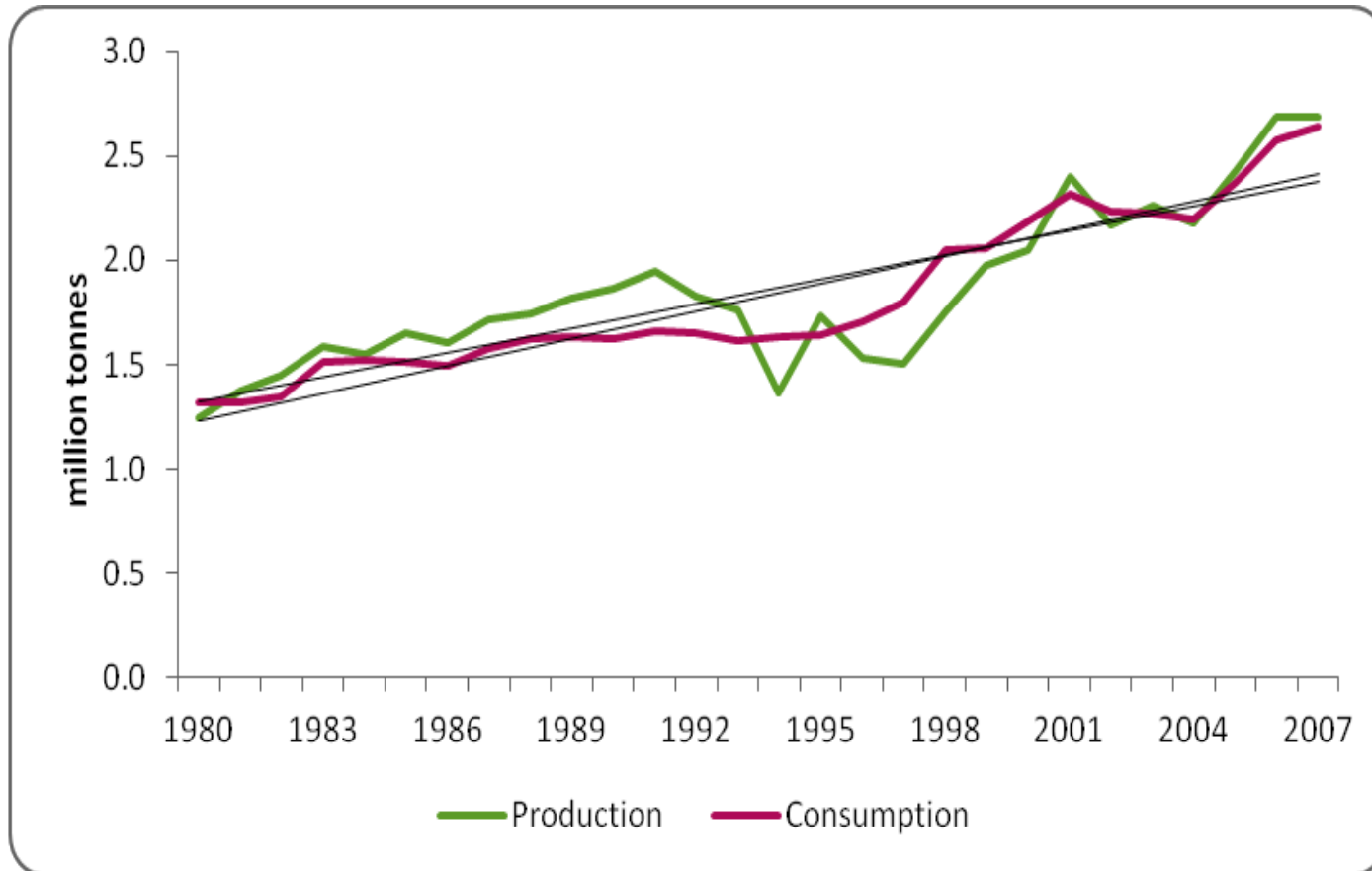


Beating the Heat: Breeding Common Bean for Increased Temperatures

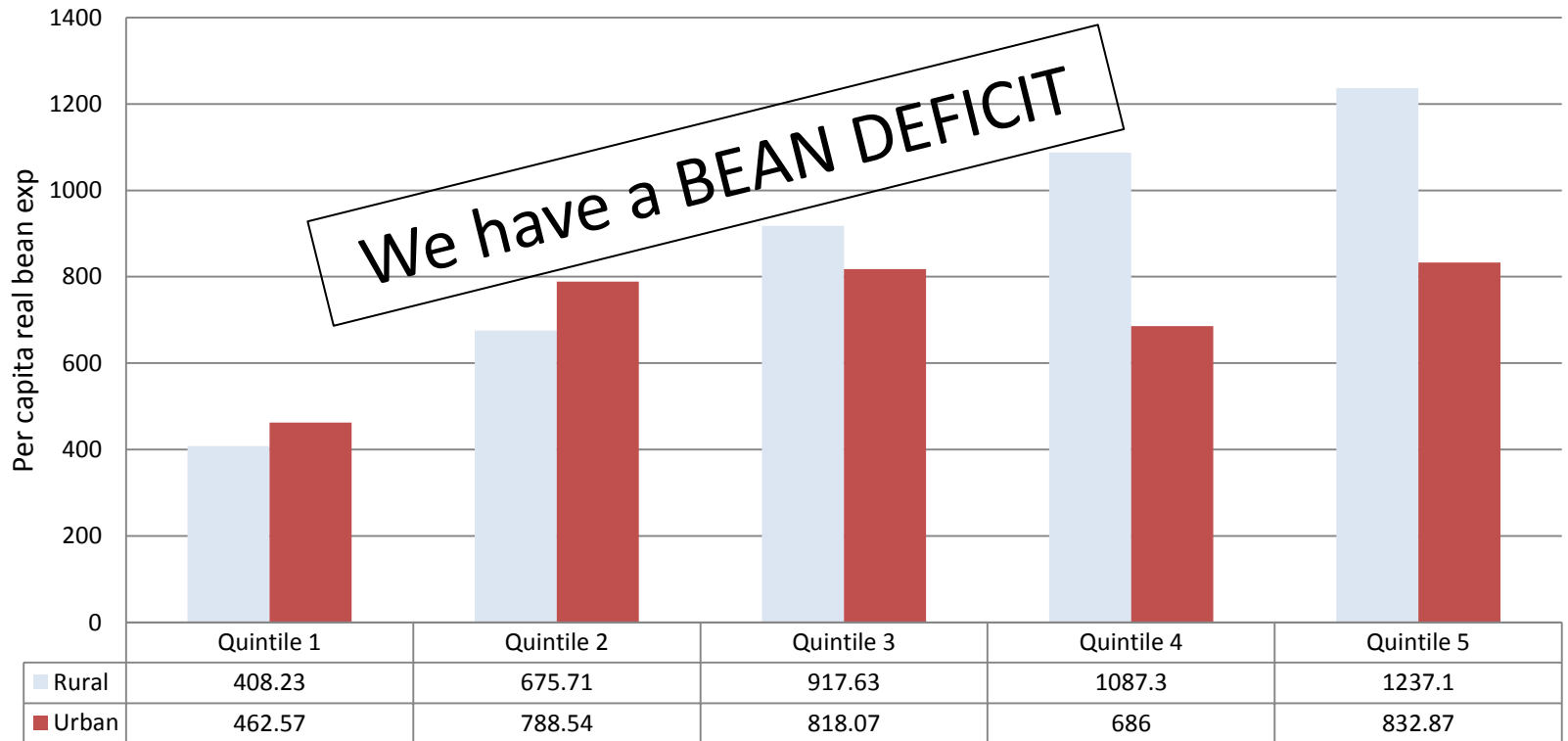
Steve Beebe
Idupulapati Rao
José Polanía
César Cajiao
Miguel Grajales
Santos Barrera
Nestor Chavés
Julián Ramirez
David Arango

Common Bean Production and Consumption in ES Africa

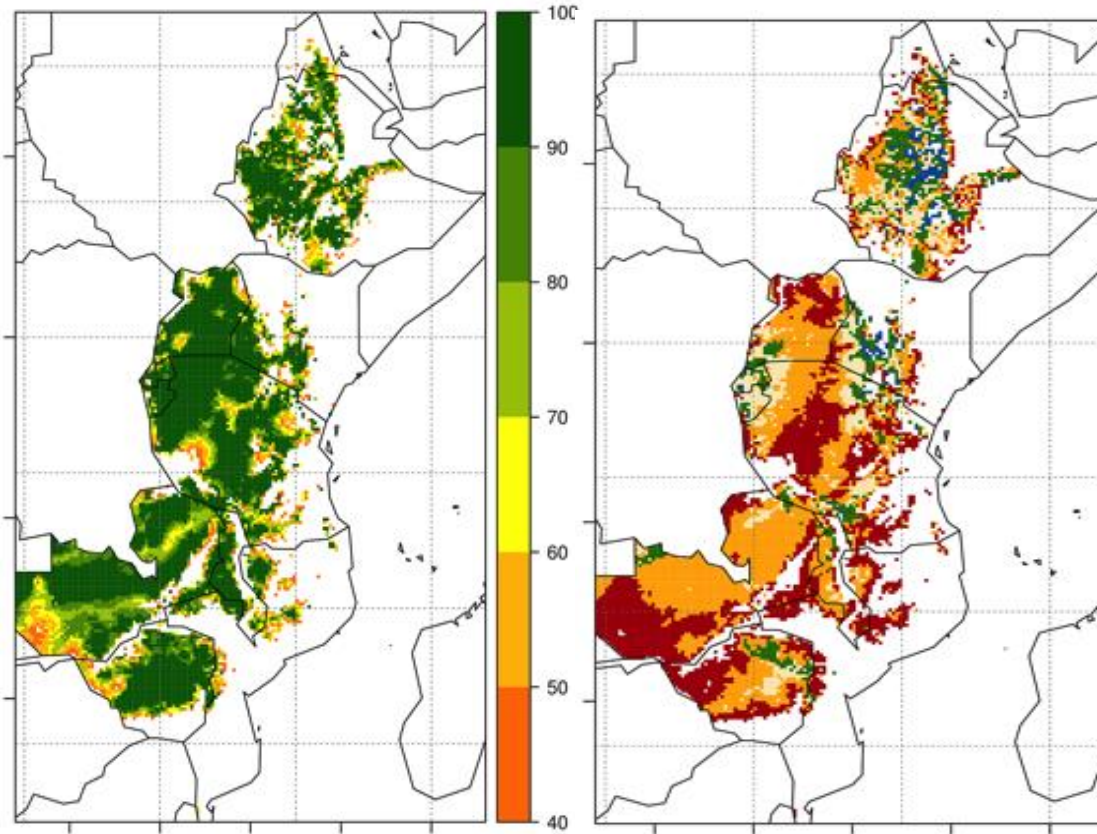


Bean expenditure by economic strata

Figure 2: Per capita real bean expenditures (UGX) in the past 7 days, per wealth quintile, Rural and Urban Uganda



Estimates of Bean Adaptability Now and in 2050



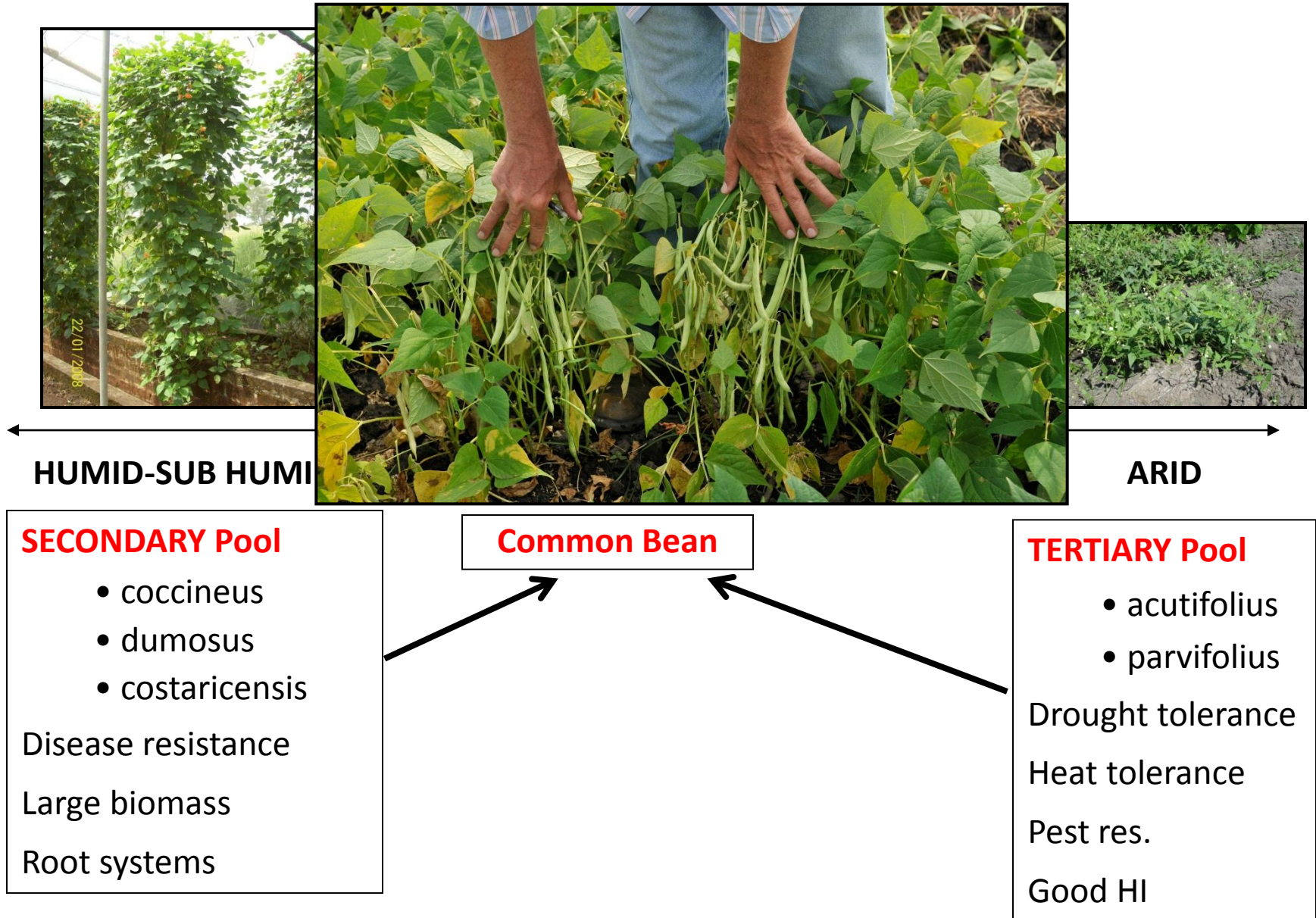
Current adaptability

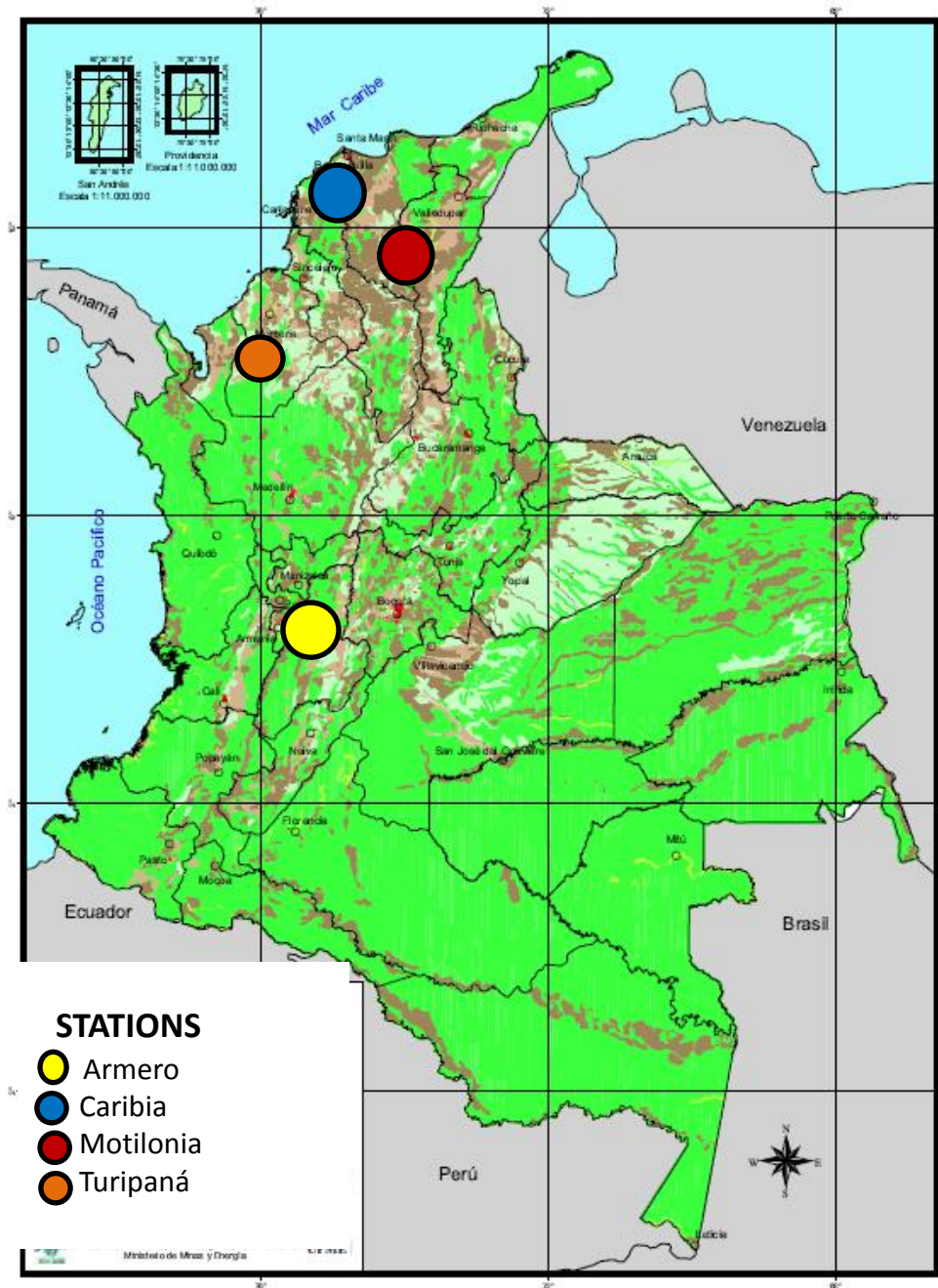
The "do-nothing"
scenario

What is our strategy?

- Defense?
- ...or go on the Offensive?
- “The best defense is a good offence.”

Phaseolus spp. originated over a range of ecological niches





High Temperature Research Sites

STATIONS

- Armero
- Caribia
- Motilonia
- Turipaná

Interspecific lines– Armero, Tolima, Colombia



SEF 14

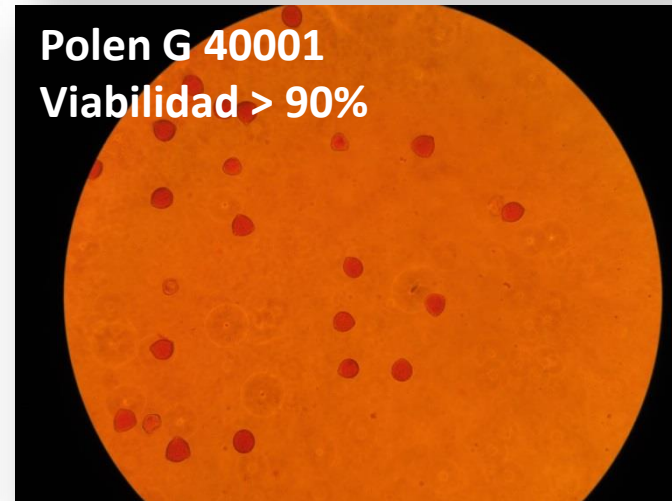
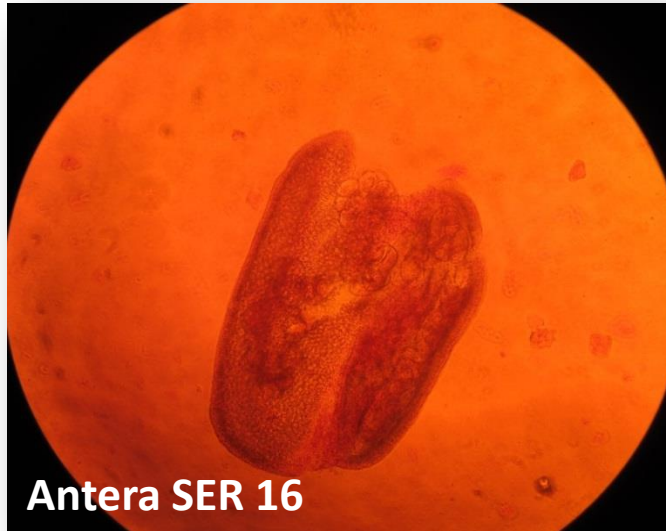


SEF 43



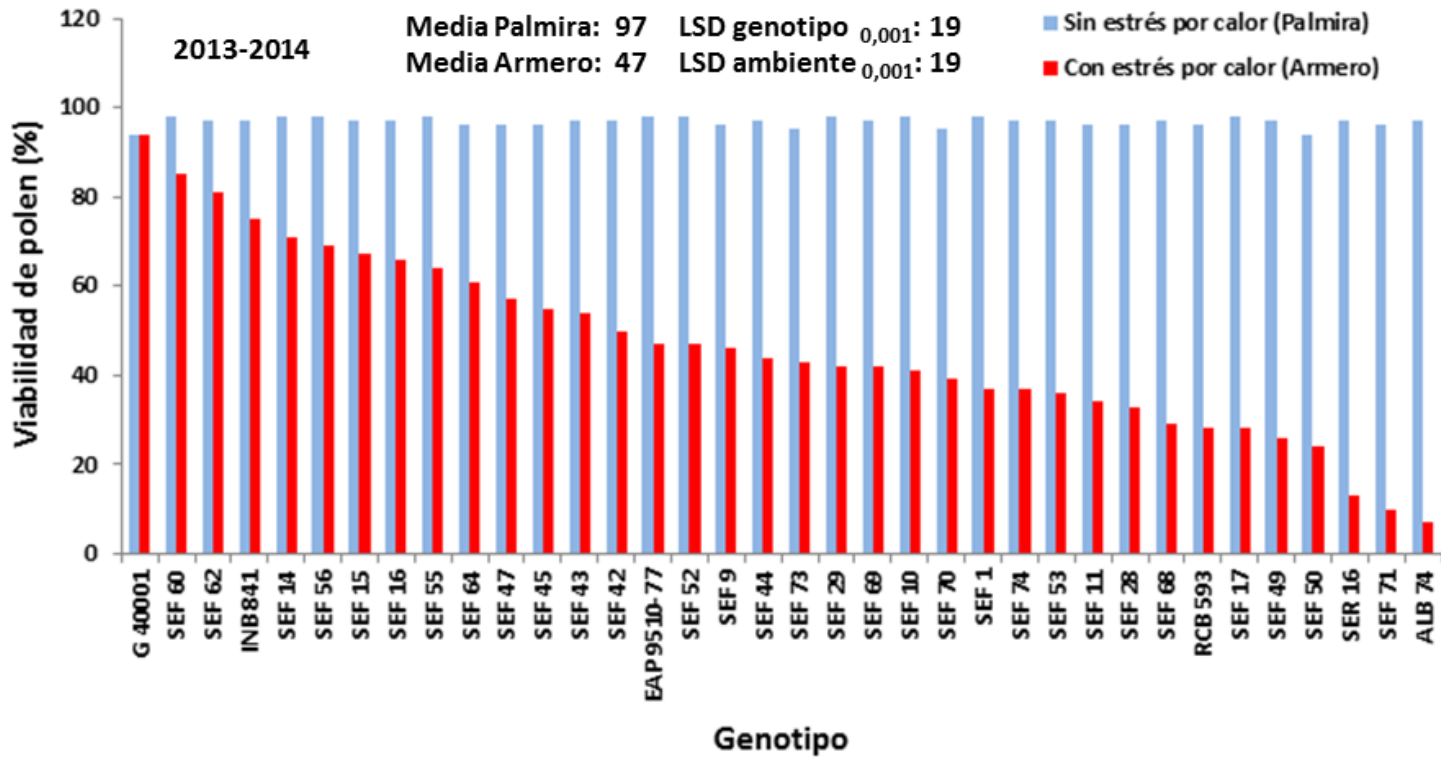
SEF 60
Pollen viability:
83.54%

Heat Stress on Anthers and Pollen Viability



Pollen Viability

With and Without Heat Stress



Heat Stress Effects on Grain Filling



New High temperature facility

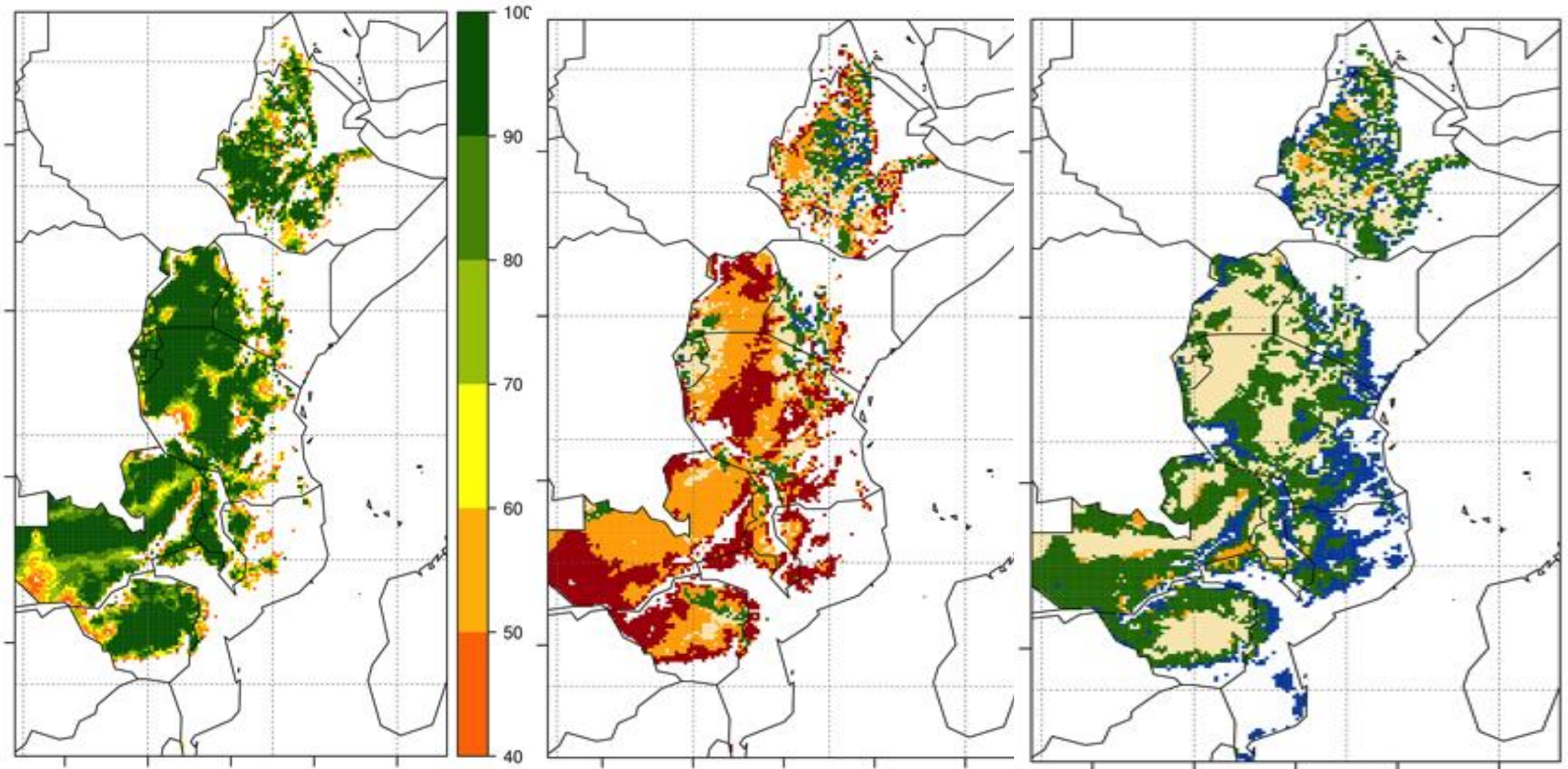


Nestor Chavés; José Polanía

What is our strategy?

- Defense?
- ...or go on the Offensive?
- “The best defense is a good offence.”

Estimates of Bean Adaptability with Heat Tolerant Beans with 3°C advantage



Current adaptability

The "do-nothing"
scenario

Plus 3 degrees
adaptation

40 years of bean research at CIAT

Resistance to biotic constraints



Improving biological nitrogen fixation



Tolerance to drought



Tolerance to high aluminum and low phosphorus



Research on genetic resources



DNA technology



Nutritional quality



Heat tolerance



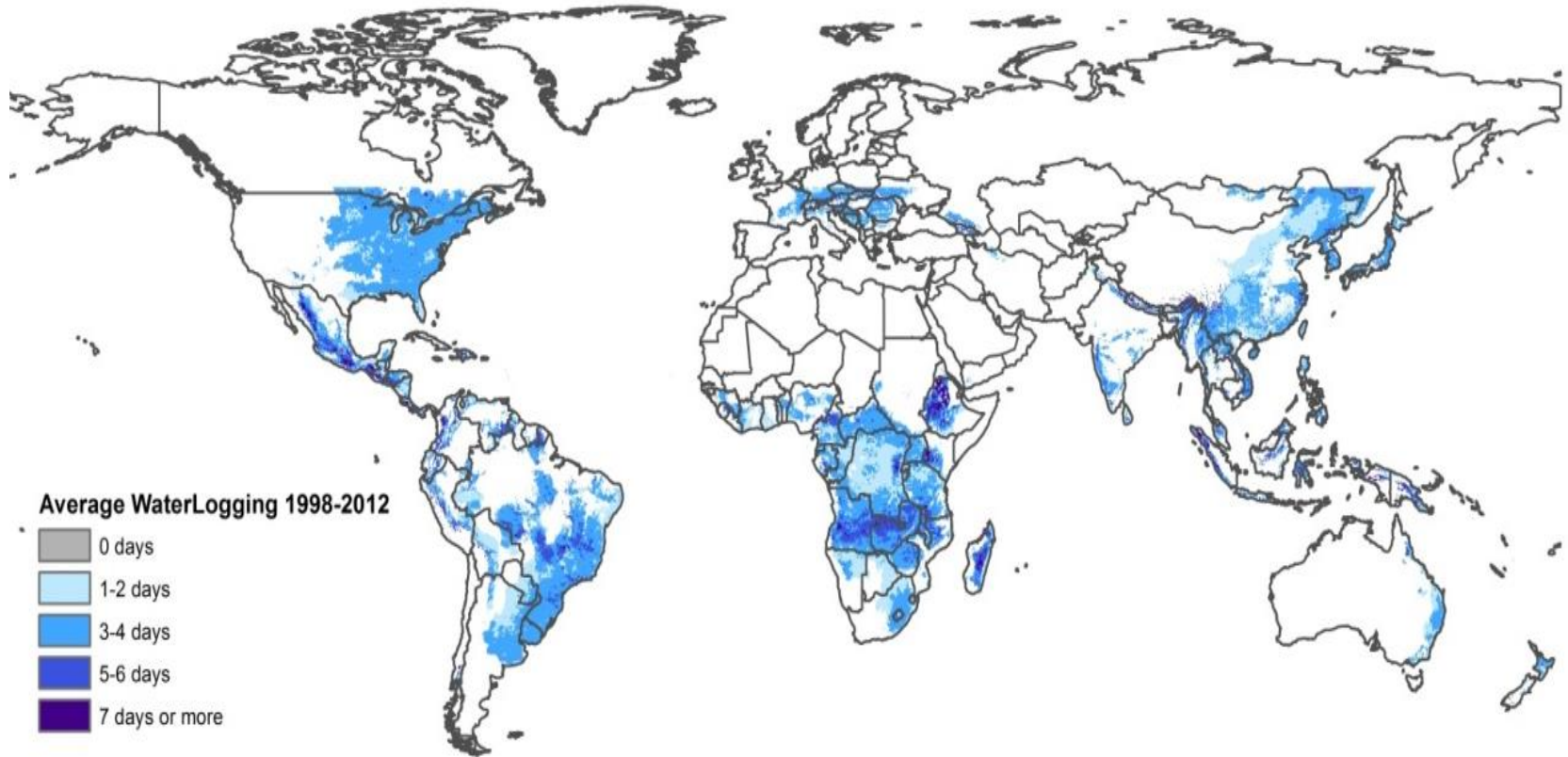
'75 '80 '85 '90 '95 '00 '05 '10 '15

F1's of Common bean x Sister spp.



Santos Barrera; Roosevelt Escobar

Threats of Excess Rainfall



David Arango