# Protein self sufficiency of livestock: sustainability first

## Insectinov 2 - Adebiotech / AgroParisTech

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# **Summary**











Self-sufficiency = demand vs resources

 $\bigcirc$  Protein self sufficiency : which proteins are

we talking about ?

 $\bigcirc$  What are the levers to increase the protein

self sufficiency of monogastrics ?



### Self-sufficiency = demand vs resources

To speak of the protein self sufficiency of livestock production, it is necessary to know not only the supply but more importantly the demand (quantity and quality)





#### Demand for animal proteins expected to rise but many uncertainties

**Demographics :** vast uncertainties even with quite orthodox scenarios.

**Purchasing power :** how big are really the emerging classes ; for 10 years, world GDP growth has been slowing down ; inequalities are growing in rich countries.

Food transitions : meat consumption increase in developing countries, in developed countries upper classes tend to reduce their meat consumption.





#### Poultry and seafood shoulder-to-shoulder in terms of consumption in 2030

(two animal products consuming concentrated proteins)





#### Global trade of animal products expected to continue to grow





# 75% of the population in cities in 2050 and megapoles that will be port cities. What about local supply?





### A demand for animal proteins that will lead to different production models... not to oppose





### **Resources parameters**





## **Resources subject to volatility**





## Techniques and technologies improuvement



Source : La moisson, representation allégorique du mois de juillet, manuscrit du 1 4ème sciècle

- ✓ In 14<sup>th</sup> century, one farmer could bearly cultivate 1 hectare and produce 1 tonne of grains on it.
  ✓ Yield was very connected with drought and
- field was very connected with arought ar diseases.



Source : Paysan Breton, 14 décembre 2016

- ✓ In most advanced countries, 1% to 2 % of people fed the entire population.
- $\checkmark$  The population has been multiplicated by 3.







### Despite uncertainties, world needs in animal and vegetal proteins should increase

3 major determinants of the balance between supply and demand





# Protein prospective 2030





# Protein prospective 2030





# At a world scale, negative balance of 15% in oilseed meals by 2030 ?





# **Summary**





#### *Ruminants...and the others : Very different protein supply and demand*





#### **Overall increase in industrial feed production in China** and other emerging countries





#### **TOP FEED INGREDIENTS\***

**CEREALS** : Corn (76% preference), Wheat (21%), barley (1%), mix corn/barley (1%) **PROTEINS** : Soybeanmeal (96% preference), Sunflower (1%), rapeseed/canola (1%)

(\*2016 Alletch global feed survey results)

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(Source: Alltech 2017)



### **Proteins of crop origin : demand is connected with the kind of animal production**





# A country's protein self-sufficiency relies on several factors

- ✓ Interior demand in animal and vegetal products : quantity et quality (specifications)
- Interior supply in cereals and oil-protein rich plants (depending on soil and climate context, subsidies, regulations)
- ✓ Forrage availability (meadows, silage)
- Share of ruminants vs monogatrics
- Expertise level in animal feeding
- Comparative prices between raw materials
- ✓ Agricultural and energy policies, international trade regulations (sanitary rules, tariff barriers)



### Protein Self sufficiency for the EU in 2015/16

#### (excluding forages) – Source European Commission





#### France is a net protein exporter (about 2M tons) but is a net PRP\* importer.



# Proteins of crop origin : not only soybean





### *Protein self-sufficiency on PRP : France is a model pupil in the EU*





### French protein self-sufficiency on PRP : far above the European average





### A real french performance concerning soy consumption





#### Pool of available proteins is much wider than PRP

FRANCE : contributions of RM at protein supply in industrial feed





# **Summary**











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- $\bigcirc$  Protein self sufficiency : which proteins are

we talking about ?

What are the levers to increase the protein

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## Soymeal remains an inescapable raw material



#### A lot of advantages...

- 66% of world supply in oilseeds (vs sunflowerseeds 7% and rapeseeds11%)
- An especialy well designed protein (well balanced in amino-acids)
- A quality / price balance which remains attractive
- A volatility which is not really higher than other meals
- Low fertilizer requierments (legume)
- The decline in imports is not the guarantee of an improvement in protein autonomy (Black Sea sunflower meal, canola gmo)

#### But...

Two drawbacks : deforestation (cerrados Brazil) and GMO
Asia and Africa are purchasing more and more soybeans (China market share in soymeal equivalent has increased from 10% to 39% in 15 years while the share of UE was falling from 39% to 19%)
An upward trend in the soymeal/wheat ratio

- ✓ Soybean made in France (interprofessional project, objective : increase cropland from 140 000 ha to 250 000 hectare in 8 years, remplacing 0,5Mt imports non gmo soyameal, )
- ✓ Danube soya and Europe soya : OGM free, two standards certified in order to meet half of the demand.

#### Several raw material prices volatility – France – 05/15



#### Soja price divided by wheat price - France





### Rapeseed meal : increase protein rate



 Rapeseed meal price variation depending on its protein rate



✓ Raw material cost for feed industry and protein self sufficiency depending on rapeseed meal protein rate.



- > Feed industrials are ready to pay for an increase of the protein level (1 point CP = +7/8 \$/t)
- > Make protein level higher leads to savings. Protein self sufficiency increase by 0,45 pourcentage point when CP level grows by 1% context 15/16
- But a production of rapeseed in UE linked to a political demand (biofuels) called into question (clean energy package)



# Amino acids can reduce CP needs level.

#### What is the ranking of limiting AA in feed formulation ? Example broiler feed



- ✓ Valine is the 4th limiting AA after Met, Lys and Thr
- ✓ Arginine and Ile (or Trp) are colimiting after Val
- ✓ L-Valine allows a dietary CP reduction in broiler feeds of 0.6 to 0.9 points of CP (depending on the cereal used)



# **Processed Animal protein for feed : Do insect meals suit monogastrics ?**

#### **Advantages**

- $\checkmark$  A lot of fundraising for start-ups everywhere in the world
- ✓ A very interesting digestibility and amino-acid profile

#### Drawbacks

- Meat meals forbidden in the EU since 2000 (but very often used in Brasil and Asia)
- Regulatory restrictions for insect meal (sanitary, animal welfare) in the EU stronger than in the other regions
- ✓ Authorization since july 2017 for fish breeding
- ✓ Sustainability that remains to be demonstrated (energy, input)
- $\checkmark$  A very high cost and price level which eliminates farm animal from the market
- ✓ A very high cost level which require added value opportunities (petfoods, cosmetics, biodiesel) → business model to find
- $\checkmark$  A resource which will remain limited at the world scale.





# A notion of sustainability that evolves





# The reasons for continuing to improve our protein independence in the future:

- ✓ Support local productions and our breeding industries
- ✓ Improve the sustainability of our livestock productions and their traceability
- ✓ Avoid the use of imported soybean and its twofold handicap (GMO and deforestation), especially in poultry production
- ✓ Secure our supplies

# Thank you for your attention !



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