A bio-economic model to design new selection objectives

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Plan

- Why do we need a bio-economic model?
- Updating the economic values for an intensive Holstein system in a new context
- OSIRIS project: a modeling tool to define new breeding goals

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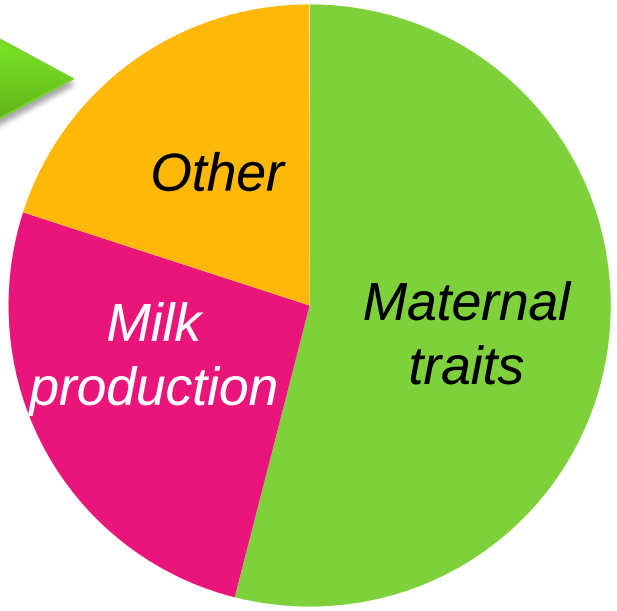
How to rank traits?

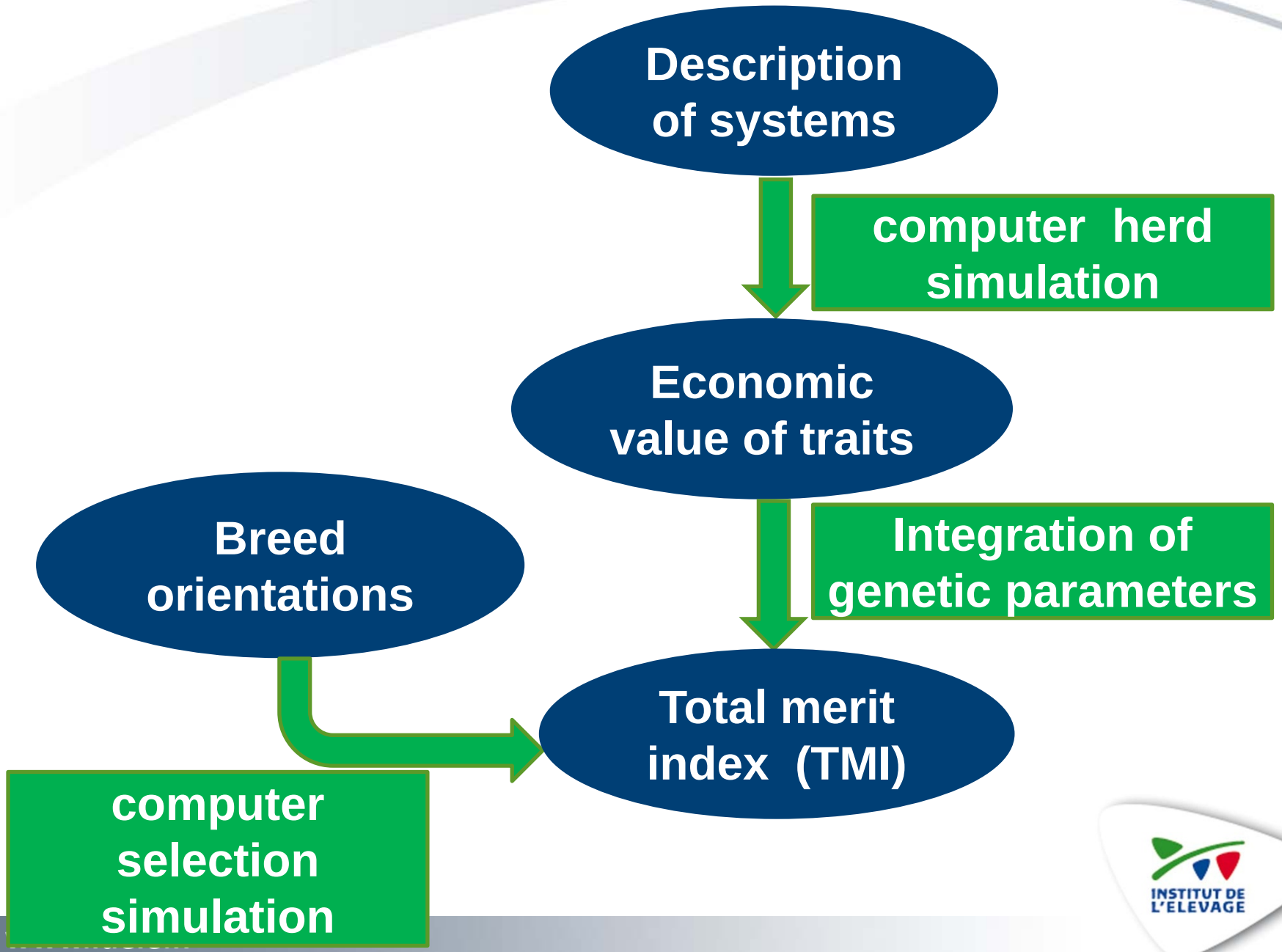
Farm systems

Breeding objectives



A need for economic studies, based on field data!

Breed process for breeding objectives and TMI



Plan

- Why do we need a bio-economic model?
- **Updating the economic values for an intensive Holstein system in a new context**
  - Delphine Pinard[1], Didier Regaldo[1]
    [1] Institut de l'Elevage, 149 rue de Bercy, 75012 Paris
- OSIRIS project: a modeling tool to define new breeding goals

ISU= production + morphology

2001

ISU= production + somatic cell concentration + cow fertility + functional longevity + udder morphology + milk speed

Weights based on a bio economic model

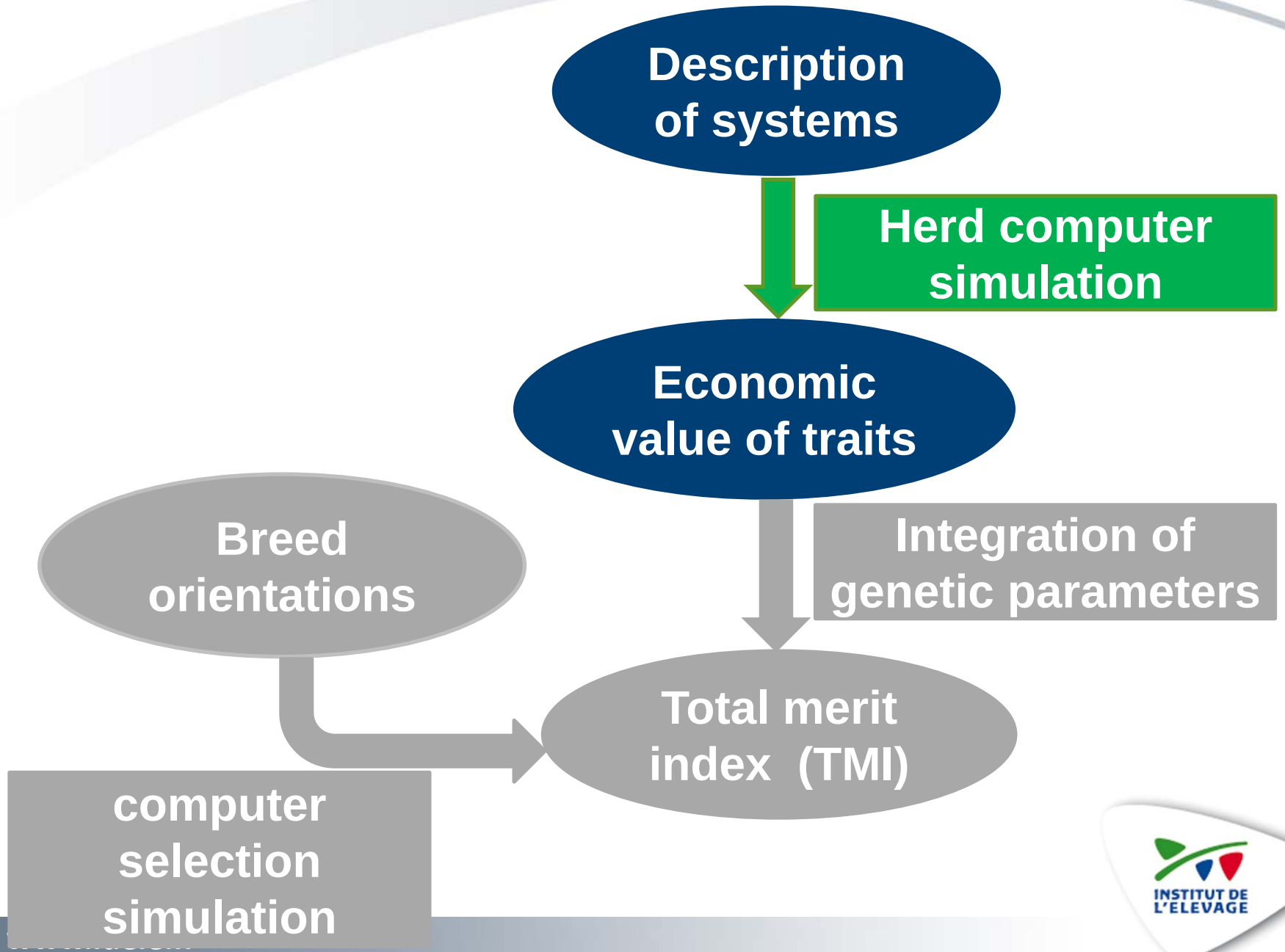
2012

ISU= 2001 ISU traits + mastitis resistance + heifer fertility + interval between calving and first A.I.

Weights based on technical statements to take into account genomic selection implementation

We need a bio economic model to take into account new economic challenges

Breed process for breeding objectives and TMI

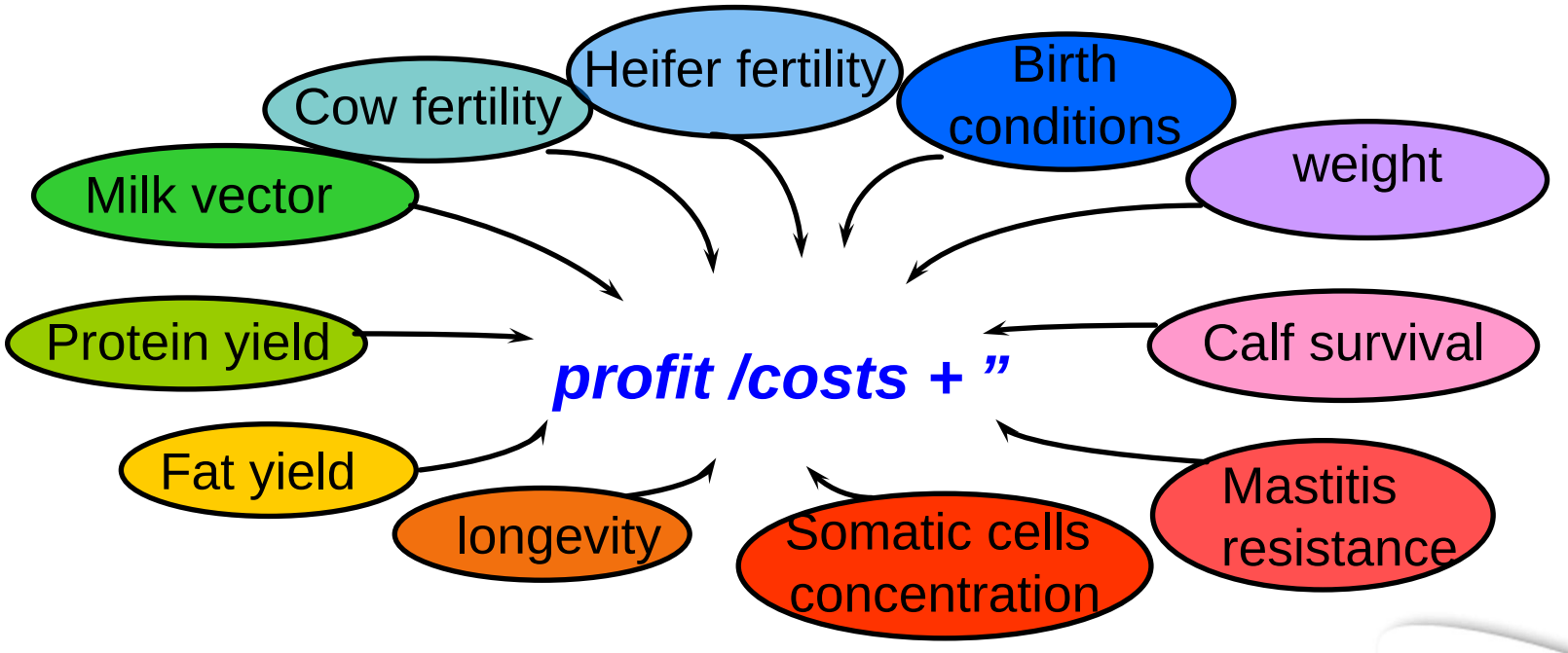


Linking the costs and revenues to traits

Revenues = milk + calves + culls + subsidies

Costs = feed + calving + A.I. + Mastitis + other health costs+ fixed costs

Profit= revenues – costs



Example with cow fertility : + 1 %

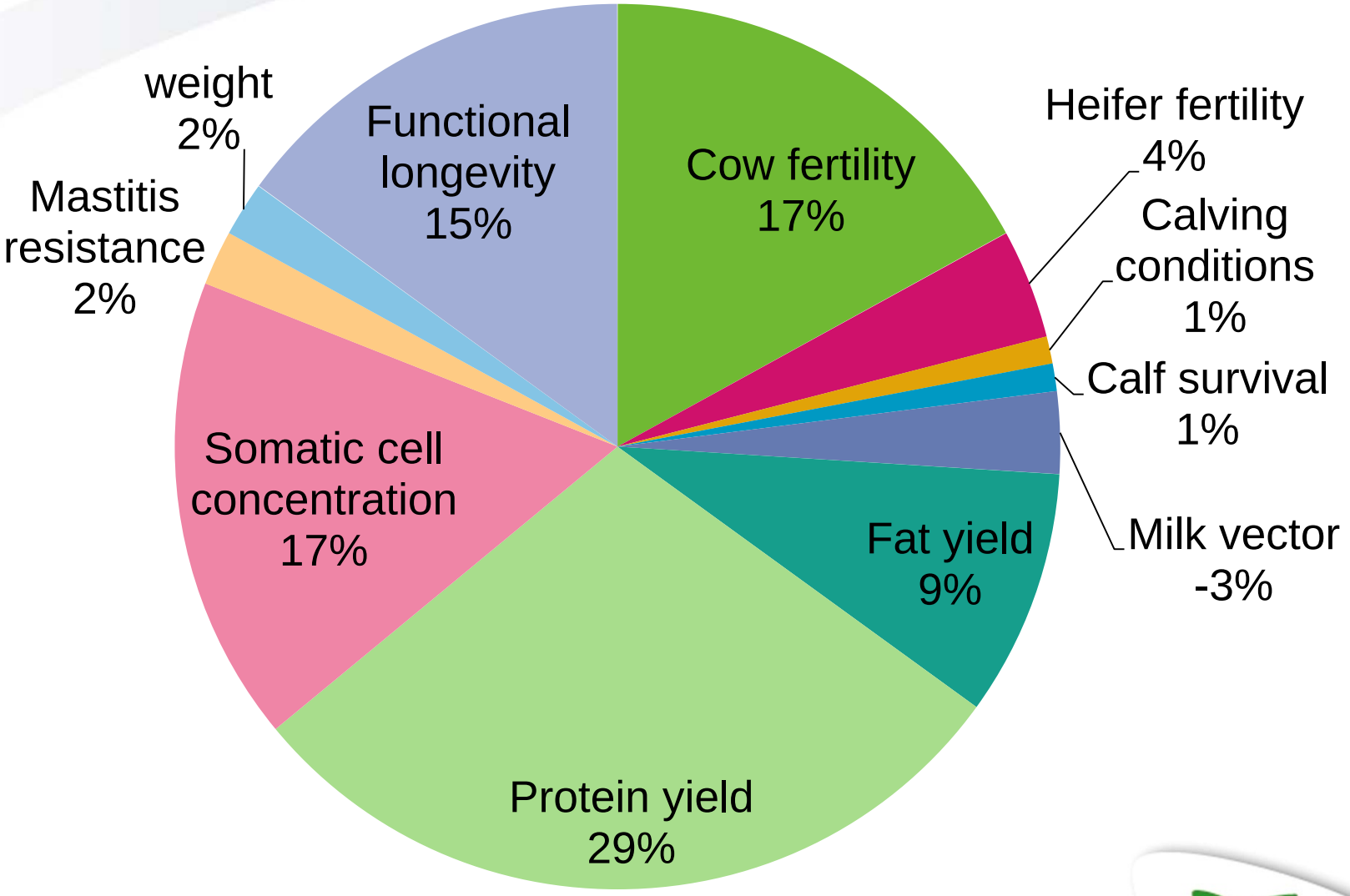
- Culls ↘
- Replacement Heifers ↘
- Multiparous cows ↗
- Primiparous cows ↘

- Revenues from calves ↗
- Revenues from milk ↗
- Difficult calving costs ↘
- Heifer feeding costs ↘
- Reproduction costs ↘
- Interval between calvings ↘

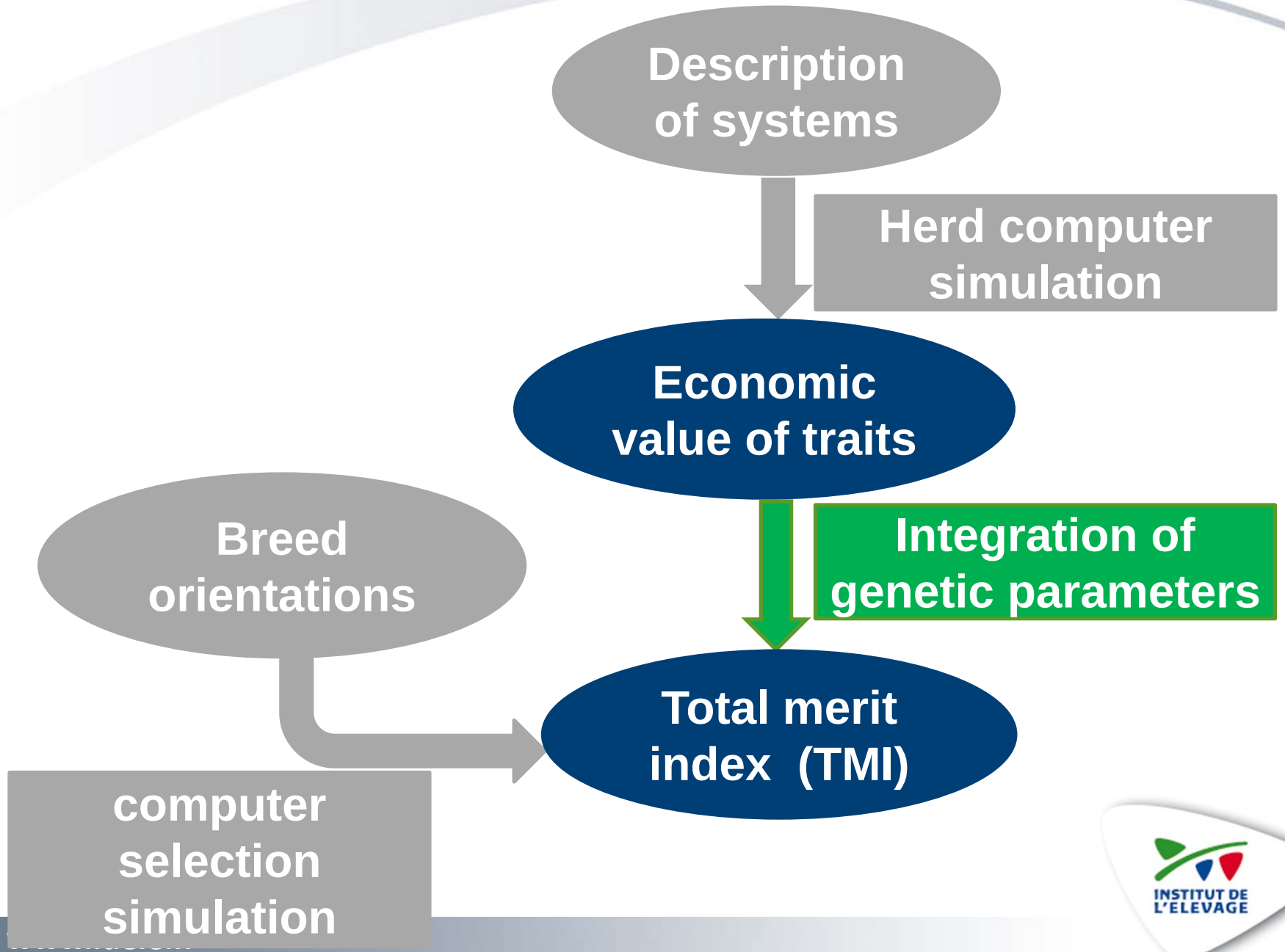
+8.45 €

- Calf feeding costs ↗
- Cow feeding costs ↗
- Revenues from culls ↘
- Mastitis costs ↗

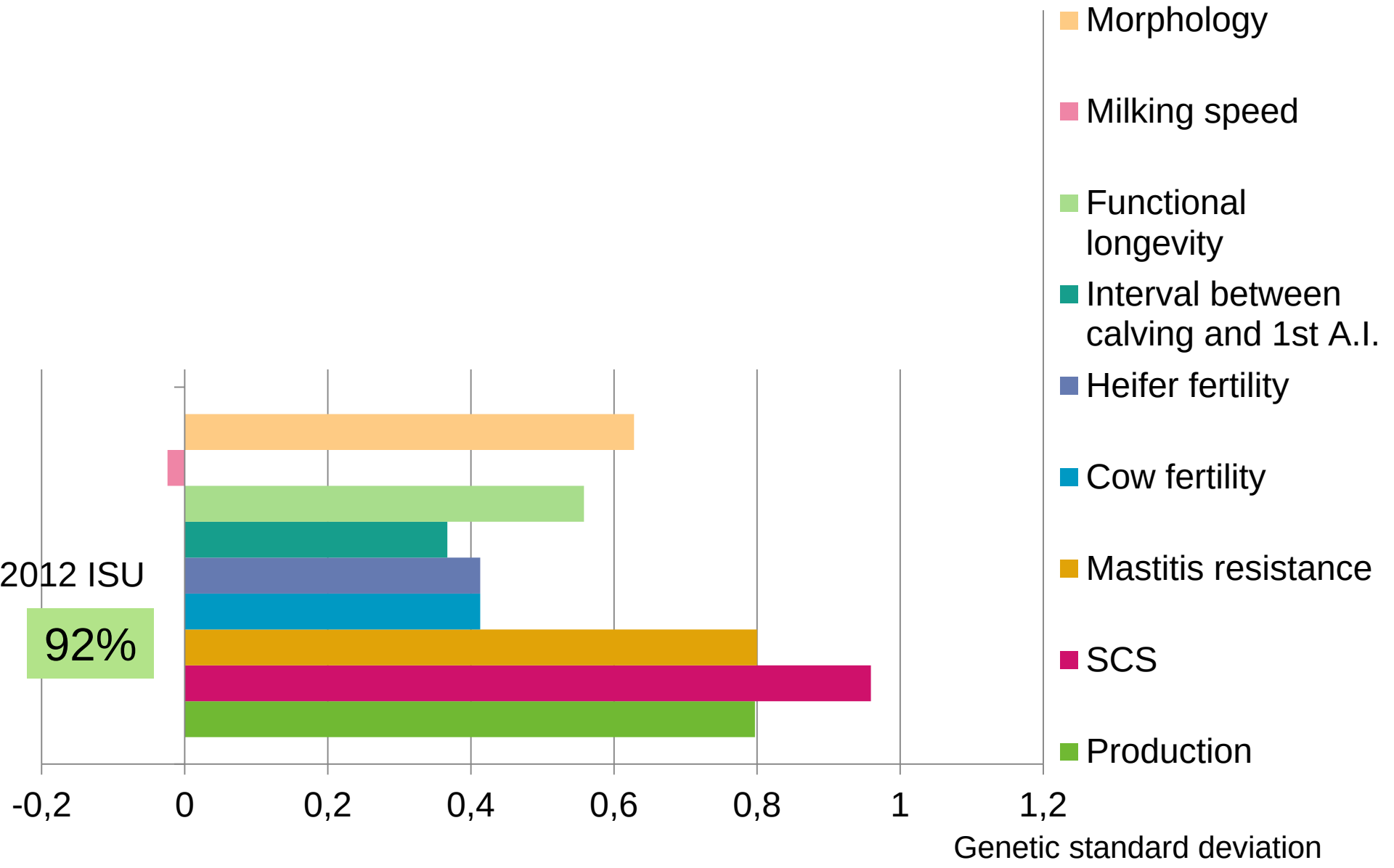
Relative economic value of traits



Breed process for breeding objectives and TMI



Responses to selection of today's and economic ISU



Conclusion

- **For the Prim'Holstein Breed :**

  Estimation of the economic values of traits taking into account a new context

- **BUT :**
  - It is very time consuming!
  - It is a process used only for cattle
  - We need more reactivity to update breeding goals or to integrate new traits!

The Prim'Holstein model is the base to develop other models as part of the OSIRIS project

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- **OSIRIS project: a modeling tool to define new breeding goals**

- Guerrier Jean[1], Catherine Experton[2], Stéphane Patin[3], Florence Phocas[4]

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Organization of the OSIRIS project

- Project over 3 years (2012-2014)

- In collaboration with

RACES DE FRANCE

ITAB

INRA SCIENCE & IMPACT

INSTITUT DE L'ELEVAGE

manager

- Financial support

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RÉPUBLIQUE FRANÇAISE

MINISTÈRE DE L'AGRICULTURE DE L'AGROALIMENTAIRE ET DE LA FORÊT

Avec la contribution financière du compte d'affectation spéciale «développement agricole et rural»

France Génétique Elevage

OSIRIS goals

Economic weight of traits

- With a bio-economic model
- Based on costs and revenues associated with herd performances

Total Merit Indexes

- Conception
- Update

Four reasons for the OSIRIS Project

MORE REPRESENTATIVE

of other production systems like organic farming

MORE REGULARITY

for updating breeding objectives and Total Merit Indexes

MORE HOMOGENEITY

between ruminant industries TMI

MORE REACTIVITY

to integrate new trait indexes

OSIRIS organization

6 PILOT SYSTEMS
REPRESENTATIVITY

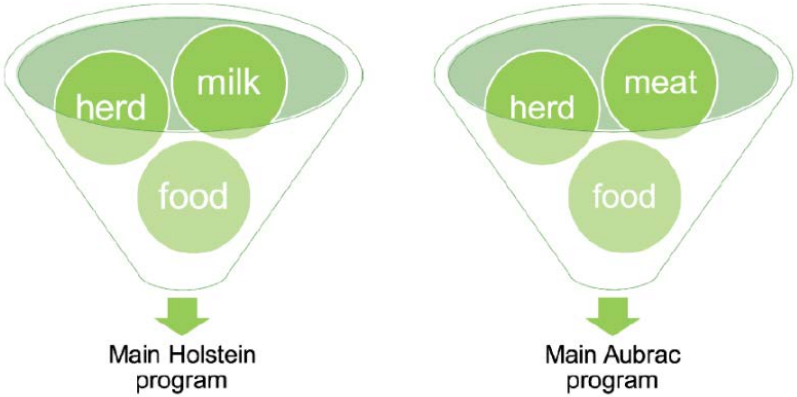
- Five breeds (one in each ruminant industry)
  - Montbéliard (dairy cow)
  - Mouton Vendéen (meat sheep)
  - Aubrac (beef cow)
  - Alpine (goat)
  - Lacaune (dairy sheep)
- One organic farming system in Montbéliard breed

3 NEW TRAITS
REACTIVITY

- Length of productive life
- Resistance to parasitism in small ruminants and to paratuberculosis in cattle
- Milk composition and meat organoleptic quality

Functioning with programmed modules

- **Common and specific modules when it's necessary**
  - Common modules are configured with parameters (HOMOGENEITY)



- **A correction or improvement in a module has an effect on all bio-economic models using it**
  - Breeding goals updated more FREQUENTLY and more REGULARLY

Conclusion

- **All system results are compared with the Czech Software ECOWEIGHT ®**
  - To verify our hypothesis and results
- **Currently, we have finished :**
  - 3 out of 6 systems
  - 1 out of 3 new traits
- **The implementation of this program is in 2015**

Thank you for your attention