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# *Selection of control zones in IT*

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*MARS PAC Annual conference 2007, Madrid 12th – 14th Nov 2007*

*AGEA*

For each of the around 8,000 IT municipalities, the following risk criteria were considered

(art. 32, Reg. EC 796/04):

### **Amount of aid**

- z Value of Single Payment Scheme (SPS) entitlements requested in 2006, summed at municipal level
- z Positive factor: the higher the amount, the higher the risk

## Average size of declared (single crop) parcel

- z for each municipality, the average size of the declared single crop parcels was calculated
- z Negative factor: the smaller the average parcel size, the higher the risk

## Number of years since the last check

- z For each municipality, the last year of OTS checks was considered
- z Negative factor: the higher the number of years since the last checks, the higher the risk
- z For municipalities checked the same year, the total declared area was taken into account: the greater the area, the higher the risk

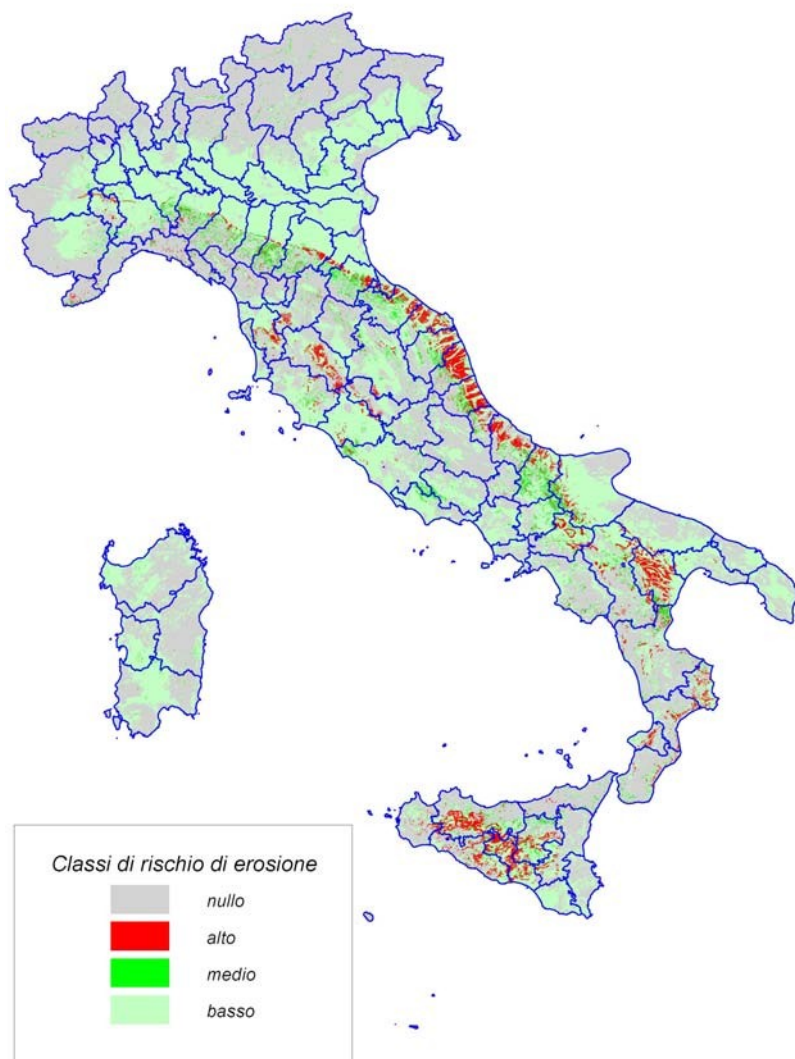
## Results of OTS checks from the previous years

- z For each municipality, the total area not determined during the last OTS checks was calculated
- z Positive factor: the greater the area not determined, the higher the risk

All the provinces (and related municipalities)  
were checked in the last 10 years

## Additional risk criteria related to Cross-Compliance Risk based on the GAEC risk map created by AGEA in 2006 with:

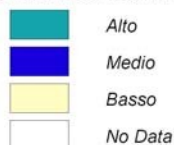
- Area of olive grove at municipal level
- Pasture area at municipal level
- Nitrates vulnerability areas (ZVN) at municipal level
- Natura 2000 (*SIC and ZPS*) distributed over agricultural land use classes
- Water stagnation risk zones at municipal level
- Erosion and landslide risk on agricultural areas: risk classes % at municipal level
- Risk level of burnt stubble or residual vegetation, based on multi-annual HR data, at provincial level



Landslide and erosion risk final map (**high-medium-low**) intersected with national arable land layer



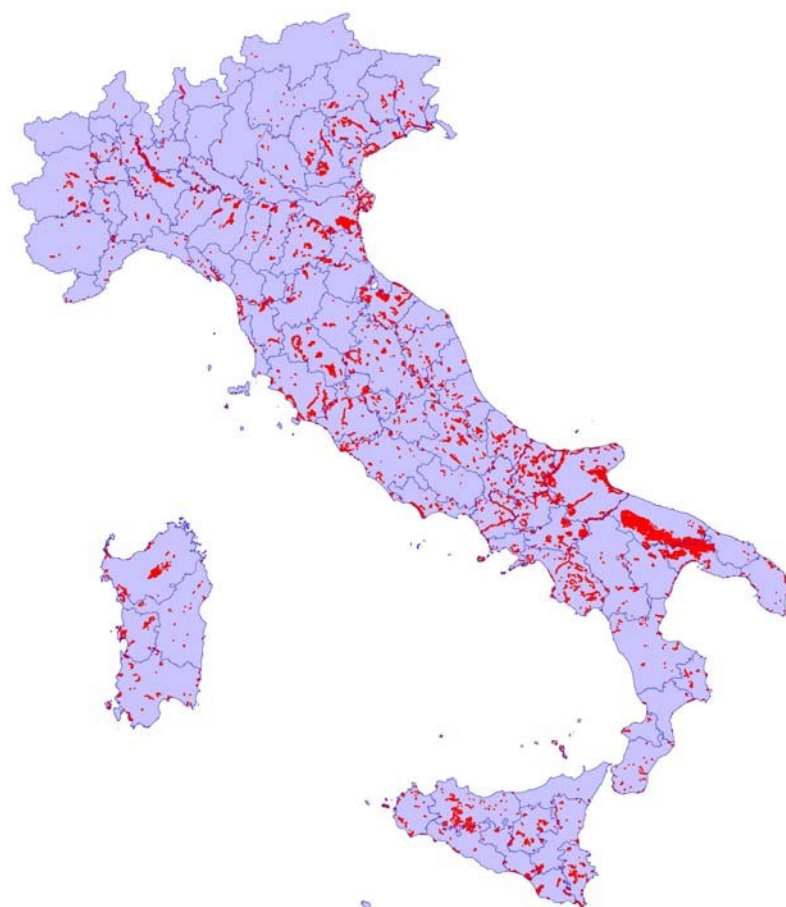
Mappa del rischio di ristagno



Risk of water stagnation **High** – **Medium** – **Low** in agricultural areas through the intersection of 3 layers:

- permeability
- low slope classes
- arable lands

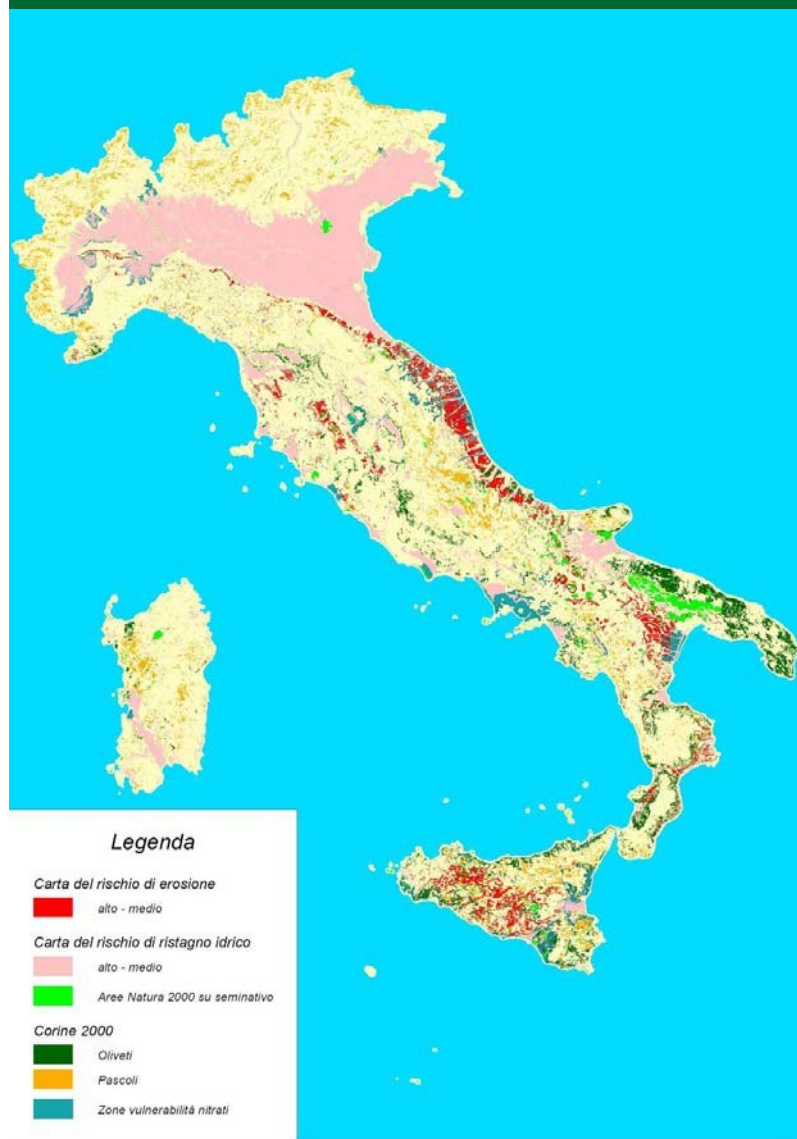




Distribuzione aree Natura 2000 su aree a seminativo

 Aree Natura 2000

Natura 2000 zones  
intersected with the national  
arable land layer  
SMR n°1, 5



Summary of Italian GAEC risk map AGEA aimed at:

- targeting the remote sensing zones on specific risk areas;
- GAEC risk analysis for the annual sample selection

## Risk index method applied, at municipal level

- ④ For each Italian municipality, a risk index was assigned to each of the above mentioned criteria
- ④ The overall risk index was obtained through the following:

$$\Sigma \text{POS}_i * \text{WEIGHT}_i$$

where

POS<sub>i</sub> = risk position of a municipality for a given factor (i) within the national classification of municipalities (1-8,000)

WEIGHT<sub>i</sub> = weight of risk factor (i)

Risk criteria	Weight
④ Average size of declared crop parcels (non cadastral)	10%
④ Previous years check results	20%
④ Value of applications (titles)	20%
④ Last check annuity	15%
④ Municipal olive grove area	5%
④ Municipal pastures area	5%
④ Municipal Nitrates area	5%
④ Natura 2000 (SIC + ZPS) municipal area	5%
④ Water stagnation risk municipal area	5%
④ Erosion and landslide risk municipal area	5%
④ Burning risk index at provincial level	5%
<b>TOTAL</b>	<b>100%</b>

## From municipal to Province level

- ④ The final result is an overall risk score for each of the 8,000 Italian municipalities
- ④ The risk score of each of the 103 Italian provinces is then calculated through the average of the risk scores of the municipalities falling within the province

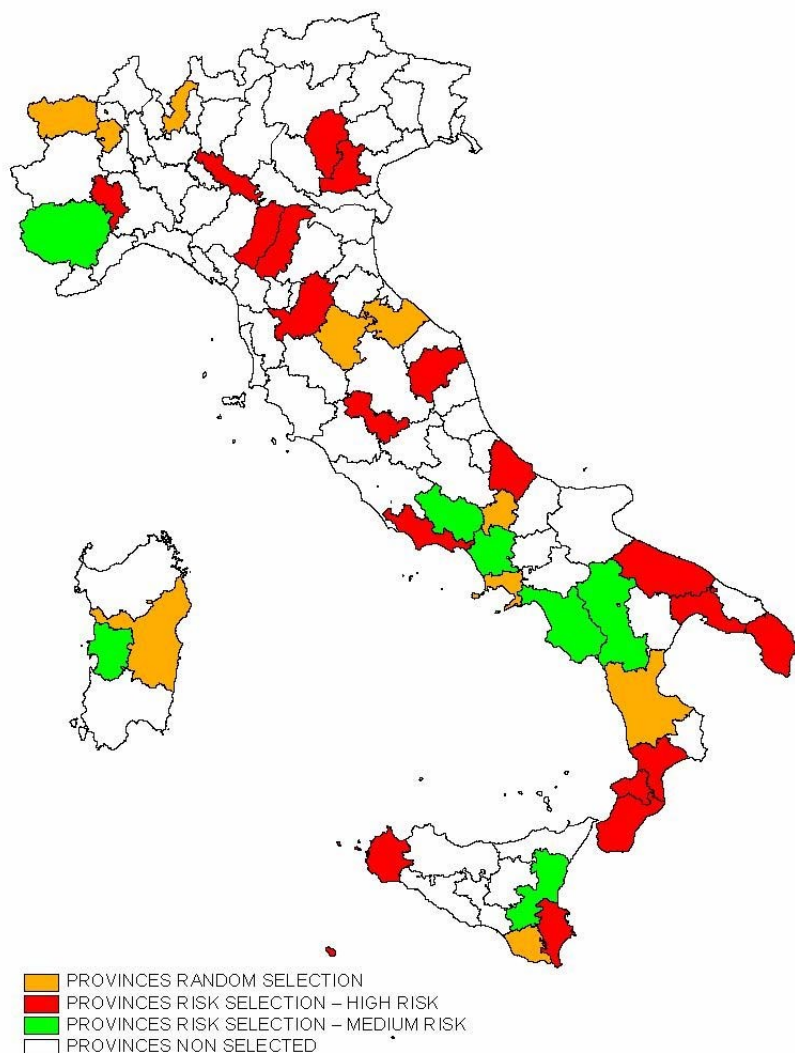
## Method applied for the selection of 36 provinces, matching with the 36 CwRS zones

### Risk selection

- ④ 19 provinces were selected manually from the 36 provinces with the highest score of risk index
- ④ 7 provinces were selected manually from the 36 provinces with the next highest risk index, with a view to having an homogeneous distribution of zones over the entire national territory.

### Random selection

- ④ 10 provinces were selected randomly with a view to having an homogeneous distribution of zones



2007 campaign

Final overview of the  
36 selected provinces

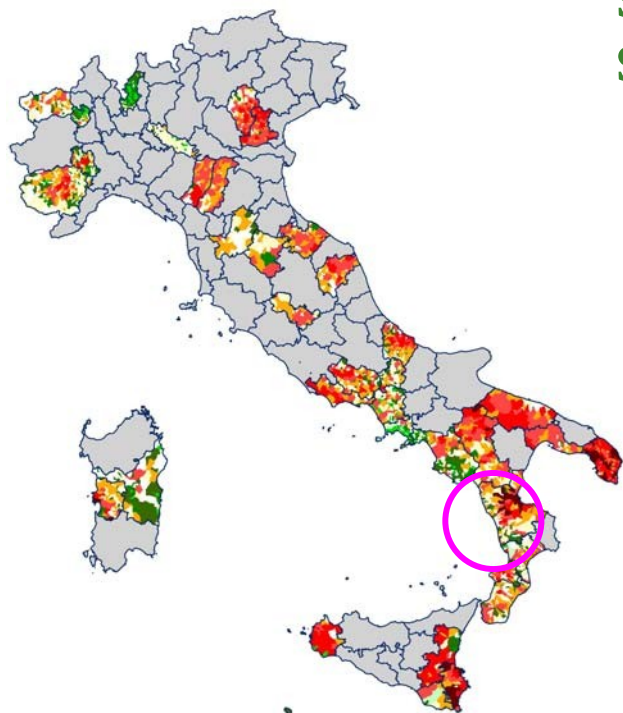
## Method applied for the sample areas selection, at municipal level

- ④ Within each of the 26 provinces with “risk selection”, the final sample zones were selected by choosing the group of municipalities with the highest average risk score
- ④ Within each of the 10 provinces with “random selection”, the final sample zones were selected by choosing the group of municipalities with the highest number of applications
- ④ In both cases the following technical constraints were taken into account :
  - ⑨ Municipalities should be adjacent and reach a total area of 400-500 Km<sup>2</sup>
  - ⑨ Shape of group suitable with the best satellite acquisition tracks (e.g. N-S alignment)
  - ⑨ Municipalities with the major number of applications presented in the previous year

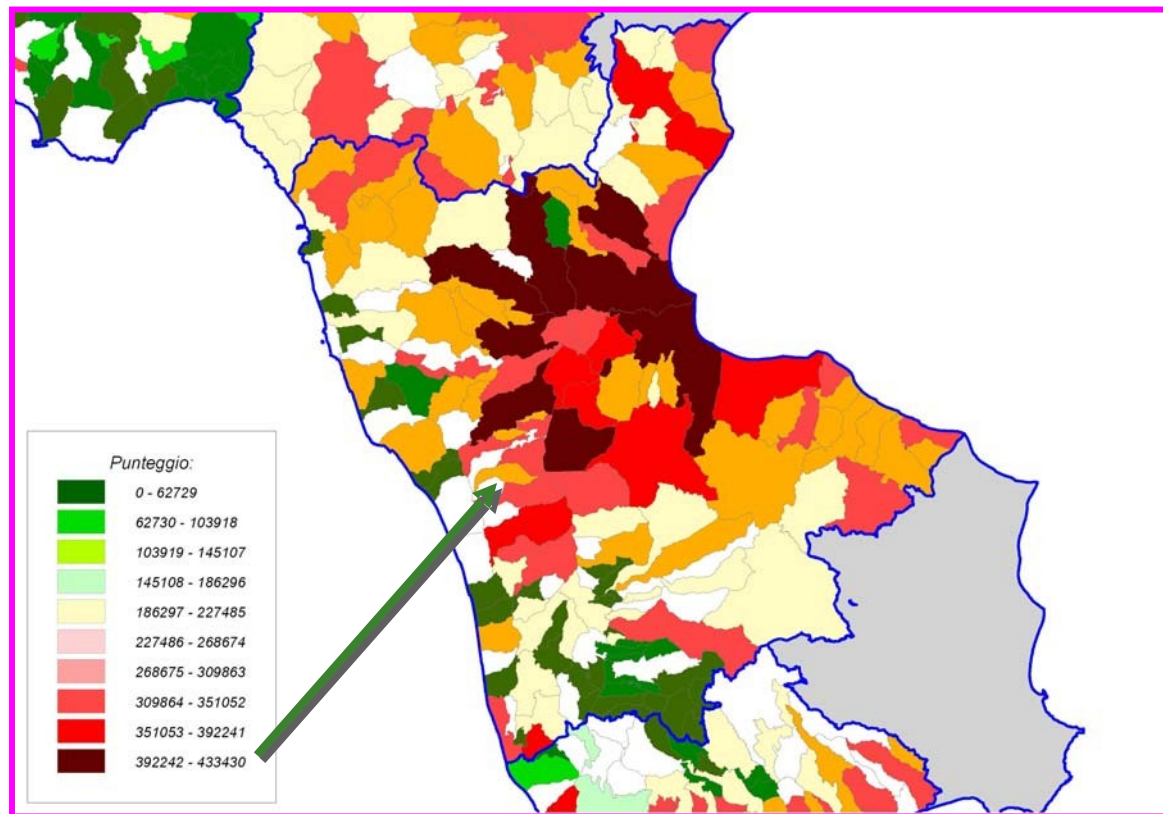


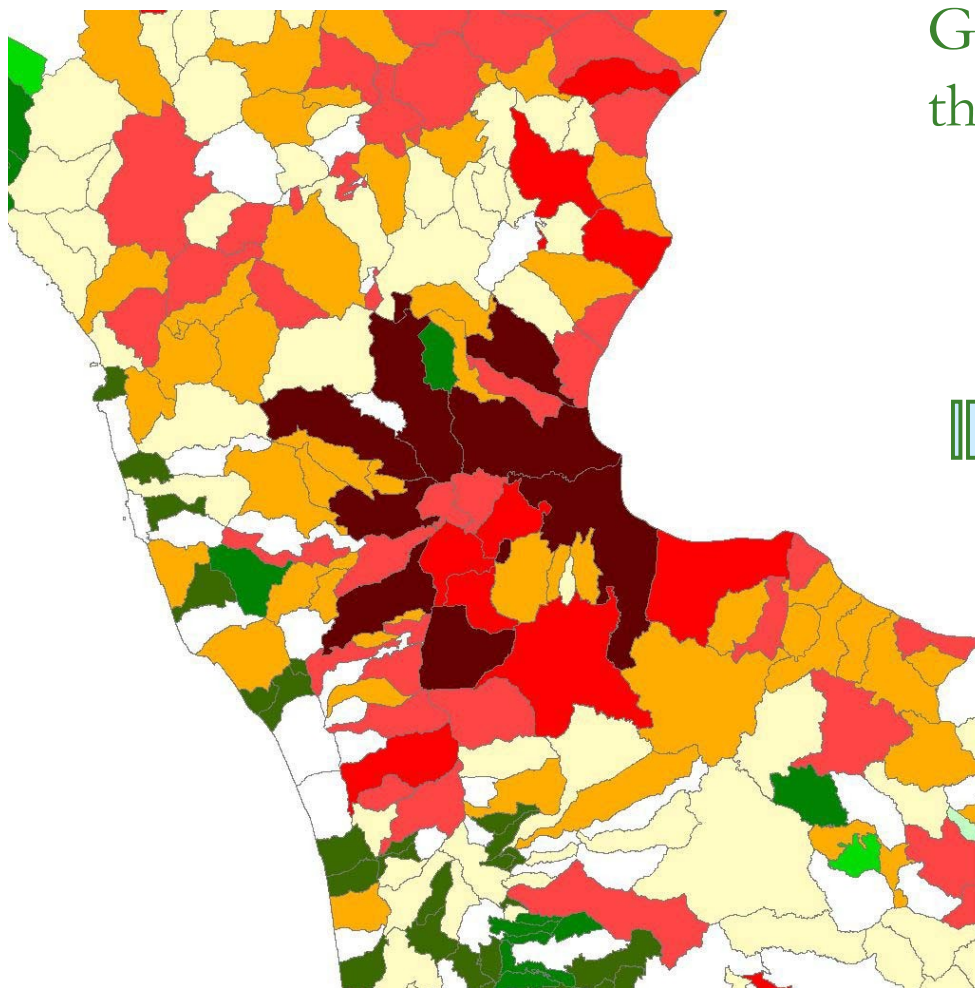
## Starting from provinces: Sample areas selection, at municipal level

Cosenza province example: classification of the municipalities, based on the Risk score (weighted distribution of indexes)

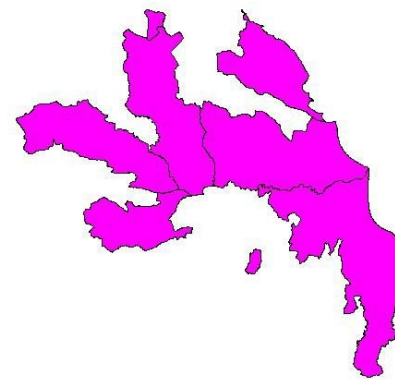
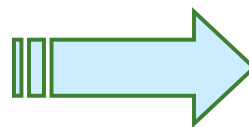


Reddish colour  
municipalities describe  
higher score of the risk  
analysis



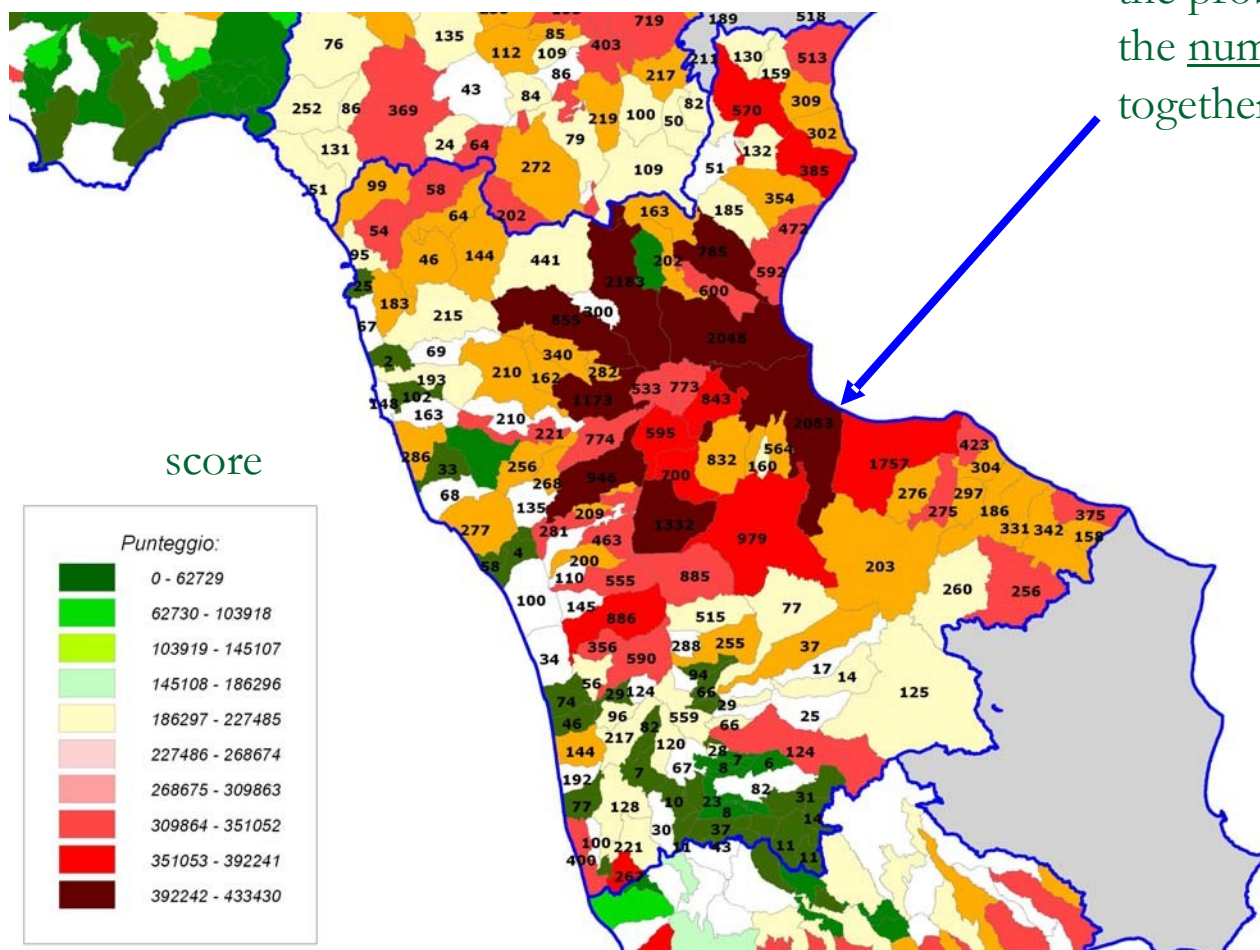


Groups of municipalities within  
the selected provinces



Using only the highest score, the sample  
shape does not appear suitable for the  
VHR satellite acquisition ...

...The next criterion for solving the problem is to take account of the number of applications together with the risk score

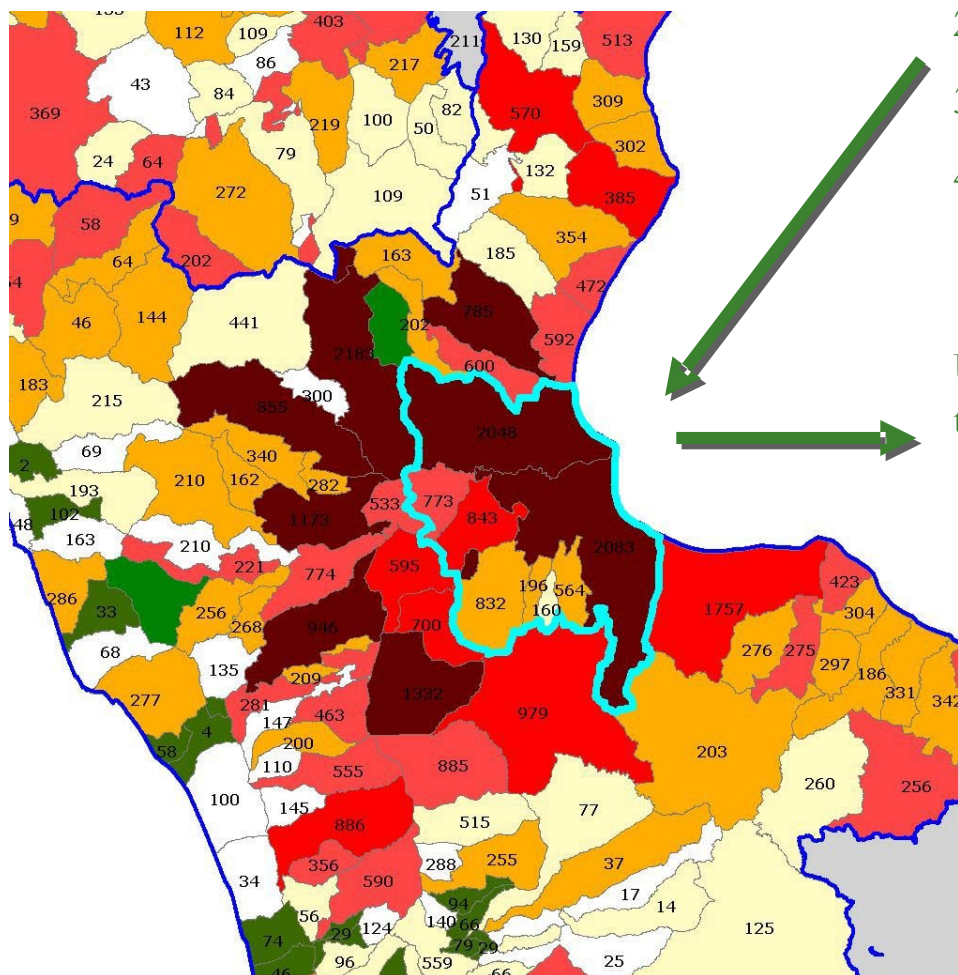




Additional parameters :

1. Average area around 450 kmq
2. North – south possible alignment
3. Regular shape
4. Group of complete municipalities

Using the above criteria, for Cosenza province the following municipalities were grouped:



NOME COMUNE	SUPERFICE (km <sup>2</sup> )	NUMERO AZIENDE
CASSANO ALLO IONIO	158,87	2.048
CORIGLIANO CALABRO	192,02	2.083
SAN COSMO ALBANESE	11,57	196
SAN DEMETRIO CORONE	59,31	832
SAN GIORGIO ALBANESE	22,69	564
SPEZZANO ALBANESE	32,26	773
TERRANOVA DA SIBARI	43,46	843
VACCARIZZO ALBANESE	8,53	160
	528,71	7.499

Area

N° Applications



Final sample distribution of neighbouring municipalities from the starting 36 selected provinces

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**Provincia di Modena:**

NOME COMUNE	SUPERFICE (kmq)	NUMERO AZIENDE
CAMPOGALLIANO	35,87	142
FIORANO MODENESE	26,27	46
FORMIGINE	46,33	141
MODENA	182,82	453
PRIGNANO SULLA SECCHIA	79,55	144
SASSUOLO	38,65	58
	409,49	984

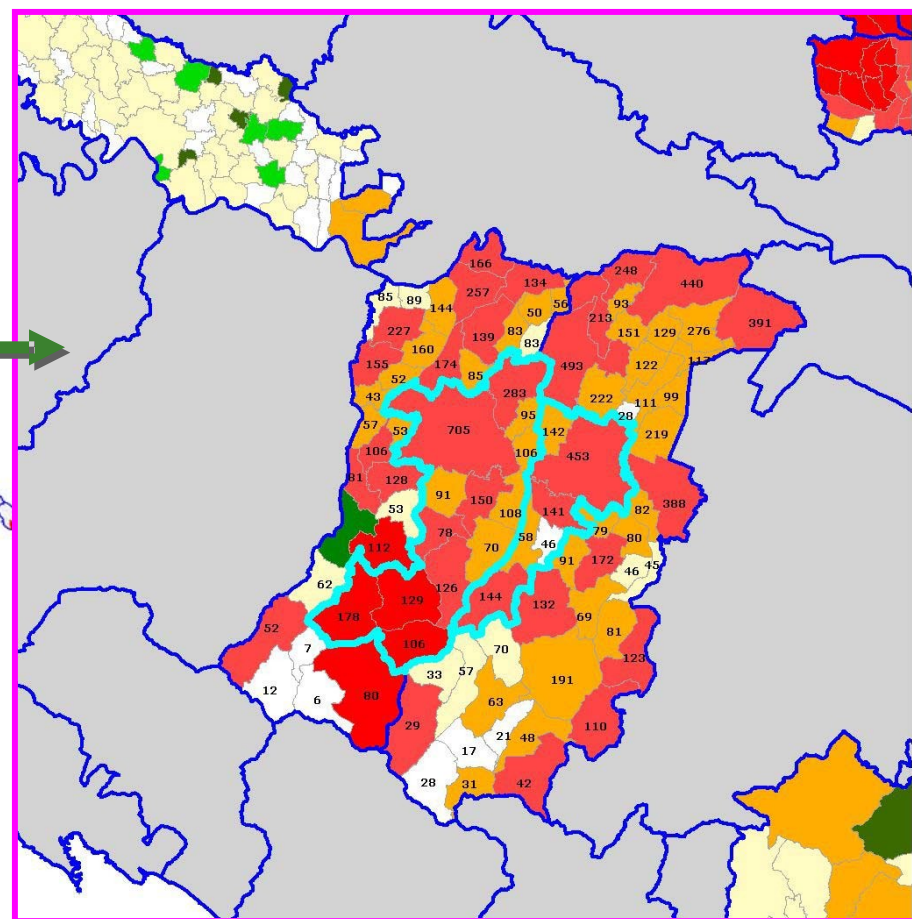
**MODENA** province  
**REGGIO EMILIA** province examples

**Provincia di Reggio Emilia:**

NOME COMUNE	SUPERFICE (kmq)	NUMERO AZIENDE
CASTELLARANO	58,06	70
VIANO	44,97	78
ALBINEA	43,89	91
SAN MARTINO IN RIO	22,76	95
RUBIERA	25,33	106
TOANO	67,25	106
CASALGRANDE	37,71	108
BAISO	75,55	126
CARPINETI	89,56	129
SCANDIANO	50,05	150
CASTELNOVO NE' MONT	96,68	178
CORREGGIO	77,33	283
REGGIO EMILIA	230,71	705
	919,85	2.225



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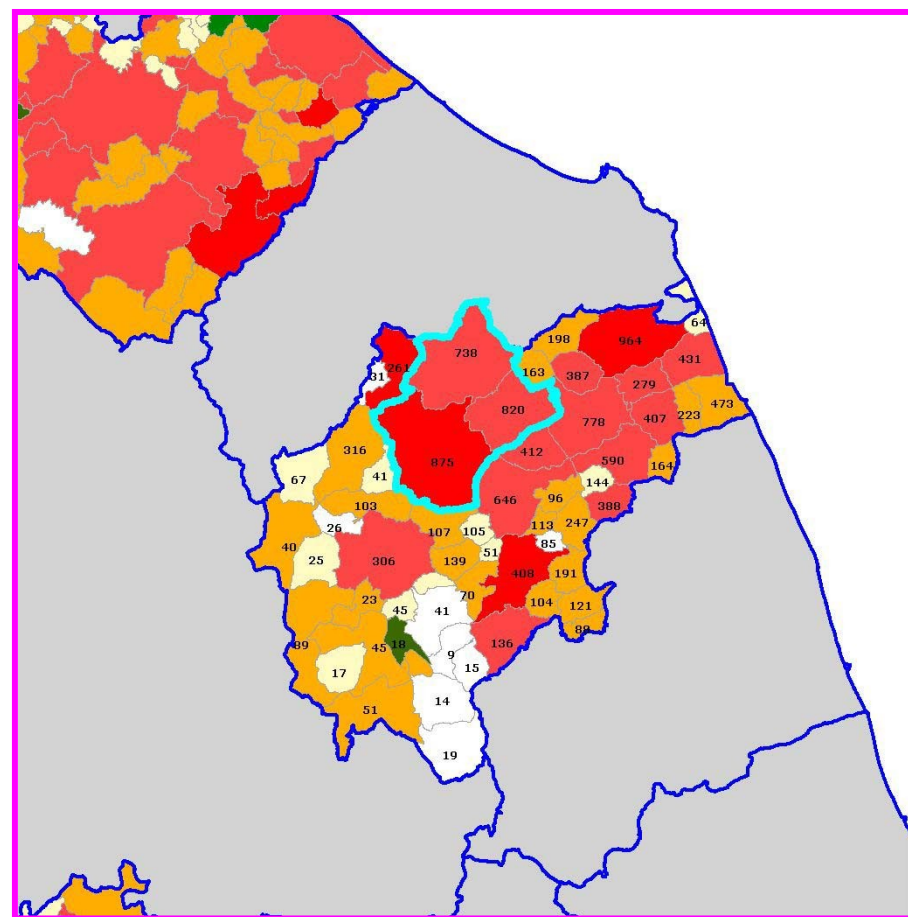
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NOME COMUNE	SUPERFICE (kmq)	NUMERO AZIENDE
CINGOLI	148,20	738
SAN SEVERINO MARCHE	194,25	875
TREIA	93,53	820
	435,98	2.433

## MACERATA province examples



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## Sample applications selection methodology

### Determination of risk factors

- ④ As the 26 selected risk based zones contained more claims (110.553) than the targeted number (60.000), an additional risk analysis was performed to select claims inside these zones
- ④ The random OTS checks sample of the 2005 campaign was used to determine the factors that are correlated with inaccurate claims
- ④ The Classification And Regression Tree (CART) method was used for this exercise (with the technical support of JRC, cf. *“Assessment of the effectiveness of risk analysis”* by Hervé Kerdiles)



# Application of CART

- ④ The Objective was to identify the types of claims for which the aid not paid (after OTS check) is the highest
- ④ 9 classes of claims were identified with CART
- ④ For each class, a sampling rate was assigned taking account of
  - ⑨ the distribution of the classes inside the 2005 1% random sample
  - ⑨ the estimated % of claims falling within the CwRS zones (10%)