Wrap-up: highlights and conclusions from the workshop, explanation of follow-up.

Wolter Elbersen

Workshop “Agricultural residues for bioenergy. Problems and solutions”

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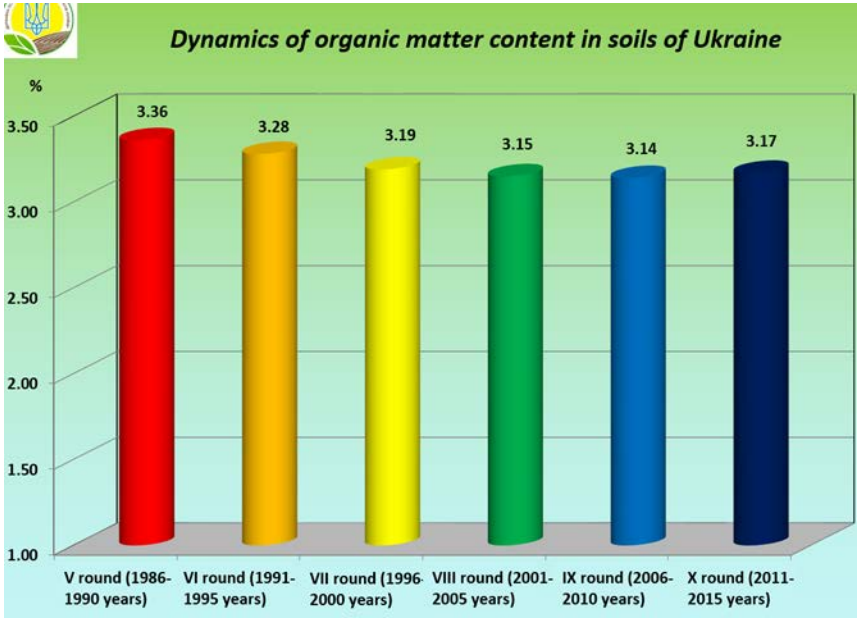
Group questions

- Assign a rapporteur
- Questions:
  1. Do we agree that agricultural field residues can be removed for other uses?
  2. How much? %
  3. What determines the fraction that can be removed?
  4. Is it clear how to do this? Are there question?
  5. What research needs to be done to solve the remaining questions?
  6. Who can carry out this research? What project do we need?

Where are soils in Ukraine now?

- Soils in Ukraine are declining –
  - Residue burning
  - Under-fertilisation
  - Lack of rotation
- Decline is slowing but still declining
- Using residues for energy seems not worse than burning straw in the field and using natural gas.....

Setting very high standards for crop residues may kill the option before it starts



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What is your standard?

A. Is you reference field burning and using natural gas? As it is now

B. Or is your reference maintenance of soil quality and energy crops as alternative energy source?

If we use field residues, A is now the standard.

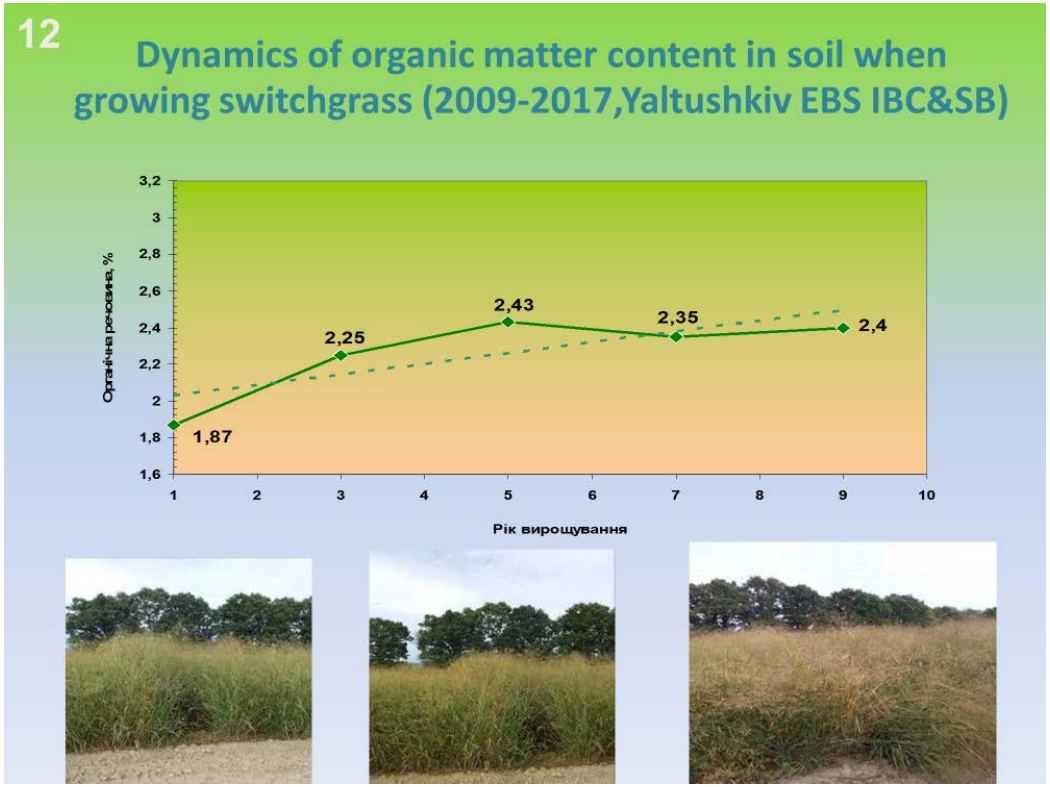
This seems unsustainable soon → we need to make B our standard asap

“What is not ecological is not economical” or

“What is not ecological <u>should</u> not be economical”

Can we have the biomass and feed the soil too?

- Yes, but it will cost extra
- Is it still competitive against alternatives like energy crops (natural gas)?
- We do not know at this moment!
- Can we define “no regret” recommendations?
- Can we define what we need to know and develop?



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How promising are the measures?

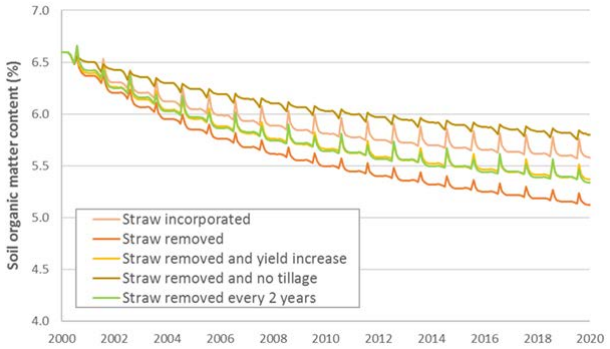
Return Ash / digestate?

Better use corn than wheat straw

No-till + nutrient replenishment + rotation

- Arriaga: → higher yield?
- Lessche and E:
- No-till and straw removal is better than current practice without removal of straw

Tillage Type	Stover Yield	N Removal	P Removal	K Removal
	-- Mg/ha --	---------- kg/ha ----------		
	Moderate Harvest Level			
Conventional	4.1	~~24.0~~	2.6	31.9
No tillage	3.7	~~24.5~~	2.8	30.9
LSD (0.10)	ns	~~ns~~	ns	ns
	High Harvest Level			
Conventional	7.1	~~43.3~~	4.6	59.0
No tillage	7.3	~~49.7~~	6.0	63.8
LSD (0.10)	ns	ns	ns	ns



		Maize Residue Harvest Level		
	County Yield	**No harvest**	**Moderate**	**High**
	---------- Grain Yield in Mg/ha ----------			
Mean	10.2	9.8	10.1	10.1
Range	2.9 – 13.4	1.3 – 16.5	0.6 – 16.7	0.8 – 16.4

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500years

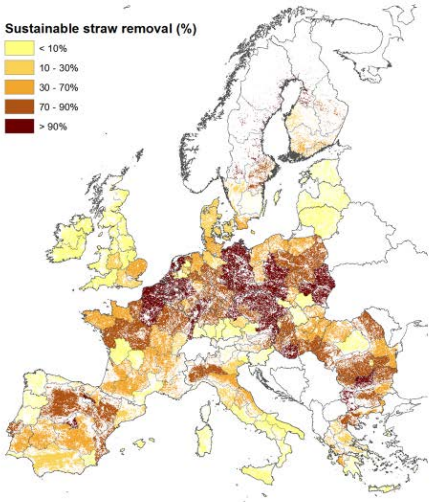
How much field residue can we use without soil damage

- 60 to 120 m Ha in EU…….
- 30 to 50% of residue

- How about Ukraine? 20 -30%
- Which 20/30%?

- In practice local residue will be (over)used.

Results – Sustainable straw removal rate



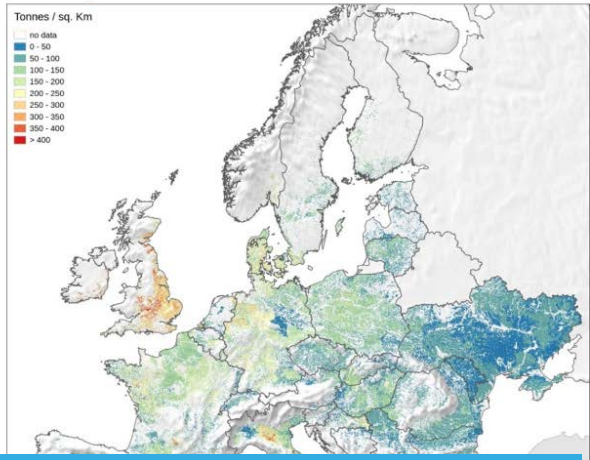
Total straw potential for bioenergy:

66 Mton dry matter

~1100 PJ

Environmental potential of crop residues

The effect of residue removal rates on SOC stock change due to biomass removal

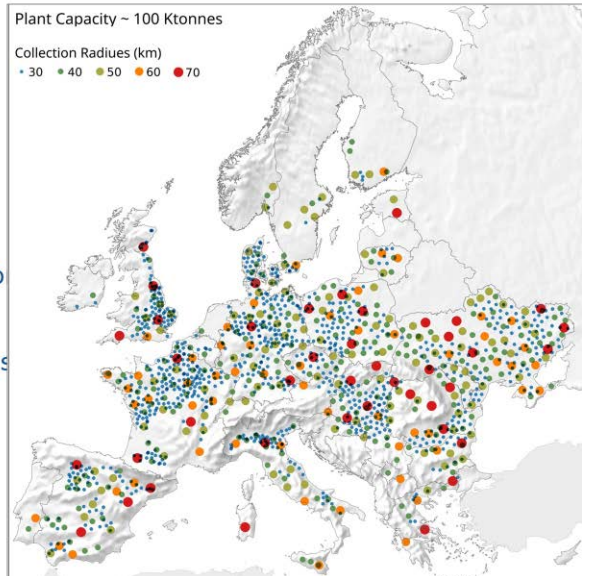


Plant locations

Map of potential plants

- Find most favourable site
- Establish plant capacity within a certain area
- Establish collection radius fo a certain capacity

Optimal plant capacity depends on available resources and collection costs



We have a window to do the research now!

- No-till → Will this solve it???
- Harvesting straw only once every 2-3 years
- Green manure crop
- Increase crop yields
- Leaves for the soil (2/3 nutrients left in the field + 1/3 of organic matter) → Pari
- Apply other organic fertilizers: digestate, manure, etc.
- Use maize straw not wheat straw
- Returning ash from straw burning to the field
- Requiring balanced fertilisation from farmers

- Measure (soil) impacts
- Measure cost
  - – what is value of SOM?

- Make the right comparison!
- Natural gas come at a cost: loss of foreign funds and security of supply and GHG emissions!

- Better have farmers make good (long term) decisions → give them the tools!
- Financiers can help by setting standards – but not kill the option
- Government can help with right compensation system

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END

Drinks.....

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Time	Topic	Speaker
8:30 - 9:00	Registration and welcome coffee	
9:00 - 9:15	Opening of the Workshop	• Head of State Agency of Energy Efficiency and Energy Saving of Ukraine, Sergii Savchuk • Agricultural Counselor, Embassy of the Netherlands in Ukraine, Carolien Spaans • Regional Manager for Ukraine, Belarus and Moldova, IFC, Jason Brett Pellmar (tbc)
9:15 – 9:20	Introduction of moderator	Kees Kwant, Netherlands Enterprise Agency
9:20 – 9:50	The state of fertility of soils in Ukraine	Yuri Kryvda, Director of Cherkasy branch of State Institution "Soils Protection Institute of Ukraine" (Ukraine)
9:50 – 10:20	Sustainable use of crop residues for bioenergy: USA research	Dr. Francisco J. Arriaga University of Wisconsin-Madison Soil and Water Management Specialist
10:20 – 10:30		Break
10:30 – 11:00	Experience in the EU with sustainable use of crop residues for energy	Nicolae Scarlat, JRC
11:00 – 11:30	Agricultural residues for bioenergy. Problems and solutions	Jan Peter Lesschen, Wageningen UR (The Netherlands)
11:30 – 12:00	Using residues vs using biomass crops for energy	Mykola Royik, Institute of bioenergy crops and sugar beet of NAAS (Ukraine)
12:00 – 13:00	Lunch	
13:00 – 13:30	Recommendation from FAO on using agri-residues – Is Ukraine different?	Sandra Corsi, Food and Agriculture Organization of the United Nations (FAO)
13:30 – 14:00	Possible measures to reduce impacts of crop residue removal: experiences on wheat harvest in Sweden and France	Luigi Pari, CREA (Italy)
14:00 – 14:30	REACTIONS from panel	• Policy: Ukraine Ministry of agriculture: Policy view • Industry: Agro Holdings • Financial institutions • Bioenergy association of Ukraine
14:30 – 15:00		Break
15:00 – 16:00	Collaborative formulation of recommendations and research questions	4 groups will formulate recommendations and identify research priorities
16:00 – 16:30	Reporting per group + short discussion	Reporting by one rapporteur per group
16:30 – 16:45	Wrap-up: highlights and conclusions from the workshop, explanation of Follow up.	Wolter Elbersen, Wageningen UR (The Netherlands)
16:45	Closure of Workshop and Drinks	