Implementing genomic selection in CGIAR breeding in perspctive

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Wayne Powell and the Implementing Genomic Selection in CGIAR Breeding Programs Workshop Participants 2016

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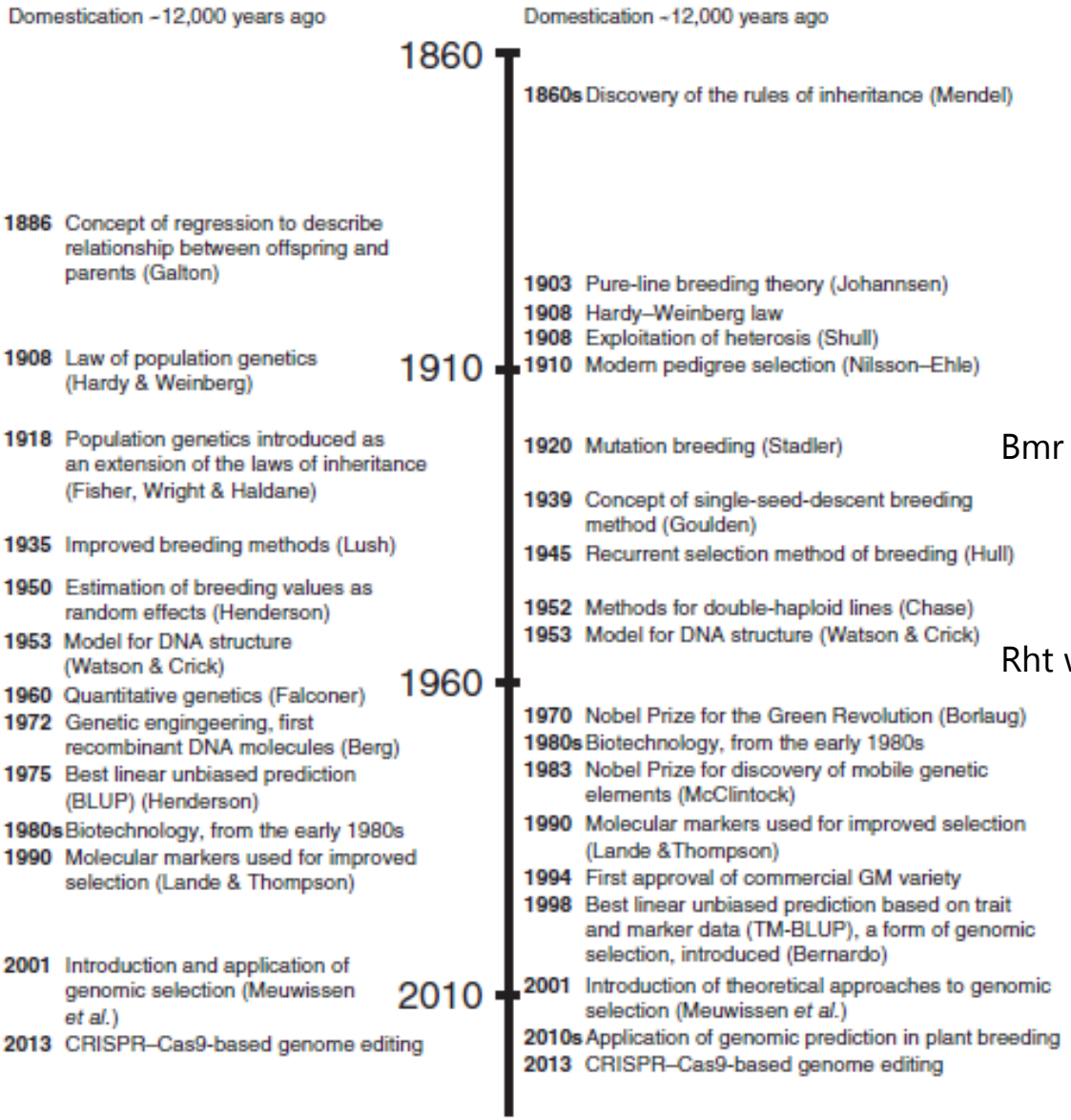
Demand for innovation in agriculture because…

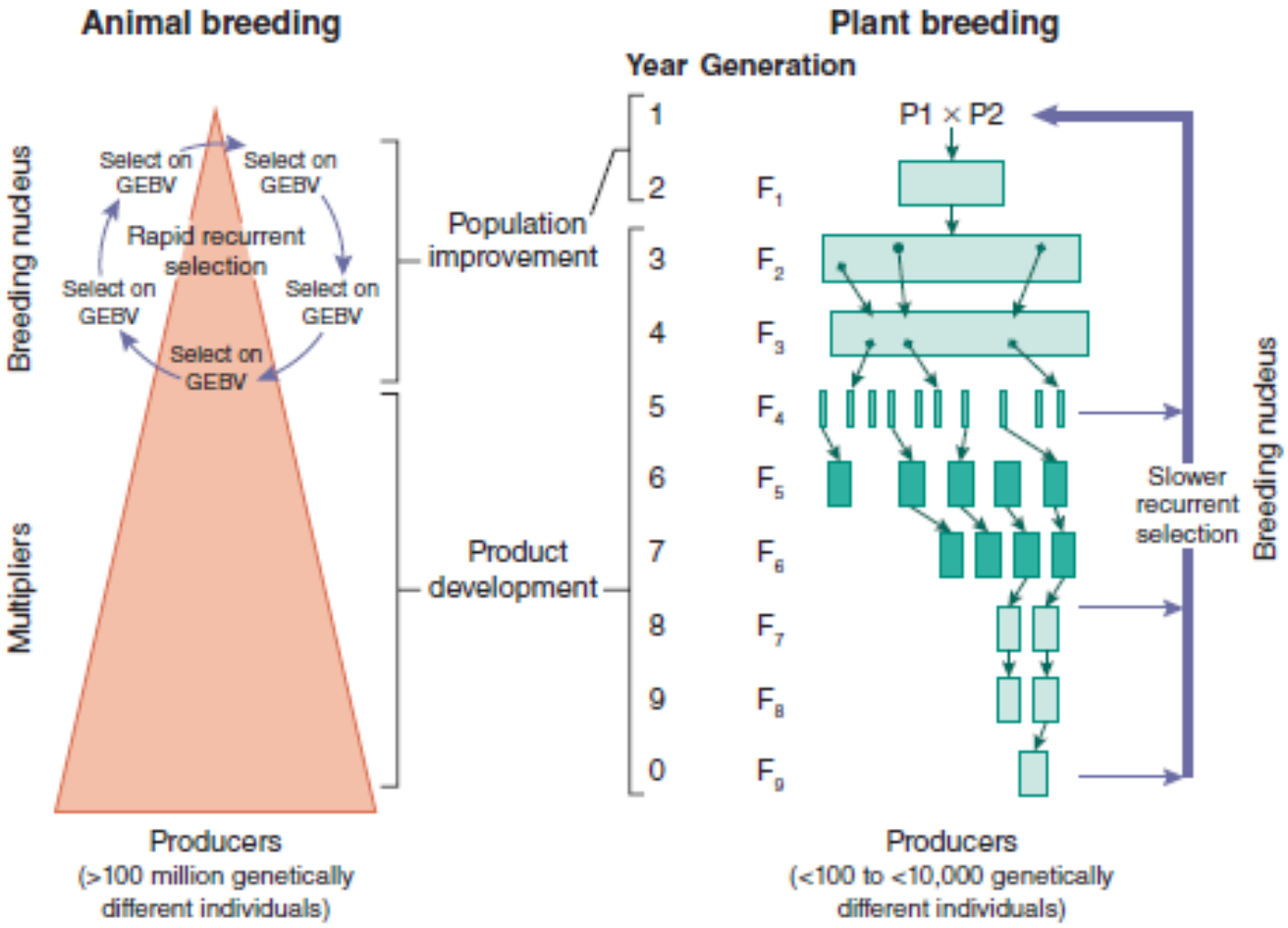
- Global food price crisis of 2008
- Changing climate and a growing population
- Increase CO2 AND temperature
- Food insecurity
- A 70–100% increase in food production next 35 year
- Biofuel – food- feed dilemma
- Change in lifestyle
- Water supply
- Limiting resources P

CGIAR: Consultative Group for International Agricultural Research

Milestones in selective animal and plant breeding

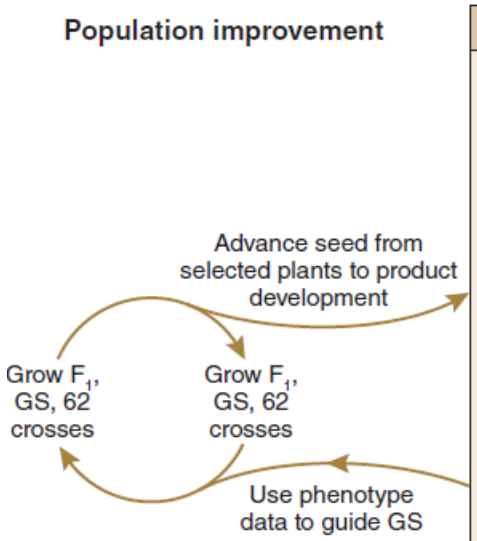


Breeding approaches



Ideotype

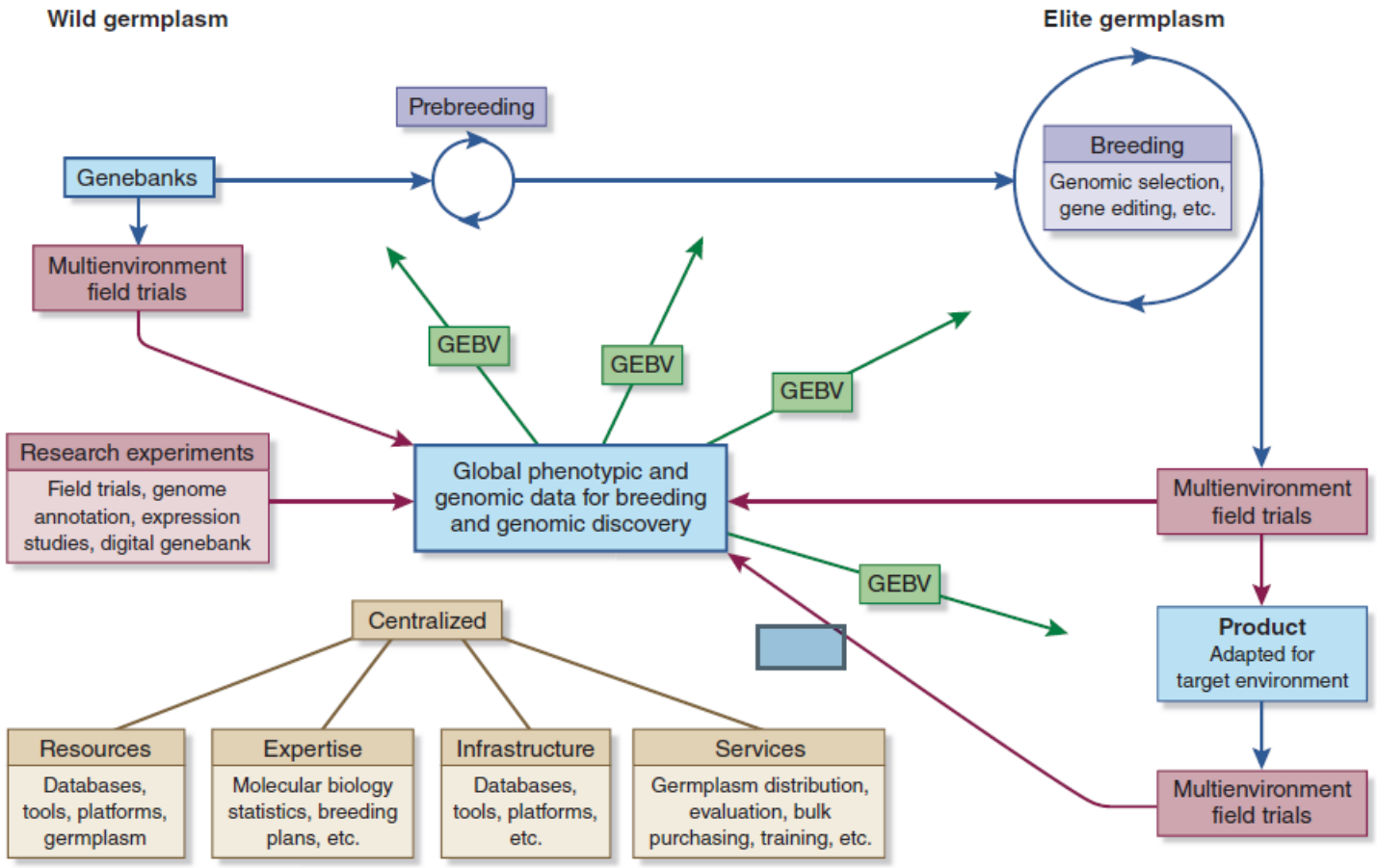
Population improvement & product development



Product development

Year	Generation	Number of plants	Action
1	F_1	124 half-sib families	Increase in greenhouse
2	F_2	1,000 plants per family	Bulk 50 plants per family
3	F_3 ×124	1,000 plants per family	Bulk 50 plants per family
4	F_4	1,000 plants per family	Derive new lines from 50 plants per family
5	$F_{4:5}$	6,200 headrows	Advance 1,000 lines
6	PYT, $F_{4:6}$	1,000 lines	Yield trial, genotype
7	AYT, $F_{4:7}$	100 lines	Yield trial
8	EYT, $F_{4:8}$	10 lines	Yield trial
9	EYT, $F_{4:9}$	10 lines	Yield trial
10	$F_{4:10}$	1 line	Release variety

PYT, primary yield trials;
AYT, advanced yield trials
EYT, elite yield trials.



genomic estimated breeding value (GEBV)
genetic diversity
coordinated phenotyping across environments
cost-effective sequencing
genomic prediction and genome editing

PERSPECTIVE

nature genetics

Genomic prediction unifies animal and plant breeding programs to form platforms for biological discovery

John M Hickey[1], Tinashe Chiurugwi[2], Ian Mackay[2], Wayne Powell[3] & Implementing Genomic Selection in CGIAR Breeding Programs Workshop Participants[4]

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