

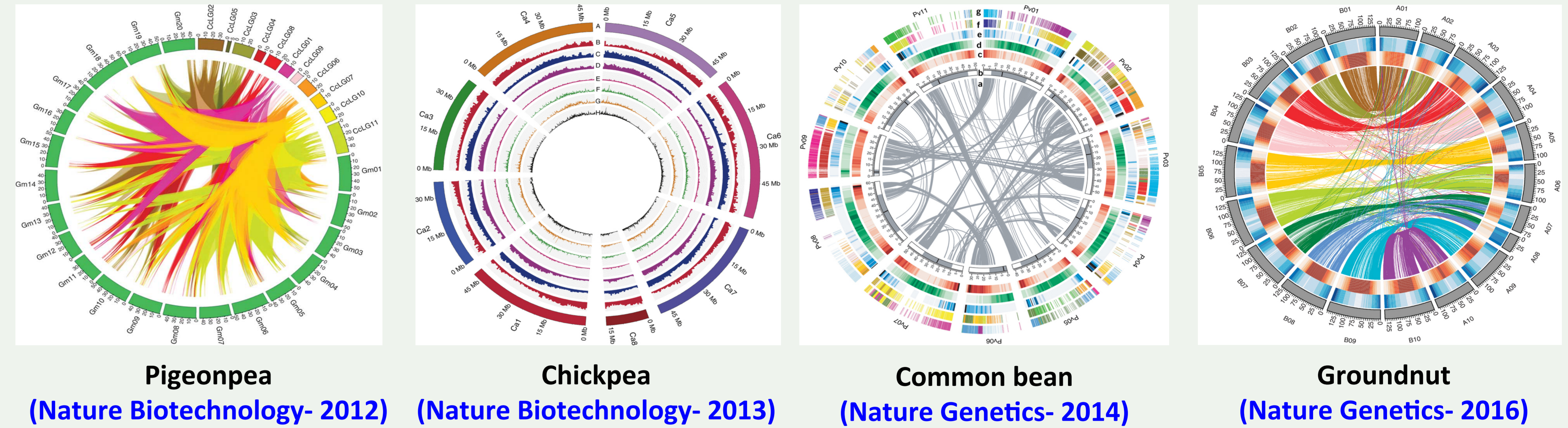


# Development of tools, technologies and platforms for genotyping, sequencing and informatics in legumes

## Abstract

As compared to major cereal crops, CRP mandated legume crops in general didn't enjoy the availability of genomic resources until recently. Under the framework of CRP-Grain Legumes, significant advances have been made in developing genomics tools, technologies and platforms for accelerating genomics research as well deploying molecular breeding. To name a few: genome sequencing for legume crops, transcriptome assembly, several hundred thousands to millions of molecular markers, several trait associated markers, several molecular breeding lines, implementation of Breeding Management System (BMS), development of high-density genomic database for chickpea under the umbrella of Global & Open-source Breeding Informatics Initiative and very recently, low-cost and high-throughput genotyping hub have been established for enhancing precision and efficiency in legume crops.

## Genomic sequence assemblies



## Advances in development of molecular markers

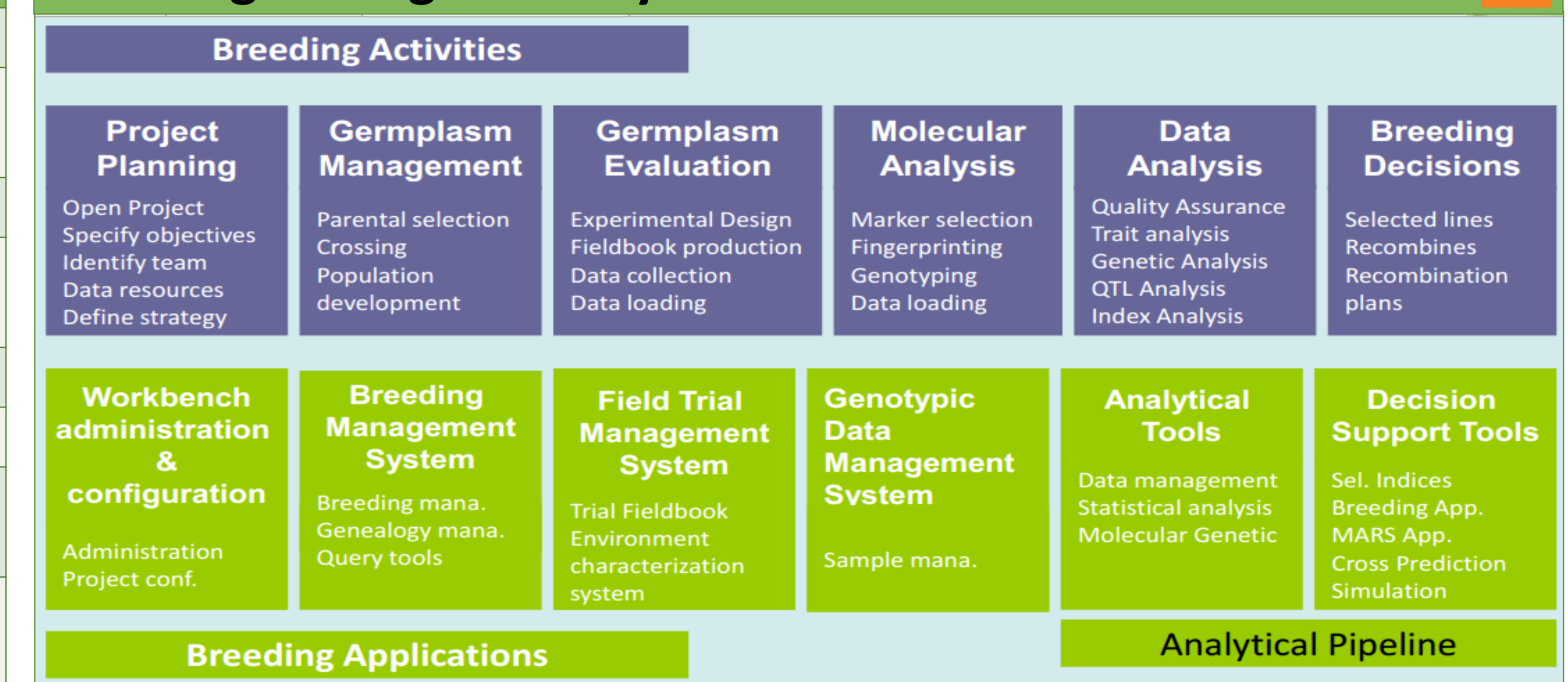
	Marker Resources		Trait Associated Markers	
	2012	2016	2012	2016
Chickpea	++	++++	+	++
Common bean	++	+++	++	+++
Faba bean	+	++	-	+
Groundnut	+	+++	+	++
Lentil	+	+++	+	++
Pigeonpea	++	++++	-	+
Soybean	+++	++++	+++	+++

\*one, two, three and four + sign indicate availability in moderate, good, very good and excellent quantity, respectively.

## Development of molecular breeding lines

	Traits introgression
Chickpea	Drought tolerance, Fusarium wilt resistance, Ascochyta blight resistance
Common bean	Common bacterial blight, Rust
Faba bean	Orobanche resistance, Botrytis, Rust, Ascochyta blight
Groundnut	Late Leaf Spot, Leaf rust, oleate trait
Lentil	Fusarium wilt, Stemphylium blight, Rust
Pigeonpea	Sterility Mosaic Disease (SMD), Fusarium wilt
Soybean	Soybean Mosaic Virus (SMV), Rust, Soybean Cyst Nematode (SCN)

## Breeding Management System



## High-throughput & low-cost genotyping hub

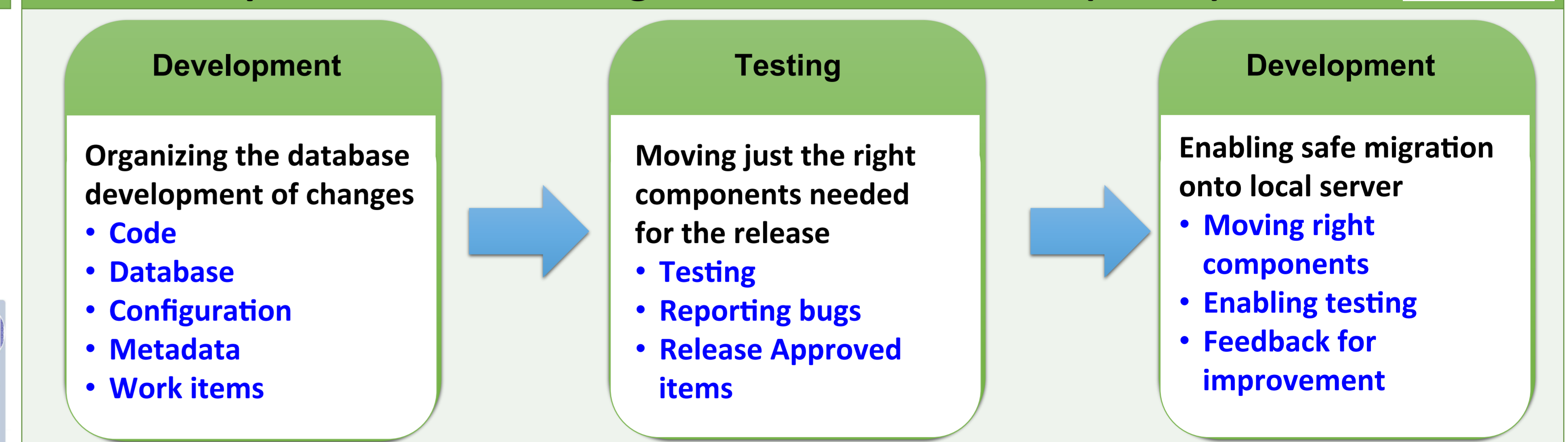
Target samples/ year	
CIMMYT	300,000
ICRISAT	240,000
IRRI	150,000
IITA	50,000
CIAT	25,000
CIP	25,000
AfricaRice	25,000



Target crops	
Chickpea	Cassava
Common bean	Maize
Cowpea	Potato
Groundnut	Rice
	Wheat
	Sweet potato



## Global & Open-source Breeding Informatics Initiative (GOBii)



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