# Windbreak effect on ecological restoration and pastoral care capacity of Namaro sand belt

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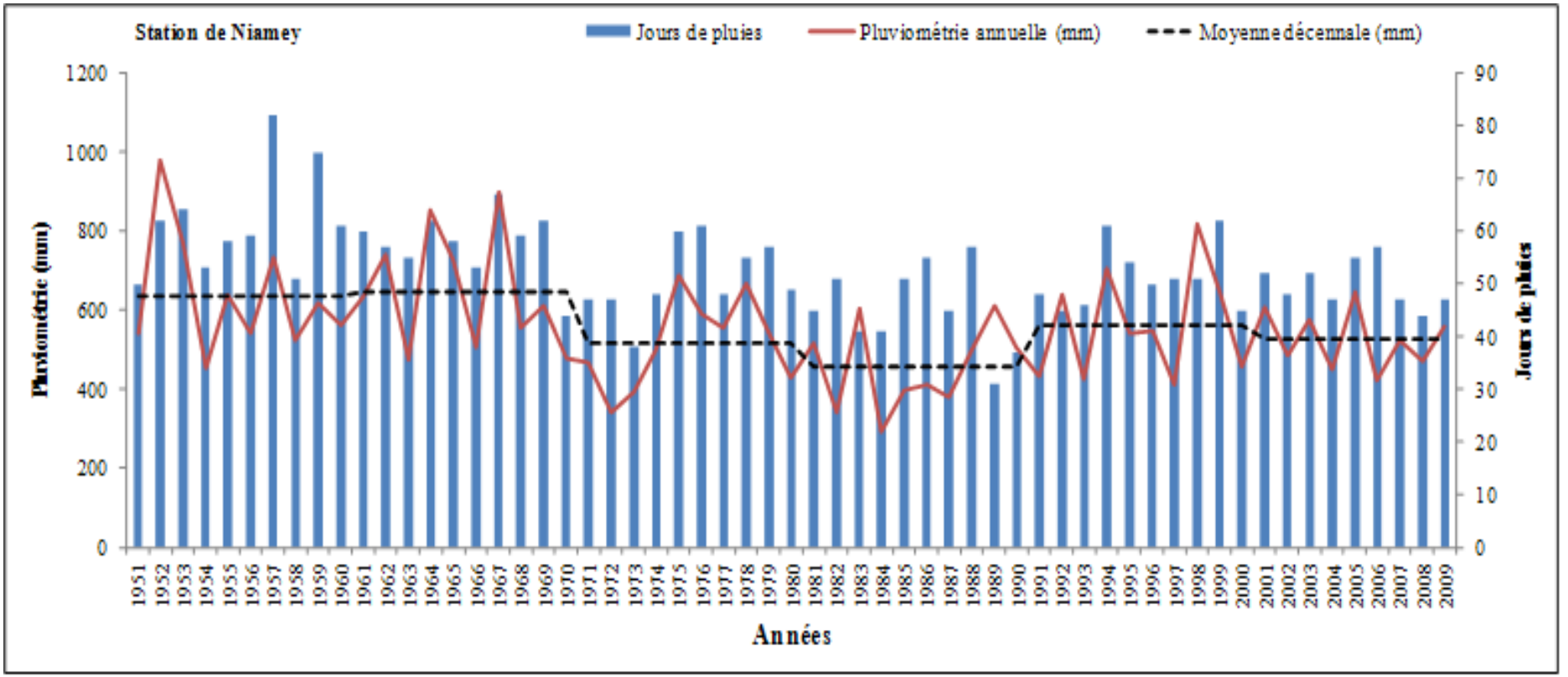
# CONTEXT

**The responsibility of land degradation come from:**

- **Sandy soil, with very low Organic matter and low level fertility;**
- **A population growth (3.1%);**
- **And climatic deterioration observed since the early 70s.**



# study aims

1. Make a diachronic study of the level of degradation of Namaro the sand belt;
2. Assessing ecological restoration (Soil and herbaceous) obtained following the implementation of Windbreak;
3. Calculed Pastoral care capacity;
4. Farmers perception on land degradation and Windbreak effect on land restoration.


# Namaro sand belt

NORTH

Niger River

Lat N: 12°30’ and 13°53’
Long E: 1°30’ and 2°55’

3 degradations levels
Not degraded
Partly degraded
Degraded (Windbreak)

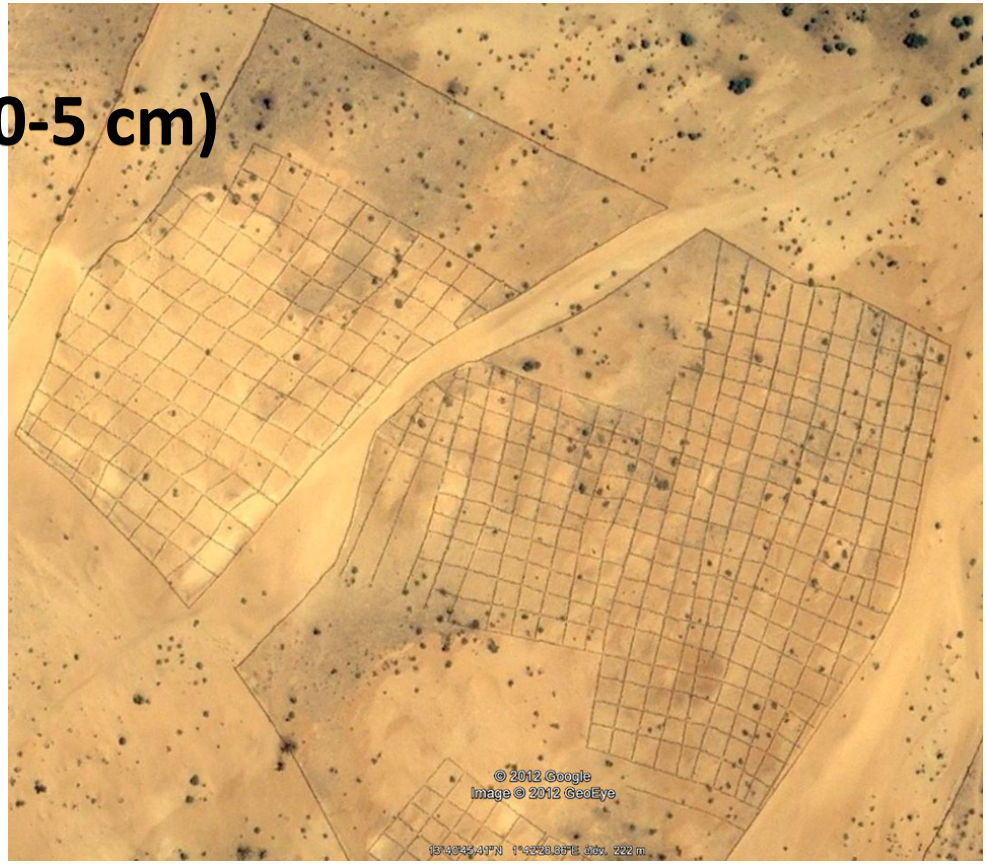
KOMBA



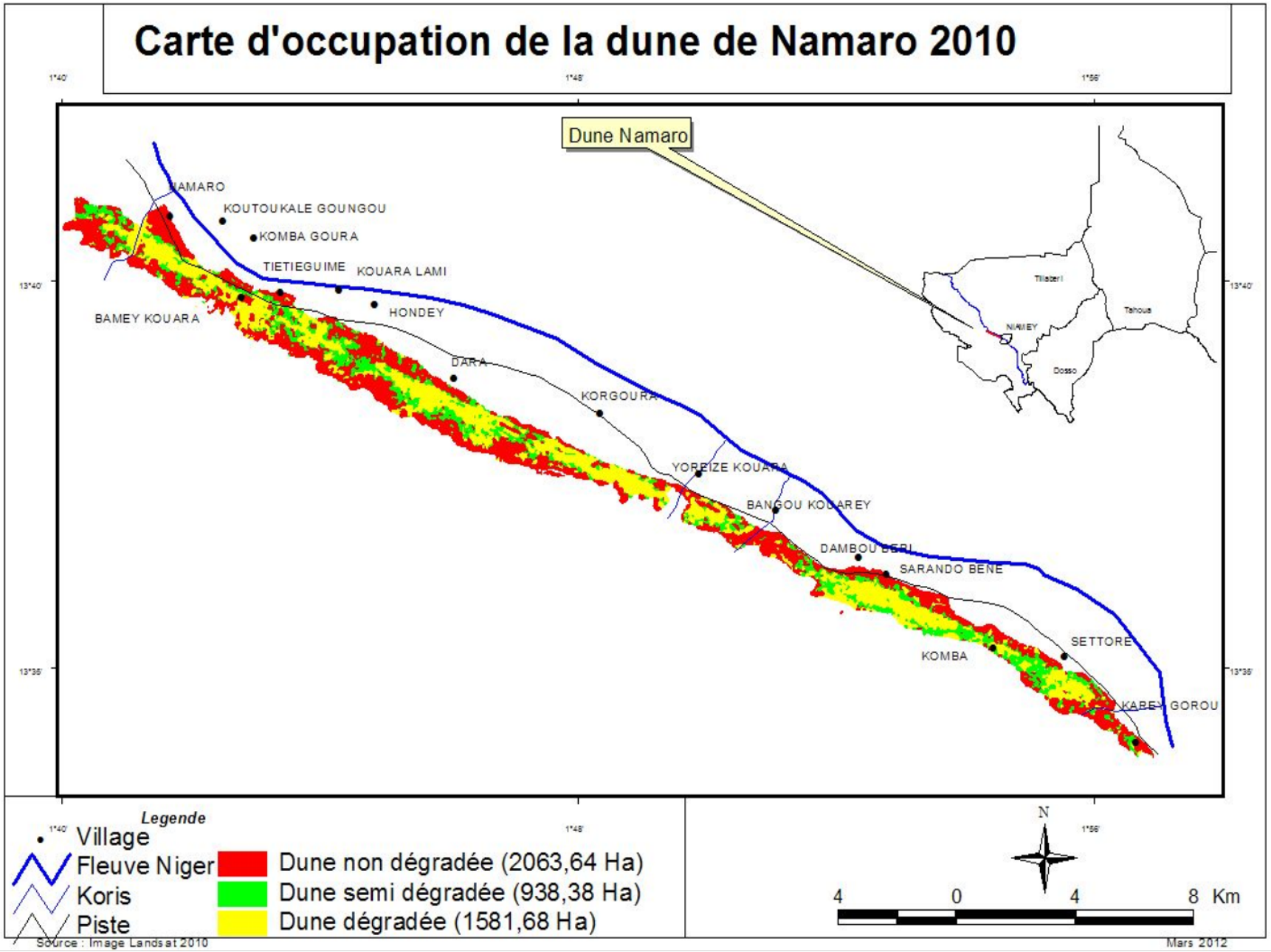
**Dune: 45km de long; PLCE: 450 ha windbreak**

# MATERIAL and METHODS

- 3 multi-spectral Landsat images of 1986, 2005, 2010
- Windbreak are of Komba;
- Soil Sub-horizon samples (0-5 cm)
- Plant identification notice;
- herbaceous productivity
- Questionnaire sheet




# RESULTS


Carte d'occupation de la dune de Namaro 2010
Dune Namaro
NAMARO
KOUTOUKALE GOUNGOU
KOMBA GOURA
TIETIEGUIME
KOUARA LAMI
HONDEY
BAMEY KOUARA
DARA
KORGOURA
YORRIZE KOUARA
BANGOU KOUAREY
DAMBOU BERI
SARANDO BENE
SETTORE
KOMBA
KABEY GOROU
Tillaberi
Tahoua
NIAMEY
Dosso
Legende
Village
Fleuve Niger
Koris
Piste
Dune non dégradée (2063,64 Ha)
Dune semi dégradée (938,38 Ha)
Dune dégradée (1581,68 Ha)
N
4 0 4 8 Km
Source : Image Landsat 2010
Mars 2012

| Année (4584 ha) | 1986 | 2005 | 2010 |
|---|---|---|---|
| **Not degraded** | 43% | 46% | 45% |
| **Partly degraded** | 31% | 26% | 20% |
| **Degraded** | 26% | 28% | 35% |

- Increasing anthropogenic pressure;
- Indirect effects of the droughts of 70 – 80 and climatic deterioration;
- Result of restoration actions by FAO and some local NGOs (years 90);
- Stabilization due to the actions fixing PLCE / BN (years 2000);

# Soil Quality

| Years of windbreak installed | 2007 | 2008 | 2009 | 2010 | Témoin (champ dunaire) |
|---|---|---|---|---|---|
| Middle diameter (µm) | 128 | 129 | 136 | 143 | 129 |
| pH | 8,5 | 8,5 | 7,73 | 8,45 | 5,12 |
| Organic matter (%) | 0,44 | 0,28 | 0,54 | 0,58 | 0,20 |
| Total Phosphorus (ppm) | 46 | 65 | 176 | 85 | 42 |

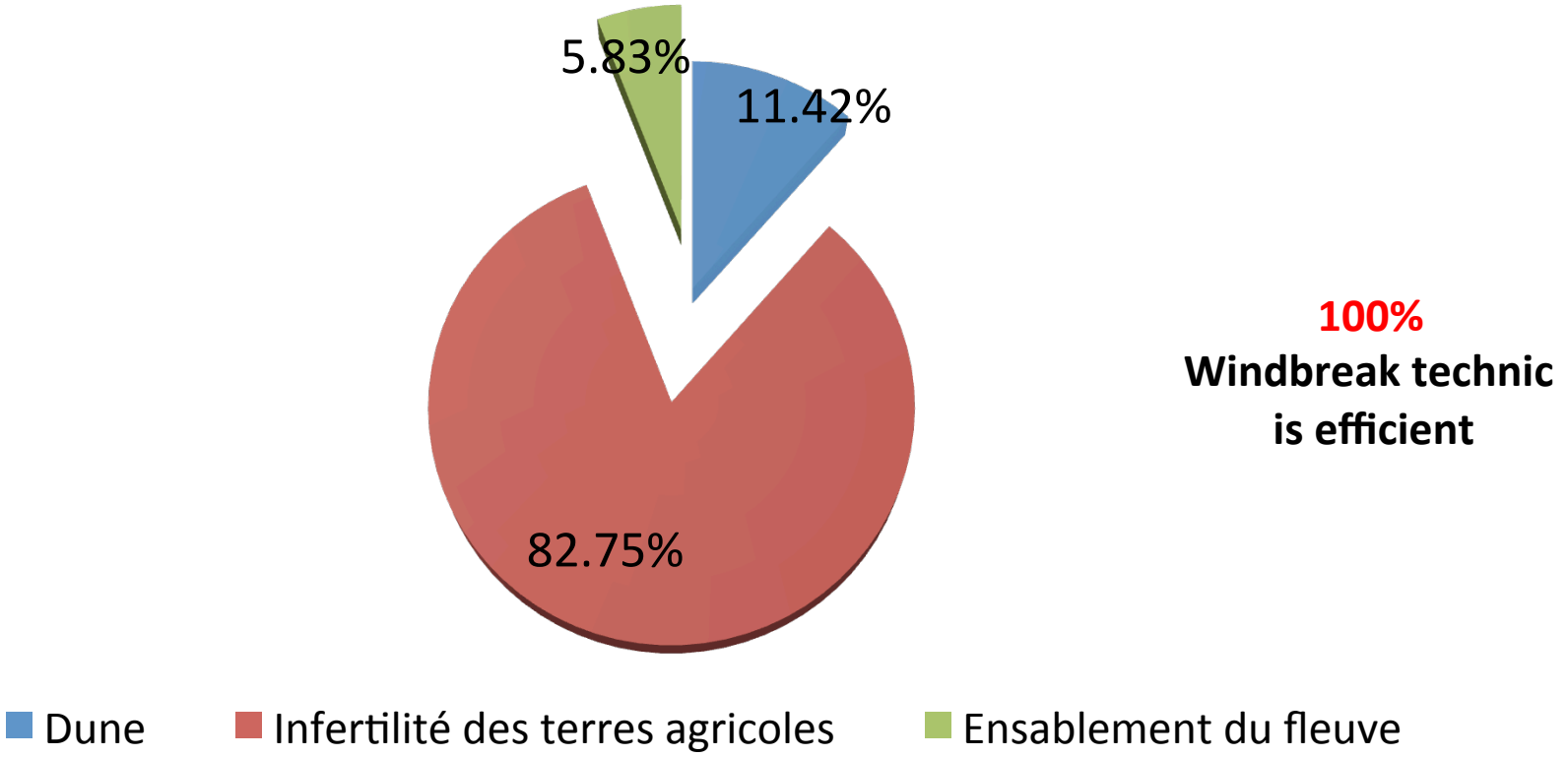
# Herbaceous productivity and diversity

| Site | Productivity (Kg MS/ha) | Diversity | Specific Contribution<br>Specific frequency |
|---|---|---|---|
| 2007 | 298,3 | 9 species<br>4 families | *Cenchrus biflorus*<br>*Zornia glochidiata*<br>*Aristida palida* |
| 2008 | 240,5 | 8 species<br>6 families | |
| 2009 | 151,5 | 11 species<br>8 families | |
| 2010 | 31,2 | 8 species<br>4 families | |

# Herbaceous productivity and Charge capacity

| Paramètres | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| Production totale (kg MS/ha) | 298,3 | 240,5 | 151,5 | 31,2 |
| Production consommable (kg MS/ha) « 1/3 de la production» | 99,43 | 80,16 | 90,5 | 10,4 |
| Nombre de journée de pâture sur un Ha (1 UBT = 6,25kg) | | | | |
| Cattles (0,7 UBT) | 23 | 18 | 12 | 2 |
| Muttons and Goats (0,1 UBT) | 155 | 128 | 81 | 17 |

# Most threatening environmental problems according to the farmers




**100%**
**Windbreak technic is efficient**

**People have realized that Namaro sand belt is degraded but this degradation is not a fatality because the windbreak technic can restore the ecological potentiel**

# CONCLUSION

- Namaro sand belt is degraded between 1986 and 2010 (Increased of 10%);
- Restoration techniques (Windbreak) ameliorate soil fertility and herbaceous coverage;
- This productivity can supported the cattle, goat and mutton moderate farming;
- Namaro people is conscient of the Namaro Sand belt degradation and approve the windbreak technic for the land restoration.

# Thank you for attention

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