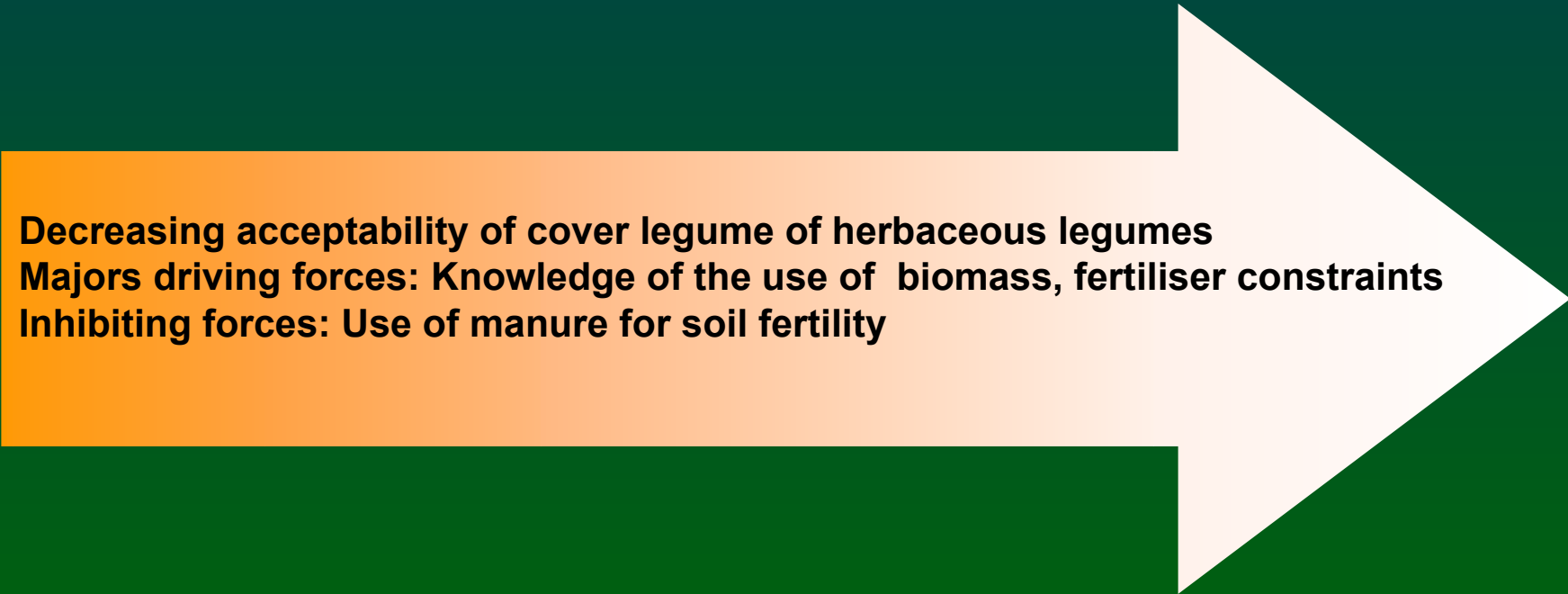
Choice structure-2001 (Cover legume only)





# Legume adoption gradient in the DS

Azozoundji Agbassakpa Zomondji Djrègbé



**Decreasing acceptability of cover legume of herbaceous legumes**  
**Majors driving forces: Knowledge of the use of biomass, fertiliser constraints**  
**Inhibiting forces: Use of manure for soil fertility**

# Results from the Northern Guinea Savanna

# Situational forces

# Gobirawa Dan-Birnin Dunki Turawa

Increasing market access and intensification



Crop-livestock integration, small and large ruminants are present. Large ruminants mostly as working bull. Crop residues are important feed resource, dry season feed shortage.

Integrated use of fertiliser and manure also for their well recognised complementary effects. Incidence of *Striga hermonthica*

Farmers' criteria for feeding: Grass or stover to kill hunger, cotton seeds and groundnut to "add oil" to animals weight

# Farmers' classification and judgement of introduced basket in the NGS



Grain legume

Dual purpose grain legumes mainly judged according to agronomic criteria such as yield, disease resistance (residue as feeding material too natural to mention)

Herbaceous legume

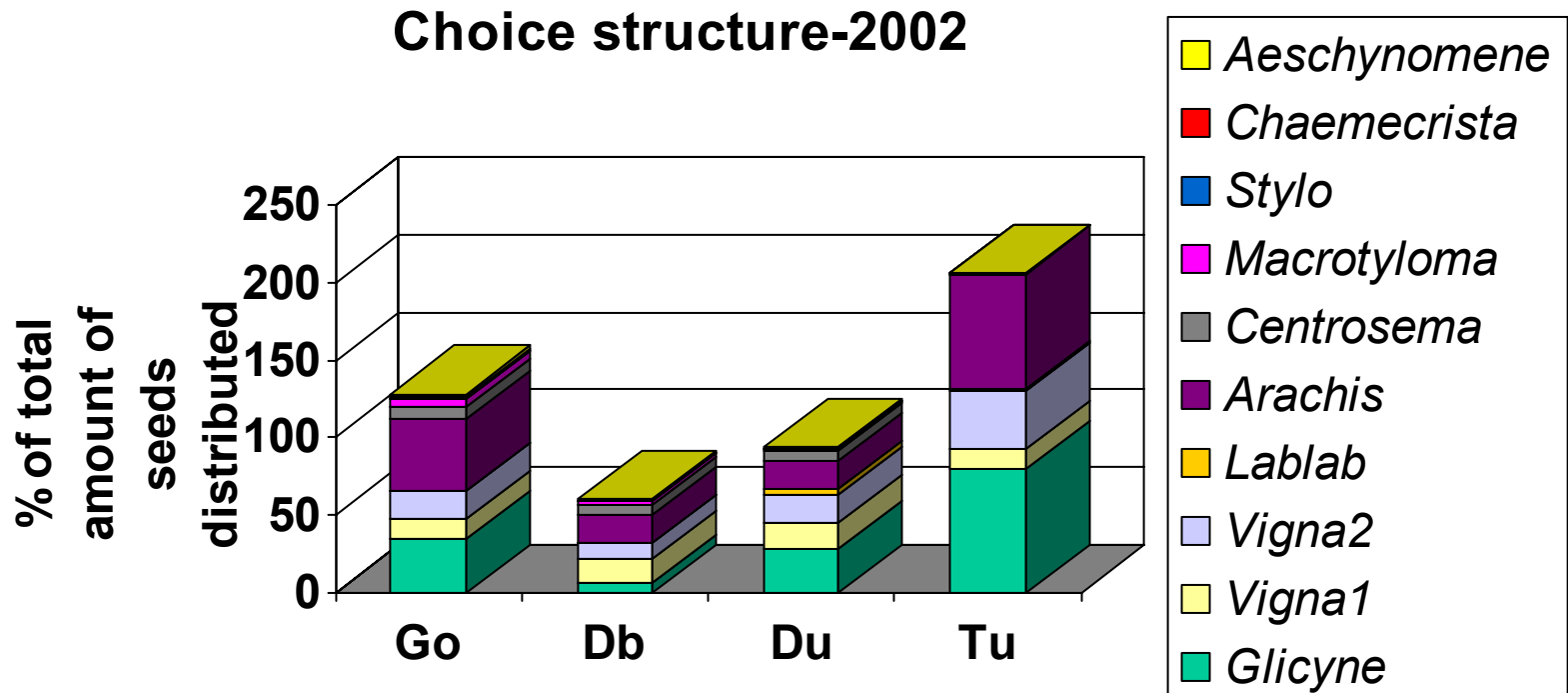
Herbaceous legumes called as "*Tchiawa*": Only to kill hunger and not to add oil?

Forage legumes

Favoured legumes: *Aeschynomene histrix* against *Striga*

*Centrosema pascuorum* and *Macrotiloma uniflorum* for livestock

# Legume choice in the NGS



# Legume adoption gradient in the NGS?

Gobirawa

Dan-Birnin

Dunki

Turawa

**No clear gradient; Preferences mainly for grain legumes;  
Specific adoption cases of non-grain herbaceous legume  
Inhibiting forces: Use of manure and fertiliser, developed knowledge of  
feeding system?**

# Conclusions

- **Herbaceous legume as a suitable technology for constrained environment (like in the DS)**
- **and not suitable for crop-livestock systems?**
- **An avenue for discussions**