Analysis of the cereal consumption in Europe by segment

Which development potential for sorghum until 2025?

(Frédéric Guedj – Euralis Semences)

1.GRAIN

2.FORAGE

Analysis of grain cereal consumption in the World and in Europe

11.GLOBAL GRAIN

12.FEED

13.FOOD

14.INDUSTRY

15.CONCLUSION

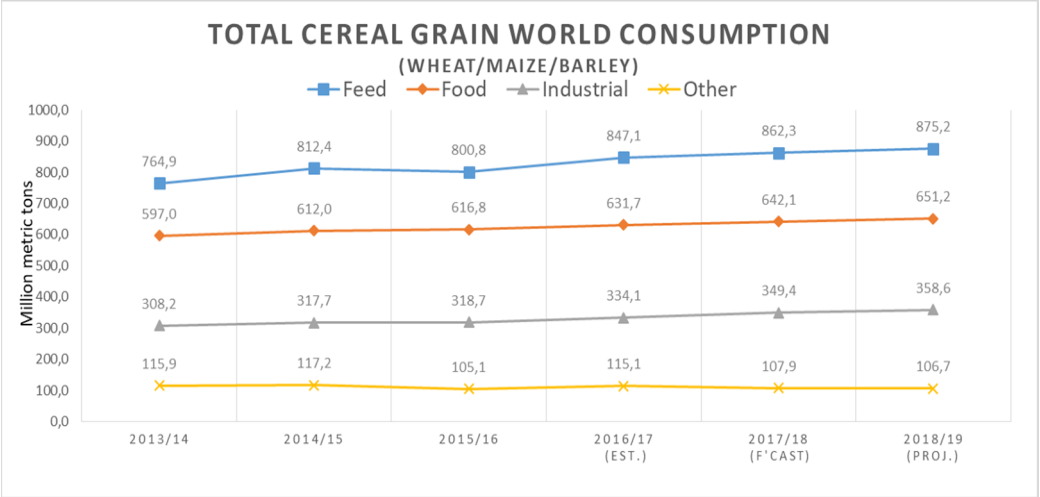
GLOBAL GRAIN: WORLD CEREAL CONSUMPTION EVOLUTION

TOTAL 2018/2019 (PROJ.) ≈ 1 992 MMT (WHEAT/MAIZE/BARLEY)

Wheat(34%) / **Maize(52%)** / Barley(7%) :

≈ 93% of total GRAIN cereal consumption

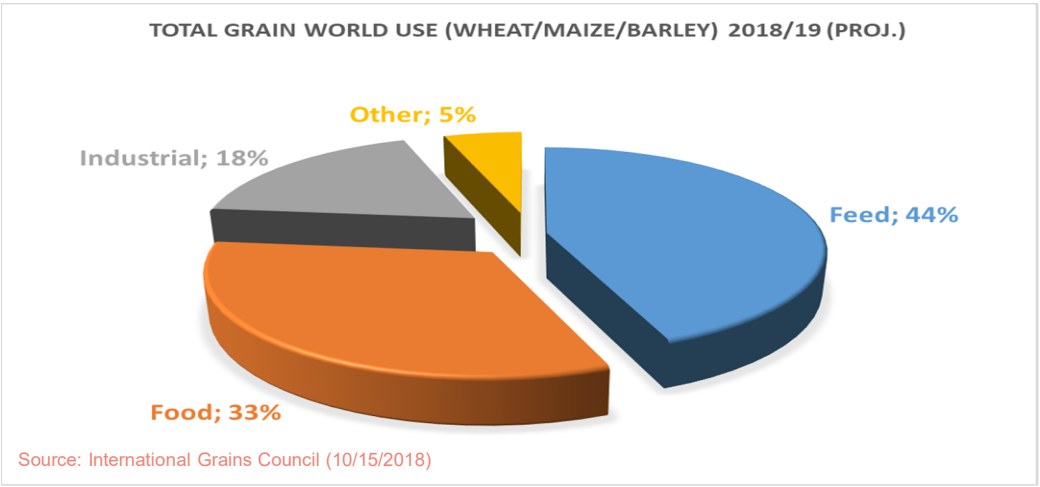
Feed ≈ 44% of the World cereal consumption



Sorghum18/19 (Proj.) ≈ 60 MMT

≈ 3% of the world grain production

(Food ≈ 50% // Feed ≈ 39% // Industrial ≈ 11%)



Source: International Grains Council (10/15/2018)

GLOBAL GRAIN: UE28 CEREAL CONSUMPTION EVOLUTION

TOTAL 2018/2019 (PROJ.) ≈ 288 MMT (13% OF WORLD)

Wheat(44%) / Maize(29%) / Barley(17%) :

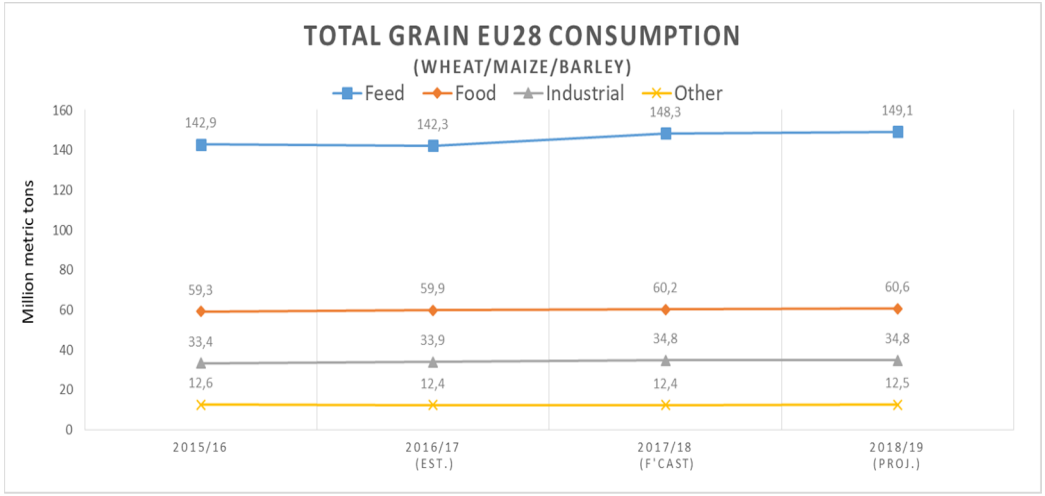
≈ 90% of total cereal GRAIN consumption

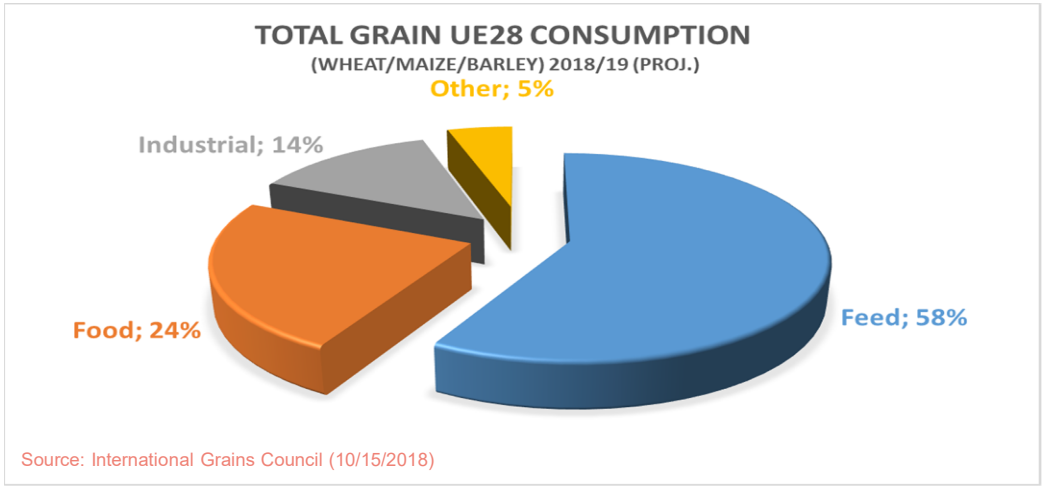
Feed ≈ 58% of UE28 cereal consumption

Sorghum 2017 ≈ 0.67 MMT

≈ 0.2 % of UE28 production

(Feed use mainly)





Source: International Grains Council (10/15/2018)

GLOBAL GRAIN: UKRAINE+RUSSIA CEREAL CONSUMPTION EVOLUTION

TOTAL 2018/2019 (PROJ.) ≈ 92 MMT (4.3% OF WORLD)

Wheat(55%) / Maize(15%) / Barley(18%) :

≈ 89% of total cereal GRAIN consumption

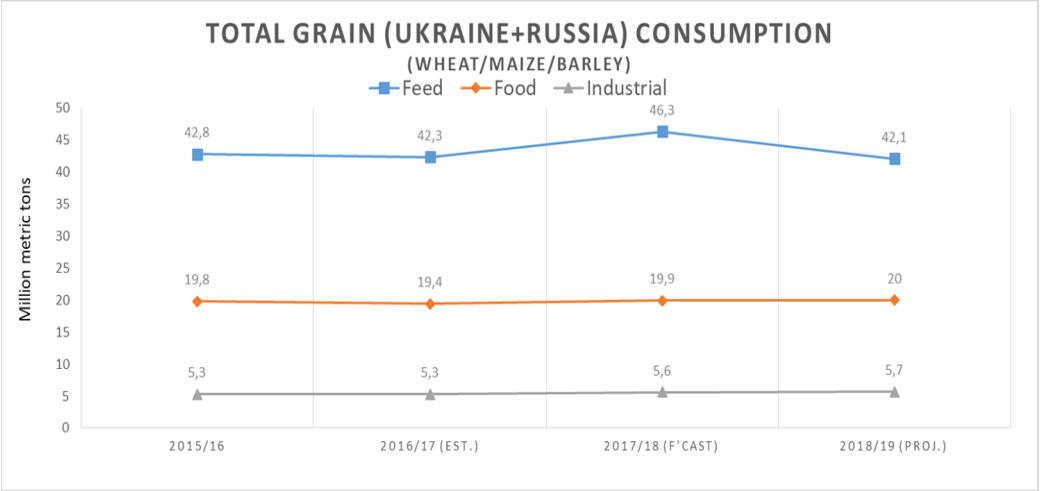
Feed ≈ 45% of (Ukraine+Russia) cereal consumption

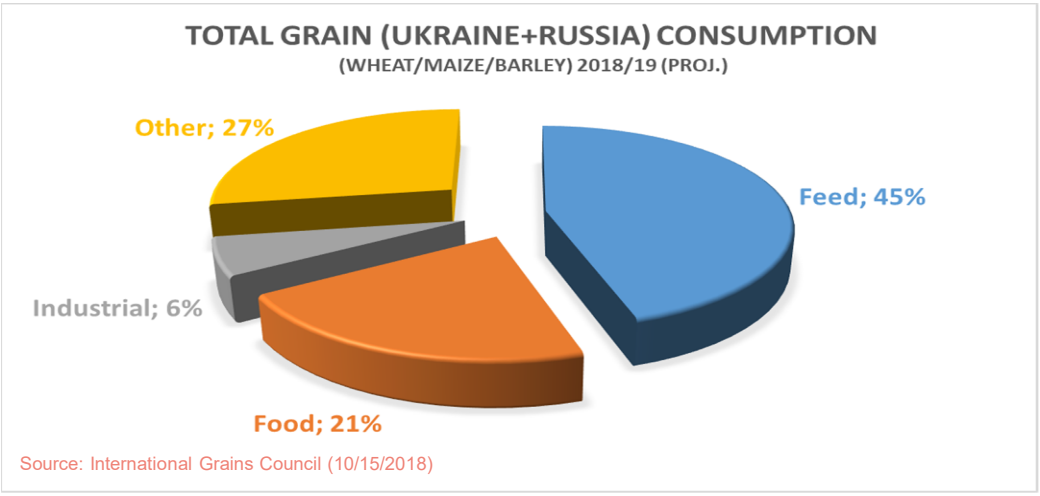
≈ 23% of production for exportation

Sorghum 2017 ≈ 0,60 MMT

≈ 0.6 % of Ukraine+Russia production

(mainly exportation for feed uses, low tannin)





Source: International Grains Council (10/15/2018)

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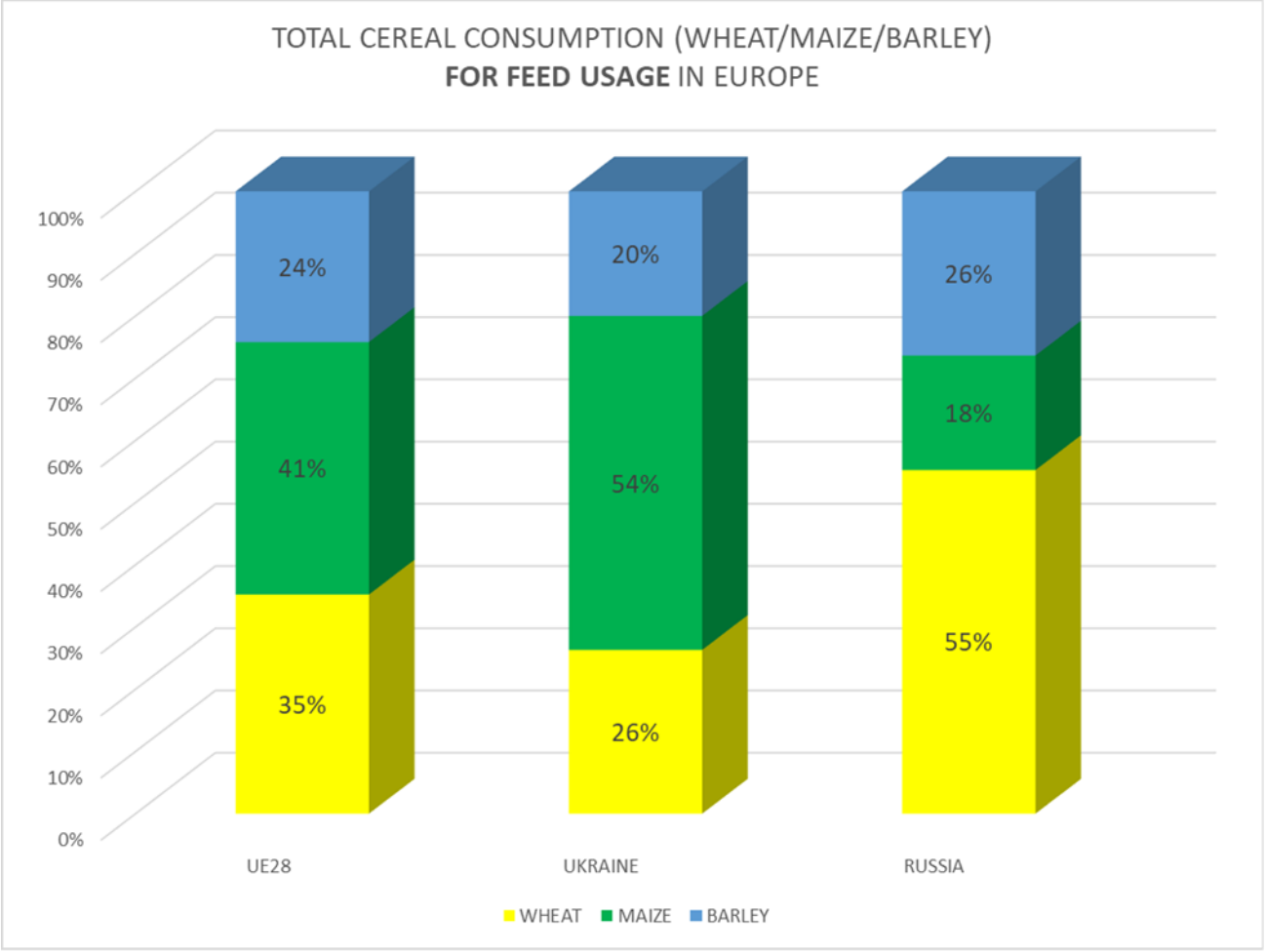
FEED: WHEAT/MAIZE/BARLEY LOCAL CONSUMPTIONS

UE28 & UKRAINE MORE MAIZE USE AND RUSSIA MORE WHEAT USE

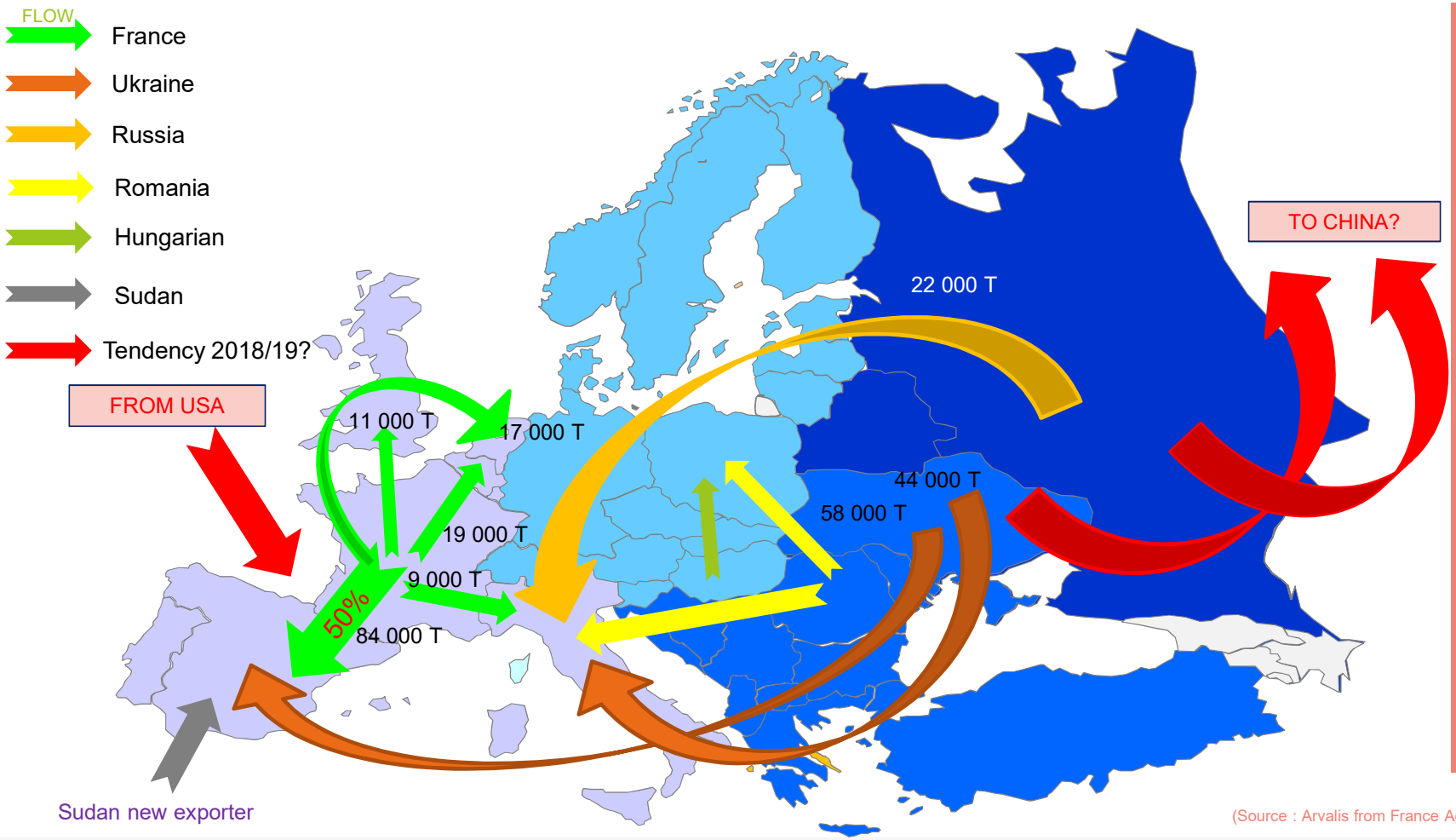
Main use of 3 cereals for animal feed in Europe (≈52% of total local cereal consumption), globally good balance between 3 main cereals in UE28, more maize in Ukraine and more wheat in Russia

Sorghum for animal feed could be the main driver for a significant development in Europe



SORGHUM EUROPEAN GRAIN PRODUCTION FLOW 2014/15/16

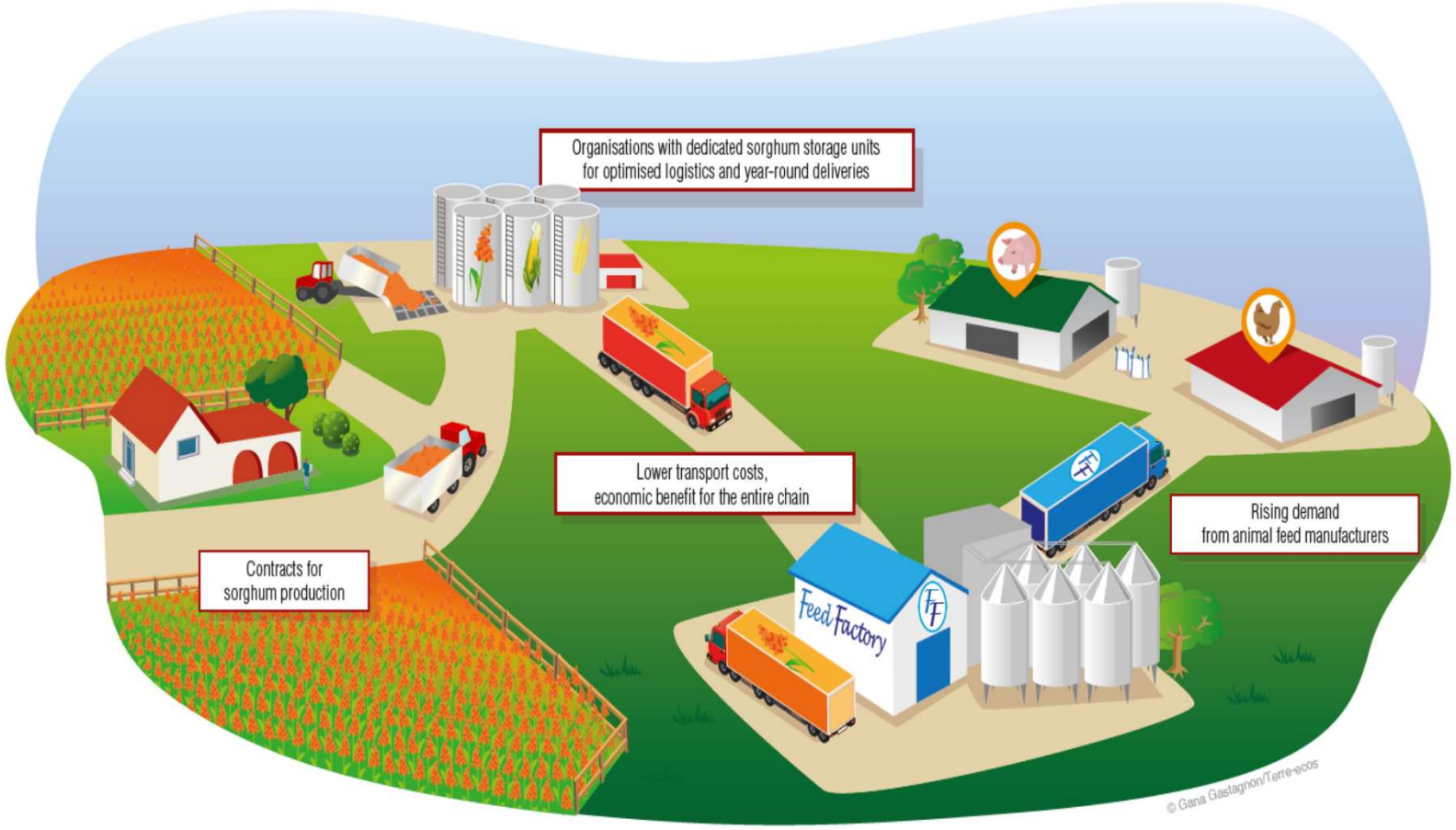
MAINLY FOR FEED (FOOD & BIOENERGY IN LOCAL)



Unstability of production could be due to high exchanges between countries and low local industry consumption

(Source : Arvalis from France AgriMer et Eurostat - Average exchanges 2014/15/16)

STABILITY OF SORGHUM PRODUCTION?
BY DEVELOPMENT OF LOCAL TRANSFORMATION CHAIN



Stability of Sorghum European production is expected by local transformation chain organization

(country or region initiatives)

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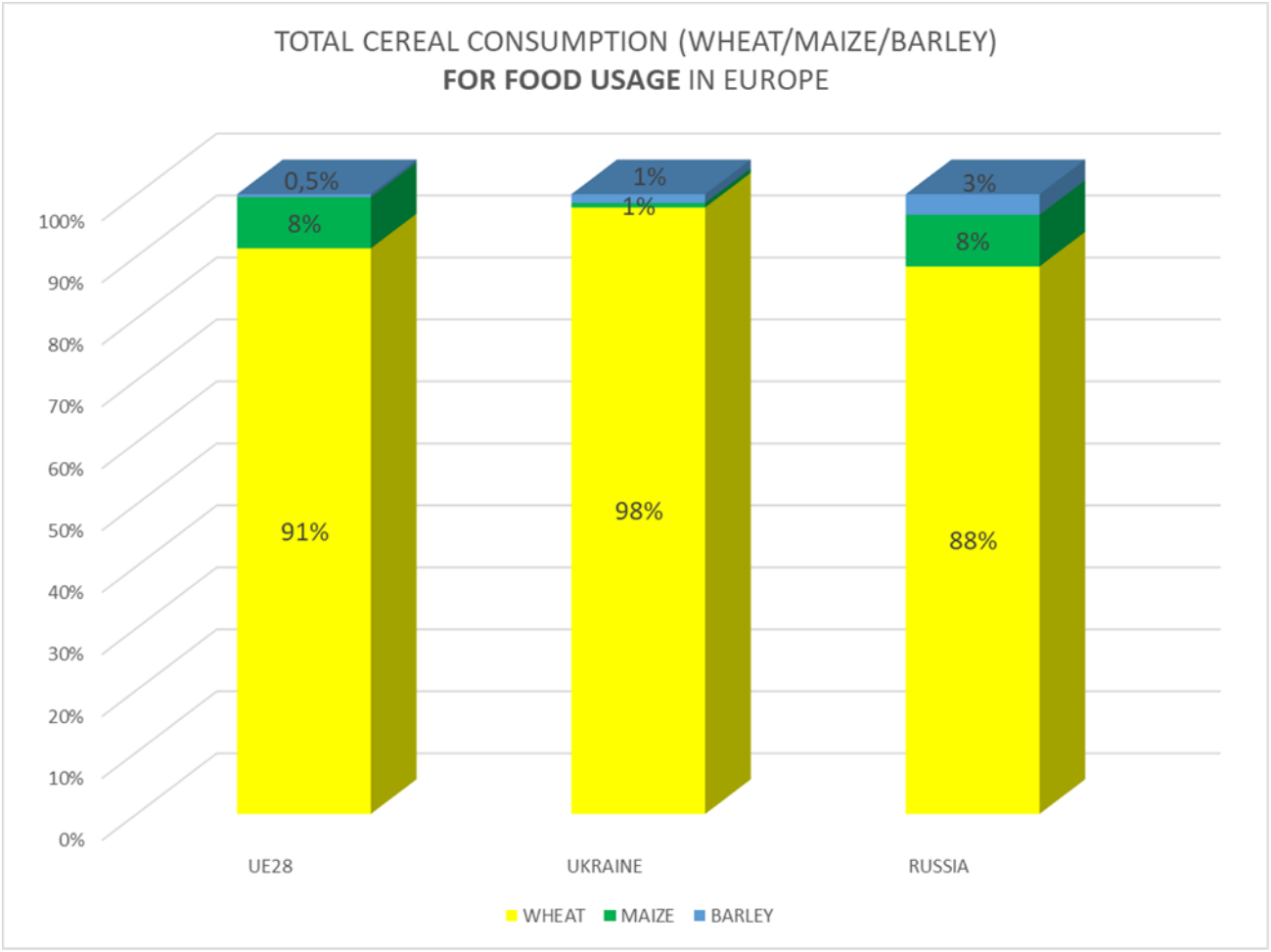
FOOD: WHEAT/MAIZE/BARLEY LOCAL CONSUMPTIONS

LOW MAIZE USAGES FOR FOOD IN EUROPE

≈ 23% of total cereal consumption are for food uses in global Europe.

≈ 90% of food cereal uses with wheat in Europe.

Today, no real data's of sorghum consumption for food, niche market & local innovative initiatives

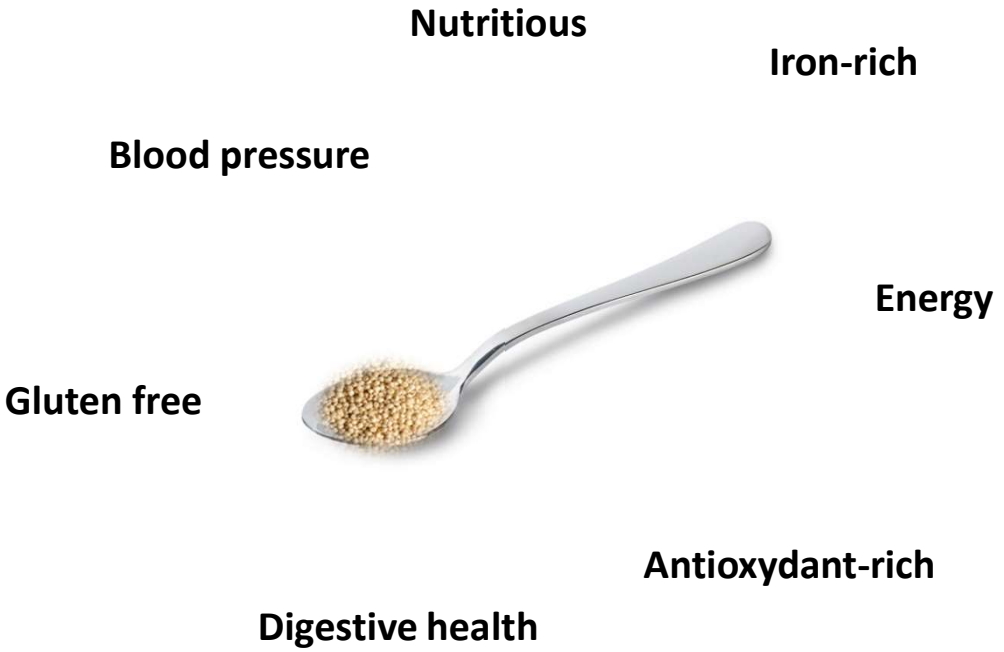


FOOD: SORGHUM OPPORTUNITY ON THE FOOD MARKET:

"A NICHE MARKET BUT WITH A REAL GOOD IMAGE FOR NUTRITION & ECOLOGY!"

With all European initiatives & innovations developed today:

« Sorghum for food could become a strong sector with high market value for farmers & industry"



***Main targets*: Organic market, high value market chain & nutrition**

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INDUSTRIAL: WHEAT/MAIZE/BARLEY LOCAL CONSUMPTIONS

MAIN USAGE: STARCH, BIO-ETHANOL & BREWING

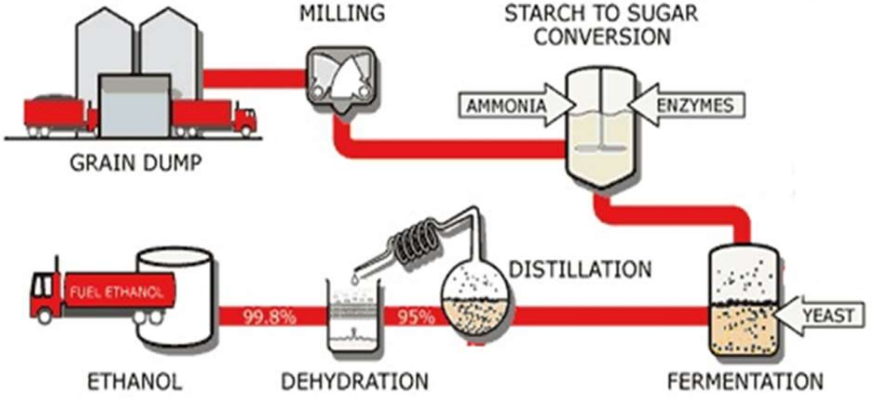
Only ≈ 11 % of 3 cereals in all Europe and mainly for bio-ethanol production

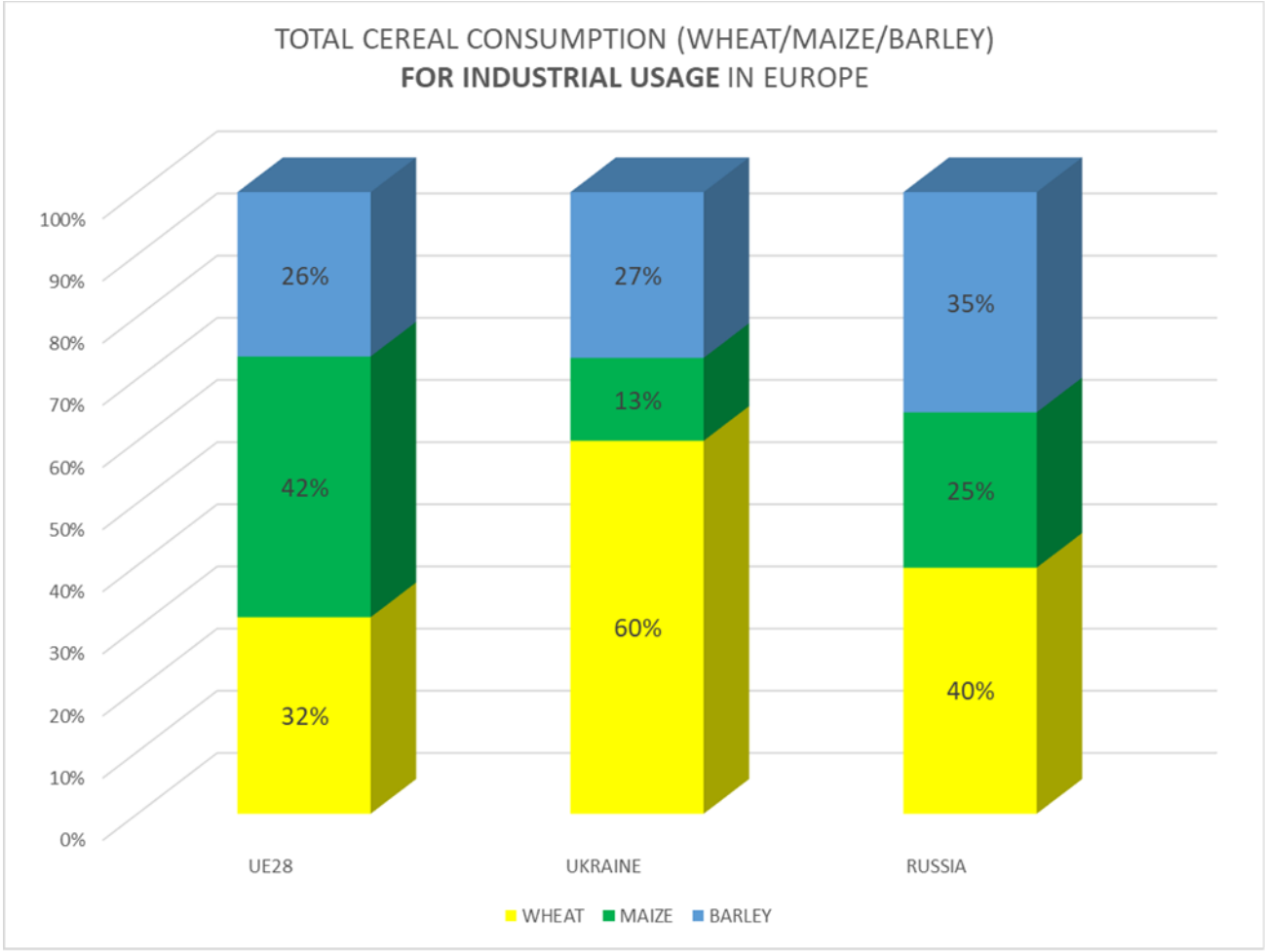
***Sorghum**: Industrial use in the world*

≈ 6 MMT vs 369 MMT, in global ,for Bio-Ethanol and Brewing (USA & China are main industrial Sorghum consummer ≈4 MMT)

Interest with high starch content

(France 2017: sorghum≈76,2% vs maize≈75,5% or wheat≈69%) and good Bio-Ethanol yield potential similar to Maize.





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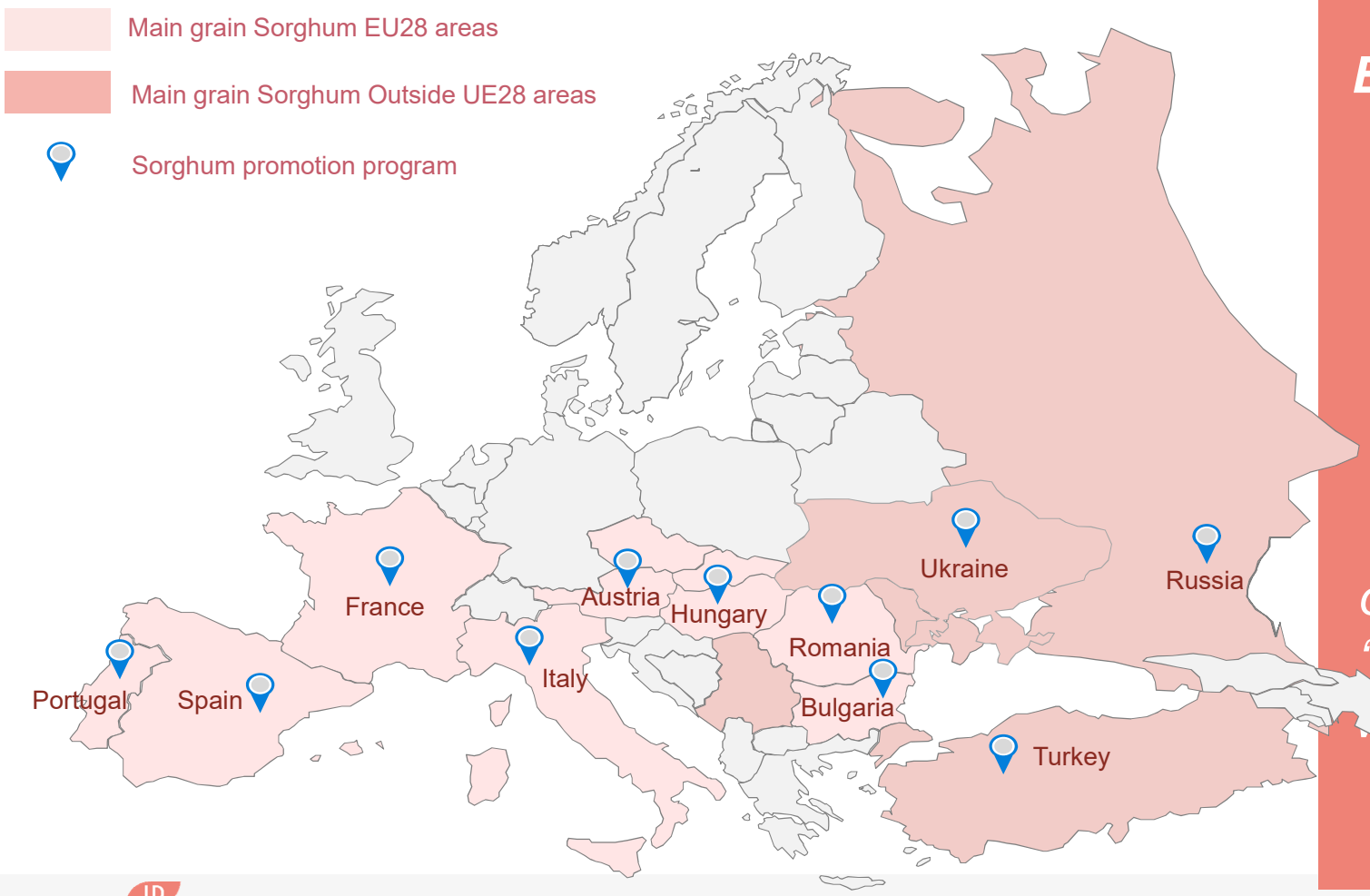
GRAIN: SORGHUM EUROPEAN SURFACES PROJECTION 2025

OBJECTIVE = TAKE A PART OF FEED LOCAL EUROPEAN MARKET, A MAIN DRIVER OF VISIBILITY



5-10 % of FEED European consumption 2025?

this is for sorghum

≈ 10-20 MMT

and

≈ 3-6 Mha

(yield average estim. ≈ 3,5 tons/ha)

of potential development "a new way of cultivating with the climate change."

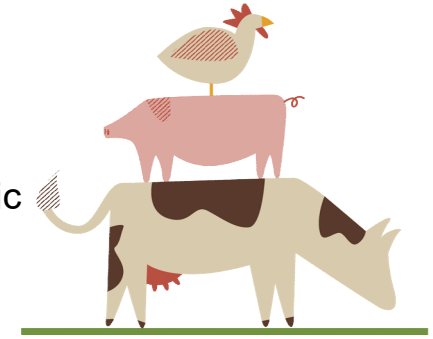
[Cereals (Wheat/Maize/Barley) for feed (2018/2019 Proj.) ≈ 200 MMT]

SORGHUM GRAIN: SUMMARY

*« A small grain of interest with good **complementarity with Maize & Wheat** »*

FEED

Main driver that will allow a better visibility of sorghum in Europe not as a secondary but main ingredient in the diet by its obvious nutritional qualities for poultry and pigs, with a new way of cultivating with climate change, with dynamic producers and market supported by EU driver



FOOD

A niche market but with obvious prospects for the real nutritional quality (free gluten, obesity, diabetes, anti-oxidant…) of this grain and the dynamic of innovation to come, its ecological image which should also boost organic farming in Europe

INDUSTRIAL

A grain rich in starch with possible development of bio-ethanol or food alcohol, to limit our dependence to oil and an alternative to wheat.

FINALLY, WHAT LEVEL INTERESTS IN THE SORGHUM CHAIN?

INDUSTRY

Alimentary value benefits for animal feed & human food as a primary ingredient in the diet, increase profitability with a local production and economic ration, important environmental interests

COLLECT-TRADING

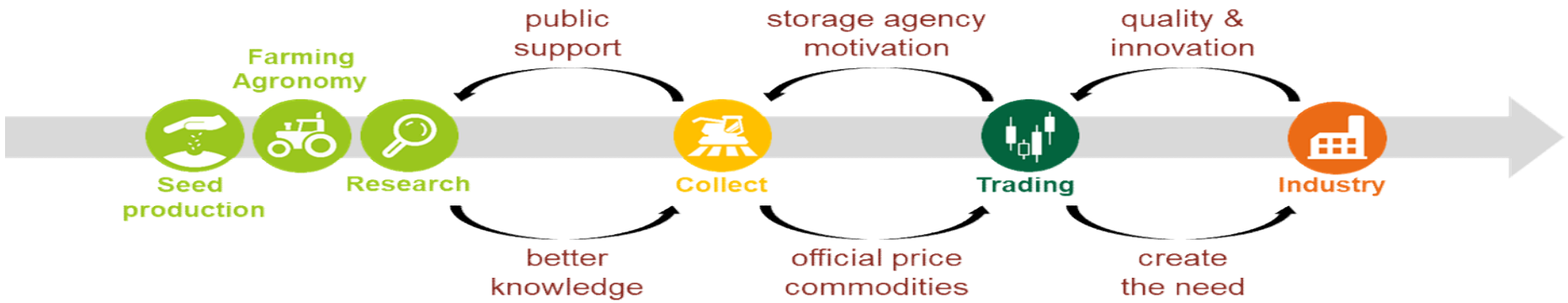
Securing local availability due to climatic instability today and low mycotoxin risks, manage as a cereal of interests

FARMER

Cultivating differently, securing the production due to climate change with diversification of crop rotation, local chain with better visibility of needs and value

INNOVATION-RESEARCH

A way for new innovations with the high variability of sorghum outlets & germplasms. Develop new European research programs to push the innovations.



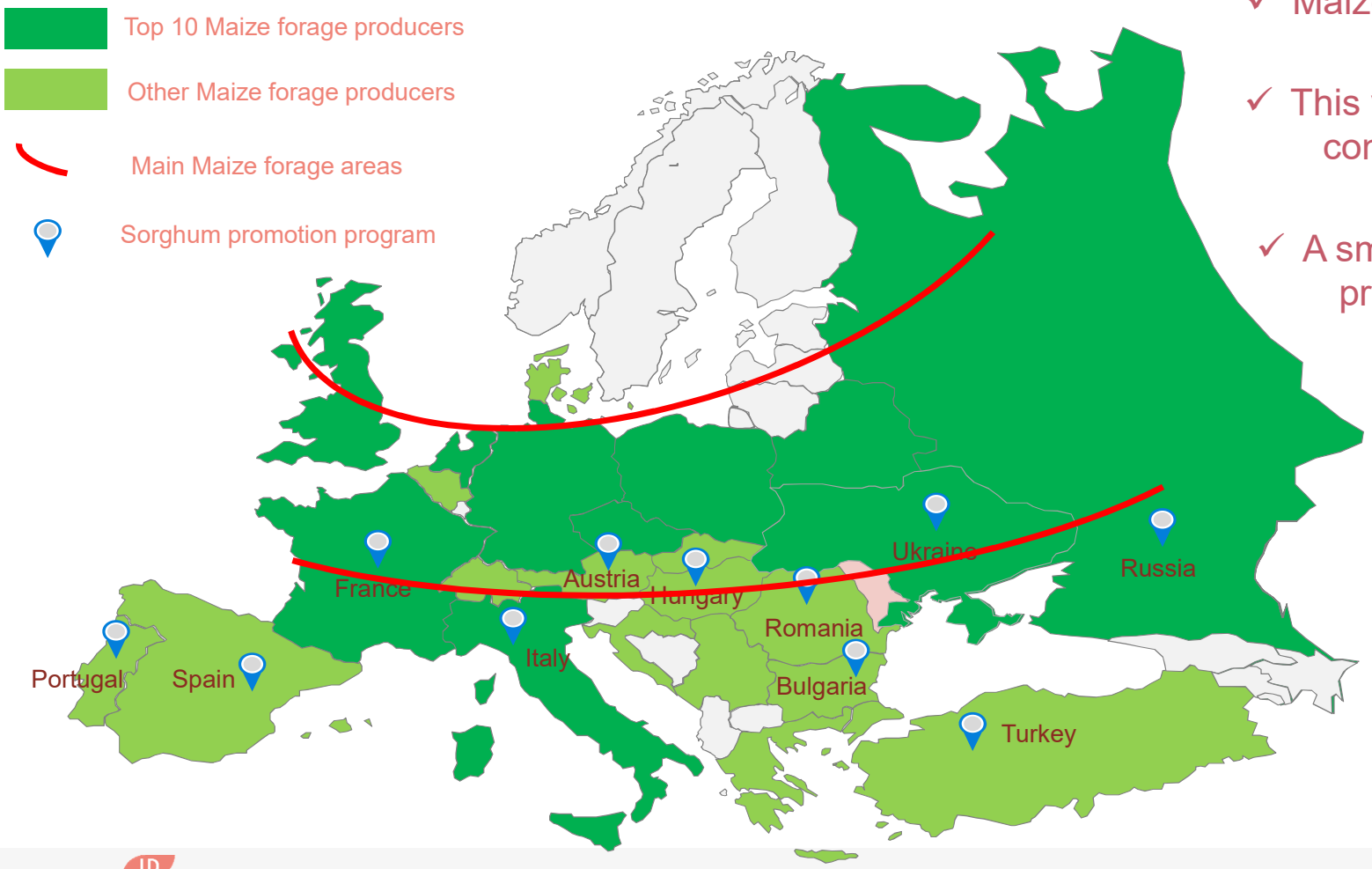
1.GRAIN

2.FORAGE

A segment difficult to analyze because little or no official figure, but with strong development possibility due to drought conditions (climate change) & complementarity to Maize to secure forage production.

FORAGE: MAIZE, MAIN PRODUCTION DRIVER IN EUROPE

2018: MAIZE MORE THAN 8 MHA IN EUROPE



- ✓ Maize forage surfaces mainly in the northern part of Europe.
- ✓ This year, impacted by high drought conditions observed. (Germany, Poland, Great Britain...)
- ✓ A small part of surfaces for Biogas production (Germany, Austria, Italy…)

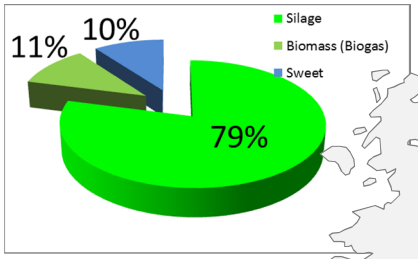
FORAGE: SORGHUM, COMPLEMENTARITY DRIVER IN EUROPE

2018: MORE THAN ≈ 180 KHA IN EUROPE (NOT REAL OFFICIAL DATA'S)

Most important Sorghum forage producers

Other Sorghum forage producers

Sorghum promotion program



Sorghum forage 2018:

UE28 ≈ 75 Kha (40%)

Ukraine+Russia ≈ 105 Kha (60%)

≈ 80% for silage (mainly milk production)

More in southern of Europe

Central Europe mainly Biogas production (Germany, Austria, Italy, Czech republic..)

IN THE END, WHAT CAN BE LEARNED FROM THIS PROMISING WHOLE PLANT SEGMENT?

INDUSTRY

> MILK INDUSTRY

Interest for milk production & quality (Fat…), securing production in association with Maize in drought conditions with new generation of forage as BmR type & large variability of whole plant accessible, less expensive to produce and deregulated market today

> BIO-ENERGY WITH BIOGAS

Good level of methane production possible, need a better knowledge by farmers, particularly date of harvest/maturity stage determination, strong point for a better quality of biogas production, possible development in more superficial soil for better land uses for this type of production.

> INNOVATION

Innovative solution possible with whole plant as biomaterial for isolation, colorant, bioenergy (bio-ethanol with sweet sorghum), food uses (syrup, alcohol, natural sugar such as sugarcane, sugar beet rotation?…)

FARMER

Securing the forage production in dry conditions in complementarity to Maize with diabrotica tolerance, development in the northern of Europe due to the climate change, a new opportunity for farmers.

RAINFALL DURING CULTIVATION: between 01 may to 30 September (Arvalis France)	CORN	SORGHUM
<200 mm	--	+++
200 to 300 mm	=	=
>300 mm	+++	+

Main targets: Drought conditions and securisation of production, crop rotation in complementarity to maize, innovations possible with whole plant.

Now, with all this green indicators, we need a strong signal from the agricultural professions in Europe and from Brussels.

To make this Sorghum development dynamic as a REALITY!

Sorghum the safe bet for the future!

Thanks for your attention!