# eRcane Multi-local selection: success in Reunion Island and new developments in Central and West Africa

Laurent Barau, Audrey Thong-Chane, Bernard Siegmund

Valoriser la ressource canne
eRcane

# SUMMARY

- The evolution of eRcane selection scheme
- Success of the multi-local selection in Réunion
- New developments in Réunion and Africa

Valoriser la ressource canne
eRcane

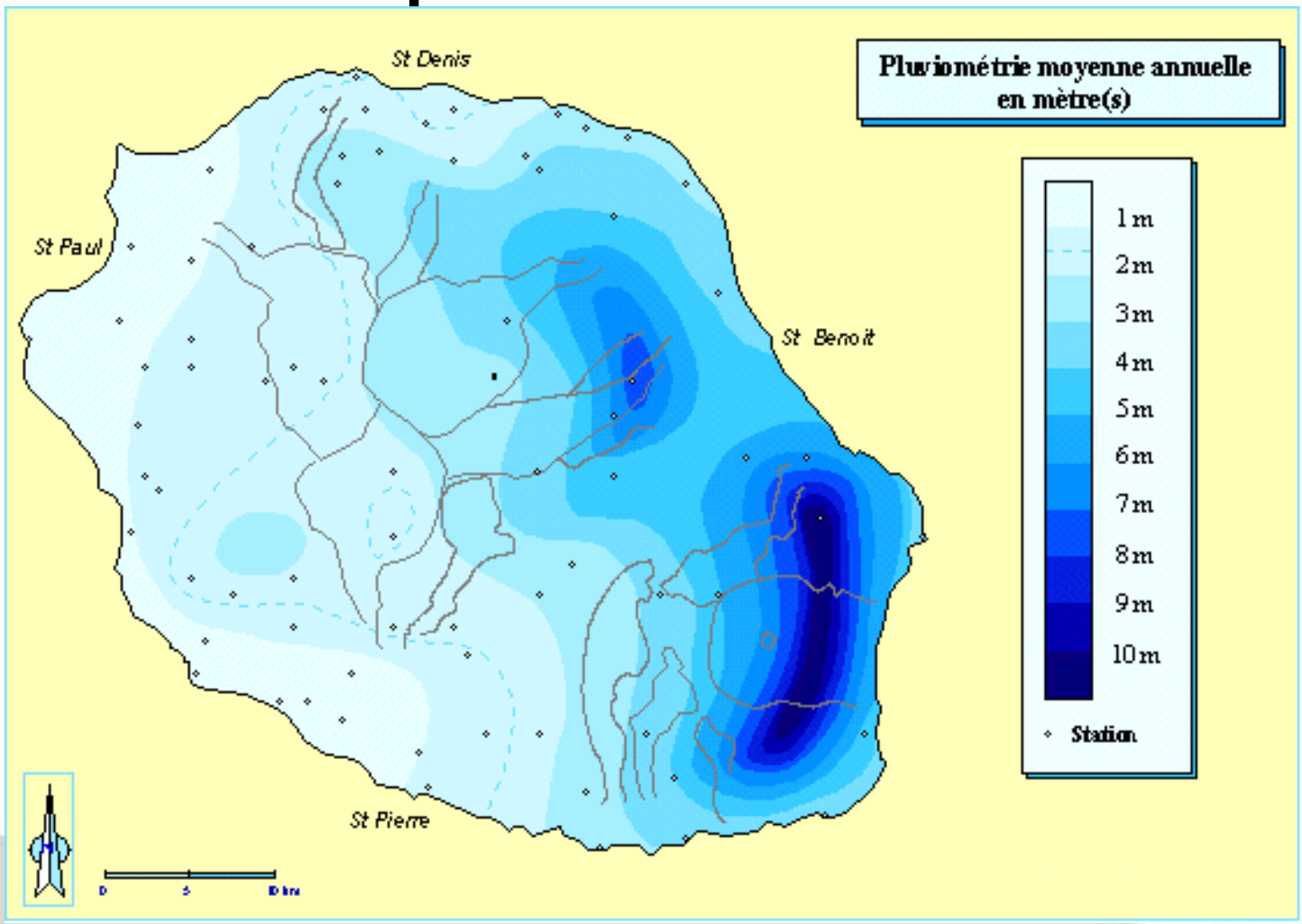
# Breeding

**Objective :** *Breed and select new cane varieties adapted to local agro-climatic conditions*

- Improving cane yield and sugar content
- Disease resistance
- Ratooning ability

Valoriser la ressource canne
eRcane

# Very contrasted areas of production



# Very contrasted areas of production

- From 500 to 5000 mm of rainfall
  - Rainfed or irrigated
- From 0 to 1000 m altitude
  - 10°C to 35°C
  - Very different sunshine expositions
- Different soil types

Valoriser la ressource canne
eRcane

# The former selection scheme

| | Selection stage | | Selection site |
|---|---|---|---|
| **Visual selection** | 1 | Seedlings nursery | **La Bretagne** |
| | 2 | Stage 2 :“1 stool” | **La Bretagne** |
| | 3 | Stage 3 : “1 row” | **La Bretagne** |
| **Experimental selection** | 4 | Stage 4 : “2 rows” | **La Bretagne** |
| | 5 | Stage 5 :“3 rows” | **La Bretagne** |
| | 6 | Multi-sites trials | **Sugarcane Estates** |

Valoriser la ressource canne
eRcane

# 1985 : Hawaiian program review

*Objective* : Evaluation of the breeding program and advice to improve the efficiency of the selection

*Two major recommendations:*

- Using more R varieties in crosses
- Implementing new selection stations where the whole selection scheme will be implemented (from seedling nursery)

**Objective** : select clones specifically adapted to the very contrasting agronomic zones of the island

Valoriser la ressource canne
eRcane

# The new experimental network

Following the program review :

- Creation of four new selection stations : Beaufonds, Le Gol, Le Baril, and Vue Belle
- 1992: La Bretagne experimental station moves to La Mare station

**eRcane manages a multi-local experimental network composed of 5 selection stations distributed in the different sugarcane production zones of Réunion island**

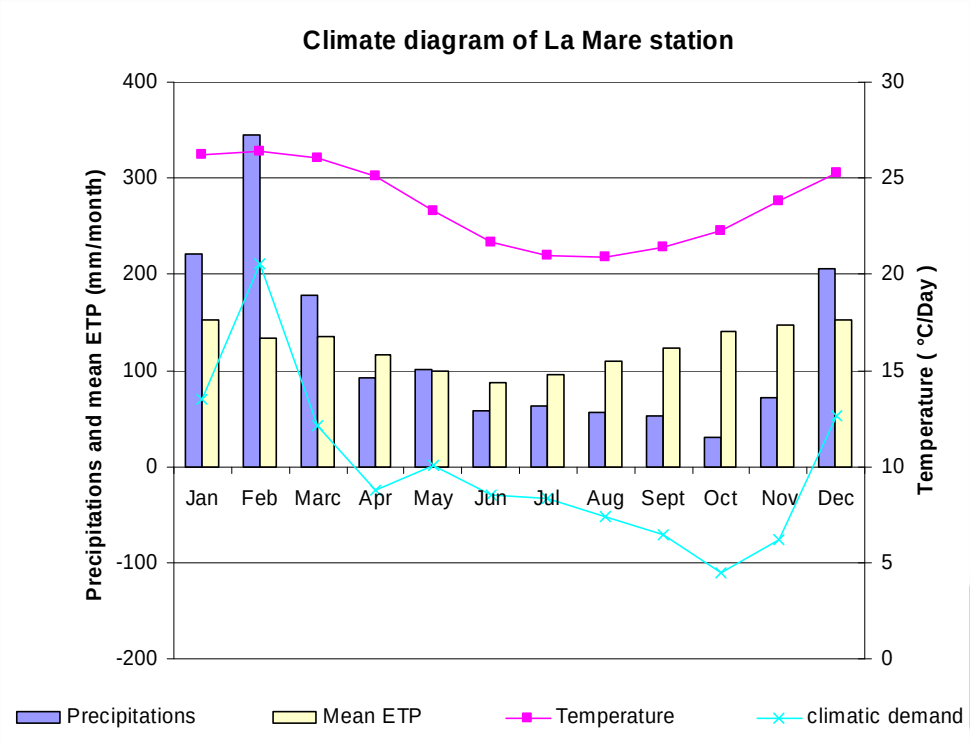
Valoriser la ressource canne
eRcane

# La Mare (Ste-Marie)

40 hectares, dry zone, sea level

Selection in rainfed conditions, cane under water stress (<1700mm/year, strict dry period)



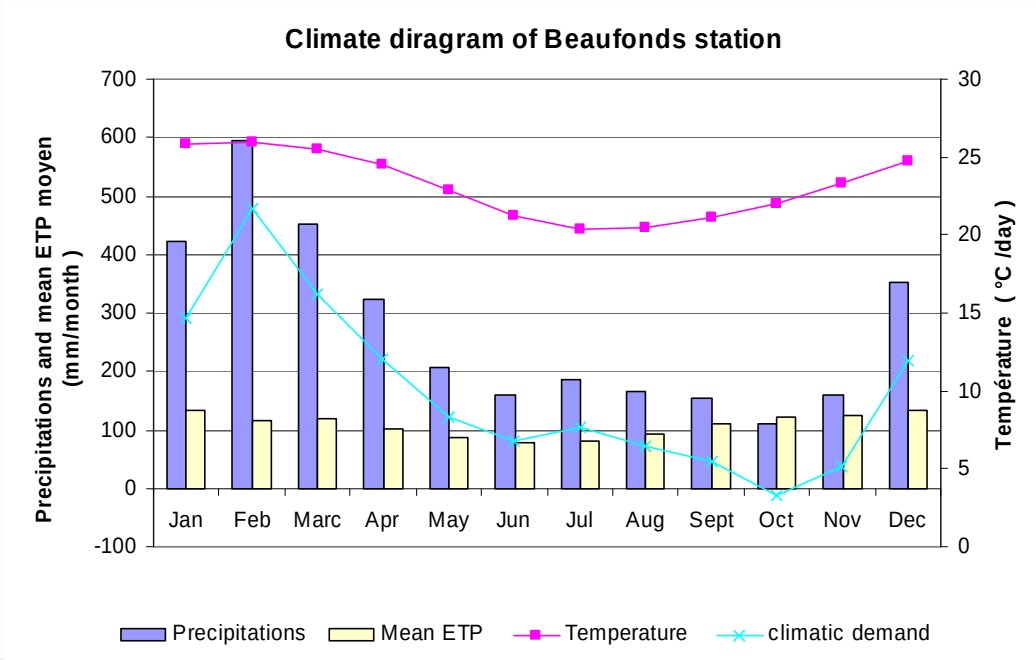


# Beaufonds (St-Benoît)

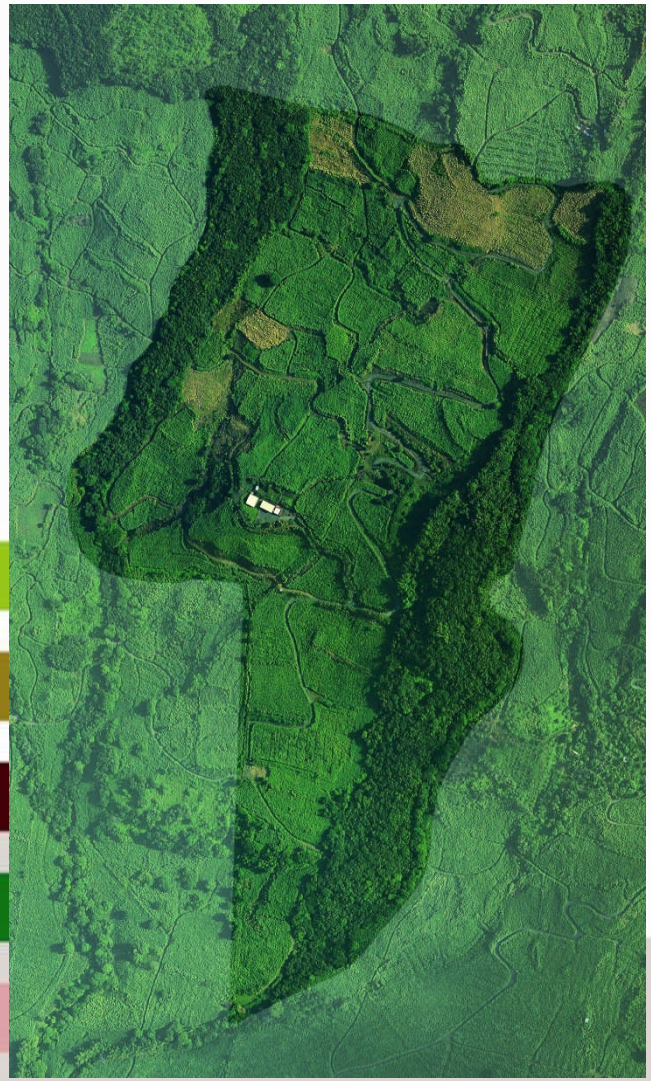


20 hectares, sea level

Selection in propitious rainfed conditions (>2500mm/year)



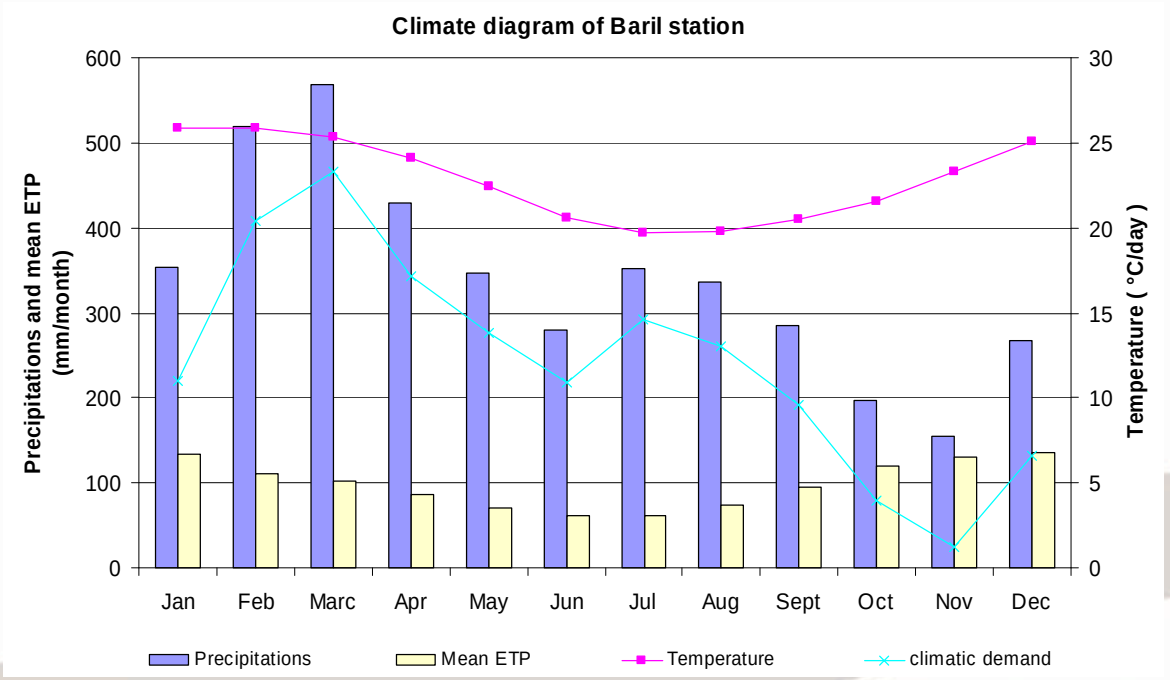
# Le Baril (St-Philippe)



30 hectares, sea level

Selection in propitious rainfed conditions (4100 mm)

Difficult cultural conditions, low available water capacity (AWC)




Valoriser la ressource canne

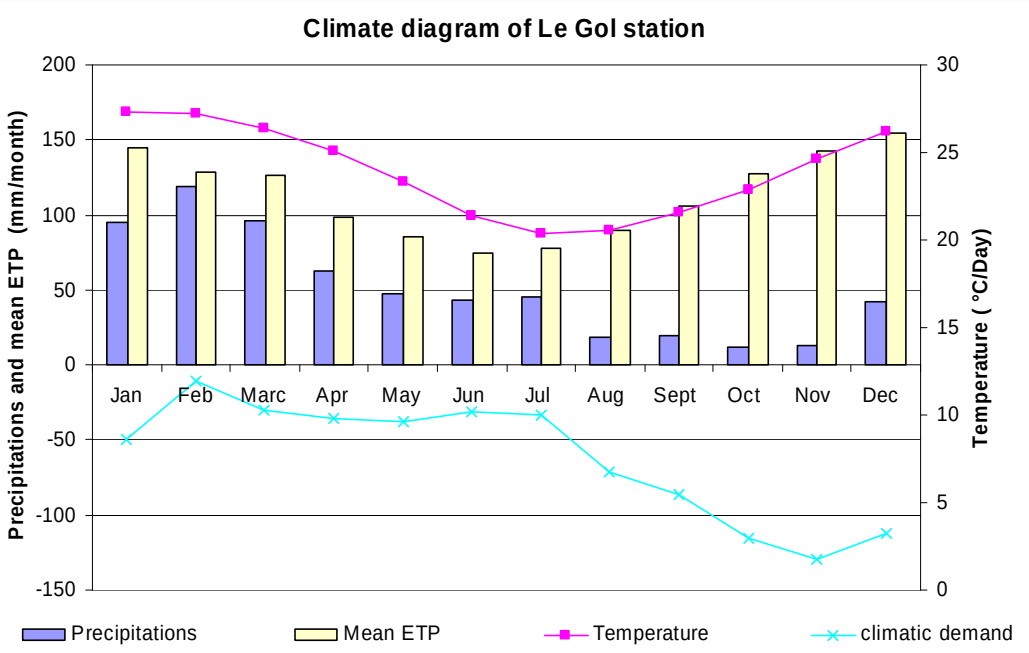
eRcane

# Le Gol (Etang-Salé)



26 hectares, sea level, dry area

Selection in irrigated conditions (drip irrigation)




Valoriser la ressource canne

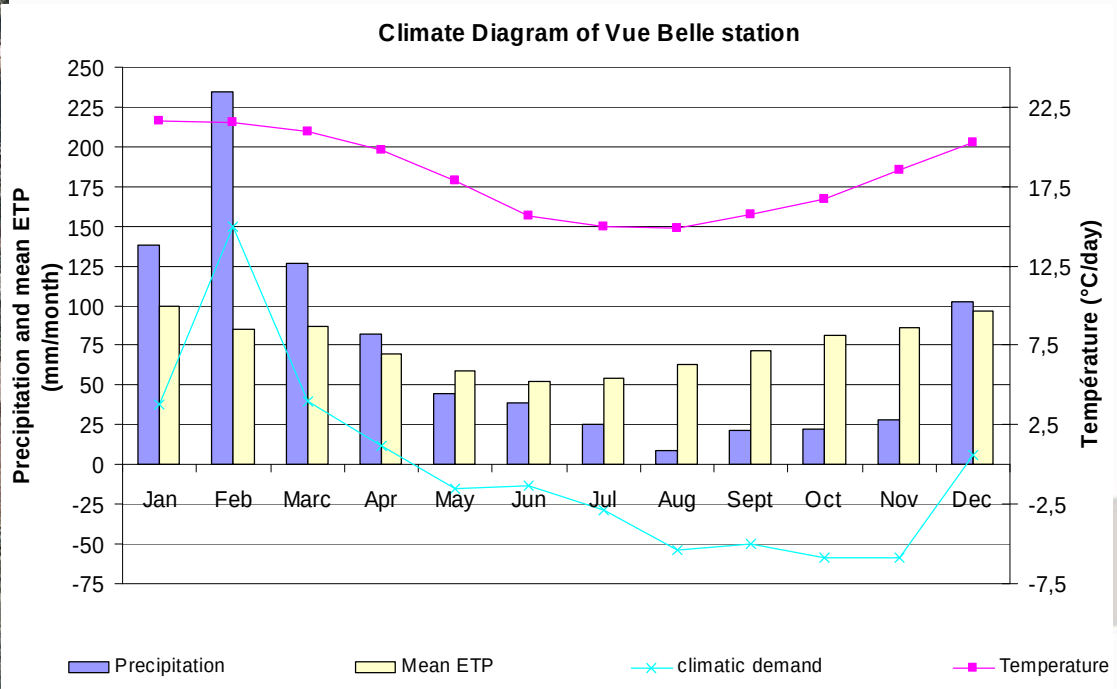
eRcane

# Vue Belle (La Saline-les-Hauts)

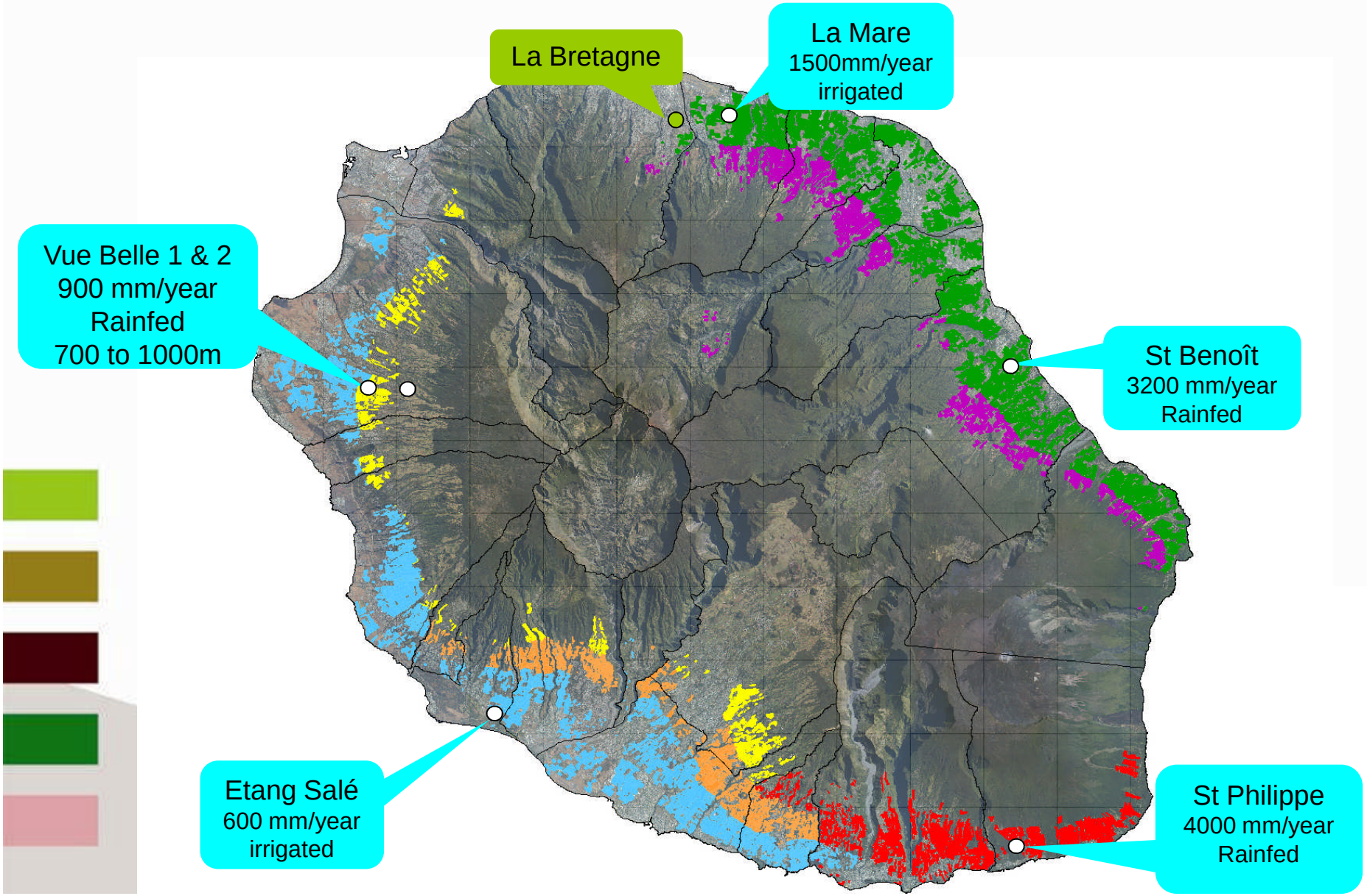


30 hectares at 650m

Selection in altitude and rainfed conditions, cane under water stress (900 mm/year), low temperature



# The new experimental network



# The new selection scheme

| | Selection stages | | Selection sites |
|---|---|---|---|
| **Visual Selection** | 1 | seedlings Nursery | **3 irrigated eRcane stations** |
| | 2 | Stage 2 :“1 row” | **5 eRcane stations** |
| **Experimental Selection** | 3 | Stage 4 : “2 rows” | **5 eRcane stations** |
| | 4 | Stage 5 :“3 rows” | **5 eRcane stations** |
| | 5 | Multi-sites trials | **5 eRcane stations + growers fields** |

Valoriser la ressource canne
eRcane

# The multi-sites experimental network results

- 1992 : The new experimental network is settled
- Length  of eRcane selection scheme : 15 years

→ **2008-2009: First series of cultivars end the new selection scheme**

Valoriser la ressource canne
eRcane

# Method to assess the new selection scheme

- **Criterion : number of elite cultivar per series**
- Generally, an Elite Cultivar is better performing than standards for many criteria
- In this study, we simply call an “Elite Cultivar” a clone having a superior extractible sugar yield to the standards at stage 4

Valoriser la ressource canne
eRcane

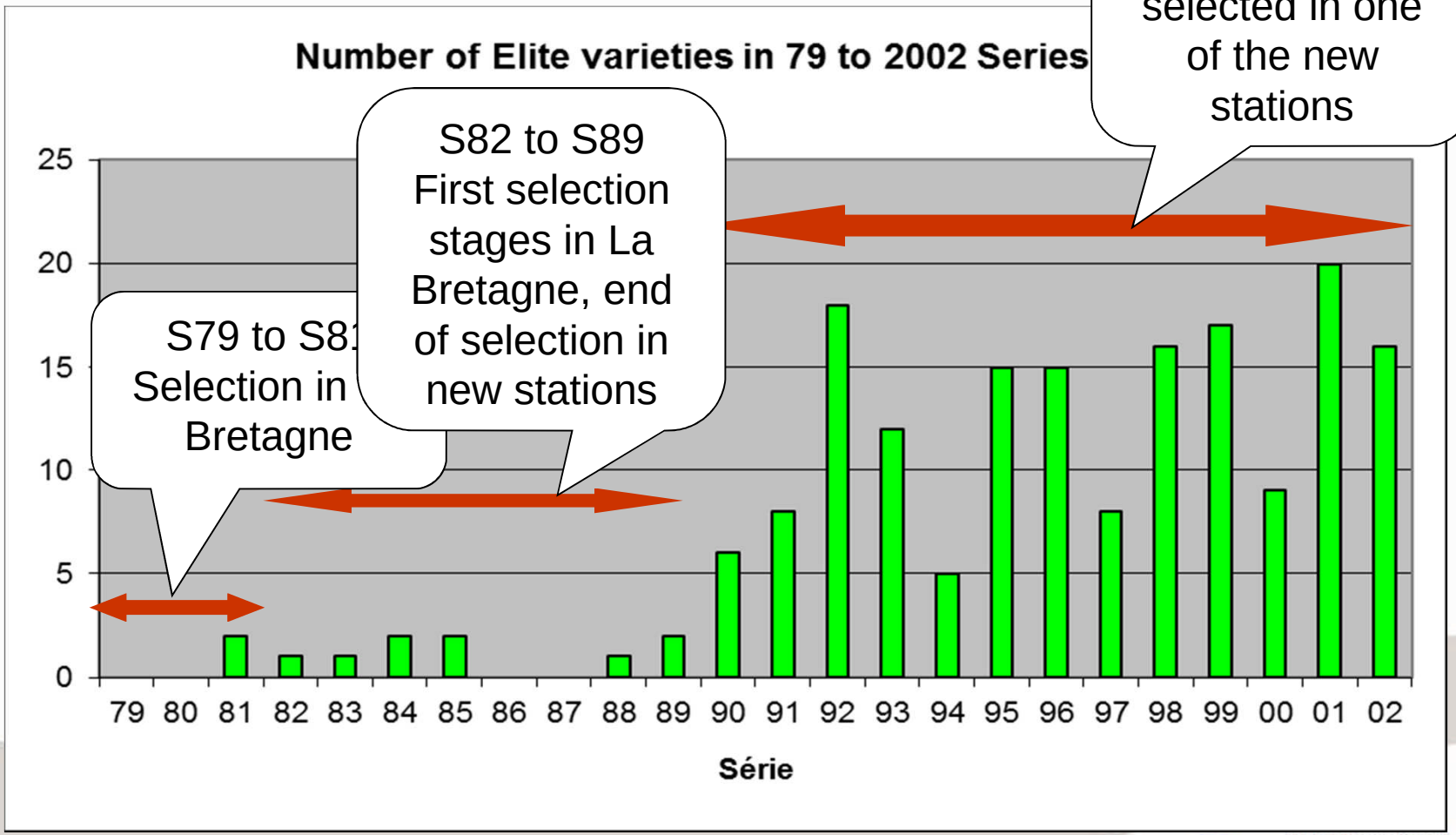
# A 24 years data set (Series 79 to 2002)

Three distinct groups :

- Series 79 to 81 composed of cultivars that were completely selected in La Bretagne
- Series 82 to 89 composed of cultivars that started selection in La Bretagne then were transferred in the new stations
- Series 90 to 2002 composed of cultivars that were completely selected in one of the new selection stations

Valoriser la ressource canne
eRcane

# Evolution of Elite varieties



# Results

- Mean number of Elite Varieties
  - Series 79 to 89 : 1 elite cultivar per year
  - Series 90 to 98 : 13 elite cultivars per year

- R582, from Serie 90, was the first released variety from the new experimental scheme.

Valoriser la ressource canne
eRcane

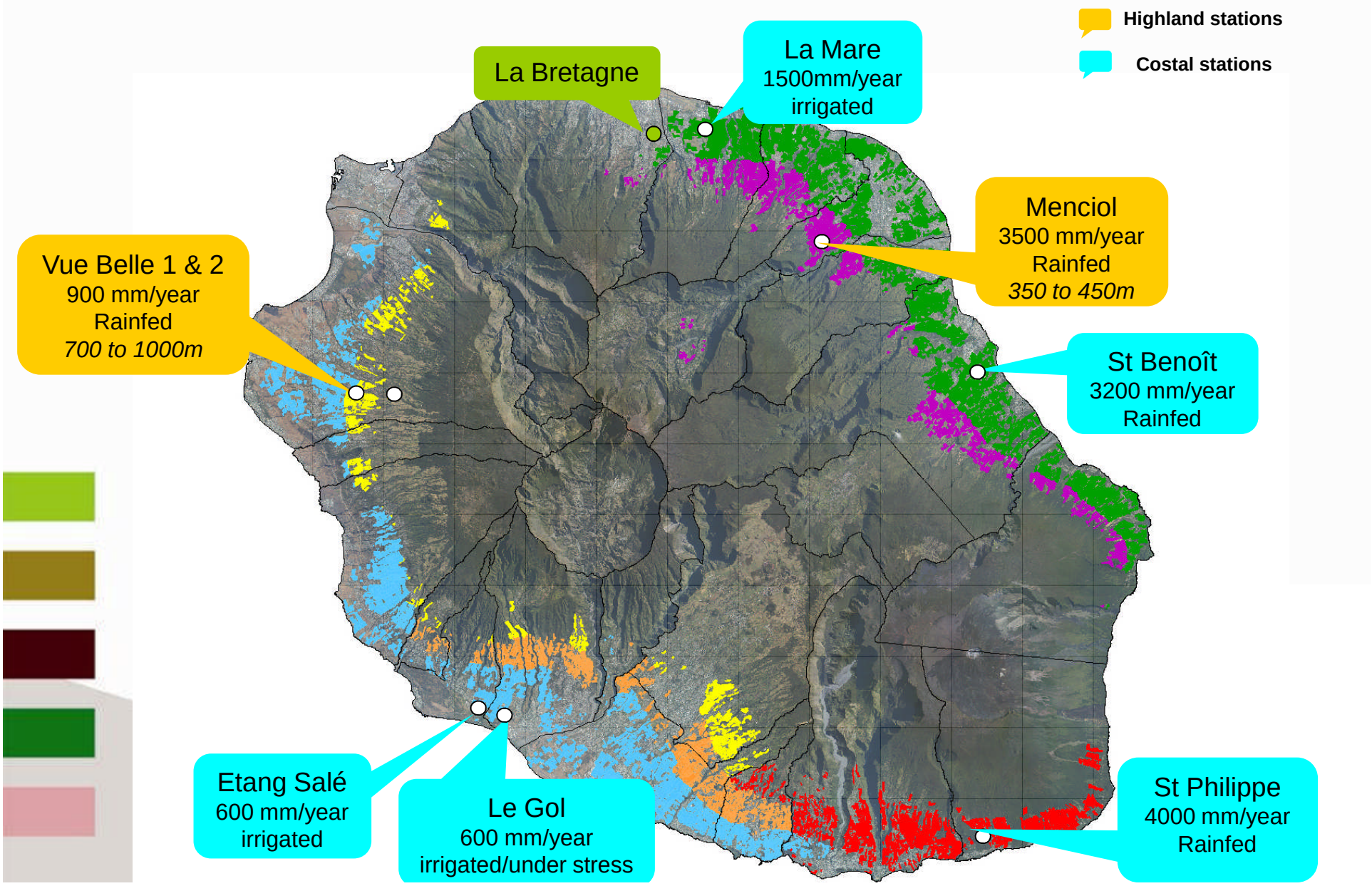
# Implications

- The new experimental network is a success : an increasing number of high yielding cultivars are indentified

- Implementation of two additionnal selection stations: Menciol and Le Gol

Valoriser la ressource canne
eRcane

# The actual experimental network



# New developments: fuzz supply

- eRcane exports R varieties for commercial production in 20 different countries
- Proposition to supply fuzz to select varieties specifically adapted to local growing conditions
- First contract signed in 2005

Valoriser la ressource canne
eRcane

# Fuzz supply



Specific crosses made in Réunion

Sowing and selection made in each seletion site




Support to develop a selection programme



Valoriser la ressource canne

eRcane

# Cameroon

- SOSUCAM: 23 000 Ha, 2 sugar mills
- 1500 mm/year, rainfed
- 1 selection site: 4000 seedlings/year, now 8000
- Project started in 2006




Valoriser la ressource canne
eRcane

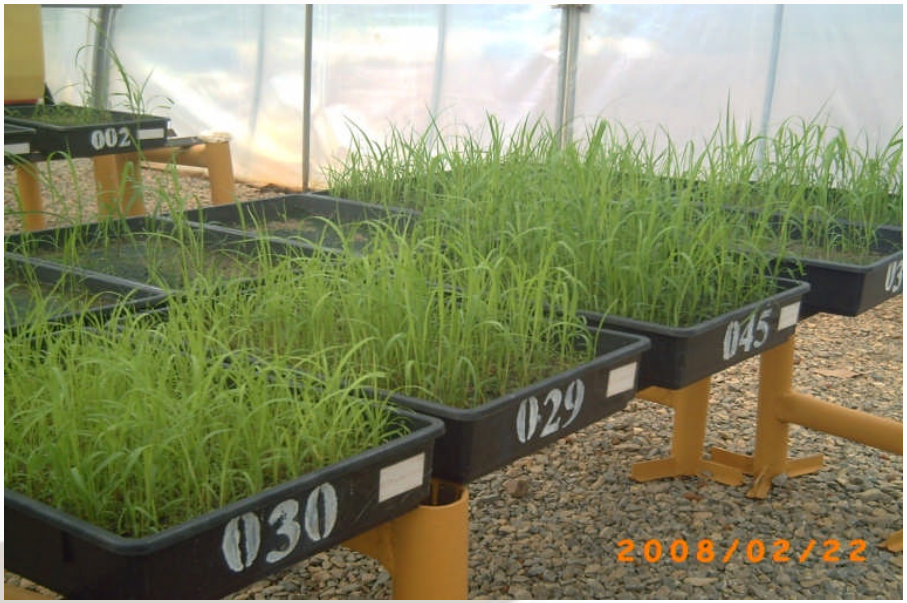
# Chad

- CST: 4 000 Ha, 1 sugar mill
- 1000 mm/year, irrigated
- 1 selection site: 4000 seedlings/year
- Project started in 2006



# Congo

- SARIS: 12 000 Ha, 1 sugar mill
- 1200 mm/year, rainfed
- 1 selection site: 4000 seedlings/year
- Project started in 2007




Valoriser la ressource canne
eRcane

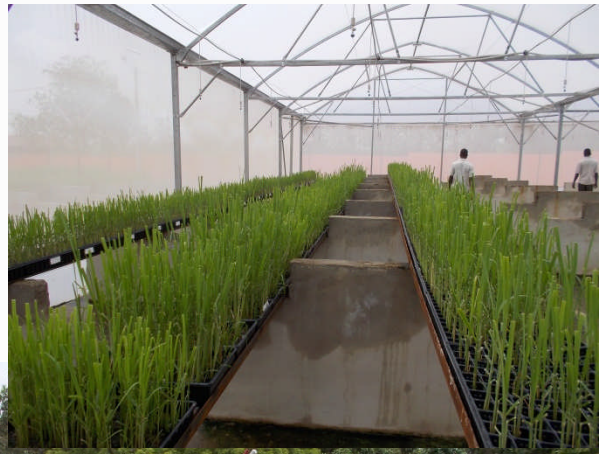
# Senegal

- CSS: 10 000 Ha, 1 sugar mill
- 400 mm/year, irrigated
- 1 selection site: 8000 seedlings/year
- Project started in 2009

Valoriser la ressource canne
eRcane

# Ivory Coast

- Sucrivoire - Zuénoula: 5 600 Ha, 1 sugar mill
- 1200 mm/year, irrigated/rainfed
- 2 selection sites: 8000 seedlings/year in irrigated Condition, 4000/year in Rainfed conditions
- Project started in 2013





# Ivory Coast

- Sucrivoire - Borotou: 5 700 Ha, 1 sugar mill
- 1400 mm/year, irrigated/rainfed
- 2 selection sites: 8000 seedlings/year in irrigated Condition, 4000/year in Rainfed conditions
- Project started in 2013




Valoriser la ressource canne
eRcane

# Ivory Coast

- Sucaf-CI: 11 000 Ha, 2 sugar mills
- 1200 mm/year, irrigated/rainfed
- 2 selection sites: 6000 seedlings/year in irrigated Condition, 2000/year in Rainfed conditions
- Project started in 2013

Valoriser la ressource canne
eRcane

# Morocco

- Project: 3 selection stations
- Contract signed, but no sending yet

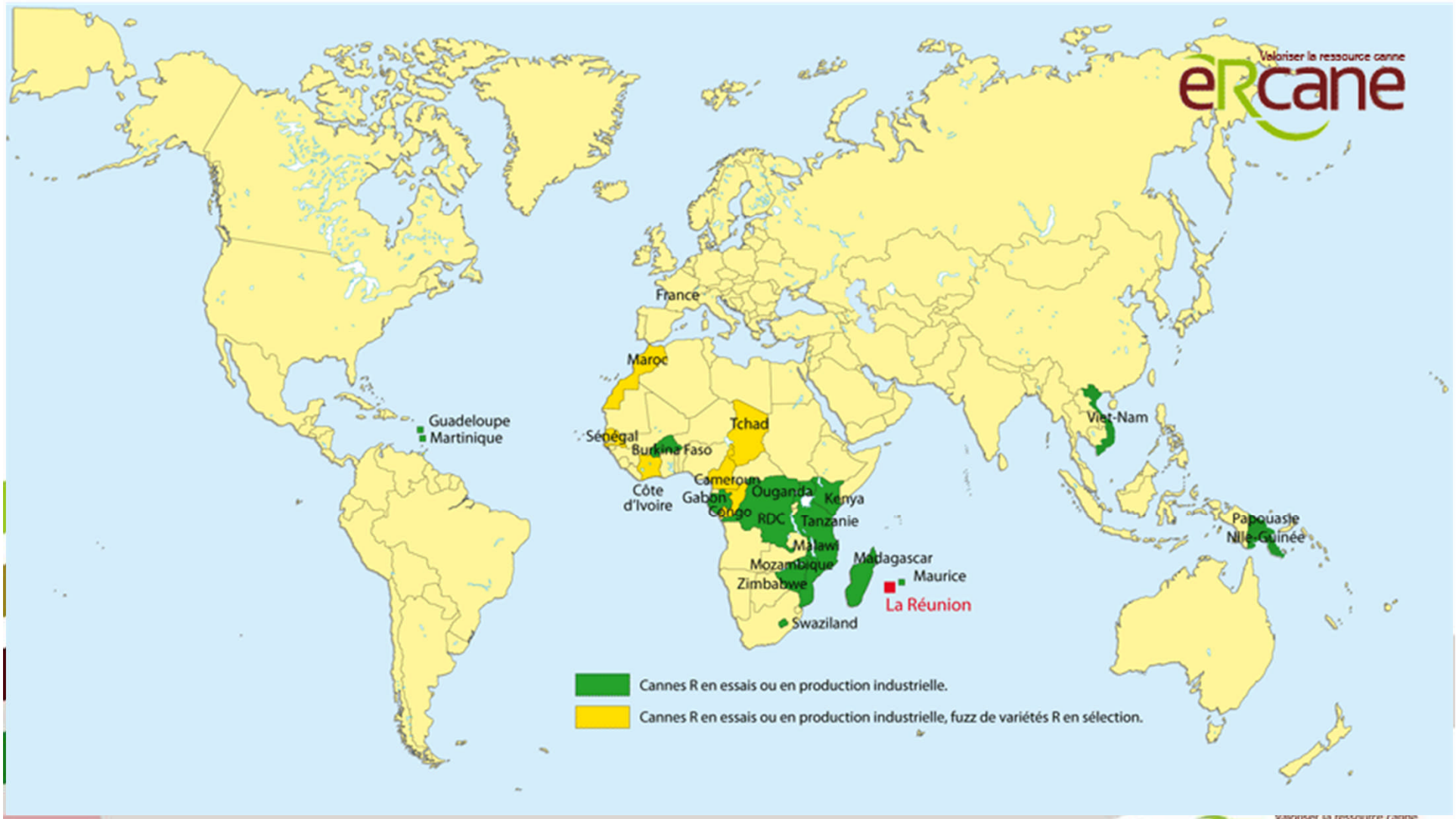


# New developments: fuzz supply

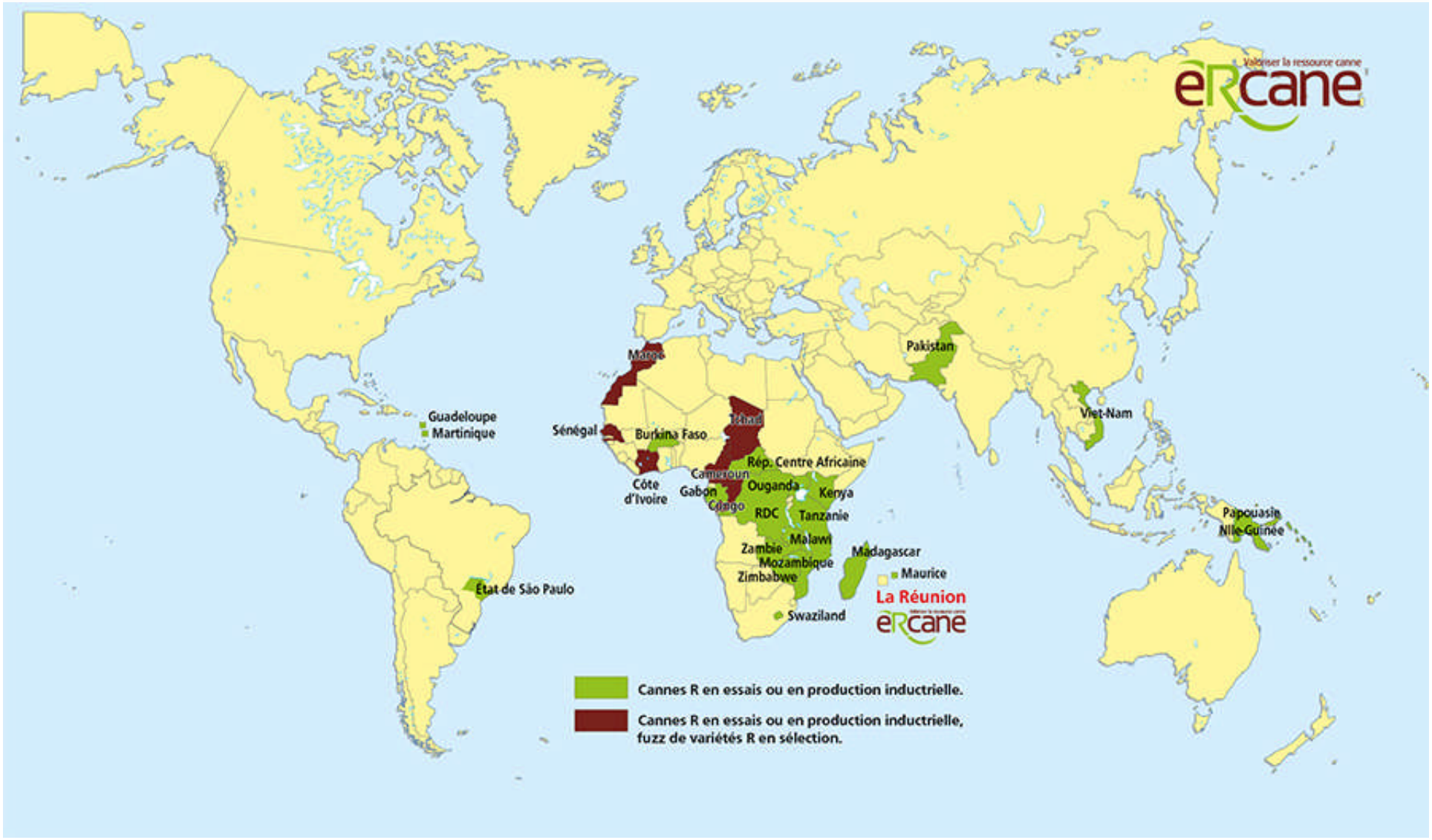
- 10 selection stations in Africa (Cameroon, Chad, Congo, Senegal, and 6 in Ivory Coast)
- The first variety will be released in 2016 (Cameroon or Chad)

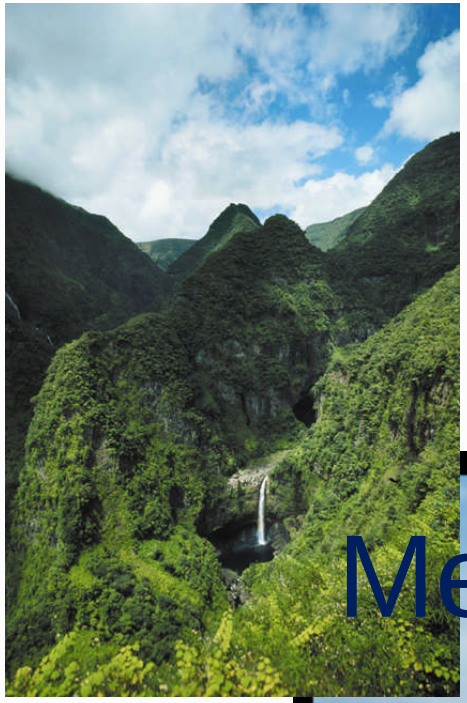
Valoriser la ressource canne
eRcane

# “R” VARIETIES WORLDWIDE



# “R” VARIETIES WORLDWIDE







# Merci de votre attention





Valoriser la ressource canne

eRcane