Pyrolysis and biochar systems for sustainable agriculture development in Egypt: Challenges and Opportunities

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- ARC Agricultural Research Centre of Egypt

- **Desert Technology 12 th International Conference**
- **Cairo 2015**

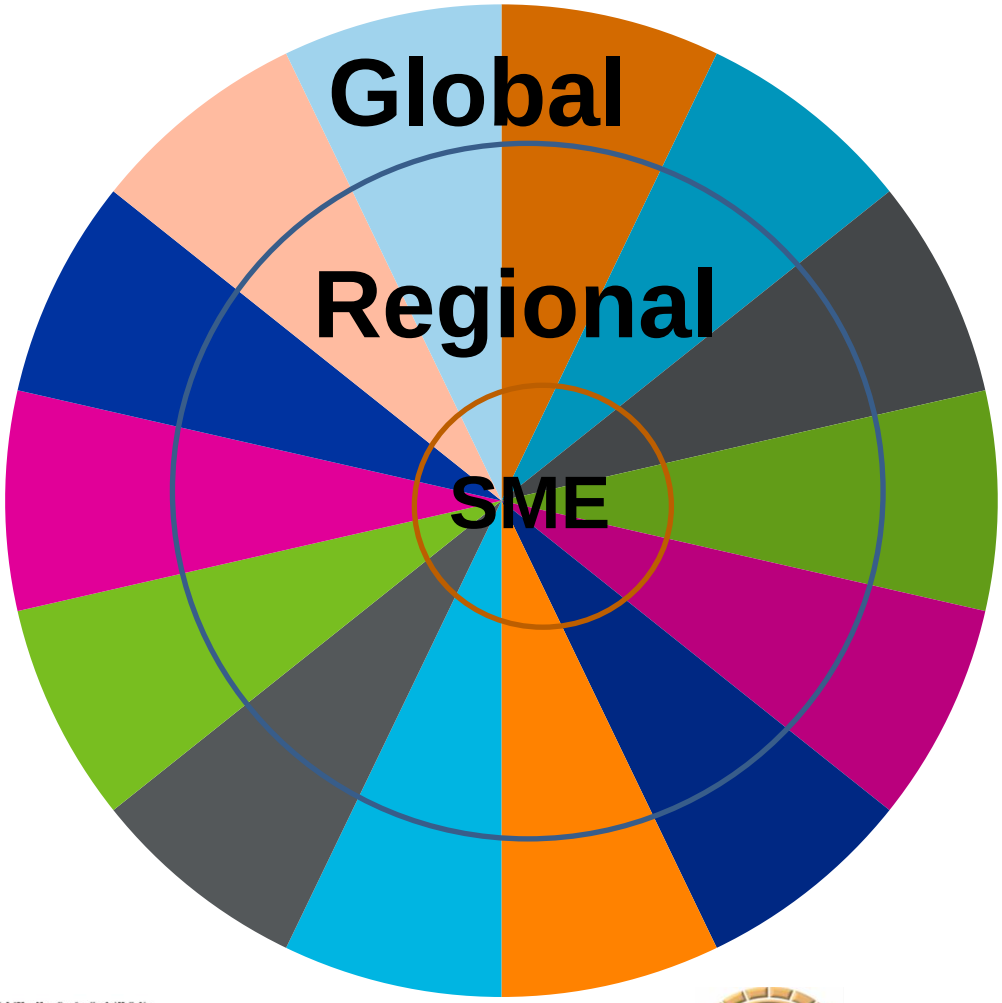
Contents

- Background: pyrolysis and use of products
- ICI project: aims
- Pyrolysis technology used in the project

- Products: gas, liquids and biochar
- Use of biochar
- Use of liquids
- Use of energy

- Economical analysis of the concept
- LCA asesment of the biochar production and use
- Conclusions

Pyrolysis products: Impact sectors



- Organic high value components
- Health: plant, animal, human
- Plant growth, yields & quality
- nutrient cycling
- waste management
- Bioenergy
- Carbon neutral buildings
- Clean Tech
- Water use efficiency
- Soil Fertility
- Food security
- Carbon sequestration
- Land use
- Climate change mitigation

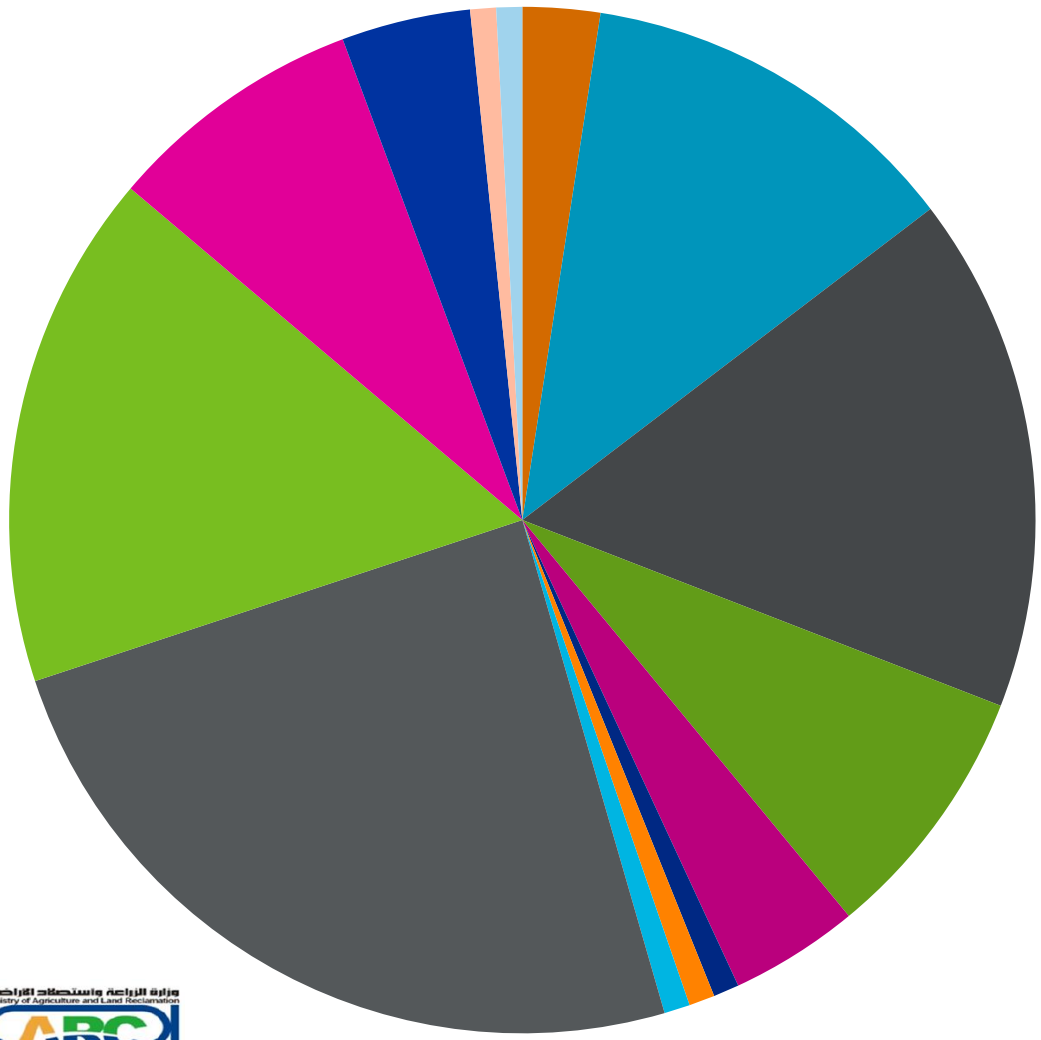
”ENHANCING DEVELOPMENT OF WATER USE EFFICIENT CROPS & PRODUCTION METHODS TO DRY AND SALINE CONDITIONS”

funded by

Ministry for Foreign Affairs of Finland

- **Led by Dr. Oiva Niemeläinen, Luke Finland**
- **Project PI Dr Magdy M Mohamed, ARC Egypt**
- **Aim: Human capacity building !**
- **Result 4 focusing to:**
- ***New agro-technologies for improvement of water holding capacity of sandy soils developed and adopted in the target area***

ICI project focus /Pyrolysis products:/ sectors



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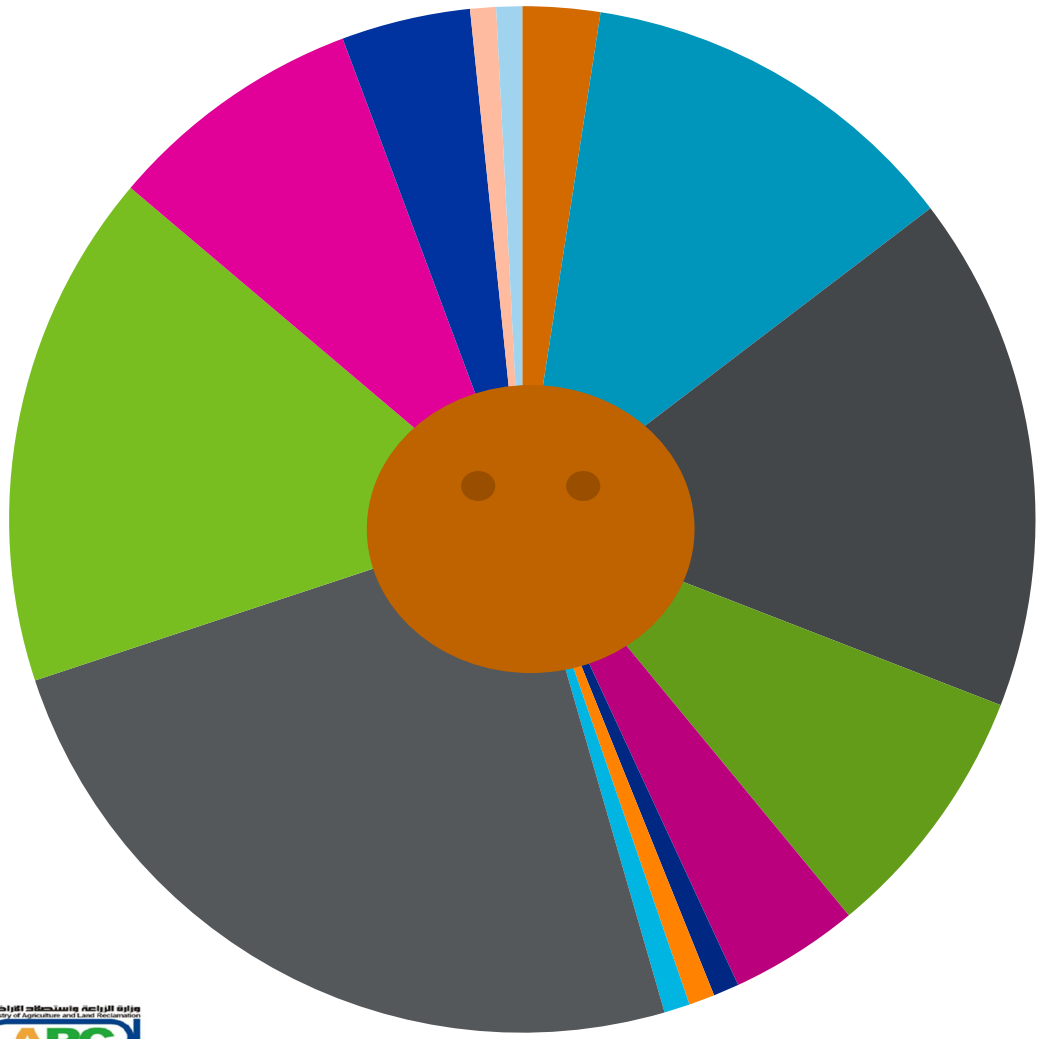

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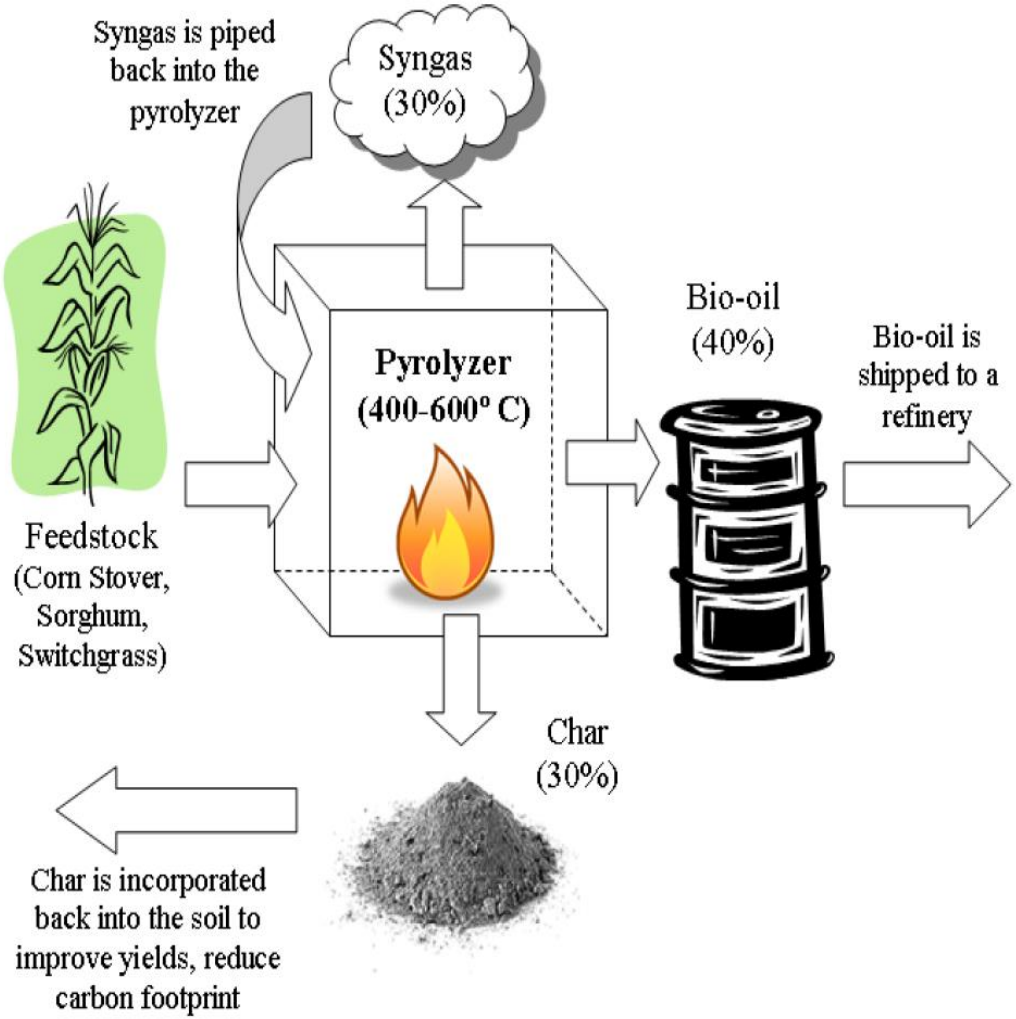
WHAT IS SLOW PYROLYSIS



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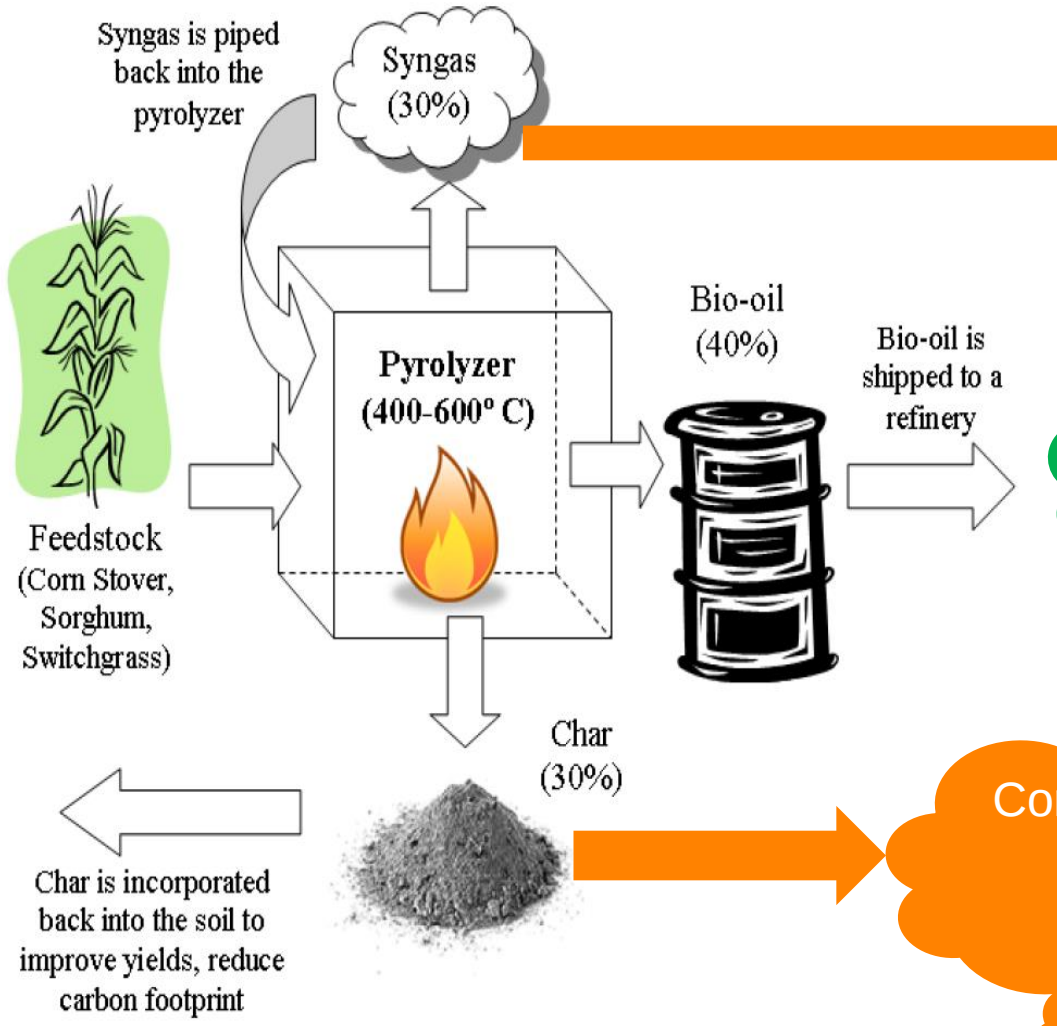


Energy

pesticides

Composting + Organic fertilizer

WHAT IS SLOW PYROLYSIS

Feedstock used in North Sinai

1 **Tomato Straw**) {14-Cycles}.
2 **Cantaloupe Straw** {10-Cycles}.
3 **Remnants of Date Palms**) {09-Cycles}.
4 **Remnants of Olive Trees** {10-Cycles}.
5 **Tamarix (Tamarix nilotica)** {1-Cycle}.

Slow Pyrolysis, RAUSSI mobile batch retort to demonstrate new technology in practice

Feedstock inside

Closing doors tightly

Heating up: wood and pyrogas

Condensing pyrolysis liquids

Opening the retort after cooling (<80 C degrees !)

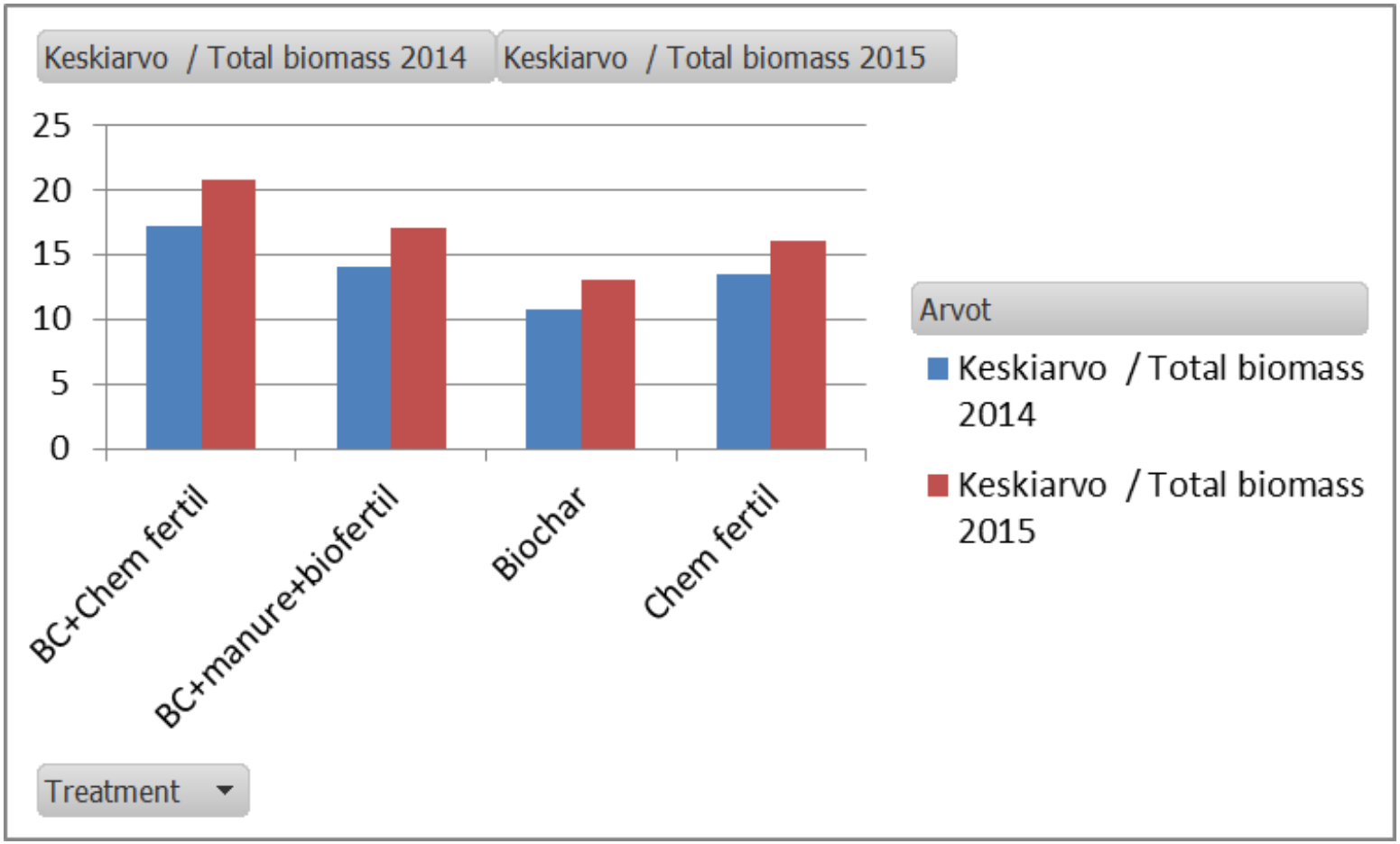
Products: gas, liquids, char

Large scale pyrolysis units for regional use

Biochar for improvement of water holding, nutrient cycling and soil improvement

Mixture of manure and BIOLAN wood based biochar

Yield increase recorded: Fababean 2014 and 2015



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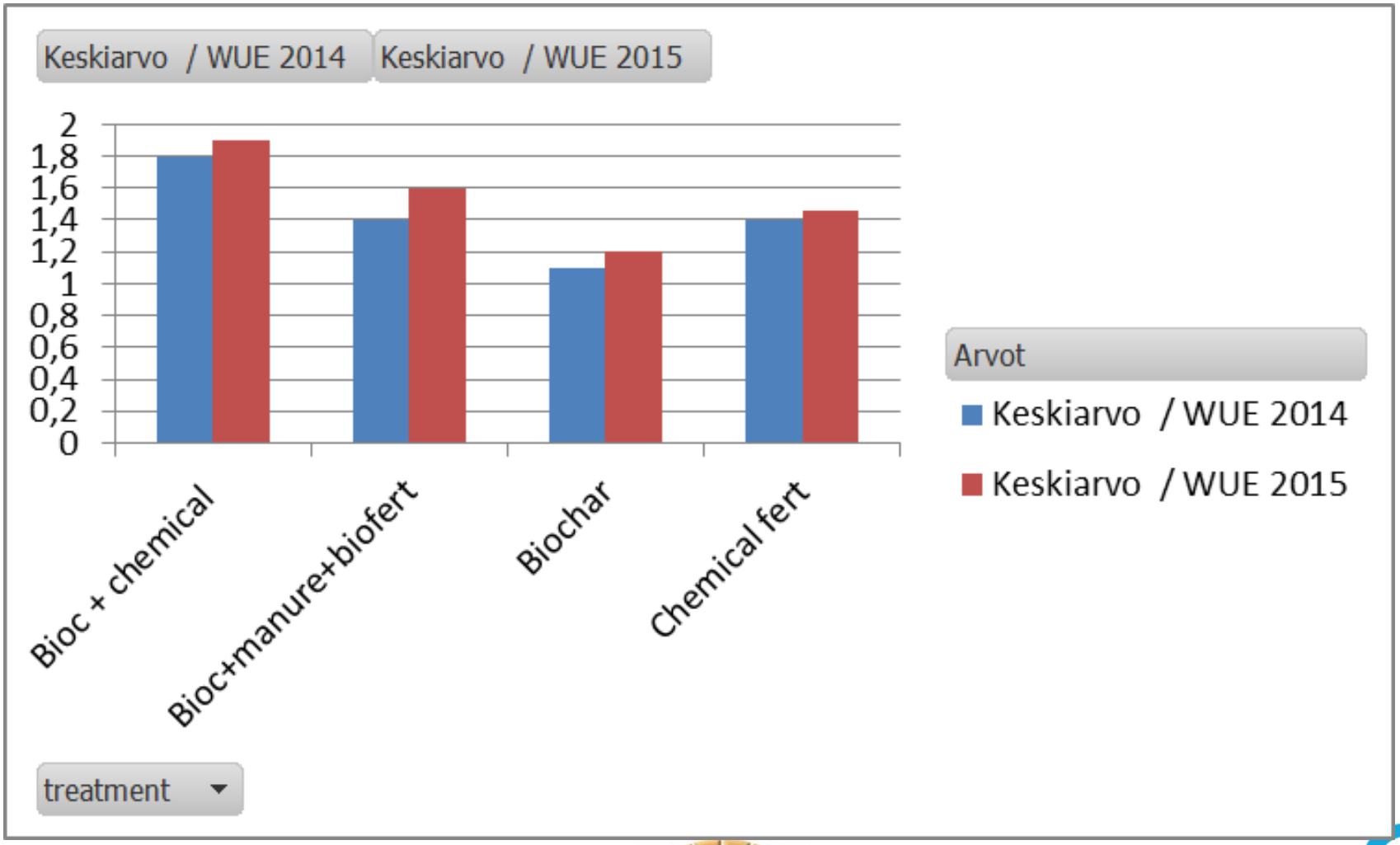
Water use efficiency improved



Liquids as botanical pesticides

Energy use options and innovative technologies ?

Human health aspect :

no smoke with high quality char +
waste management

Economical calculations and LCA assessments need to be done

GHG measurments

Conclusions

- Water use efficiency improved
- Nutrient cycling to replace fertilizers
- Yield increase
- High quality char as solid energy source
- Biological pesticides
- Waste management
- Food security
- Health improvement

- Carbon sink
- Bioeconomy based on local resources
- Mitigation of climate change

Thank you very much !

Please find more information about our ICI activities

Via FaceBook

https://www.facebook.com/NORTH.SINAI.SCHOOL.BIOCHAR

link

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