

# Potential and limitations of genomic selection in small ruminants

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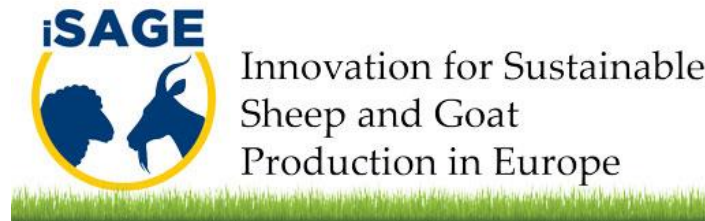
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# Partners involved

**Industry:** AGRAMA, ARDIEKIN, ASSAF.E, CAPGENES, CNBL, FRIZARTA

**Research:** INIA, AUTH, IDELE, CITA, IRIAF

**France, Greece and Spain**



- **Genomic Selection programs in dairy cattle industry are in place and working:** well organized, “one large population”, “willing to innovate”, international collaboration tradition.
- **Why does it work from a genetic perspective?**
- **What about the small ruminant populations?**



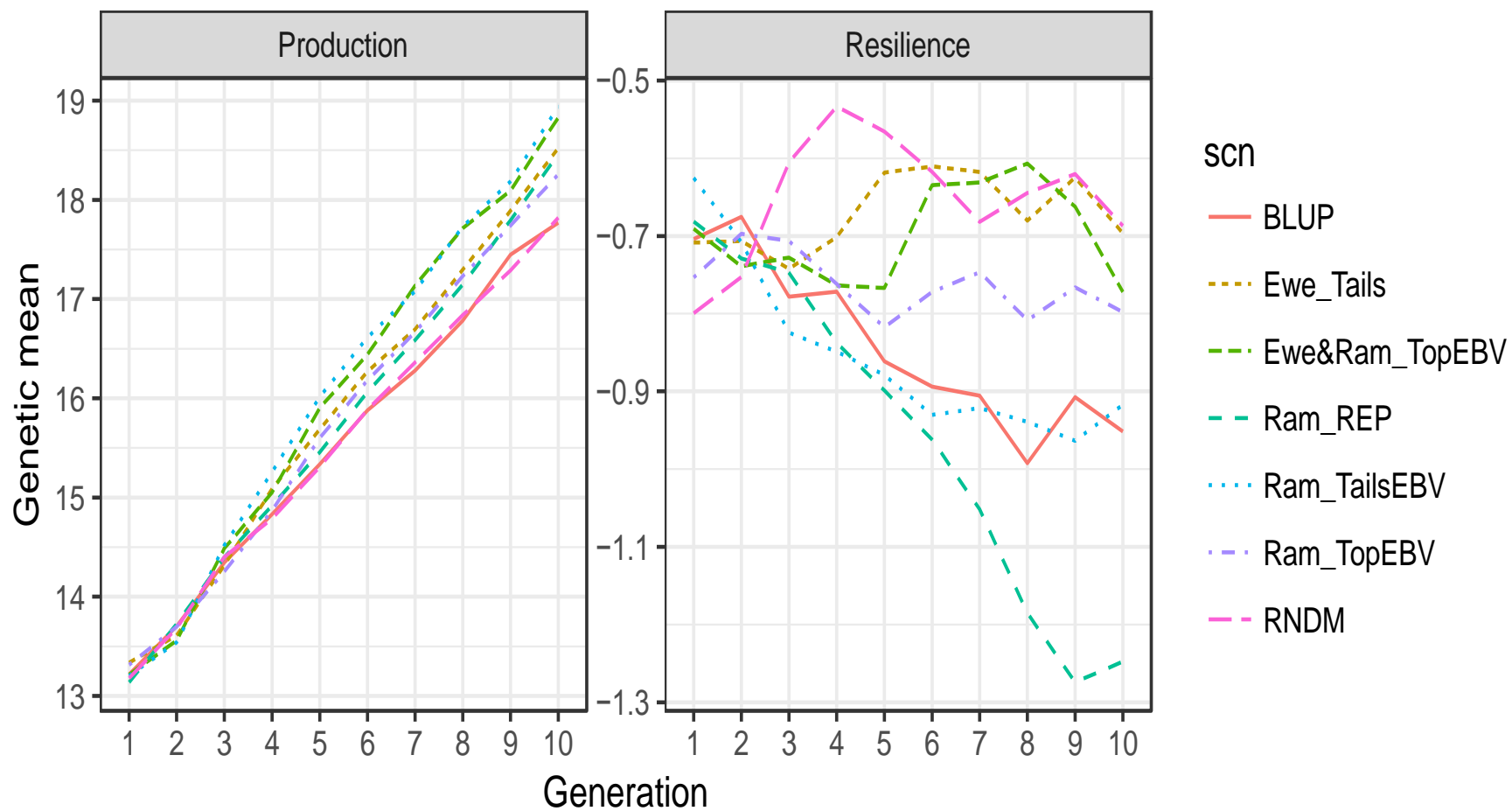
- **What is the perception of small ruminant stakeholders ? to identify potential limitations and possible drivers?**
- **How could we do to get the most? to maximize the amount of information?**
- **What about the main actors: “farmers”? would they be willing to use the genomic tools?**



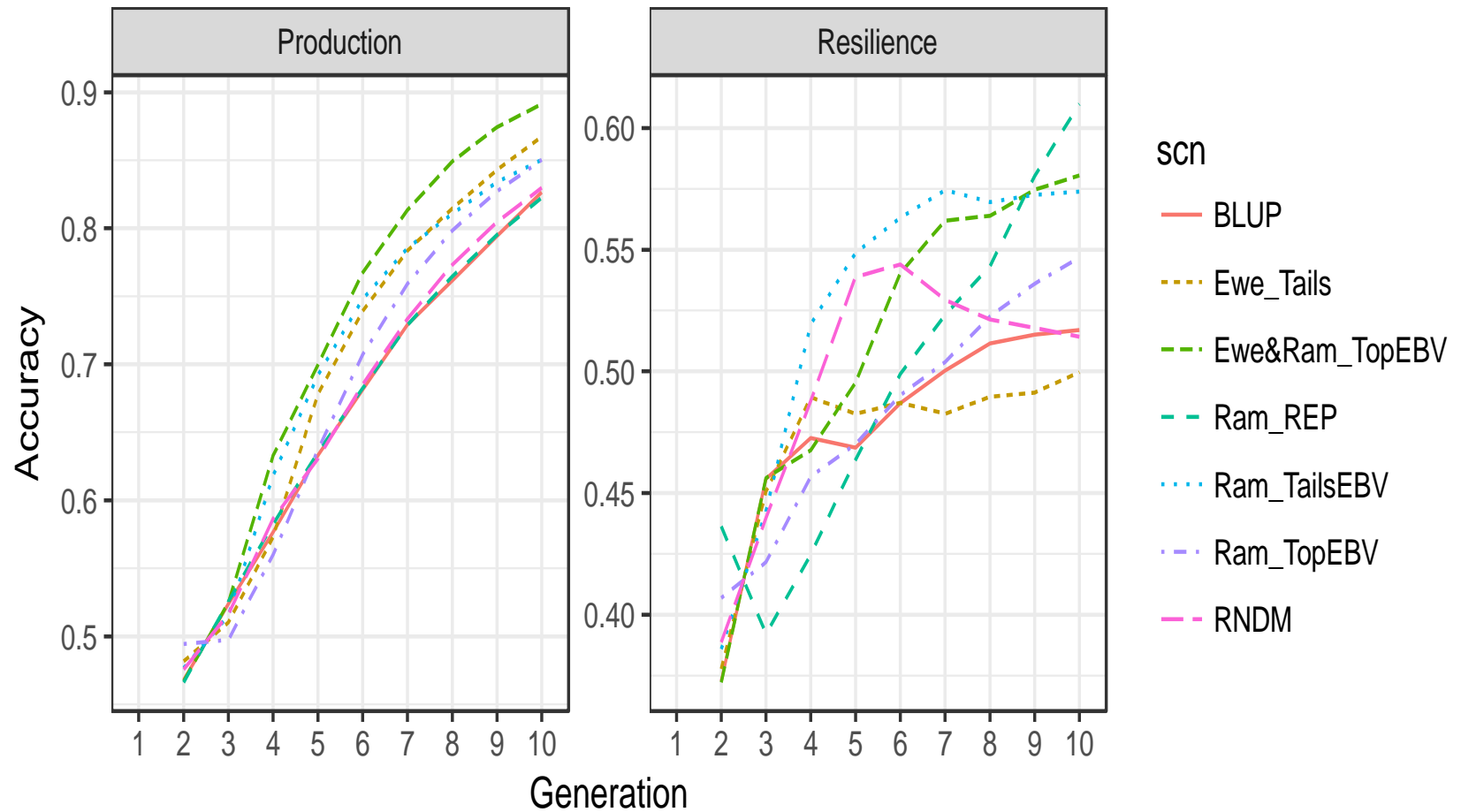
- **8 open questions to stakeholders?** to identify potential limitations and possible drivers?
- **Simulation of genotyping strategies** to maximize information
- **Attitudinal statements +** some general questions about farm and farmer profile.

- GS program must be based on a well structured industry support by a common organization
- **Costs-Funding main limitation**
- Identify groups of enthusiastic farmers to drive genetic improvement
- Timing for genotyping to make selection decisions
- Public opinion: MGO

# What are the scenarios to control the cost?



# What is the scenario to control the cost?





# Correlation between attitudinal statements, attitudinal dimensions and attitudinal gradient

Attitudinal statement	Att. toward traditional selection	Att. toward G & G breeding	Att. gradient Traditional - G&G
Using breeding values to select rams/ewes improves the performance of sheep better and faster than other ways of selecting.	-0.4	0.4	-0.4
The use of genomic and DNA/gene information to select rams/ewes will improve the performance of sheep better and faster than any other method.	-0.2	0.8	-0.6
It is important that opportunities for selection of sheep with genomic and DNA/gene information are fully utilized.	-0.2	0.8	-0.6
It is important that opportunities for selection of sheep with new genetic developments are fully utilized.	-0.2	0.7	-0.6
The appearance of a ram/ewe is sufficient for telling its performance.	0.8	-0.6	0.7
The appearance of progeny fully indicates how good the ram/ewe is.	0.8	-0.1	0.6

# Attitudinal driving factors

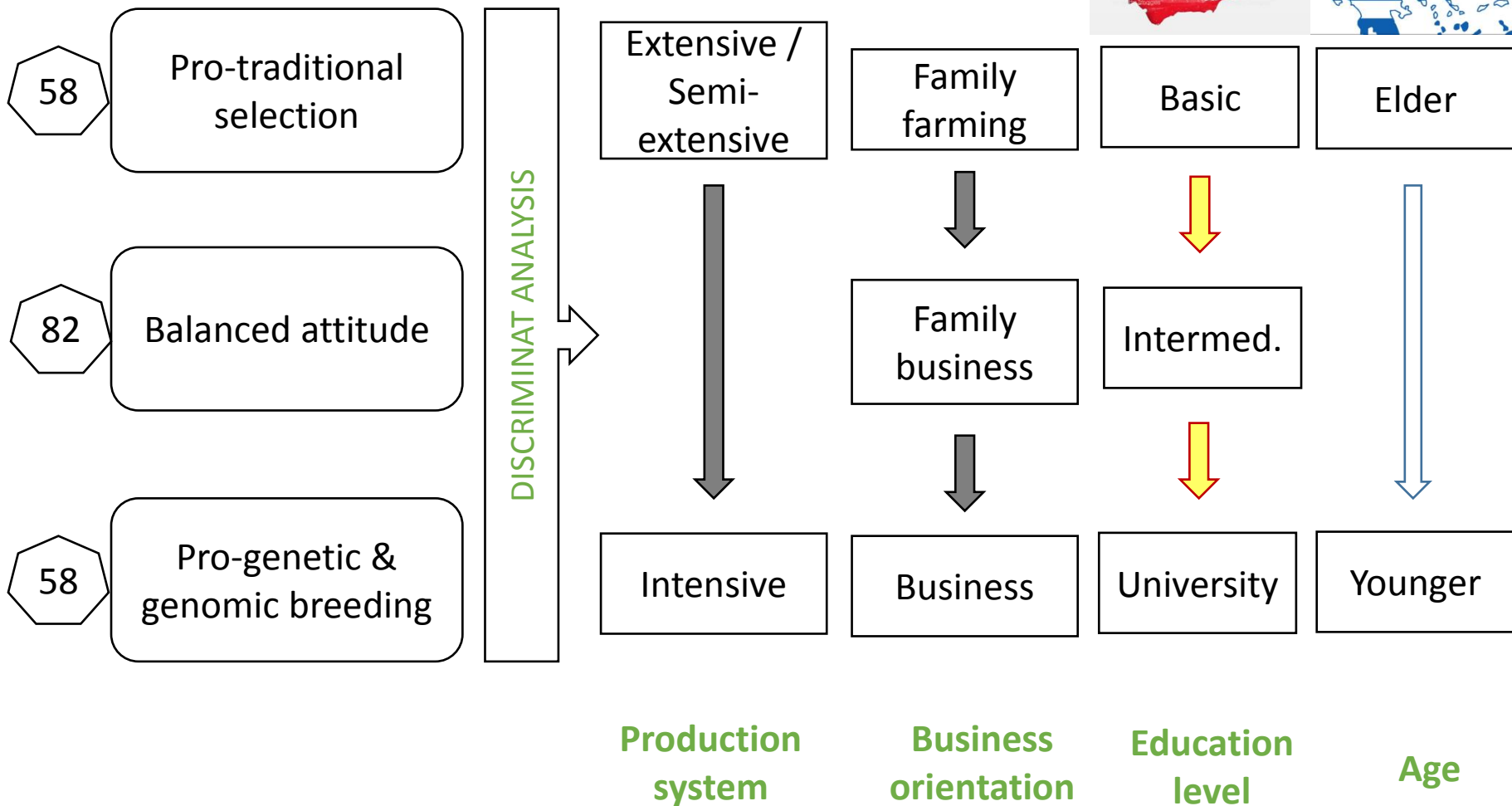
Farming system and farmer factors		Attitudinal farmer group		
		Pro-traditional selection	Balance Traditional-G&G	Pro-G&G
<sup>1</sup> Production system	Intensive	22.4	28	56.9
	Extensive/semi-extensive	77.6	72	43.1
<sup>1</sup> Farm property regime	Business	0.0	6.1	17.2
	Family business	34.5	41.5	50.0
	Family farming	65.5	52.4	32.8
Pedigree recording (% of farmers)		34.5	50.0	84.5
Performace data recording (% of farmers)		46.6	56.1	91.4
<sup>1,2</sup> Education level (Spain)	Basic	48.0	36.6	39.1
	Intermediate	12.0	17.1	8.7
	University	40.0	46.3	52.2
<sup>2</sup> Age (Greece)		44.2 ± 11.6	40.5 ± 9.7	40.2 ± 8.6

<sup>1</sup>Perc. of farmers of each attitudinal group that falls in each category of production system, property regime and education level

<sup>2</sup>Education level is on related to farmer attitudes in Spain and age only in Greece

# Farmers' attitudinal groups

## PCA



# Conclusions (I)

- Limiting factors:
  - Costs of genotyping and phenotyping
  - Change in breeding structures: cooperative work
  - Media effort to revert public opinion
- Driving factors:
  - Active extension services: business oriented.

- Genotyping scenarios
  - Provide different responses
  - Different correlated responses
  
- Comprehensive selection objective?
  - More complex production scenarios
  - Non directional variability?

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And

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