Agriculture GHG reduction measure in Hungary

(Ministry of National Development)

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„Mitigation of agricultural emissions with partial change of nitrogen fertilizer utilization and cultivations change”

In LULUCF sector

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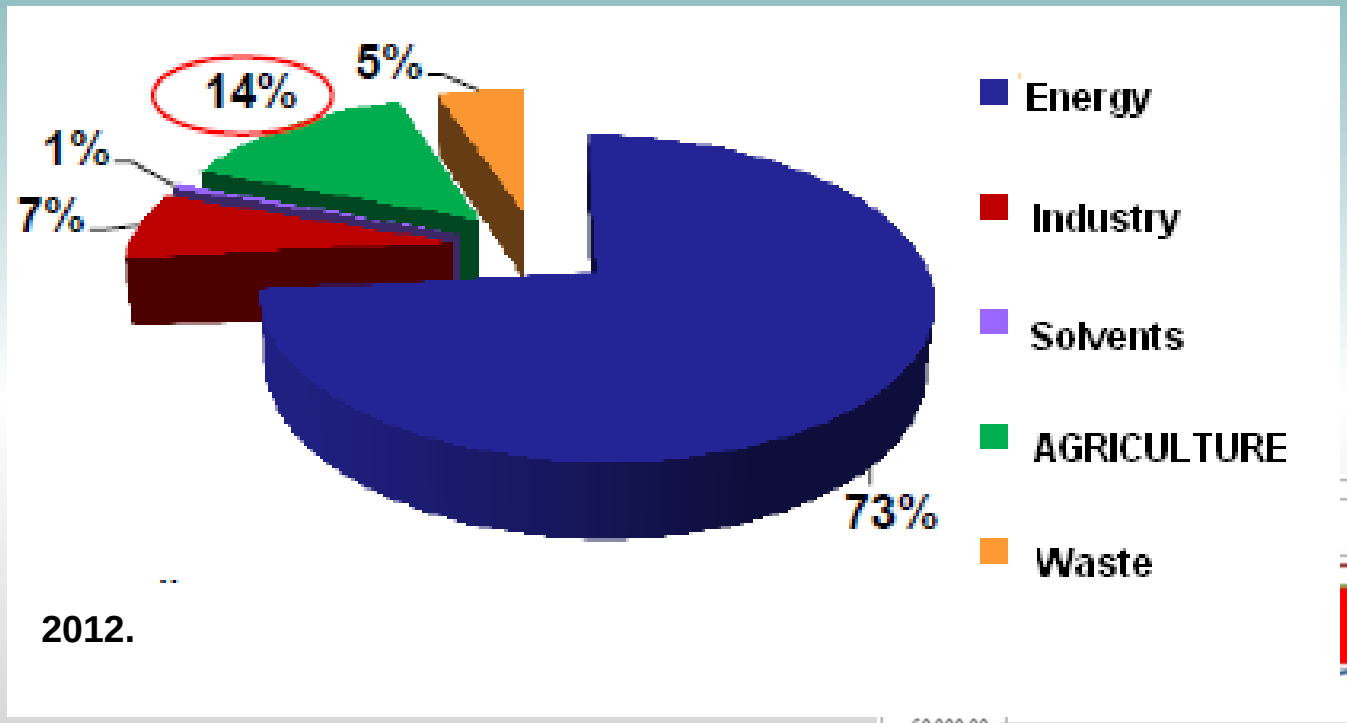
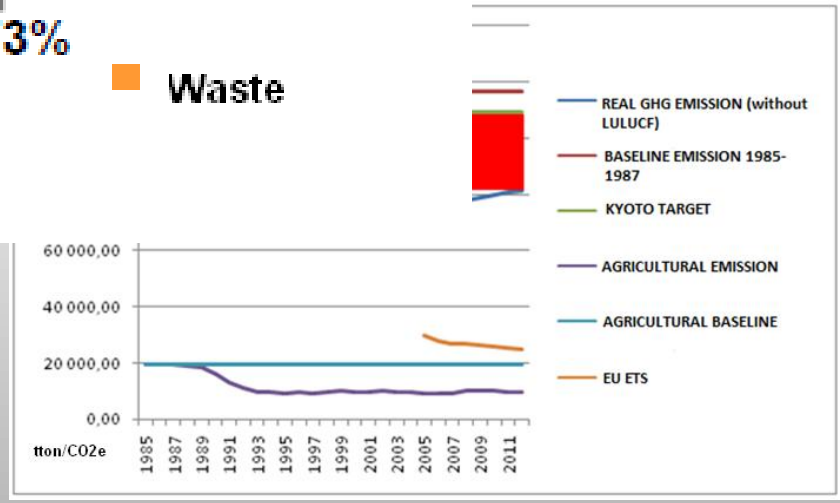
CLIMATE ACTION – CAPACITY BUILDING FOR EFFECTIVE POLICY IMPLEMENTATION 01 October 2014, Warsaw, Poland

Agricultural GHG emissions in Hungary





Source: Lovas, www.omsz.hu

Pilot project - 2011

Set up a **carbon finance** tool to manage the cultivation tillage change:

- **From conventional tillage** (soil degradation and serius carbon losses)
- **To reduce tillage** – carbon saving and conservation method of cultuvation

Bad tillage practice on million of herctares: deep plowing, deep disking, subsoilers, rippers cause loss of organic matter, degradation of soil, moisture loss, nutrient efflux, less plant residues etc.

Clean and green aims of the project proposal

- Reduction of the GHG emissions: intensive sequestration of soil organic carbon, mitigate GHG emissions and improve biological life.
- Additional incomes for farmers for the sustainable technology applications
- Introduction of new climate adaptation model on same production oroutput level
- Improvement of the quality of the cultivated soils

The project has received the Approval of the Ministry of National Development (NFM) ***as Track1 JI project proposal!***

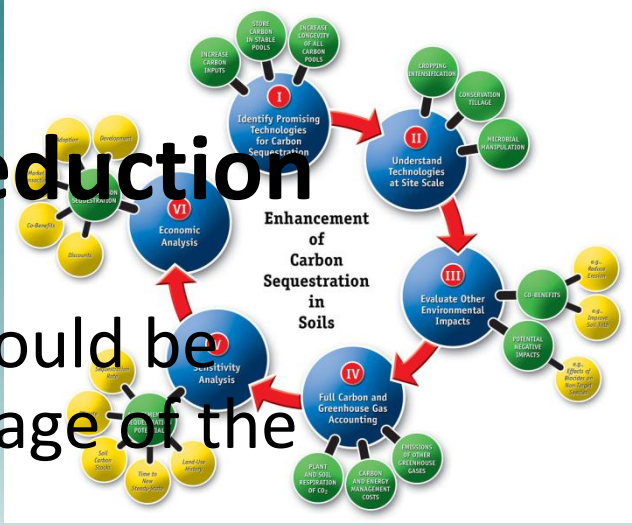
Scedule of project implementation

- Preparation, consultations: April, 2011 – innovation process/dissemination
- Project start: September 2011
- Period of crediting: Sept.1 2011- 31 Aug. 2016 (5 years)
- Project duration: 2011-2018 (8 years)
- JI support statement: July 20, 2011 (Track1 form)
- Project approval issued: May, 2012
- Project report: December, 2012
- Missing JI rules and Kyoto results: Jan, 2013
- Voluntary market, GS linking: from December, 2012
- Place of implementation: North Hungarian and Trans Danubian regions at 25 000 ha
- **JI - Waiting for the ratification of the second commitment period!!!**
- **Options: Voluntary market or Effort Sharing!!!**

Measures for reduction of GHG emissions

- ✓ Partial replacement of fossil N fertilizer (proposed: 50 kg N active substance equivalent/ha)
- ✓ Usage of biological nutrient instead of fossil N (Complex bacterial fertilizer and algal leaf fertilizer)
- ✓ Introduction of carbon saving soil tillage system
- ✓ Central principles of the project are in line with the IPPC (2011) recommendation: increasing adaptability of arable crops related to climate change

Calculated sources of GHG Reduction



- CO2 equivalent of fossil fuels that would be necessary for the production and usage of the **unused fertilizer**
- **Direct and indirect N2O emissions** of the agricultural activity
- Increased amount of **soil carbon related to the change** in the soil tillage system (from conventional tillage method to conservation tillage practice)

The difference between the conventional and proposed tillage system on soil carbon storage takes about 2,0-2,2 ton of carbon, which is equivalent to 6-8 t/ha GHG emission reduction in CO2 equivalent !

Technical aspects or effects

What we are doing?

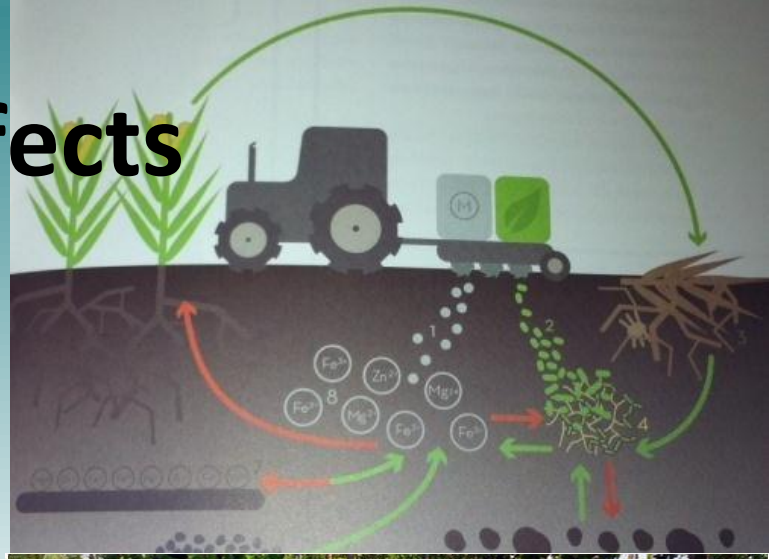
SOC* EFFECTS - Carbon losses at different tillage methods in summer

SUMMER PLOWING OPEN SURFACE	SUMMER PLOWING CLOSED SURFACE	AFTER DE-COMPACTOR OPEN SURFACE	AFTER DE-COMPACTOR CLOSED SURFACE	STUBBLE CULTIVATION OPEN SURFACE	STUBBLE CULTIVATION CLOSED SURFACE
					
CARBON LOSING AT CULTUVATION kg / hectar / day					
120-260	31-110	22-160	18-80	20-45	5-15

Source: Birkas, 2011

SOC* – soil organic carbon

Biological effects



Bacterial fertilizer:

- About 50 kg N/ha
- Increased cellulose degradation
- N fixation, Phosphor mobilizing

Algal leaf fertilizer

- Improved germination and growth
- Stimulated growth of roots and plants
- Earlier flowering, better fruit setting, shorter growing period
- Improves the taste and flavor formation of the fruits
- Improves storability, lowered nitrate content
- Higher pest and disease resistance and drought tolerance

BIOLOGICAL EFFECTS

- ✓PRACTICAL EXPERIENCE?
- ✓PROBLEMS with the products!

Monitoring

- Planned emission reduction is **1 million tons** in 5 years (200 000 tons/year on 25 000 ha)

- **The CO2 emission reduction commitment means the difference between the baseline emission and the emissions occuring after technological change (project scenario).**

- Meeting of the commitments require an internal strong monitoring control and external, international validation

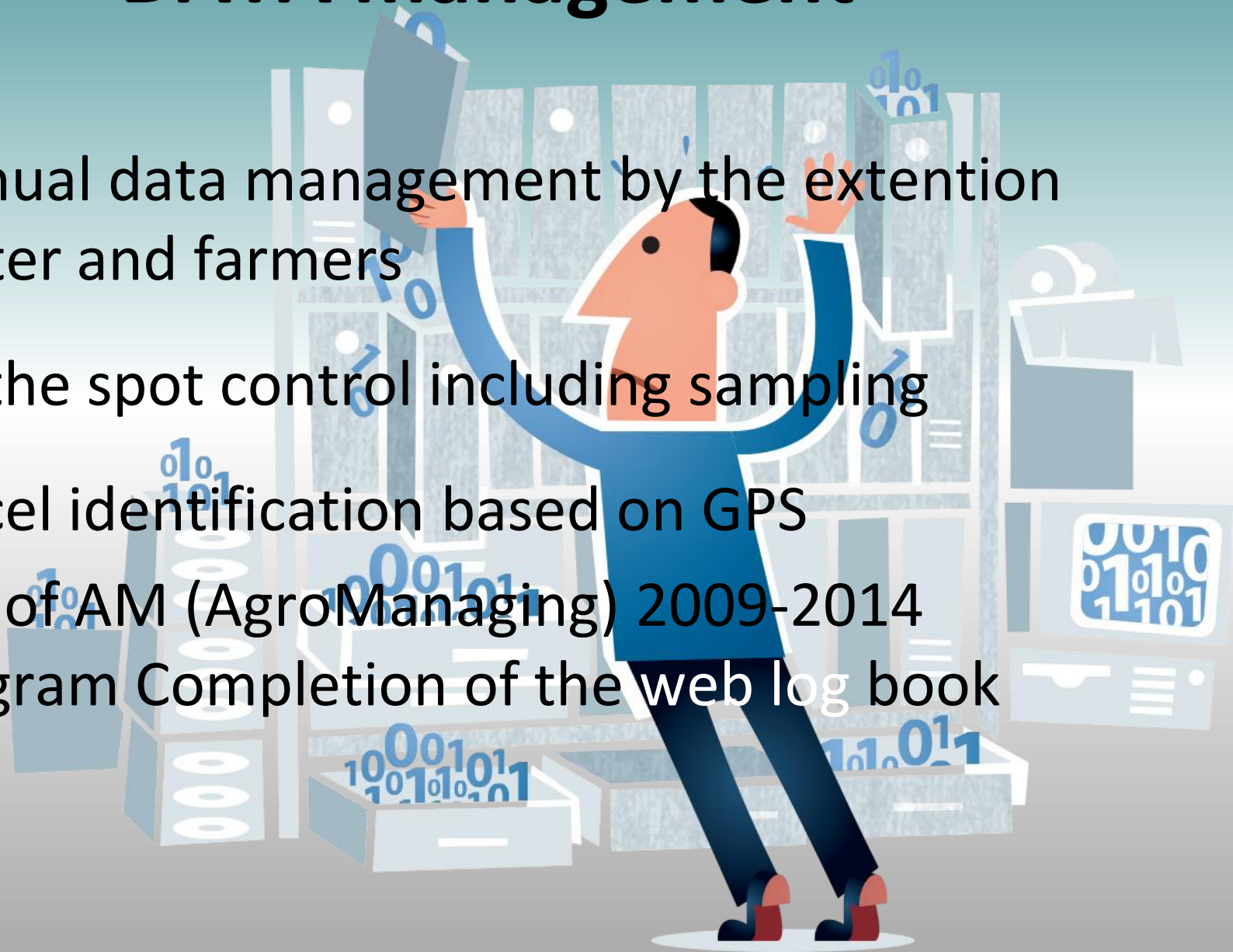
Baseline calculation from project DD

Source	Gas/Carbon storage	Status of project calculation	Explanation
Direct soil emission	CO2	Calculated	CO2 emissons related to soil tillage
	C	Calculated	Carbon from plant residues recycled into the soil
	N2O	Calculated	Direct N2O emissions related to the use of fertilizers
	N2O	Calculated	N2O emissions related to the use of manure
	N2O	Calculated	Direct N2O emissions of nitrogen fixing plants
	N2O	Calculated	Direct N2O emissions of plant residues recycled into the soil
Indirect soil emission	N2O	Calculated	Indirect N2O emissions related to the use of fertilizers
	N2O	Non calculated	Indirect N2O emissions related to the use of manure
Calculations related to the production of fertilizers	CO2	Calculated	Production related CO2 emissions calculated by type of fertilizer

Data subject to monitoring

- ✓ The amount of nutrients used both from organic and synthetic fertilizer
- ✓ The composition of nutrients used (quantity and quality control)
- ✓ Follow the soil tillage technique used in the soil preparation period
- ✓ Follow the soil tillage technique used in the after harvest period
- ✓ Changes in the amount of plant residues
- ✓ Inventory of the own and hired soil tillage machines, which are suitable for the implementation of the new technology both in quality and capacity.

DATA management



- Manual data management by the extention center and farmers
- On the spot control including sampling
- Parcel identification based on GPS
- Use of AM (AgroManaging) 2009-2014 program Completion of the web log book

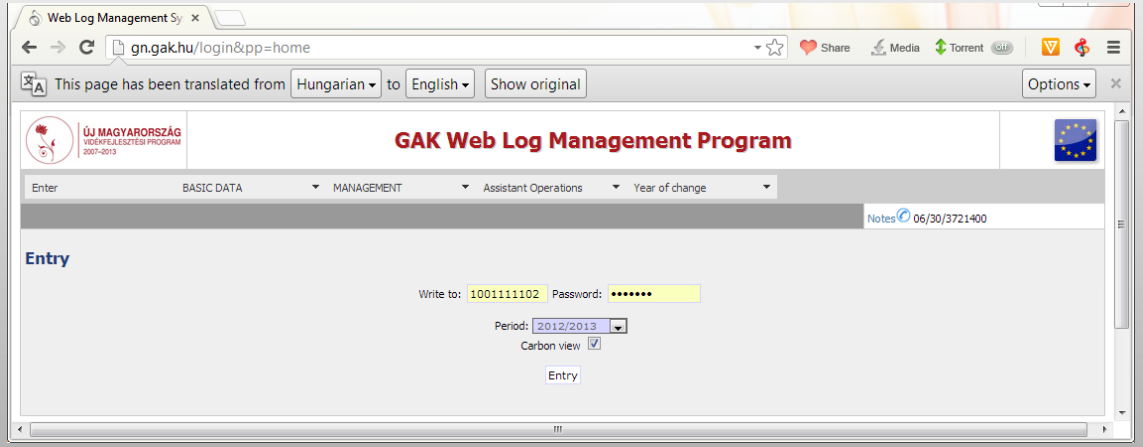
Advantages for farmers / carbon incomes

- Receive organic fertilizers in a value of 40 EUR.

  (20 l / hectar / year)

- Receive support for tillage machinery in a value of

  10 EUR/ha / year



Farmers' obligations

- Statement on the right of land using
- Follow the technology determined for 5-10 years
- Facing administrative obligations

(supplying data by crops) on a contracted bases

RESULTS

- ✓ **1 million tones of CO2** equivalent emission reduction on agricultural based.
- ✓ Based on the changes in farming technology and the use of complex bio fertilizers it may be clearly stated that the program implementation is an extra **voluntary environmental performance.**
- ✓ Farmers implement environmental friendly farming management that is beyond the requirements formulated in the EU's common agricultural policy and **strengthens adaptation to the climate change ahead of us.**

JI and GS PDD links

UNFCCC JI PDD (Track1)

WWF Gold Standard methodolody (core doc)

Thank you for your attention!

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