CLUB OF BOLOGNA

strategies for the development of agricultural mechanisation

FEDER UNACOMA
Italian Agricultural Machinery Manufacturers Federation

AGRITECHNICA
THE WORLD'S NO.

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CO_2 Savings of Agricultural Machinery until 2030

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1. Climate Policy

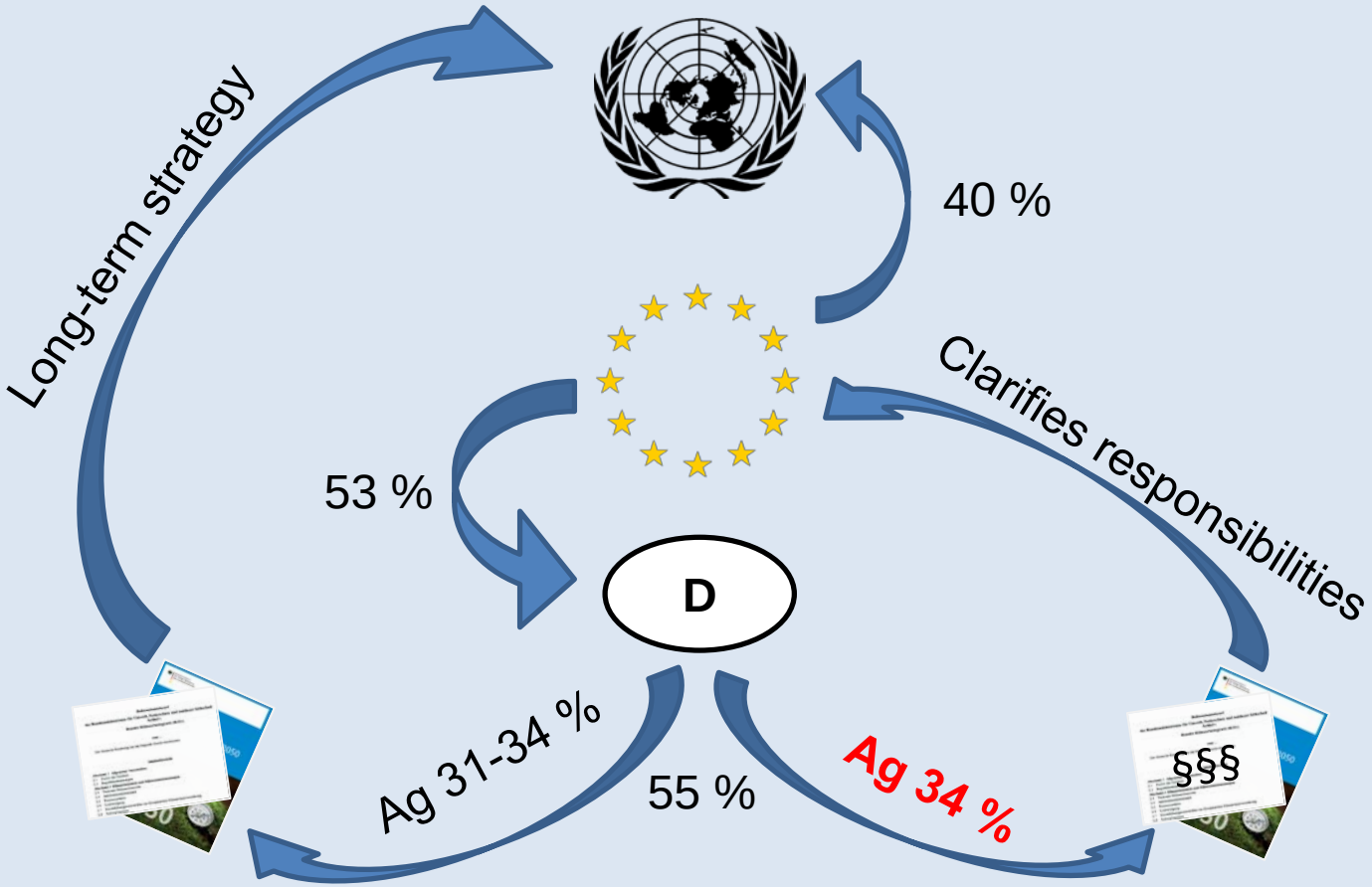
2. EKoTech

3. Derivations

4. Conclusion

Connected Regulations

CO_2-reductions until 2030 compared to 1990

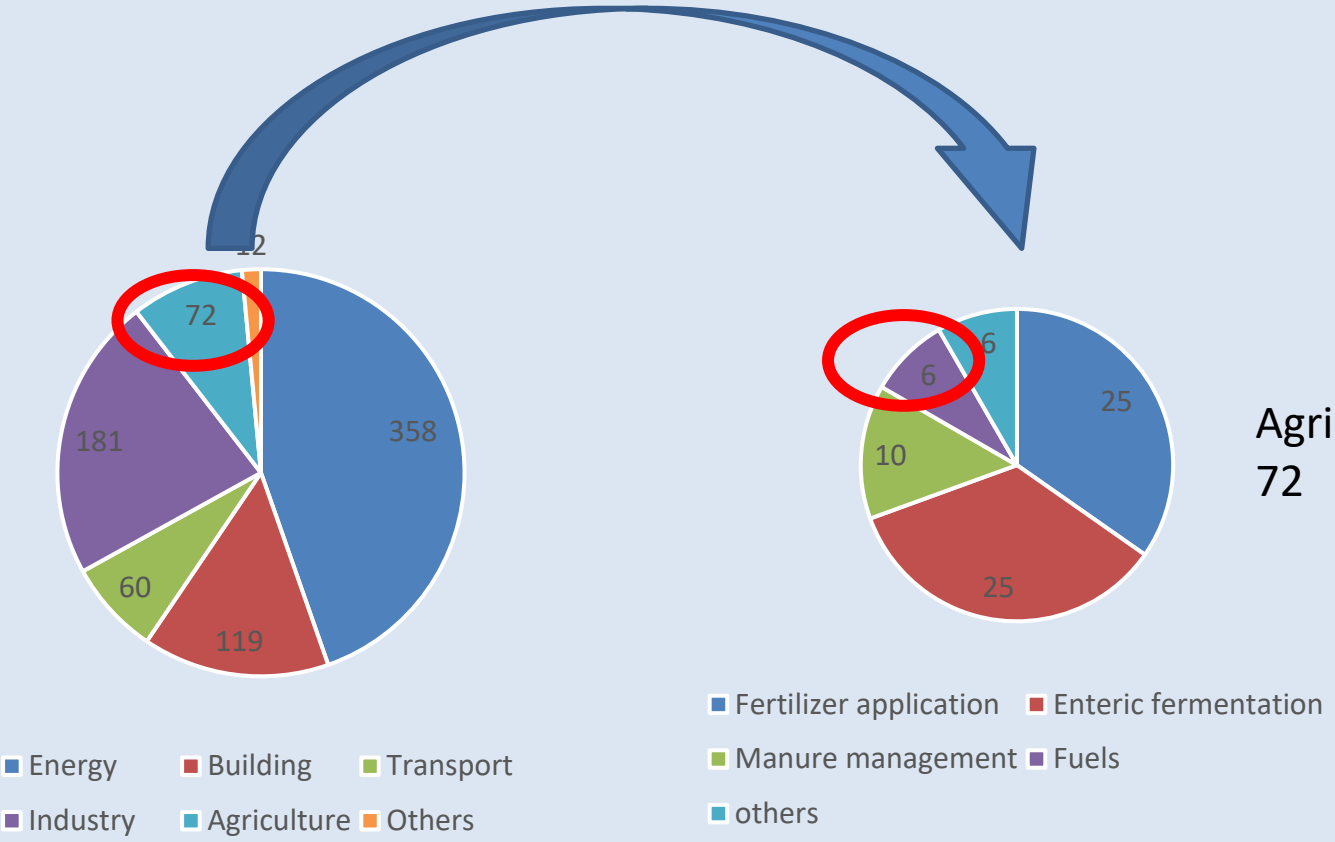


Ag CO_2-reduction until 2030 compared to 2015: 15-19%

CO_2 in Agriculture in Germany

Stand 2015, in Mio CO_2 eq

Total:
902



Agriculture:
72

Fuels in Agriculture in Germany:
0,7% from total German CO_2 emission

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Project EKoTech

Motivation, Approach, Target

- Compliance with EU climate targets
- Voluntary-self commitment instead of regulation
- Detailed conception by Ag research and industry
- Achieve environmental goals through competition driven technical innovation
- Tools to describe and forecast earlier, actual and future CO_2 emissions from diesel fuel combusted in Ag machinery

EKoTech Basics

CEMA-model and visualization of results

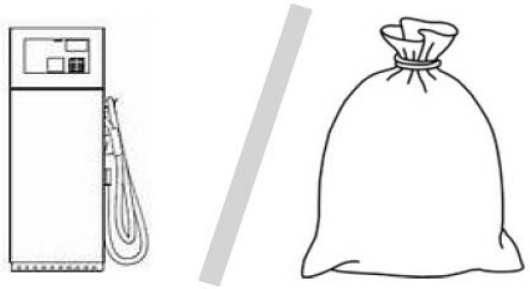
OBJECTIVES

Market-based approach instead of regulatory approach by politics

Potential of
Agritechnological process chains
for efficient use of fuel

Machine Efficiency	Process Efficiency	Operation Efficiency	Alternative Energy sources
Optimizing Engine Gearboxes Hydraulics Threshing drum Tires etc.	Improvement of machine combinations to reach more efficient processes Optimal tuning of the individual process steps to each other	Training and education of users Understanding and adaption to local needs of a specific agricultural area	Use of renewable fuel and lubricants Introduction of alternative drive concepts

Use the innovative power of free competition to achieve solutions with highest efficiency



Fuel consumption / production unit [l/GE]

NO other production facilities

Goal of EKoTech

Regional specific, virtual operations for wheat, corn, and grass

- Farmer‘s survey
- Model Farms
- Industry assessment

- Model‘s calculation
- Yield prediction

- Mathematical modeling of future savings

1990 2015 2030

... kg CO_2/t GE → X % Savings between 1990 and 2030 ← ... kg CO_2/t GE

Results

Some of Germany's results

- 6 regions with 5 wheat, 2 corn, and 2 grassland farm models
- 41 analysis of l/t GE for 1990, 2015, and 2030
- 2 scenarios for 2030
- A list of technologies supporting CO_2 reduction
- 1990-2030:

  CO_2 savings **per Grain Equivalent >** middle two-digit % range

Nov. 11. 2019, room 3B at Agritechnica

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Extrapolation to Absolute CO_2-Savings

Study of John Deere GmbH & Co. KG using EKoTech results

Motivation

- Absolute targets for CO_2 reduction in Ag sector until 2030
- Emissions out of diesel driven Ag machinery explicitly included

Goal

- Validation with and transfer of punctual EKoTech results into parameters of national economic scale

Extended Statements by EKoTech Results

Based on John Deere study

Approach

- Extend area specific fuel consumption to complete crop area of German Federal States where EKoTech model farms are located
- Validate covered crop area and Ag diesel consumption in relation to respective, nationwide statistics

Results

- Supported by continuative assumptions, EKoTech results can be considered representative for the entire agricultural sector
- By 2030, a reduction of 11 % of absolute CO_2-emissions due to diesel-driven Ag machinery is excepted compared to 2015 (Climate action plan 15-19%)
- Further potential available - but not yet opened up - by extension of EKoTech methodology to other crops besides wheat, corn, & grass

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Findings from EKoTech

- Proof of Ag process chain consideration versus legal requirements for a machine form since higher CO_2 savings as with the latter are to be expected

- German legal requirements prescribed by soon to be finalized climate action law will be largely met by the first three areas of 4-pillar-model with Ag machinery remaining at a conventional propulsion system

- Identified gaps in full compliance with coming CO_2-regulations have to and can be filled with various alternative drives

Thank you

Only together we can find a solution!