REGIONE DEL VENETO

PSR Veneto 2014-2020

Conservation agriculture and water efficiency measures in Veneto RDP: State of art and experiences

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RETE RURALE NAZIONALE 20142020

European Network for Rural Development

214-i ACTION 1 "CONSERVATION AGRICULTURE"

Payments :
- 581 Euro / hectare / year in plain
- 483 Euro / ha / year on hill

Area under commitment: 2.170 hectares
Applications: 80

10.1.1 "AGRONOMIC TECHNIQUES WITH REDUCED ENVIRONMENTAL IMPACT"

The intervention involves the adoption of conservative agronomic techniques on the farm:
- No Tillage (NT) : Introduction / maintenance
- Minimum Tillage (MT).

An open tender terms in the year 2015 (DGR 440/2015) only No Tillage - Maintenance and Introduction
Five-year Amount: € 3.200.000

ELIGIBILITY CONDITIONS

❑Surface area subject to agri-environmental commitments, at least 25% of the UAA's surface area (minimum area to commitment = 1 hectare)

GENERAL COMMITMENTS :**WEB LOG**

It is necessary, preventively, to arrange the surfaces in groups of parcels with the same characteristics, including cultivation.

A) HOMOGENEOUS AREAS: gather all individual cadastral maps that fall in the same "type of zone" Vulnerable Zone or Zone Ordinary (non-vulnerable); Subject to a specific agri-environmental "Intervention Line" (eg 10.1.1, NT, 10.1.2 ..).

B) Subareas: each Homogeneous area contains one or more sub-areas. Each Sub-area is characterized by the presence of a specific crop or annual crop rotation.

The relevant information contained in the WEB LOG is used, also for the purpose of aggregating plots subject to the same commitment.

TILLING

a. Ban on inversion of soil layers
b. Prior authorization of the regional paying agency, which gives information to regional offices, for the possible use of decompilers
c. Ban on subsoiling
d. keep evenly on site crop residues

CROP ALTERNATIONS

a. alternations of different crops, including, if appropriate, sowing another plant (especially alfalfa, clover) in the midst of a culture of cereals already an adult, in order to improve the soil

b. A maximum period of 40 days between crop harvesting and sowing of the next crop, with the aim of ensuring the continuous coverage of the soil, also through autumn-winter cover crops and / or summer herbs

SOWING

a. Adopt the sod seeding exclusively
b. Close the furrow without turning the ground

FERTILIZATION

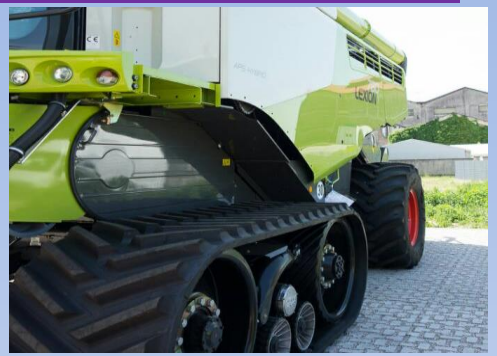
a. Distribute fertilizers before the drying phase of the cover crop, with little impact on soil profile.
b. Locally distribute fertilizers in coverage by using lighter interrupters phosphate reduced contributions only for sowing ;
c. Prohibition to distribute sulphonic sulphate on land without crops;

(foto Vallevecchia 2016)

HARVESTING

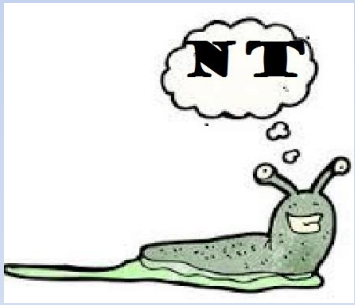
a. Harvesting with low pressure tires, twin wheels or tracks, making sure that no flaps are generated. These combine harvesters are not ordinary in the Veneto region: they are present in rice farms and hilly areas of Appennines

b. Spread the crop residues at the same time as the harvesting operations



SCOUTING AND CONTROL OF PLANT DISEASES, INSECT FAUNA, WEEDS

SCOUTING CHECK LIST THROUGH FIELD VISITS
Sowing: find the optimal time for sowing (when the furrow closes), at low risk of compacting
Emergency-First growth phases: verify investment and decide whether to keep cultivation or not (if necessary re-planting).
post-emergency phase : Check the type and density of infestations of weeds, paralyses and other epigeyphophytes
harvest : Identify the optimum harvest time, with low risk of compacting



1- CHANGES TO CONSERVATIVE FARMING COMMITMENT OVER PAST PROGRAMMING

a. Non-flexible pattern of cultivation succession by alternating grain vines or rape seed / other crucibles, corn and soy has been removed ⇒ overly binding in the farming choices
b. There was an Annex with the technical and operational indications concerning species intended for cover crops and spring / summer grasses ⇒ These indications are no longer given because elasticity is required to choose these species and their cultivation
c. Split and / or locate pest control interventions on main crops ⇒ this result commitment is counterproductive because it does not allow to effectively control infestations

2- CHANGES TO CONSERVATIVE FARMING COMMITMENT OVER PAST PROGRAMMING

a. Annual Soil analysis (divided by parcels), in order to establish the degree of attitudes towards No Tillage ⇒ The only soil analysis is not exhaustive, while continuous scouting can be more useful in assessing the pedo-climatic situations that most affect conservative agriculture
b. Prohibition of fertilization and weed control on cover crops ⇒ The experience of past programming has taught us that cover crops, to best perform their function, must produce a significant amount of biomass, so they also need to be concimated. As potential inoculum of weed seeds, it is also necessary to weed out of cover crops

Avoiding mistakes in conservation agriculture measure

a. Conservation agriculture areas should not be implemented in **non-irrigating** surfaces . If it does not rain naturally, only irrigation permits grasslands to emerge after harvesting grain in July
b. **Do not force to adhere to an extremely high surface area** (more than 30% UAA). This would lead to areas that are unsuitable for commitments, for example because of a very variable texture, low fertility, high silt, too compact or poorly drained soils.
c. We must accompany farmers in appropriate and **constant training** and information systems. Realism should not be missed by farmers, signaling the operational / managerial path to be undertaken. This requires a total change of approach.

Project "Monitamb 214 i" carried out by Veneto Agricoltura

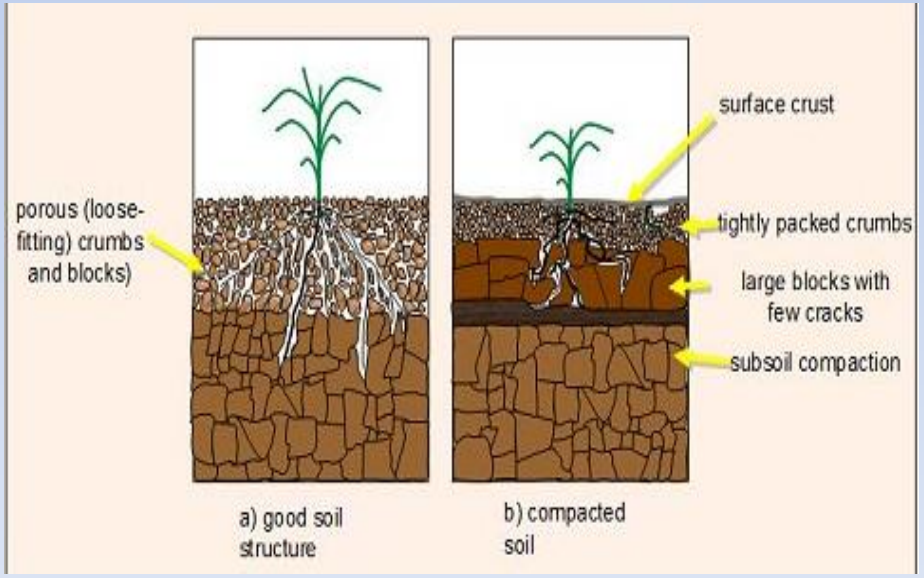
As of 2010, the evaluation of Action "Conservation Agriculture" of the PSR 2007-2013 has been carried out.
The UAA was 50% of the three experimental farms (Vallevecchia, Diana and Sasse Rami), for a total of more than 300 ha.

The aim was to monitor:

✓Organic matter in soil
✓Emissions of carbon dioxide
✓Soil Biodiversity
✓Productivity

The project highlighted the difficulty of <u>overcoming the transition period</u> due to:

✓Very low starting organic level (less than 2%, often close to 1%)
✓Strong soil compaction: compacted soil reduces the ability of exploration of the root system
✓Important competition carried out by the weeds



EC REMARK

"You are invited to provide valid justifications (proofs, presumptions, etc.) to show that the types of selected operations will lead to the expected results."

FUNDAMENTAL OBJECTIVES OF CONSERVATIVE AGRICULTURE IN VENETO

Reduce the depletion of the organic substance, replacing the plows exclusively with sod seeding, thanks to the natural mixing of the layers of the profile by:

- ✓ Telluric fauna
- ✓ Plant radicals
- ✓ Soil microorganisms

DO CONSERVATIVE FARMING TECHNIQUES RESULT IN FEWER MECHANICAL OPERATIONS, RESULTING IN LOWER COSTS?

The yield of crops contracts significantly and directly proportional to the biological / phenological characteristics of the cultivated crops

Trimming operations result in higher costs, as they are not ordinarily performed

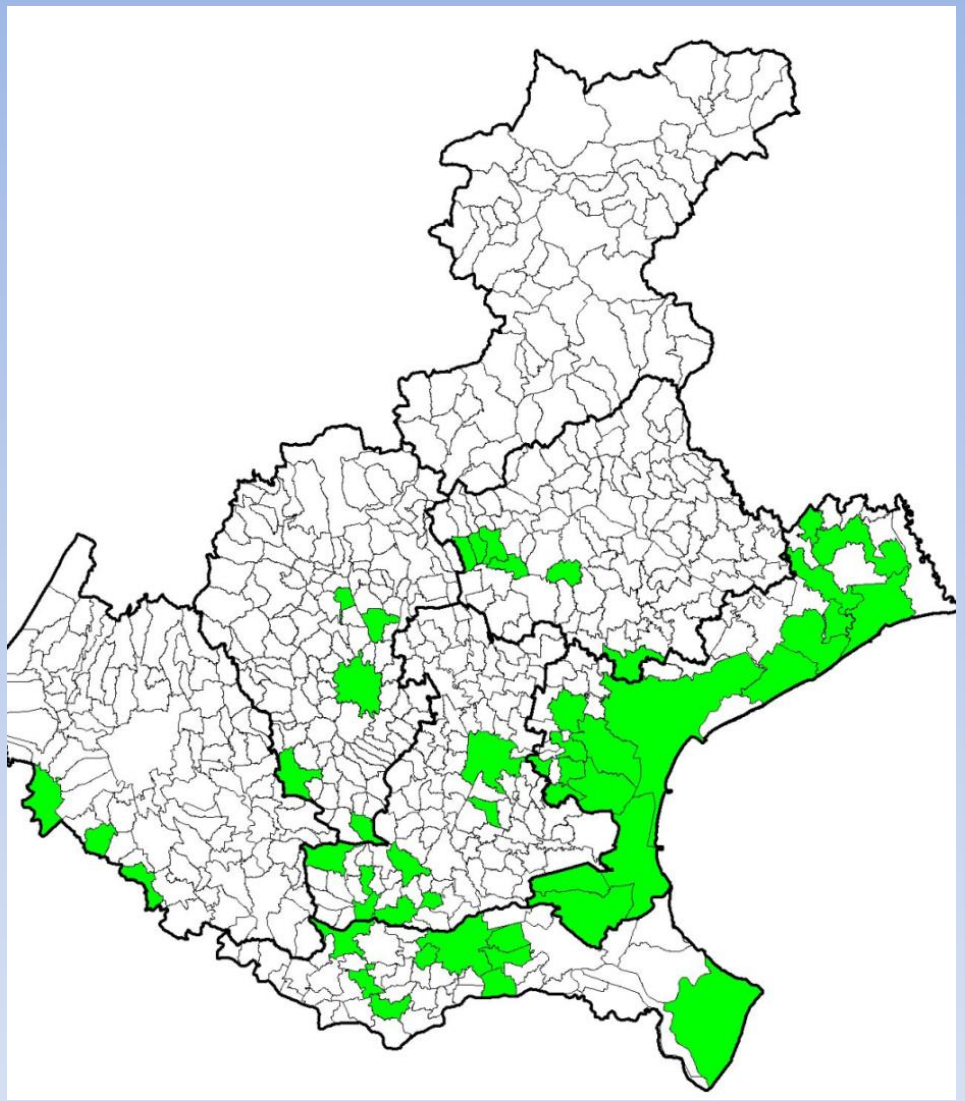
The introduction of cover crops is a net additional cost for the farm, especially as autumn-vine cover crops are subject to dehydrating treatment at the beginning of spring. After passing the transition phase, it is also possible to replace chemical control with mechanical controls with roller knife, which macerates the epigenetic part of the cover crops, devitalizing them

DG ENV: "We can accept the measure if there is a clear commitment that the mulching of the cover crop has to be done mechanically (without glyphosate). The use of pesticides should be limited to the needs for weeds and pests management"

A careful worldwide research on the management of conservative cover and pest management has been carried out.
In no case they have been able to avoid the use of herbicide products in order to devitalize the cover crops. (HULUGALLE ET AL 2011).

Contribution of prof. Vincenzo Tabaglio of the Catholic University of Piacenza:
- *Cover crops with sprouting plantlets (loose, frozen clover, herb, rye, etc.) are not completely eliminated by mechanical termination*
- *The sowing of the next crop can be strongly disturbed (even compromised) if the cover crop has been chopped or mown, because the mulch can go to block*

Contribution of prof. Maurizio Sattin of CNR:
- *"conservation agriculture cannot be efficiently implemented without a judicious use of glyphosate for weed control, especially during the phase of transition from conventional to conservation agriculture."*



10.1.1 – NO TILLAGE

		Percentage increase compared to the PSR 2007-2013
APPLICATIONS	83	+ 9%
AREA SUBJECT TO COMMITMENT (HA)	2.389,50	+ 4%
percentage ratio between the surface subject to engagement surface and farm	48%	
Number of Municipalities concerned	48	

Ecosystem services	Remark about conservation agriculture in Veneto Region
Cover Crops	Positive effect on dry matter and organic carbon based on soil characteristics
Carbon sequestration in soil	Positive effect in the first 20-30 cm No differences are observed if the calculation is reported at greater depths
Water available	Effect of the increased infiltration and reduced evaporation; Increased retention capacity is also observed in the more superficial layers
Erosion Reductio	Concordant data
Microbial biomass, enzymatic activity	Effects evident especially in the first 5 cm
Lombrichi, Arthropods (biodiversity)	Concordant data

214-i ACTION 3 " Environmental optimization of agronomic and irrigation techniques "

Reduction of nitrogen fertilizers by 30% compared with the MAS values of the Nitrates Directive - in the Veneto region, approximately 60% of the surface corresponds to Nitrate Vulnerable Areas

AND

Reduction of 25% of irrigated volumes, limited to corn and tobacco crops

Total Area under commitment: 21.169 hectares Applications: 658	The total number of farms participating in the reduction of irrigation volumes was 363, for an area of commitment (SOI) of 7.488 ha

10.1.2 “Environmental optimization of agronomic and irrigation techniques”

So far no open calls have been made (scheduled for 2018)

ELIGIBILITY CONDITIONS

- Surface area subject to agri-environmental commitments, at least 25% of the UAA's surface area (minimum area to commitment = 1 hectare)
- Unlike other agro-environmental interventions, surfaces may vary over the years depending on the crop rotation and the types of lease agreements that ensure ownership on the surfaces.

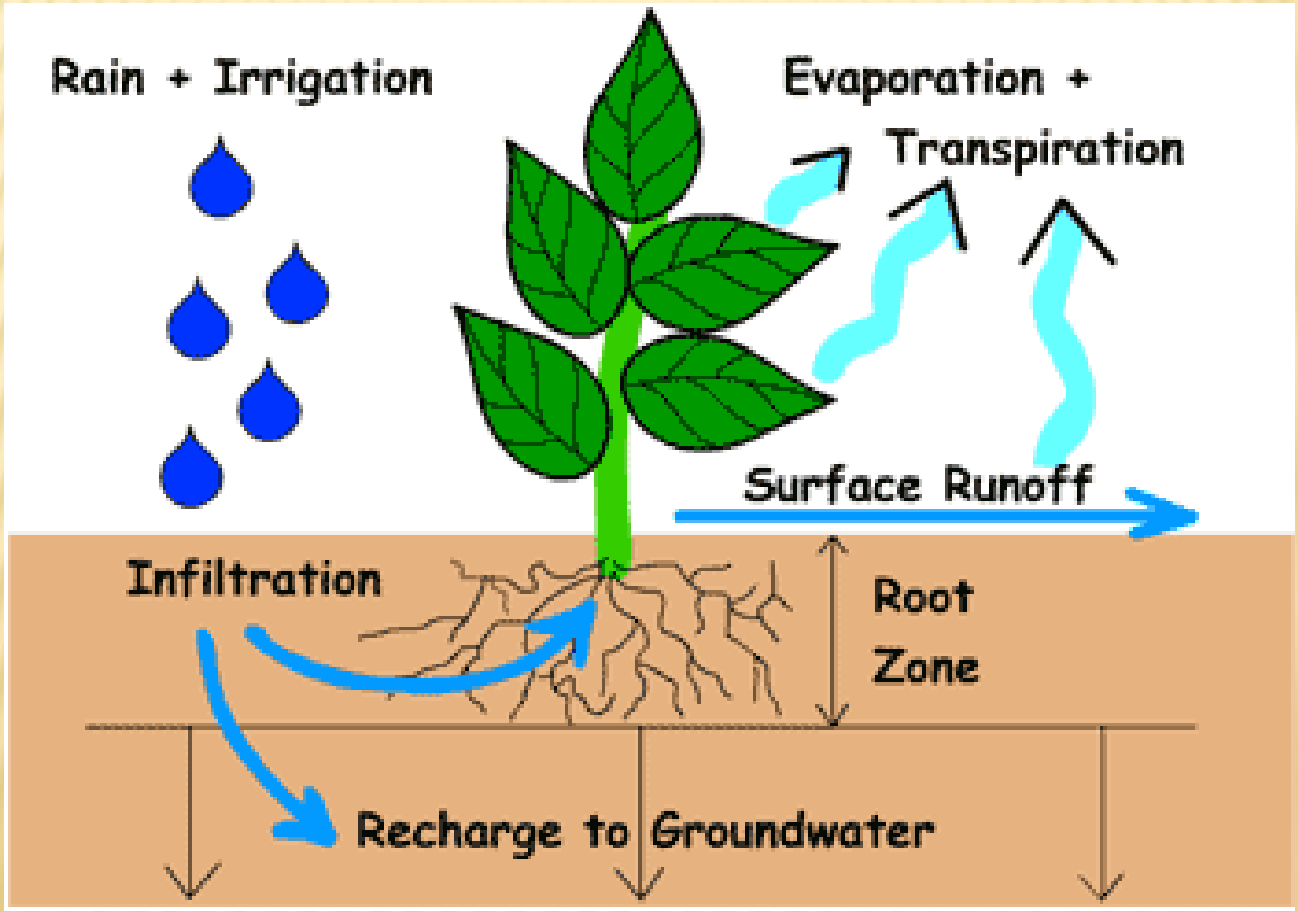
10.1.2 "ENVIRONMENTAL OPTIMIZATION OF AGRONOMIC AND IRRIGATION TECHNIQUES"

COMMITMENTS

1. Seeding of **cover crops**, chopped before sowing of the main crop
2. **Soil analysis**, dividing the surfaces into homogeneous parcels
3. **Reduction of nitrogen fertilizers** and improved distribution of fertilizers, drafting a fertilizer plan using the AGRELAN-WEB software from Arpav
4. Filling in the cultivation **web log** (See 10.1.1)
5. **Irrigation commitments**

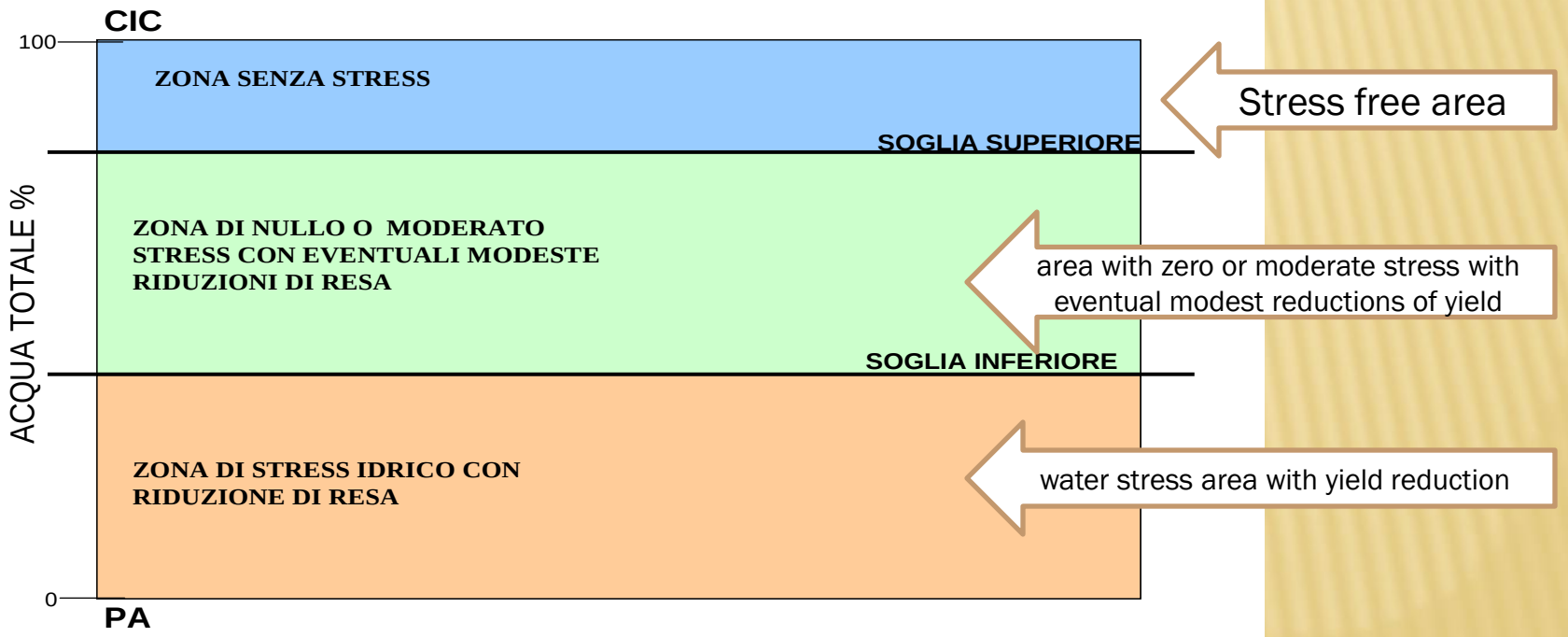
WATER BALANCE

The IrriFrame model operates a Water Balance in the ground. It considers the root zone as a tank receiving inlet water (rain, irrigation, capillary rises) and radical root outlets (rafting, evapotranspiration, deep percolation)

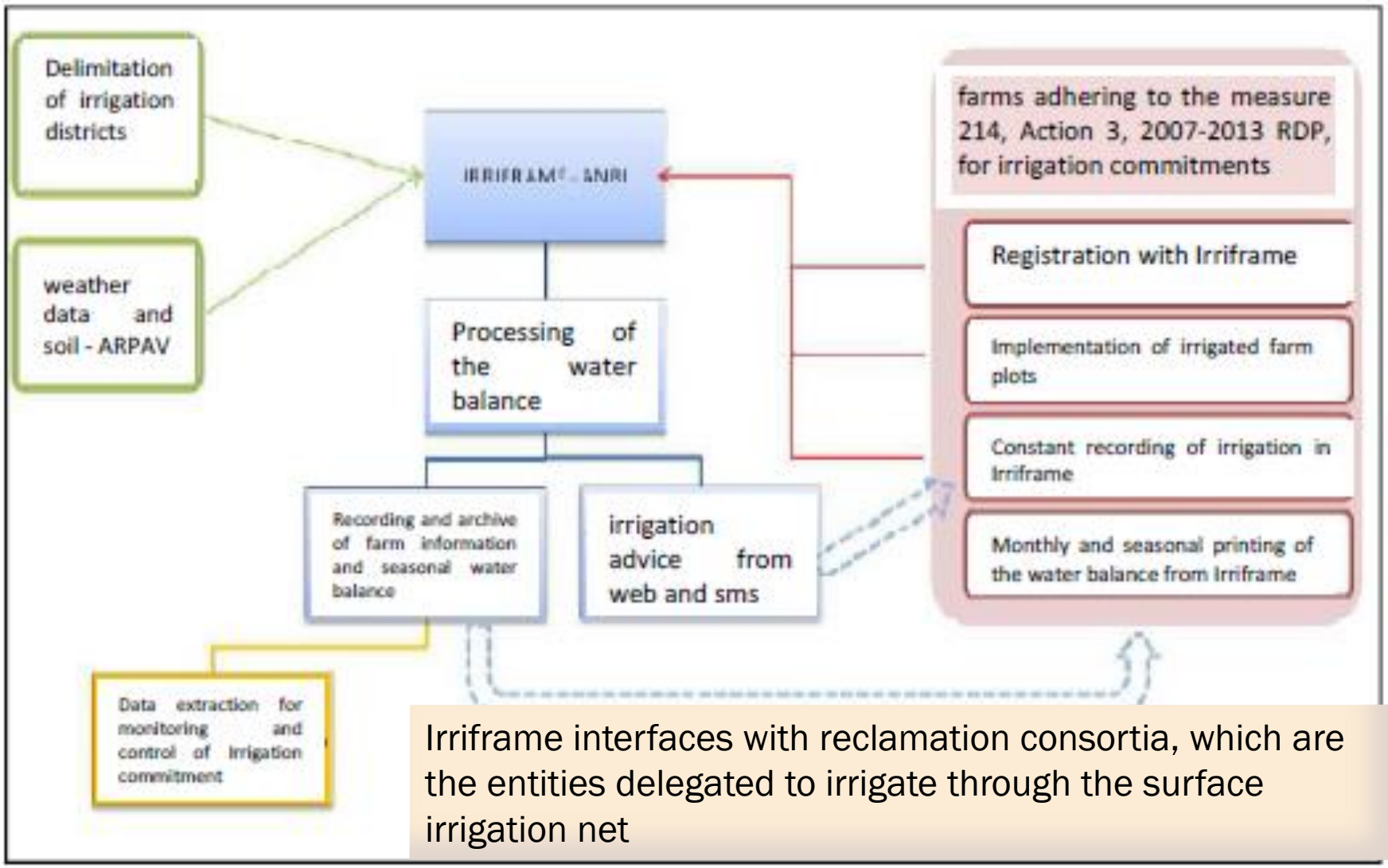


CALCULATION OF THE IRRIGATION VOLUME

When a precise level of soil moisture (Lower Threshold) is reached, it is recommended to irrigate with a precise volume that will restore the optimum conditions (Upper Threshold)



214-i ACTION 3 : Architecture of the Irriframe system, which provided irrigation advice in alternatives 1, 2, 2bis



Irriframe interfaces with reclamation consortia, which are the entities delegated to irrigate through the surface irrigation net

10.1.2 - IRRIGATION COMMITMENTS (1)

Concerned crops: Corn, soybean, beetroot and tobacco

•Compulsively subscribe annually to the web system for calculating the irrigation balance, in each pledge to commit

•equip plots with irrigation sprinkler or drip irrigation

•Implementing the irrigation advice proposed for each crop

•Print monthly and keep the log processed with the software

•At the end of the year, all logs are downloaded through the farm code key. They are transmitted to the paying agency which checks the correspondence between the data in the register and what , in the case of on-the-spot checks, is indicated by the counter placed by the farmer on the irrigation system

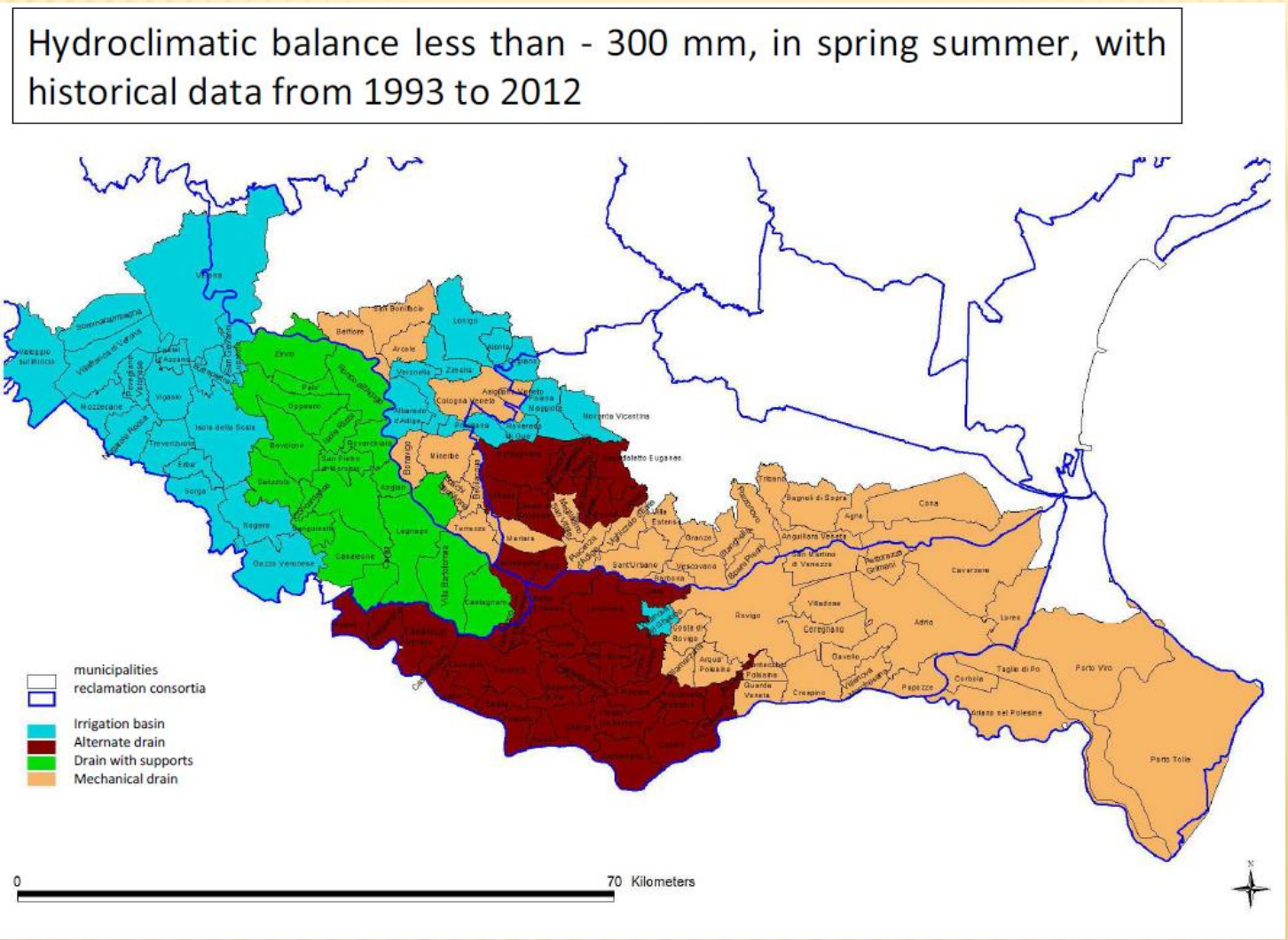
10.1.2 - IRRIGATION COMMITMENTS (2)

- Take care of irrigation operations to prevent malfunctions in the distribution network
- In micro-irrigation and fertirrigation, implement the drafting, maintenance, removal of dripping sleeves, as well as the purging and cleaning of the filters

- In micro-irrigation and fertirrigation, implement the drafting, maintenance, removal of dripping sleeves, as well as the purging and cleaning of the filters

10.1.2 - NEW SELECTION CRITERIA

Hydroclimatic balance less than - 300 mm, in spring summer, with historical data from 1993 to 2012



A proposal for new selection criteria has been advanced. It is given a score based on localization in regional areas with negative hydriclimatic balance and based on the type of drainage

Steps needed for proper activation in irrigation measure

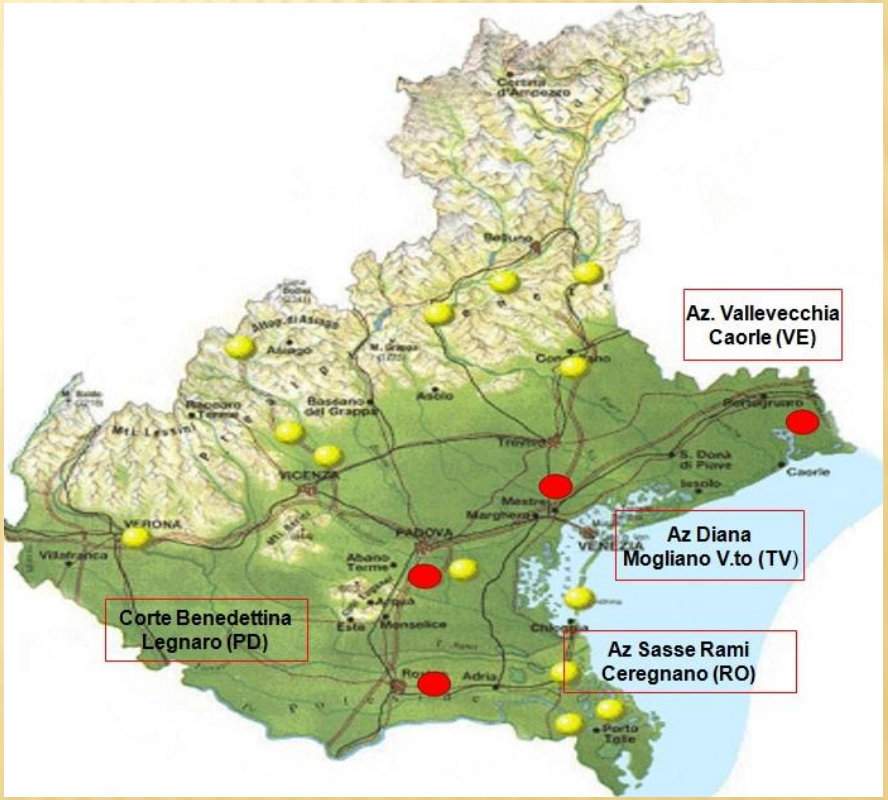
1. Sending seasonal ARPAV weather reports via email
2. Provide a land sampling service for analysis (Veneto Agricoltura)
3. Reporting to the beneficiaries of the failures / omissions revealed in the course of the season (according to ANBI-Veneto)

(1) STRENGTHS AND WEAKNESSES OF AGRICULTURAL AND ENVIRONMENTAL COMMITMENTS ABOUT NO TILLAGE AND REDUCTION OF FERTILIZERS AND IRRIGATION

These are two very complex and completely innovative measures.
For both traceability on 100% of farmers adhering through web log is provided throughout the season.
The most significant challenges have been:

NO TILLAGE COMMITMENTS

As far as conservative agriculture is concerned, technical guidance has been given to the beneficiaries through the work of Veneto Agricultura. The protocols of open farms allowed farmers to know directly all the most salient aspects of this method and possible solutions to the encountered criticalities.



(2) STRENGTHS AND WEAKNESSES OF AGRICULTURAL AND ENVIRONMENTAL COMMITMENTS ABOUT NO TILLAGE AND REDUCTION OF FERTILIZERS AND IRRIGATION

REDUCTION OF FERTILIZERS AND IRRIGATION

A key role has been played by **tobacco producer organizations**, making it possible to better know the commitments and how to implement them on the field.

ANBI-Veneto (Association of reclamation consortia) continued to provide assistance during the irrigated season to answer farmers' questions.

In addition, a **warning system** was activated that allowed the beneficiaries to notice the obligations, such as the activation and closing of the web log, which had to correspond to the sowing and harvesting of the main crop.

….AND THANKS FOR YOUR KIND ATTENTION

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