GAEC WORKSHOP 2010

SYNERGIES BETWEEN CROSS COMPLIANCE AND AGRI-ENVIRONMENTAL MEASURES FOR SOIL PROTECTION IN VENETO RURAL DEVELOPMENT PROGRAMME

THE CASE OF SUB-MEASURE 214-I "ECO-COMPATIBLE MANAGEMENT OF AGRICULTURAL LANDS"

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SoCo: Sustainable Agriculture and Soil Conservation

The European Parliament has requested the European Commission to carry out a study on Sustainable Agriculture and Soil Conservation. Two Directorates of the EC are involved in this project: DG Agriculture and DG Joint Research Centre.

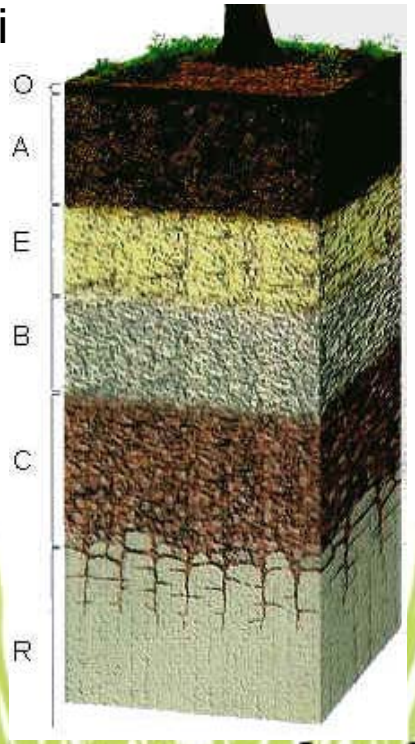
The JRC participates in the project with two institutes: Institute for Environment and Sustainability (IES: Land Management and Natural Hazards Unit and the Rural, Water and Ecosystem Resources Unit) and Institute for Prospective Technological Studies (IPTS- Agriculture and Life Sciences in the Economy Unit) in Seville.

The Soil Action of the Land Management and Natural Hazards Unit is in charge to make an assessment of the agricultural soil degradation problems and the corresponding soil conservation practices. The assessment on soil degradation will be done according to the threats identified in the Soil strategy (COM (2006) 231). Several case studies will be set all over Europe with the specific aim of evaluating the cost effectiveness of the applied agri-environmental measures in relation to soil conservation.

The project has started in 2007 and is finalized in 2009.
you may find information about Soco on the Official Web Site:
http://soco.jrc.ec.europa.eu/

Soil functions

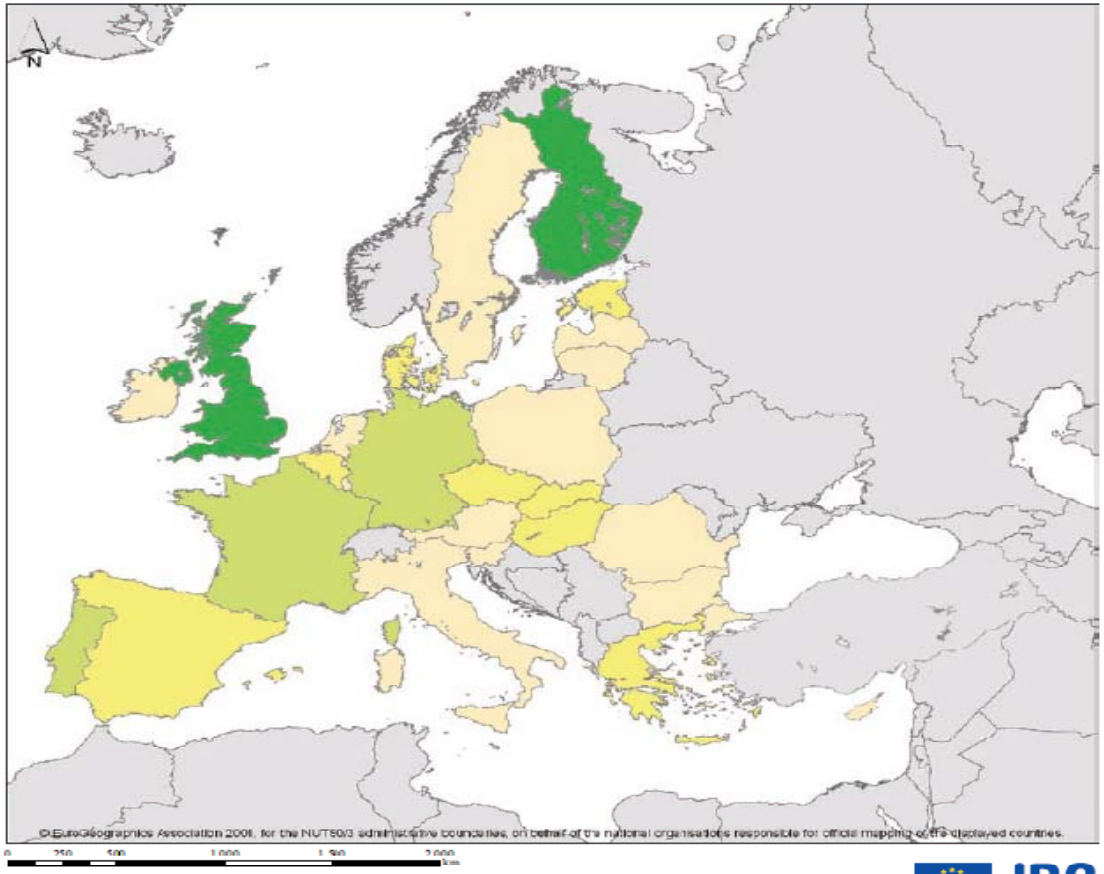
- Biomass production
- Source of raw material
- Carbon pool
- Nutrient storage, filter, transformer
- Biodi



Soil degradation processes

- Erosion (water, wind and tillage-related)
- Organic carbon decline
- Compaction
- Salinisation and sodification
- Contamination
- Biodiversity in agricultural soils

Figure 2.3: Application of reduced tillage in the EU-27 at NUTS 0 level



Source: SoCo project (European Commission, 2009)

Final report on the project 'Sustainable Agriculture and Soil Conservation (SoCo)'

Authors: SoCo Project Team
Editors: Geertrui Louwagie, Stephan Hubertus Gay, Alison Burrell

Addressing soil degradation in EU agriculture: relevant processes, practices and policies

Report on the project 'Sustainable Agriculture and Soil Conservation (SoCo)'

Authors: SoCo Project Team
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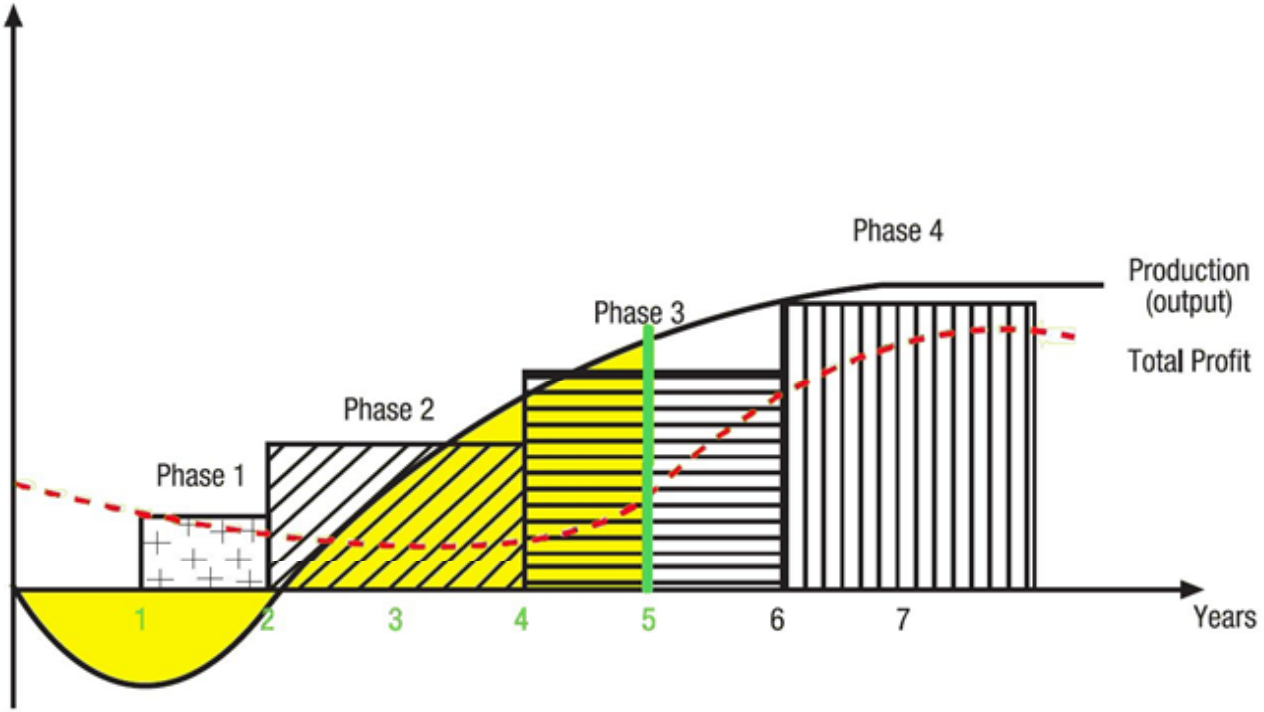
Figure 3.7 : Transition phases of conservation agriculture adoption



First phase: improvement of tillage techniques; second phase: improvement of soil conditions and fertility; third phase: diversification of cropping pattern; fourth phase: the integrated farming system is functioning smoothly
Source: FAO, 2004

Brussels, 23.7.2009
SEC(2009) 1093 final

COMMISSION STAFF WORKING DOCUMENT

The role of European agriculture in climate change mitigation

…

Soil management:

– conservation agriculture (reduced or no tillage) which avoids or reduces soil disturbance, while providing significant energy savings;

….

Regarding cropland management options, cultivation methods such as zero (and reduced) tillage, have the highest mitigation potential, followed by adding legumes to crop rotations, maintaining the soil with plant cover over the whole year, incorporation of residue in the soil and diversified crop rotations. In general, *reduced and no-tillage methods* ***require substantial changes in practices with an initial cost increase****, but may be cost-saving in the medium term and become self-financing in some areas.*

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Table 1 – **Indicative list of the main rural development measures that can be used to support mitigation in agriculture and rural areas (on the basis of the rural development regulation as modified by the Health Check)**

Soil sequestration in agricultural soils	▪ zero or reduced tillage systems which avoid or reduce soil disturbance; ▪ diversified crop rotations (to reduce fertilizer use) ▪ use of catch crops (green manure crops), protein crops, reduce the removal of residues (stubble), incorporation to soil of organic material; ▪ Conversion of arable land to permanent pastures ▪ Maintenance of permanent fallows areas ▪ maintenance of green cover of soil rows in permanent crops plantations; ▪ establishment of permanent set-aside areas with green cover;	Article 39: agri-environment Article 41: Non-productive investments	By increasing the ability of agricultural soils to store carbon, CO_2 can be removed from the atmosphere, while also playing an important role in improving the long-term quality and fertility of soils

FINAL REPORT
[16 December 2008]

"REVIEW OF EXISTING INFORMATION ON THE INTERRELATIONS BETWEEN SOIL AND CLIMATE CHANGE"

Contract number 070307/2007/486157/SER/B1
DG Environment

Page 59

CROPLAND

…

A change in management from conventional tillage to no-till practices sequesters 57±14 g C m-2 yr-1 (mean±95% CI), with the exception of wheat-fallow systems, where no C is sequestered when changing to no-till. Carbon sequestration rates will likely peak after 5-10 years of no-till, and new equilibrium SOC contents will be reached after 15-20 years.

REPORTS OF THE TECHNICAL WORKING GROUPS

ESTABLISHED UNDER THE THEMATIC STRATEGY FOR SOIL PROTECTION

VOLUME - III

ORGANIC MATTER

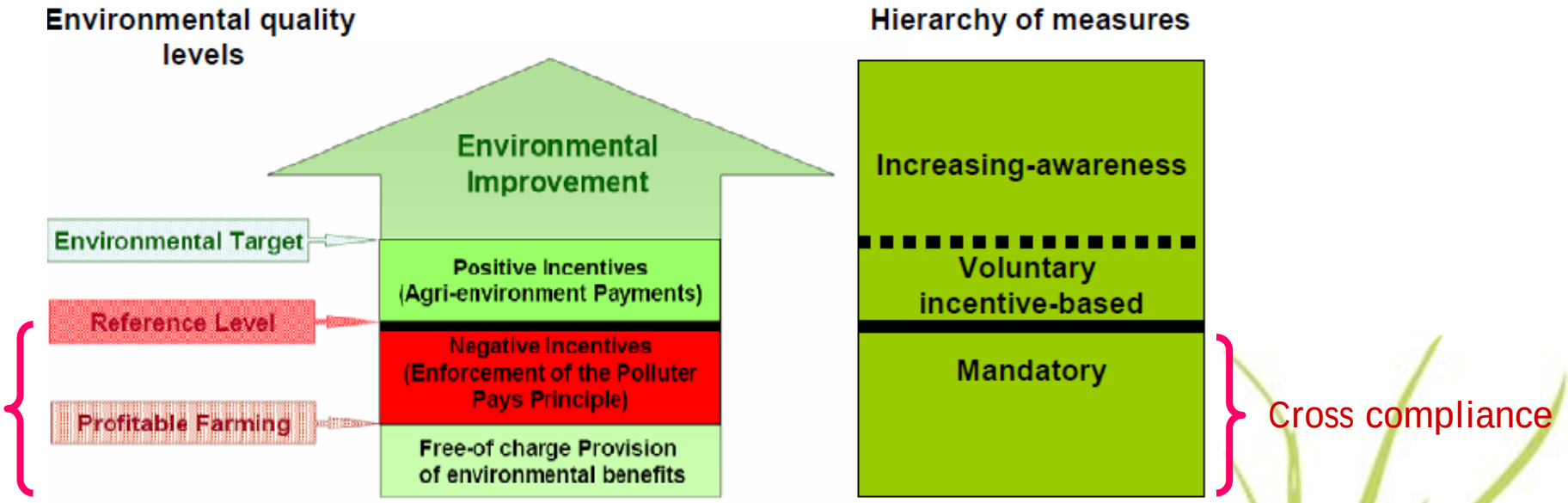
EUR 21319 EN/3-2004

Annex 2 : Policy thematics and policy tools assessment

...

Agri-environmental support .. *shall promote, among other things, ways of using agricultural land which are compatible with the protection and improvement of the soil,* as well as an environmentally-favourable extensification of farming and management of low-intensity pasture systems. This approach is favourable for soils, but could probably be more focused on SOM. It should also be recalled that agri-environmental commitments shall involve more than the application of usual “good farming practices”. It is obvious that a coherence necessarily needs to be reached between this concept of “good farming practices” and the concept of “good agricultural conditions” under the “mid-term CAP reform”.

Targeting soil quality



Source: Scheele (2008)

Relevant EU agricultural policy (CAP)

Mandatory:
Cross compliance (Regulation (EC) 73/2009)*
– Statutory Management Requirements (SMRs)
– Requirement to keep land in Good Agricultural and Environmental Condition (GAEC), targeting:
• Soil erosion
• Soil organic matter decline
• Soil structure damage
• Deterioration of habitats
• Water management

Voluntary incentive-based:
Rural Development Regulation (EC) 1698/2005

* Replacing Regulation (EC) 1782/2003 during the Health Check of the CAP

Effect of soil-friendly practices/1

	Environmental						Eco-nomic
	Water erosion	Organic matter decline	Com-paction	Water quality	GHG emis-sions	Bio-diversity	
No- or reduced tillage	-/+	+	+	-/+	-/+	[+]	-/+
Cover crops	+	+		+	+	[+]	+
Crop rotation	+	+	+	+	(+)	+	+
Buffers	+			+		+	-/+
Agro-forestry	+	(+)		+	+	+	-/+

GAEC; RDP – AEM; RDP - Agroforestry

by S.H. Gay and G. Louwagie
European Commission, JRC-IPTS

Effect of soil-friendly practices/2

	Environmental						Eco-nomic
	Water erosion	Organic matter decline	Com-paction	Water quality	GHG emis-sions	Bio-diversity	
No- or reduced tillage	-/+	+	+	-/+	-/+	[+]	-/+
Cover crops	+	+	+	+	+	[+]	+
Crop rotation	+	+	+	+	(+)	+	+
Buffers	+	+	+	+		+	-/+
Agro-forestry	+	(+)		+	+	+	-/+

GAEC; RDP – AEM; RDP - Agroforestry

by S.H. Gay and G. Louwagie
European Commission, JRC-IPTS

- **Existing suite of policy measures**, including mechanisms for advice and support, generally adequate
- **Effectiveness of implementation** and relative weight given to different types of instruments
- **Cross compliance** clearly contributed to **establishing a common reference level** for sustainable soil management across the EU
- **Rural development measures:** an important instrument for **assisting farmers' transition** to higher levels of soil quality
- **Information and advice are essential** to support any changes in farming practices

INTRODUCTION

Plow-based soil cultivation has become really common in mainstream modern agriculture.

Continuous soil disturbance through cultivation and particularly through soil inversion has lead to:

- *degradation of soil structure*
- *soil compaction*
- *decreased levels of organic matter in soil*

*CONSERVATION **AGRICULTURE***

Conservation Agriculture is based on enhancing natural, and biological processes above and below the soil surface.

It aims to conserve, improve and make more efficient use of natural resources through integrated management of available soil, water and biological resources combined with external inputs. It contributes to environmental conservation as well as to enhanced and sustained agricultural production. It can also be referred to as resource-efficient/resource effective agriculture.

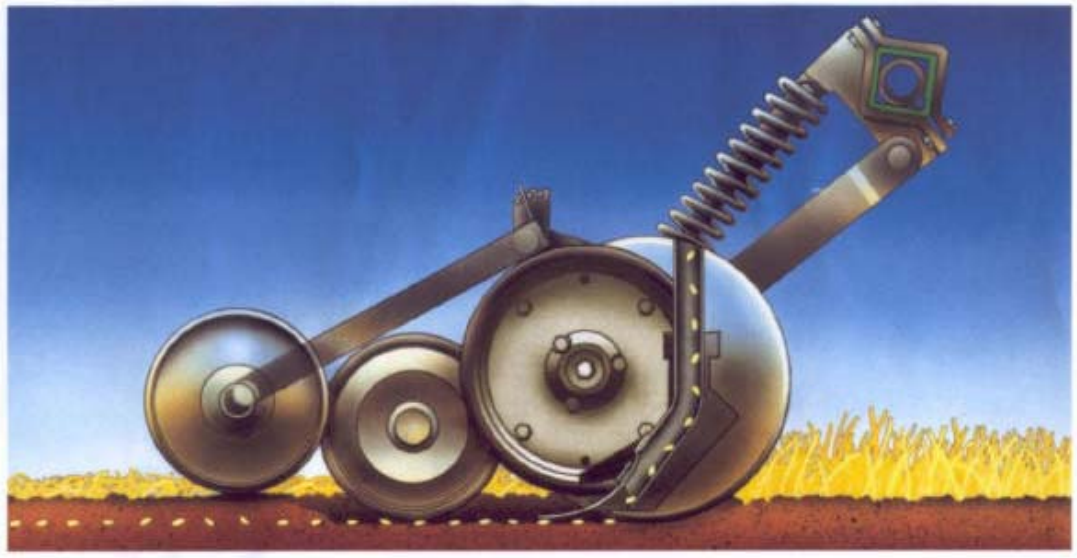
MINIMUM MECHANICAL SOIL DISTURBANCE	Conservation tillage, ideally no-tillage (or 'no-till' where the soil is not disturbed other than to plant the seed), is preferred to conventional mouldboard ploughing (where the soil is inverted).
PERMANENT SOIL COVER	Keeping a vegetative cover over the soil in the absence of a crop has an important role in protecting the soil and enhancing its properties. These covers protect soil from the impact of raindrops and wind which lead to erosion, adding organic matter to improve its structure and fertility.
DIVERSIFIED CROP ROTATIONS	Appropriate sequences of crops will reduce the impact of weeds, pests and diseases on a single crop type and give opportunities for alternative methods of control or reduce the need for external inputs.

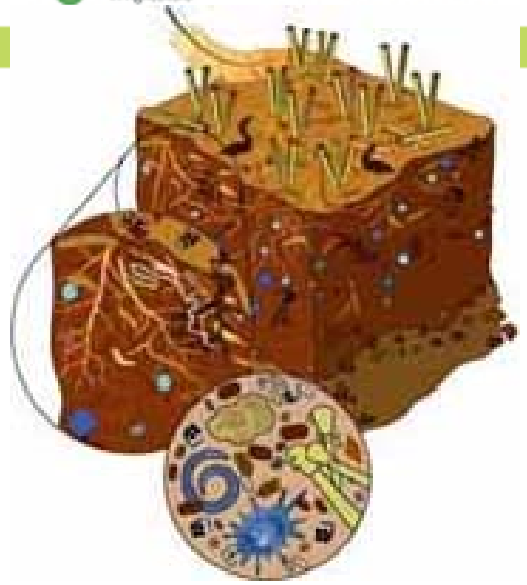
DIRECT-SEEDING TECHNIQUE

Direct seeding place seeds in condition to sprout directly in untilled soil on plant cover soils.

Direct seeders must have the capacity to penetrate the soil to correctly place seeds and must be able to operate on dense plant cover or crop residue.

Only narrow strips of soil are disturbed by the equipment openers used to place fertilizer and seed in the soil without full width tillage. Much of the residue from the previous crop is retained on the soil surface.





SOIL QUALITY

Over time, a soil that is not disturbed by tillage and to which crop residues have been continually added, develops an extensively diversified biota; i.e., bacteria, fungi, micro & macro fauna AND EARTHWORMS. The maze of tunnels, old root channels and pathways greatly increase the soil's water holding capacity. The secretions of these biota tend to aggregate the soil and give it a very stable structure, increasing its "tilth".

The waste products of these biota place nutrients in a form very accessible to plants.

TECHNIQUES OF SOD SEEDING

HEALTH CHECK
NATIONAL STRATEGY AND RURAL DEVELOPMENT PROGRAMMES UPDATING

In accordance with NSP (National Strategic Programme) update and RDP (Rural Development Programmes) reprogramming and following CAP and Recovery Plan Health Check, Regions and Autonomous Provinces have been called to specifically update their RDP development strategies by integrating or strengthening the related purposes as for new challenges and broadband infrastructure.

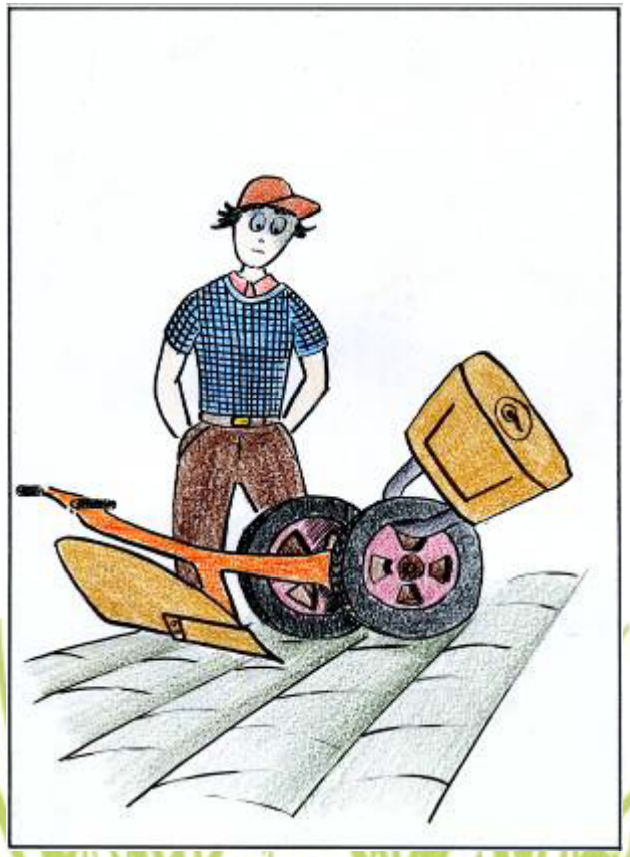
THE NEW CHALLENGES: CLIMATE CHANGE, BIOENERGY, WATER MANAGEMENT, BIODIVERSITY

The agricultural sector faces now challenges that were not as pronounced in 2003:

- **Fighting climate change**
- Making the most of the opportunities offered by bioenergy
- More efficient management of water
- Preservation of biodiversity

Purpose of the proposal is to strengthen capacity to improve the response to the above mentioned new challenges using the existing RD measures

ECO-COMPATIBLE MANAGEMENT OF AGRICULTURAL LANDS
SUB-MEASURE CODE : 214/I
ACTION 1 – IMPLEMENTATION OF AGRICULTURAL CONSERVATIVE TECHNIQUES



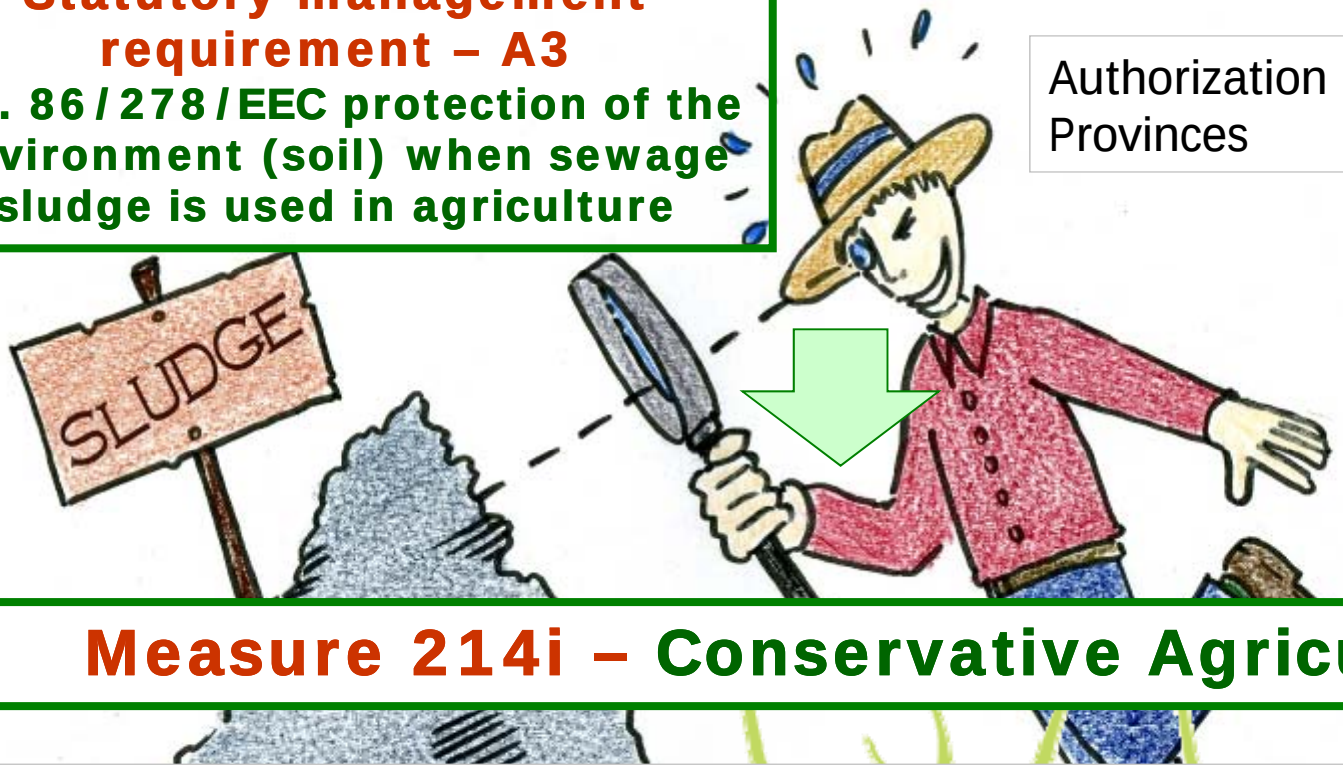
MOTIVATIONS AND PURPOSES

The first action of the sub-measure 214-I (Rural Development Program of Veneto Region) is set to develop the role of soil tillage, as a tool certainly suitable to affect the tenability of agricultural systems, allowing for their considerable influence over the soil agronomic fertility and over the cultivations' yield.

Remarkably, sod seeding is distinguished by a lowest energy requirement and, if well effected, by the substantial absence of compaction, with the consequential possibility to control soil erosion, to increase organic matter and to reduce carbon dioxide and greenhouse gas emissions.

Statutory management requirement – A3

Dir. 86/278/EEC protection of the environment (soil) when sewage sludge is used in agriculture



Authorization requests to Provinces

Measure 214i – Conservative Agriculture

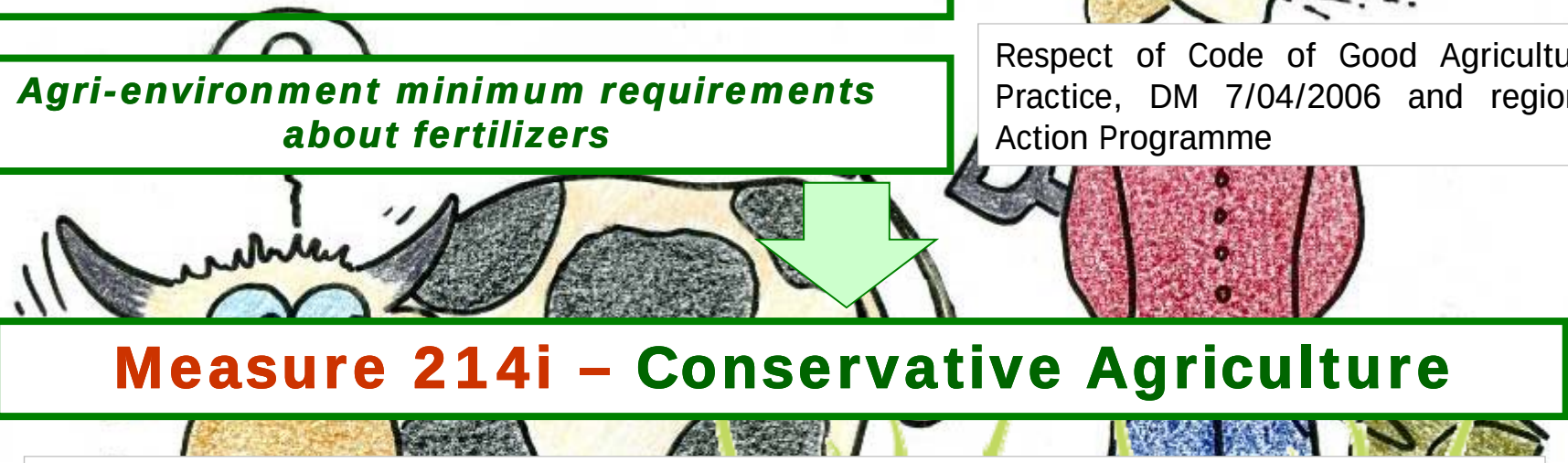
It is prohibited to use any kind of sludge such as purification mud and other mud, toxic and non toxic residues

Statutory management requirement A4
Dir.91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

Respect of the maximum amounts of nitrogen fertilizer use and prohibition of use for the autumn-winter period (from 90 to shoveled manure for 120 days for non-shoveled manure)

Agri-environment minimum requirements about fertilizers

Respect of Code of Good Agricultural Practice, DM 7/04/2006 and regional Action Programme



Measure 214i – Conservative Agriculture

Must apply nitrogen and phosphorus at different times, close to the seed and ready to be used by the plant.
Record in a “Farm register” each single agricultural practice executed
Sowing a winter cover crop during fall. Winter cover crop cannot be fertilized.

Statutory management requirement - B9

Dir. 91/414/EEC Placing of plant protection products on the market

Correct holding of treatment registry ; § compliance with the requirements provided for use in label ; § use of personal protective equipment; § authorisation (license) to the use of very toxic/toxic/harmful plant protection products

Measure 214i

Conservative Agriculture

Splitting of weed control measures

Drafting of cultural practices registry

Standard 1.1 - Minimum soil cover

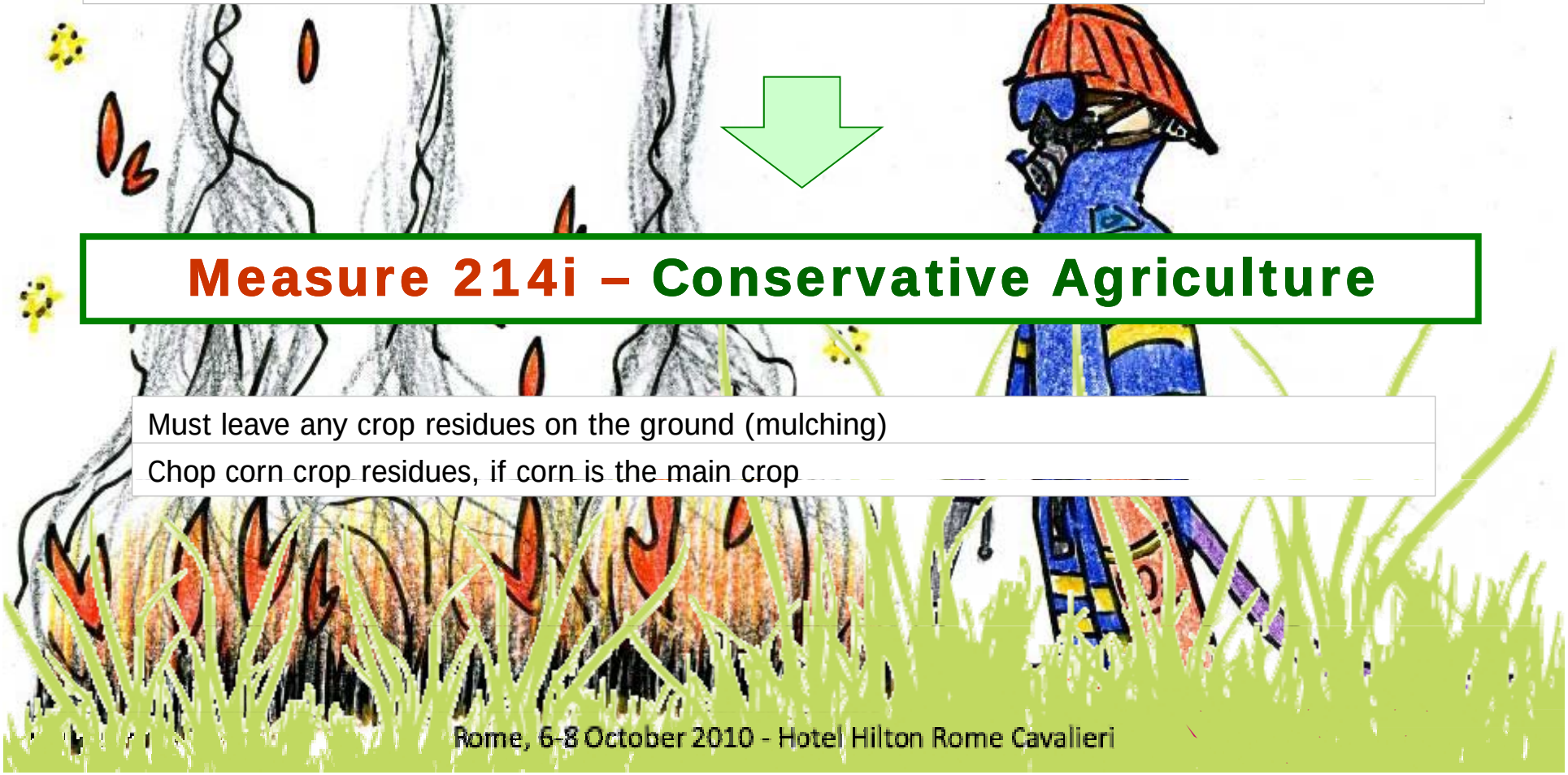
Point b: in presence of evident erosion, soil must be covered for 90 days from September 15th to May 15th

Measure 214i
Conservative Agriculture

Soil must be covered all year round. This can be achieved by sowing a second crop or cover crop during summer and winter cover crop during fall.

Standard 2.1 - Arable stubble management

Ban on burning of straw stubble and crop residues left in field after harvest



Measure 214i – Conservative Agriculture

Must leave any crop residues on the ground (mulching)

Chop corn crop residues, if corn is the main crop

Standard 2.2: Standards for crop rotations

Ban of cereal monoculture for a duration exceeding 5 years

Soil analysis, only for corn monoculture from the 5th to 7th year

Measure 214i Conservative Agriculture

Soil must be covered all year round. This can be achieved by sowing a second crop or cover crop during summer and a winter cover crop during fall. Before spring sowing cover crops will be killed with devitalizing herbicides (only in the early years of commitment)

Apply diversified crop rotations and crop combinations suitable for the CA system, such as a combination of winter cereals or canola with corn and soybean

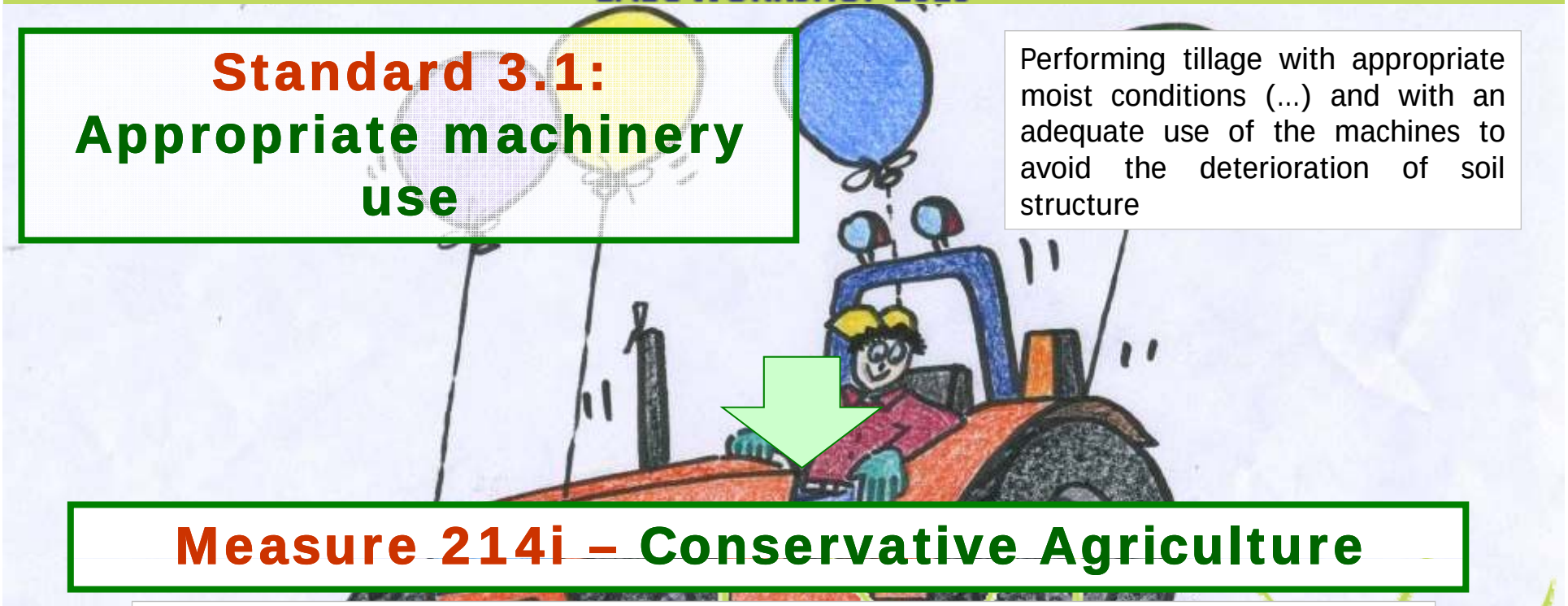
Perform chemical and physical analysis of the soil. Results must be registered

Corn as main crop cannot be planted for two years in a row on the same plot

GAEC WORKSHOP 2010

Standard 3.1: Appropriate machinery use

Performing tillage with appropriate moist conditions (...) and with an adequate use of the machines to avoid the deterioration of soil structure

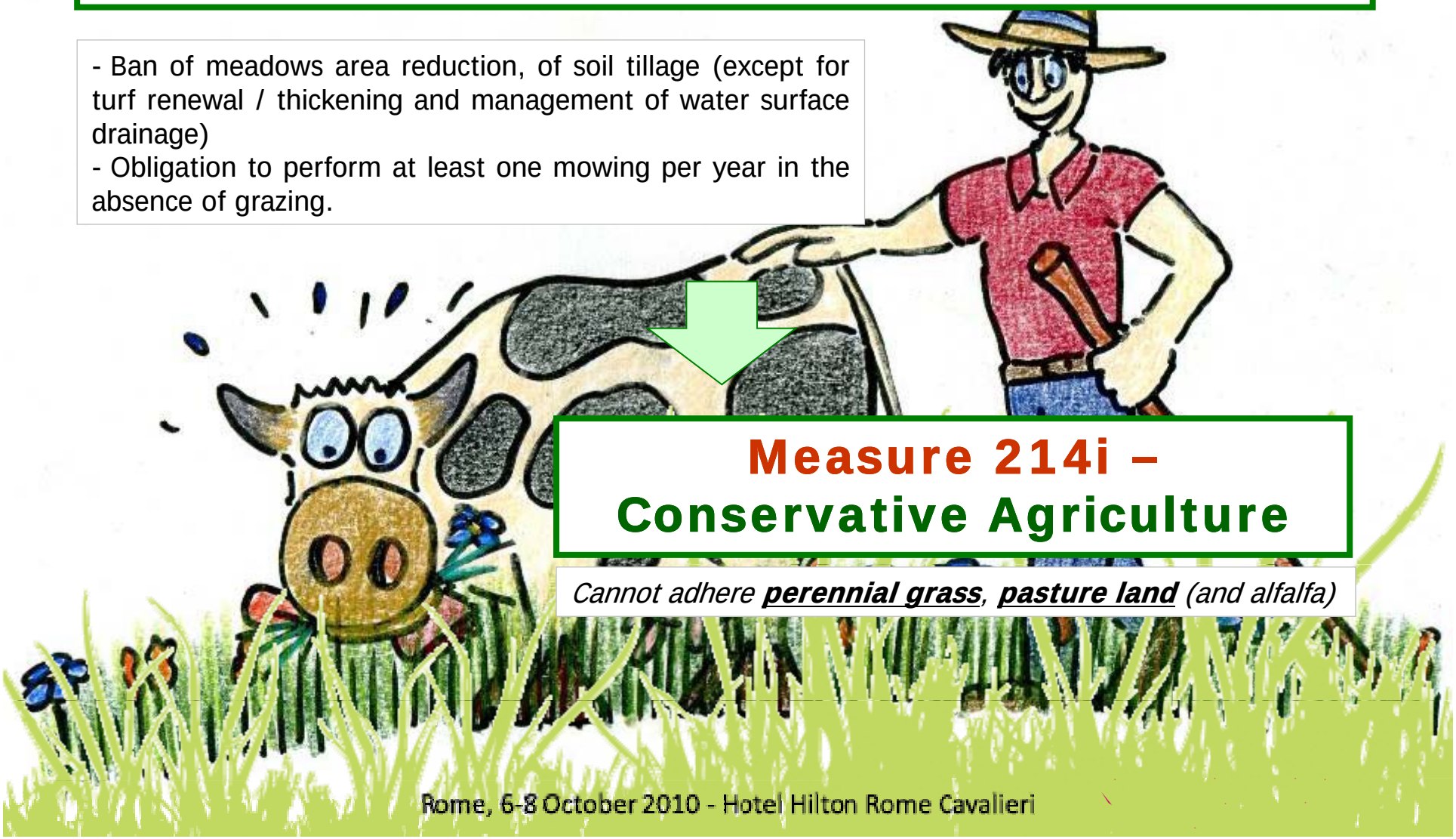


Measure 214i – Conservative Agriculture

Use Conservation Agriculture techniques on at least 25% of the farm cultivable land.
Not invert soil layers
Adopt the sod-seeding system that is the mere deposition of the seed into the ground, without altering the pre-existing structure. This operation involves a portion on the ground 8-10 cm wide and 6-8 cm deep.
Is prohibited to plough and to perform any kind of mechanical labour before and after seeding

Standard 4.1 - Protection of permanent pasture

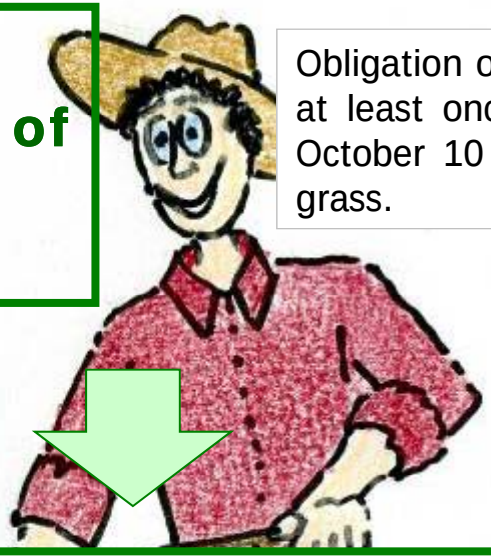
- Ban of meadows area reduction, of soil tillage (except for turf renewal / thickening and management of water surface drainage)
- Obligation to perform at least one mowing per year in the absence of grazing.



Measure 214i – Conservative Agriculture

*Cannot adhere **perennial grass**, **pasture land** (and alfalfa)*

Standard 4.2.
Avoiding the encroachment of unwanted vegetation on agricultural land



Obligation of a mowing or chopping at least once a year no later than October 10 with no rupture of turf grass.

Measure 214i – Conservative Agriculture

Cannot adhere deactivated land and non cultivable land

Restrictions, checks and entrance conditions/1

- Conservation Agriculture techniques on at <u>least 25% of the farm</u> cultivable land. Minimum surface is 1 Ha.
- It is <u>prohibited to use any kind of sludge</u> such as purification mud and other mud, toxic and non toxic residues.
- Is <u>prohibited to plough and to perform any kind of mechanical labour</u> before and after seeding.
- <u>Fertilizing and weed controlling on cover crops is forbidden</u>. Cover crops cannot be harvested and used but have to stay on the ground.

Restrictions, checks and entrance conditions/2

- Corn as main crop cannot be planted for two years in a row on the same plot.

- Still hold the Rules on Cross-compliance as a baseline for ACTION 1, as well as for other Agro-environmental measures, with main reference to the Statutory management requirements referred to Council Directive 91/676/EEC and Good agricultural and environmental condition referred to the issues Soil erosion, Soil organic matter and Soil structure.

- Cover crops can be dried up with herbicides such as Gliphosate and Ammonium Gluphosinate that link to soil colloids soon after their application and are degraded through microbes and aerobic pathways with the production of water, nitrogen, phosphorus and carbon dioxide.

Payment:
400 €/ha per year, for a period of five years.

Budget of the sub-measure 214/i:
10.000.000 €, for a period of five years.

Target group:

Farmers, as defined by the Regulation (EC) No 73/2009, Article 2.

Areas eligible for payment :

Agricultural utilized area of Plain and Hill in Veneto Region.

Thank you for your attention