

Comparing *ex situ* and *in situ* conservation in maize landraces



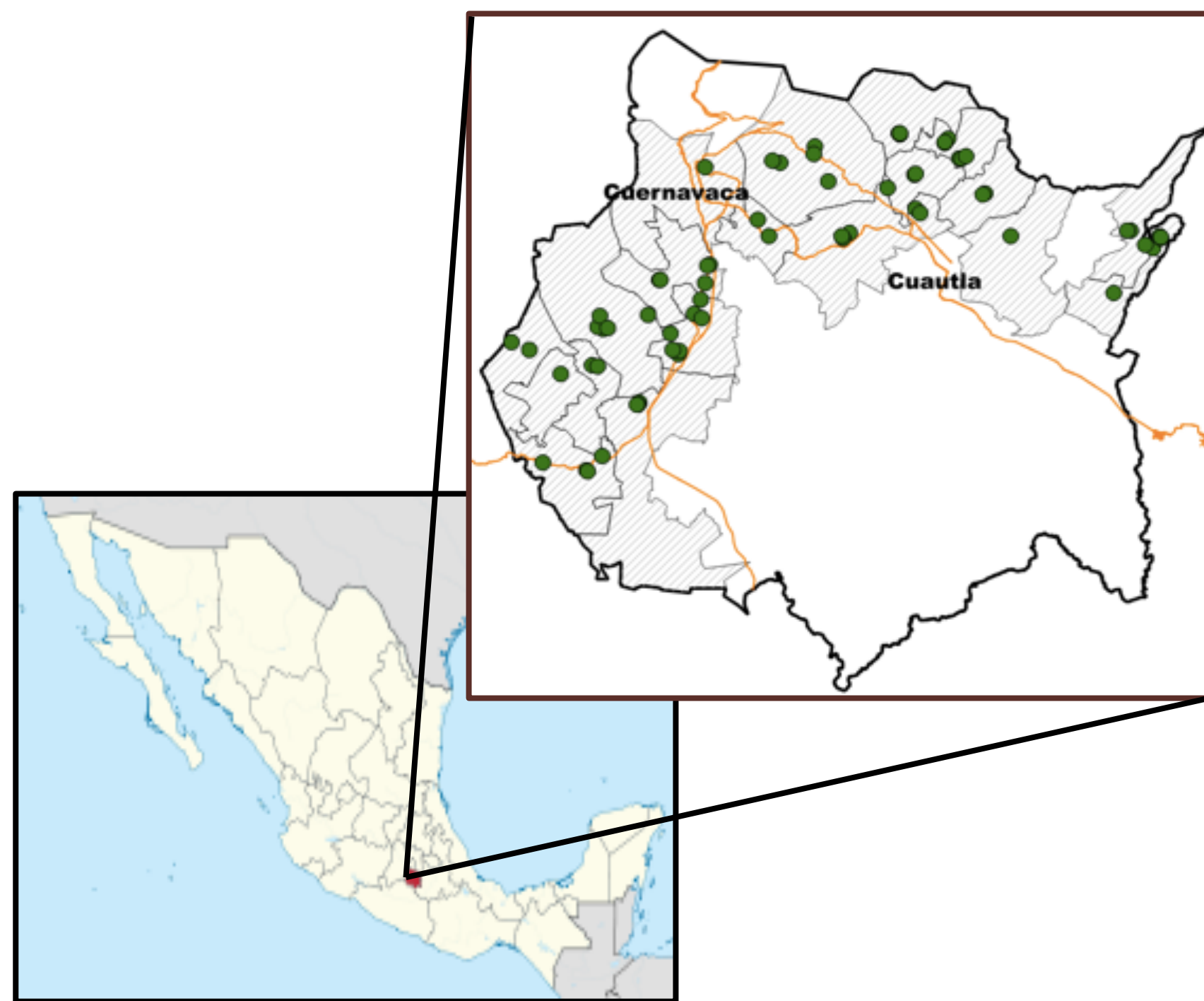
Francis Denisse McLean R.¹, T. C. Camacho Villa², D. Costich², C. Almekinders³, M. Dell'Acqua¹, M. E. Pè¹

How is maize from *genebanks* different from maize from *farmers' field*?

Genebank managers want to find out:

- Do farmers still have the materials we conserve?
- Do they want these materials back?
- Will these materials adapt to the current environments? to farmers' and market preferences?
- How have the materials changed in the field?

We found a collection from CIMMYT Maize Germplasm Bank rich in passport information that would allow us to do this **direct comparison**



93 accessions from **66 families** from the state of Morelos, Mexico collected in **1967**

We traced back the **same families** using the **name** and **origin** of the donors

Farmers identified the materials based on the **pictures** and **common names**

In **2017** we assembled new '*in situ*' samples with the **same number of cobs** as the samples stored at the genebank

Example of passport data:



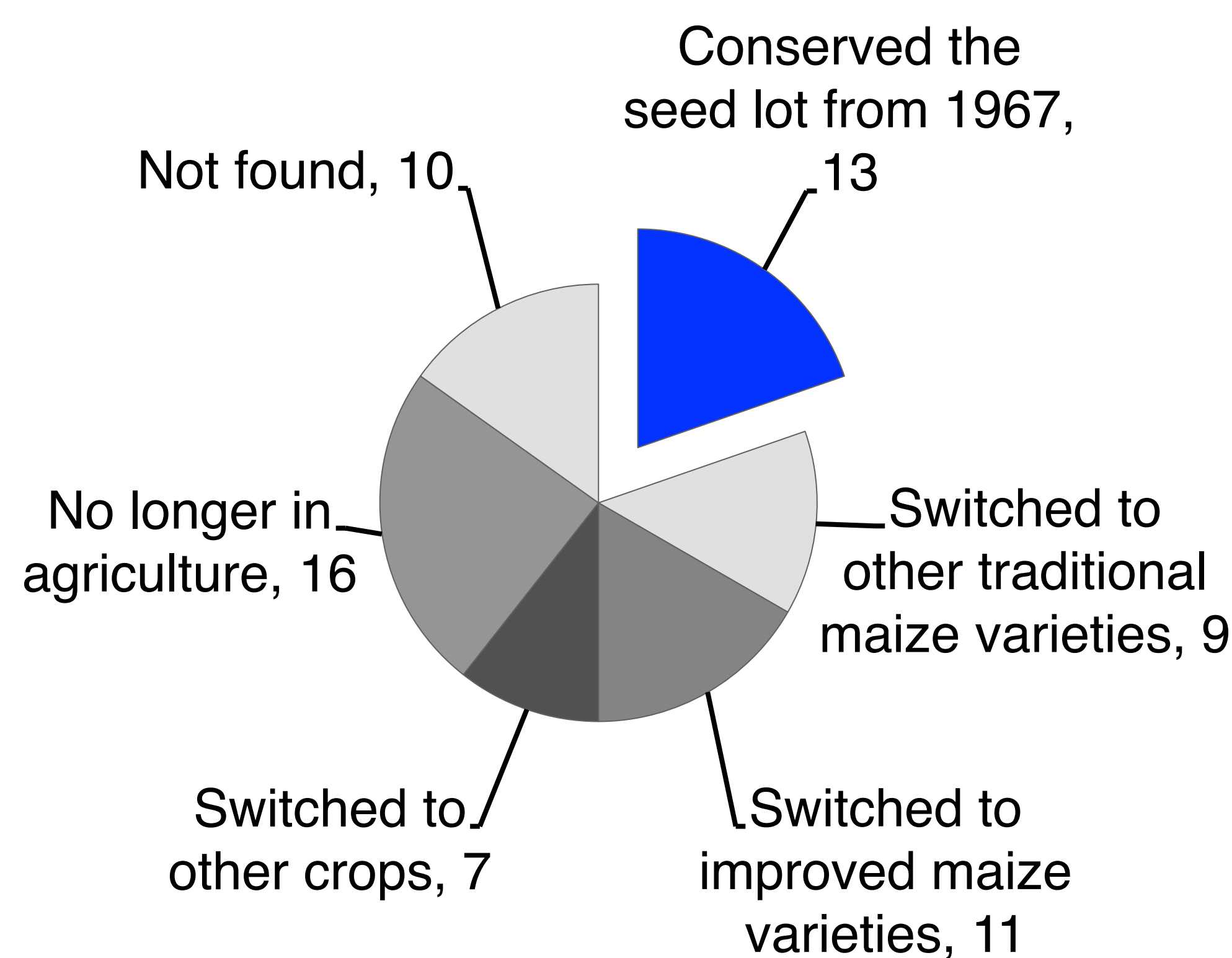
Ancho maize
Margarito Mendez
Yecapixtla
12 cobs

Thirteen out of 66 families have conserved the seed they donated in 1967



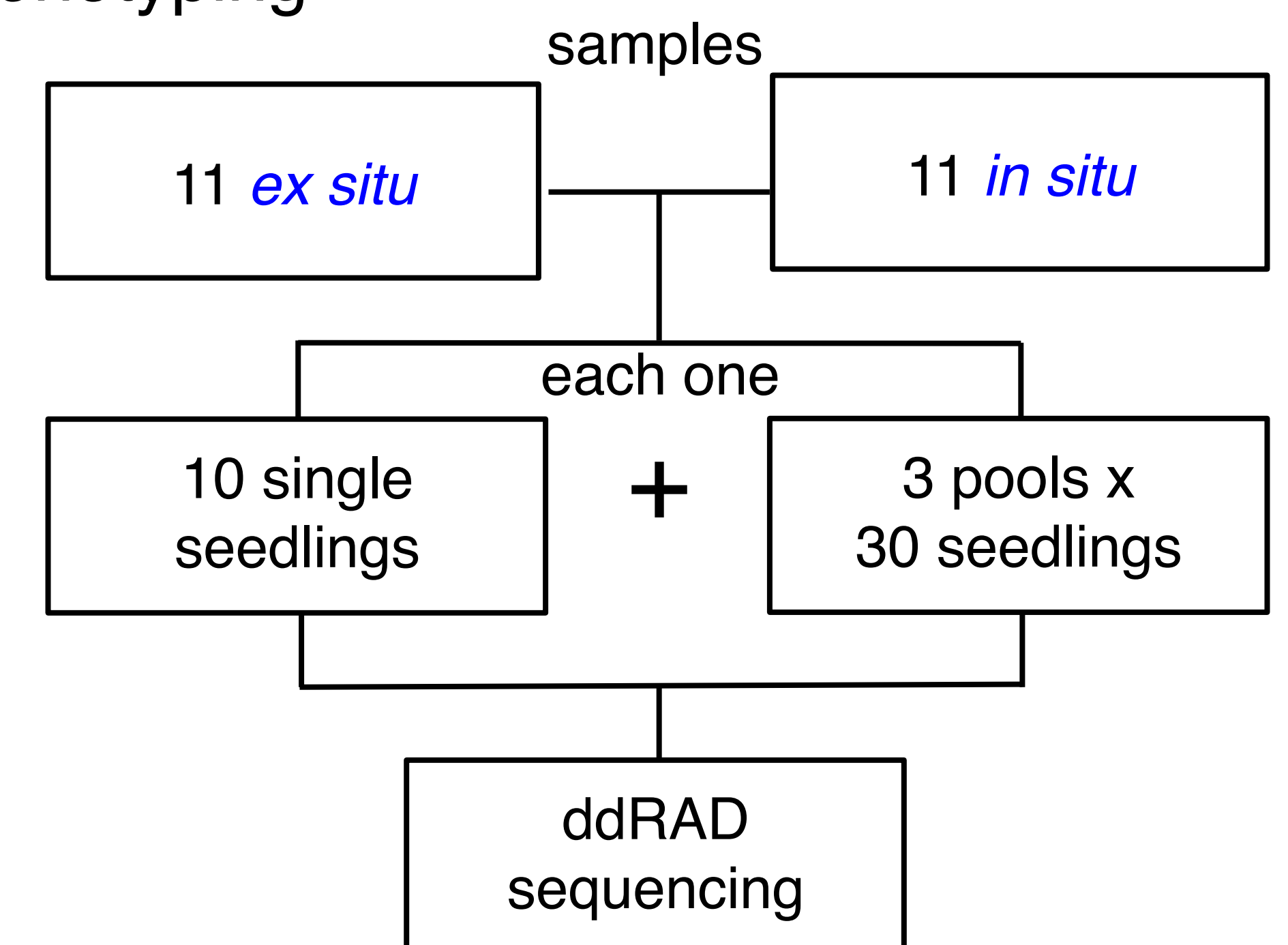
A. Luis Oranieguez donated two accessions to the Bank in 1967. He has conserved one of them *in situ*

B. Modesto Guzman shows a picture of his late mother who donated seed to the Bank. He is no longer planting his mother's maize



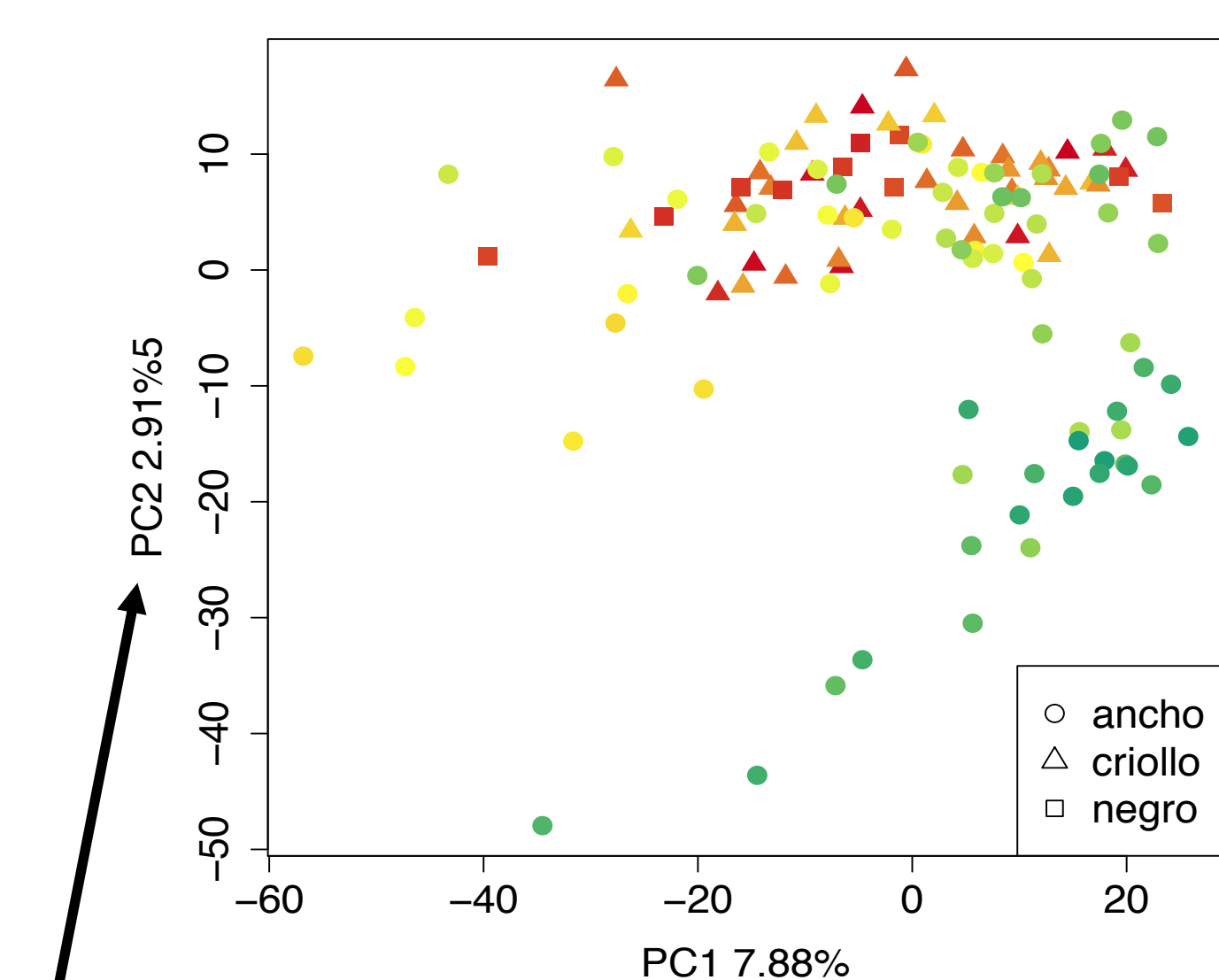
Other families have **moved on to different economic activities**

We collected **11 of the 14 accessions** found *in situ* and matched them with their *ex situ* pair for DNA extraction and genotyping

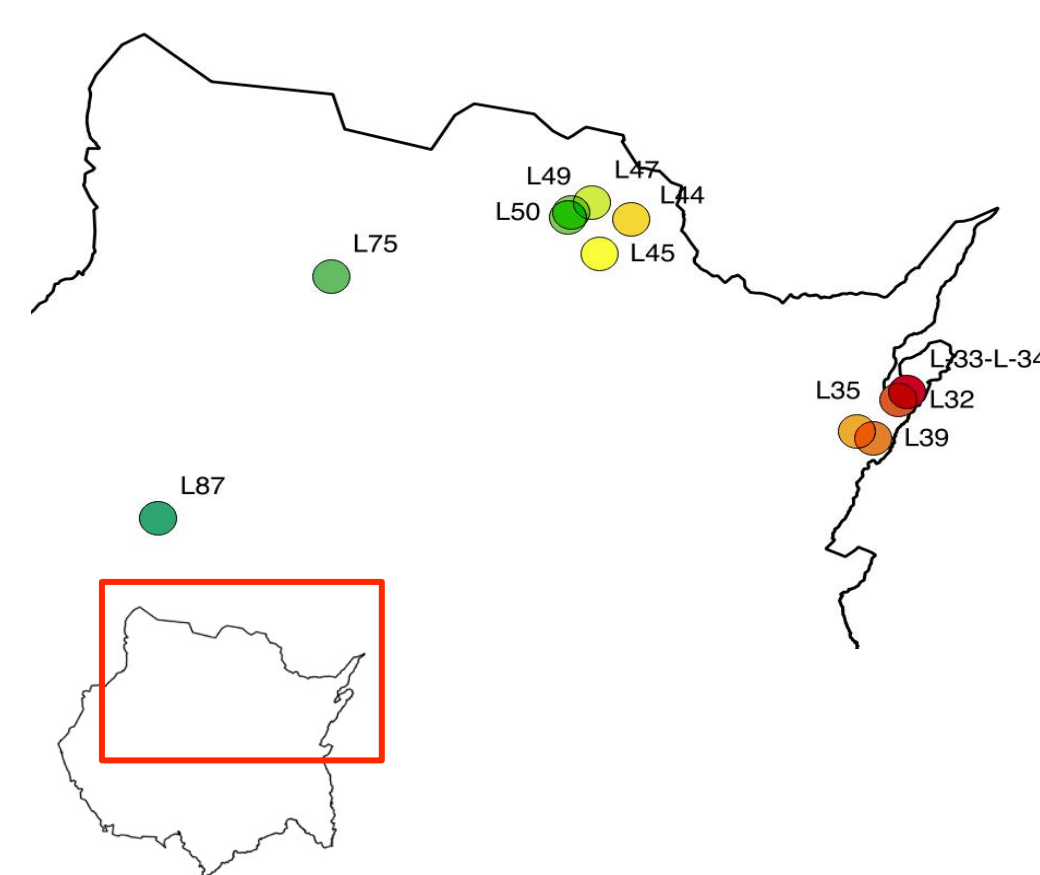


We look forward to analyze the *genetic differences* between *sample sets*

3900 SNPs from *ex situ* samples indicate **some degree of admixture**.

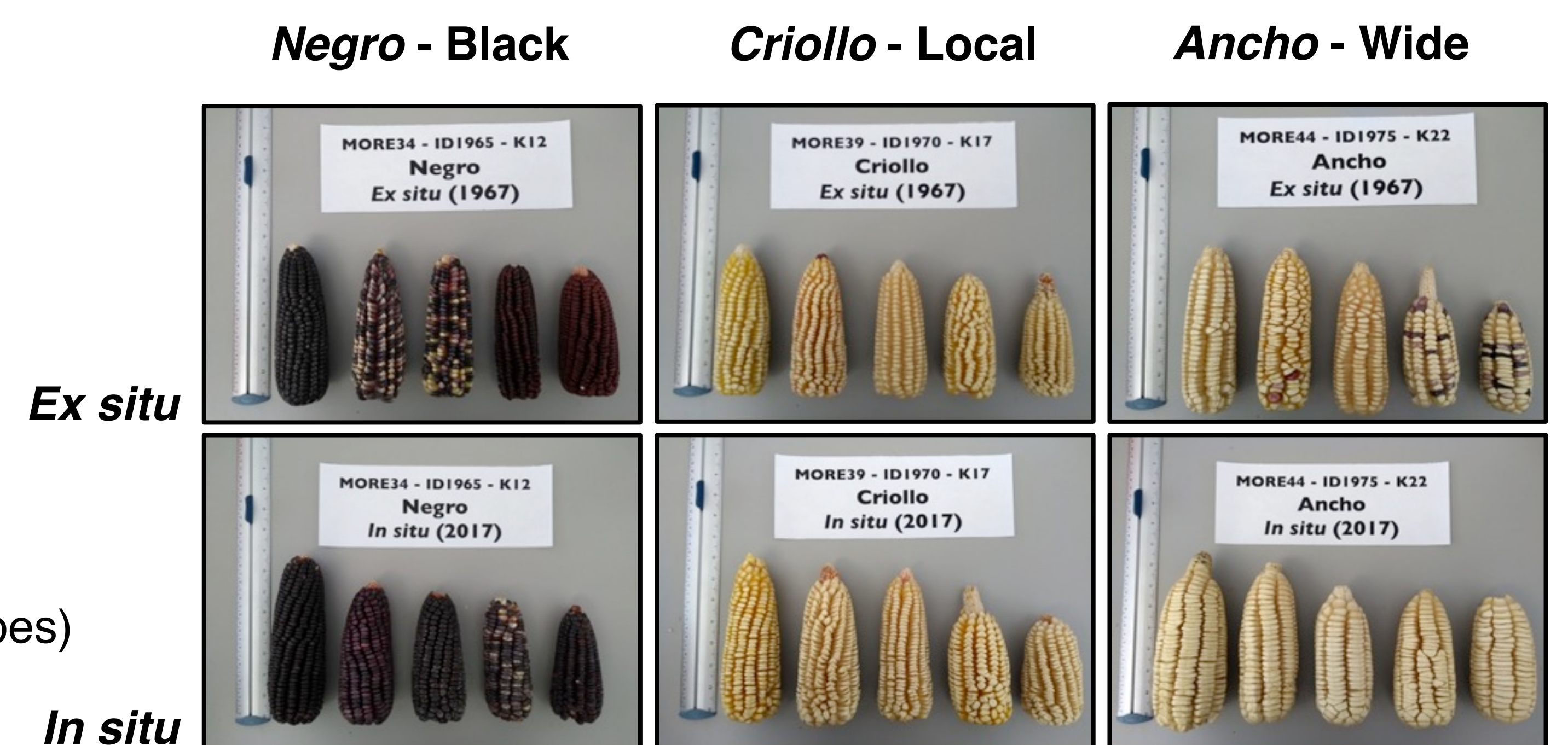


Small percentage of the variation is explained by first two PCs



Neither relative distance among samples (colors, in map) nor landrace identity (shapes) fully explain the distribution of diversity

In situ samples are now being **sequenced**



We increased all samples in 2017 to obtain **enough same-aged seed** for future phenotyping. Some differences are already noticeable

¹ Institute of Life Sciences, Sant'Anna School of Advanced Studies

² International Maize and Wheat Improvement Center, CIMMYT

³ Department of Social Sciences, Wageningen University