



# URBAN GEOMatics for Bulk Information Generation, Data Assessment and Technology Awareness

► Contribution by ISPRA - 23/07/2019

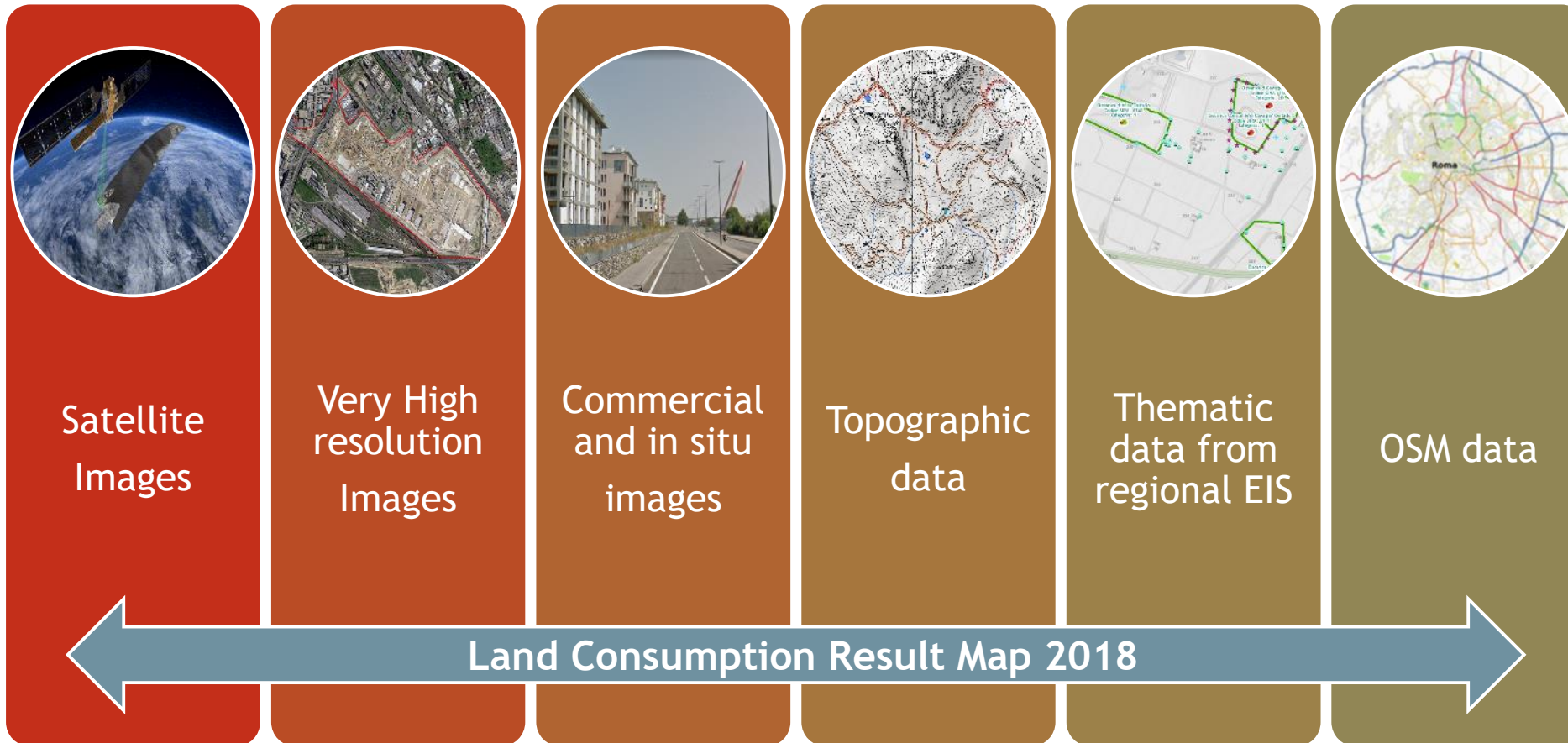
PRIN PROJECT: *URBAN GEOMatics for Bulk Information Generation, Data Assessment and Technology Awareness*



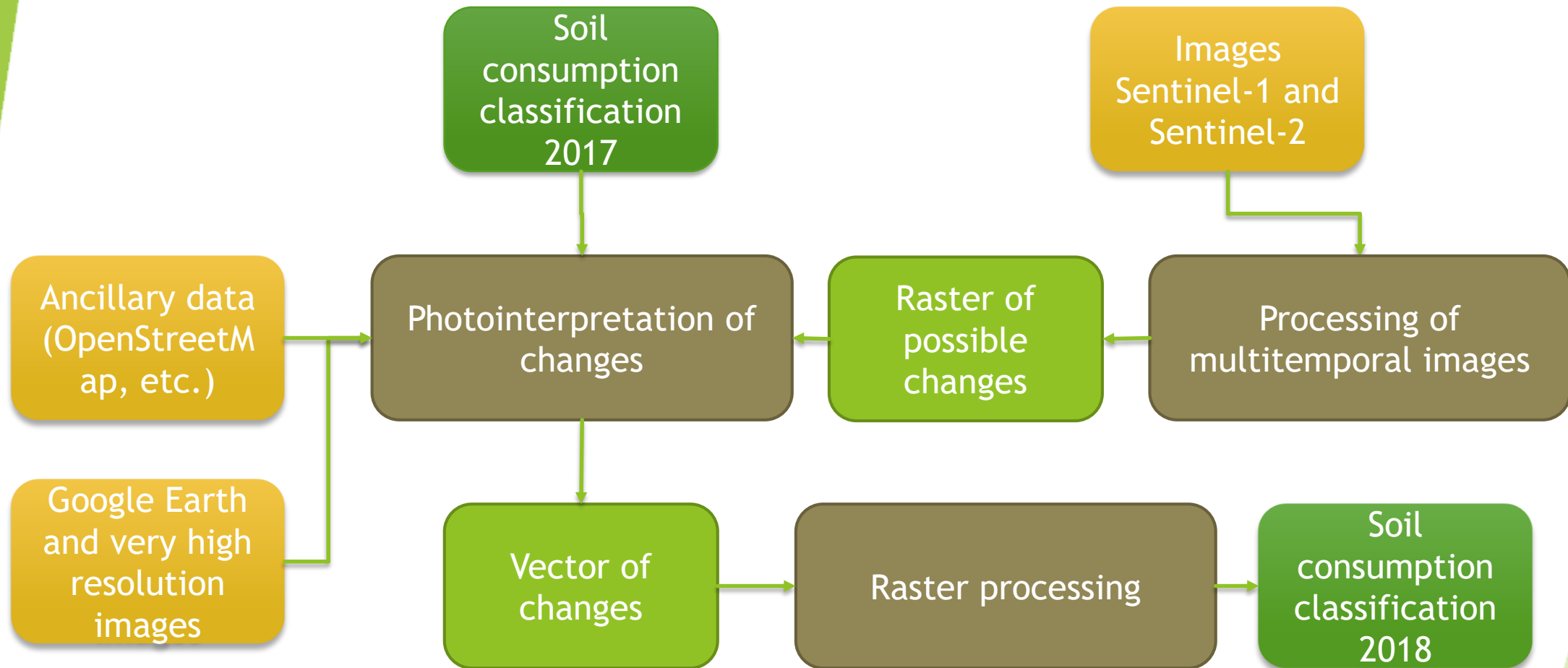
MINISTERO DELL'ISTRUZIONE DELL'UNIVERSITA' E DELLA RICERCA



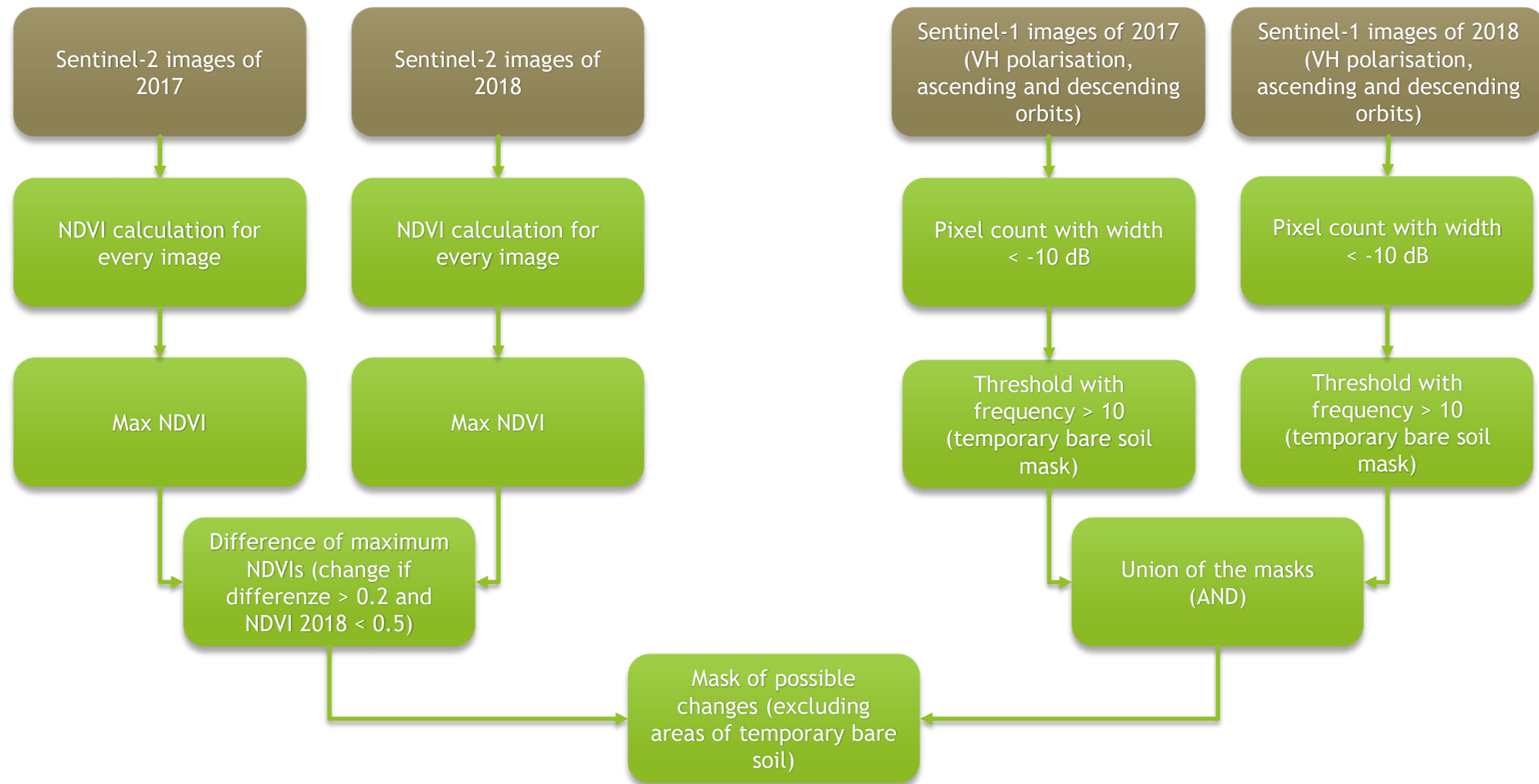
# Available data



# Processing and update of soil consumption map



# Processing and update of soil consumption map



# Change Map: Integration results



Real Change



Omission



Commission

# Change Map: Integration results

Integration of Multispectral and SAR data for change detection.



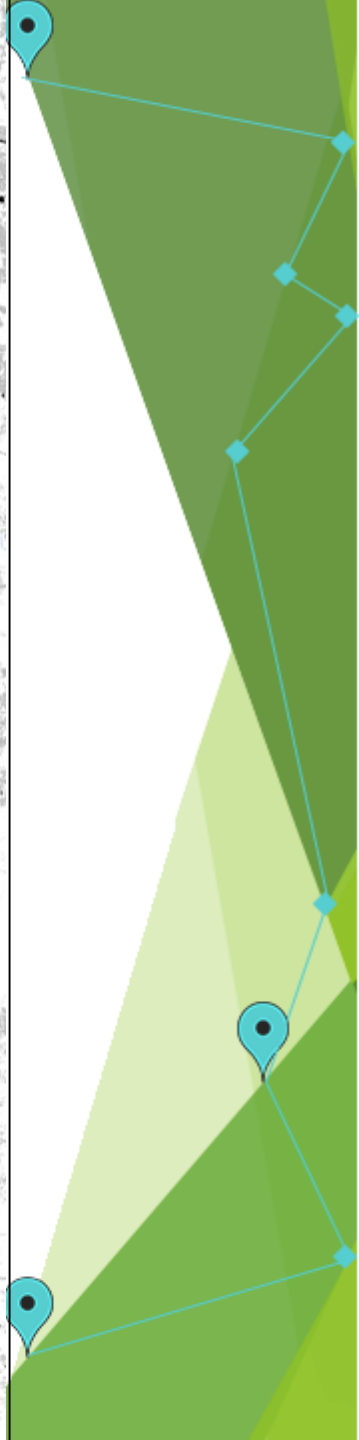
Comparison between mask and photointerpreted changes

# Land consumption classification results





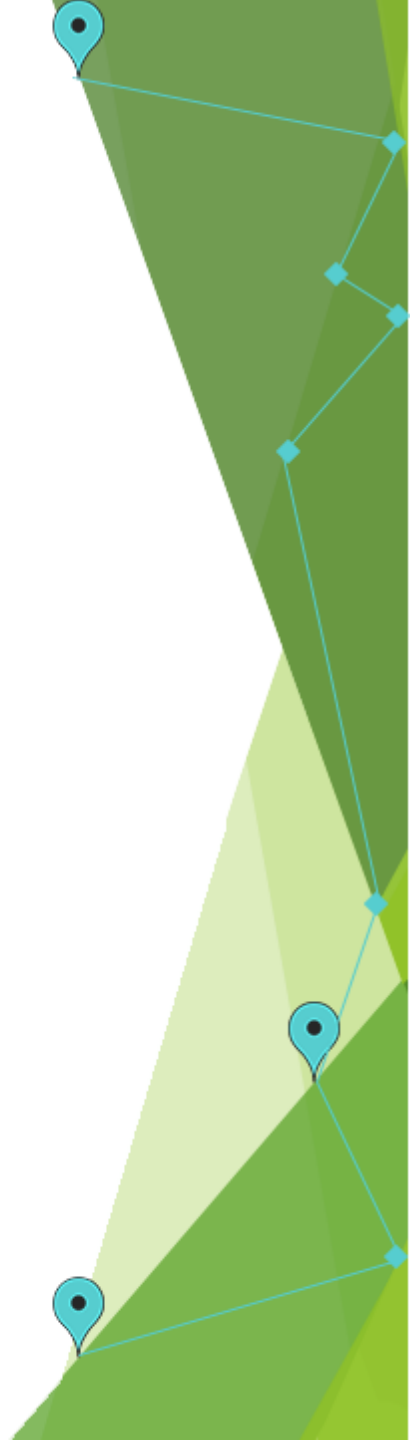
ROME



MILAN



NAPLES



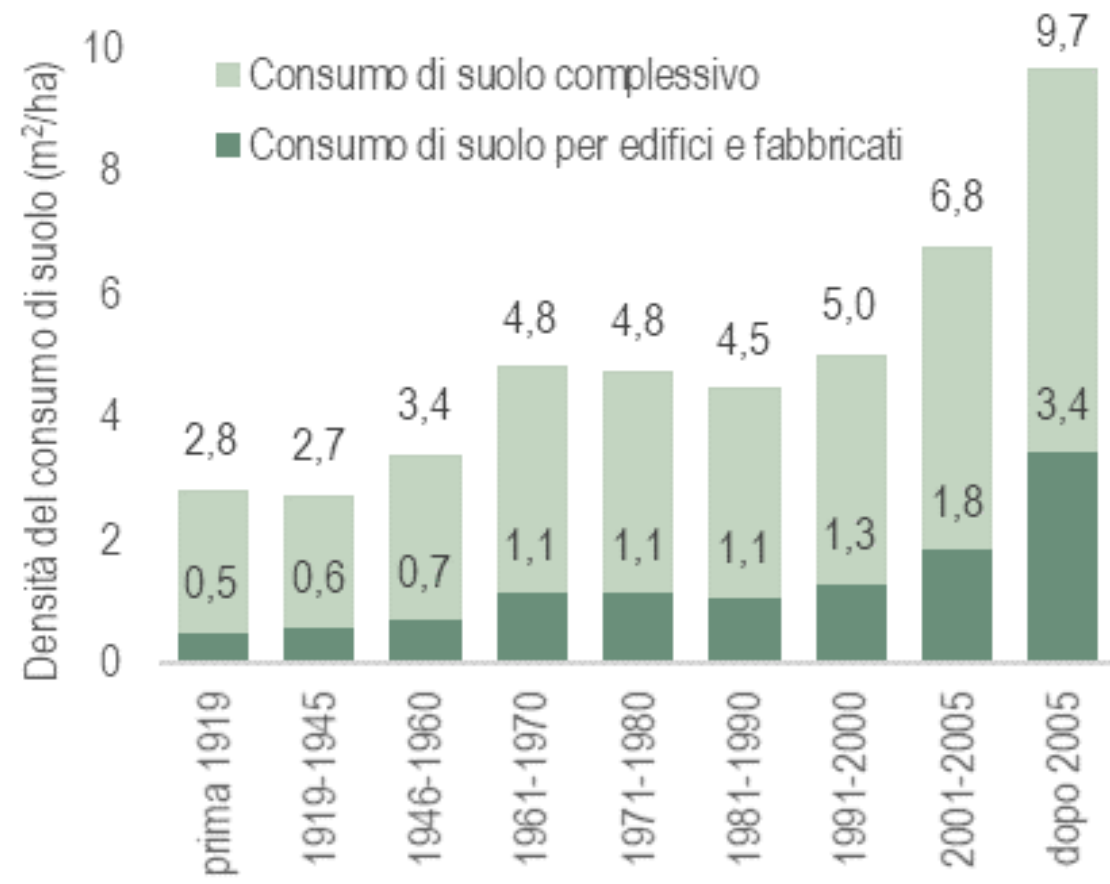
PADUA

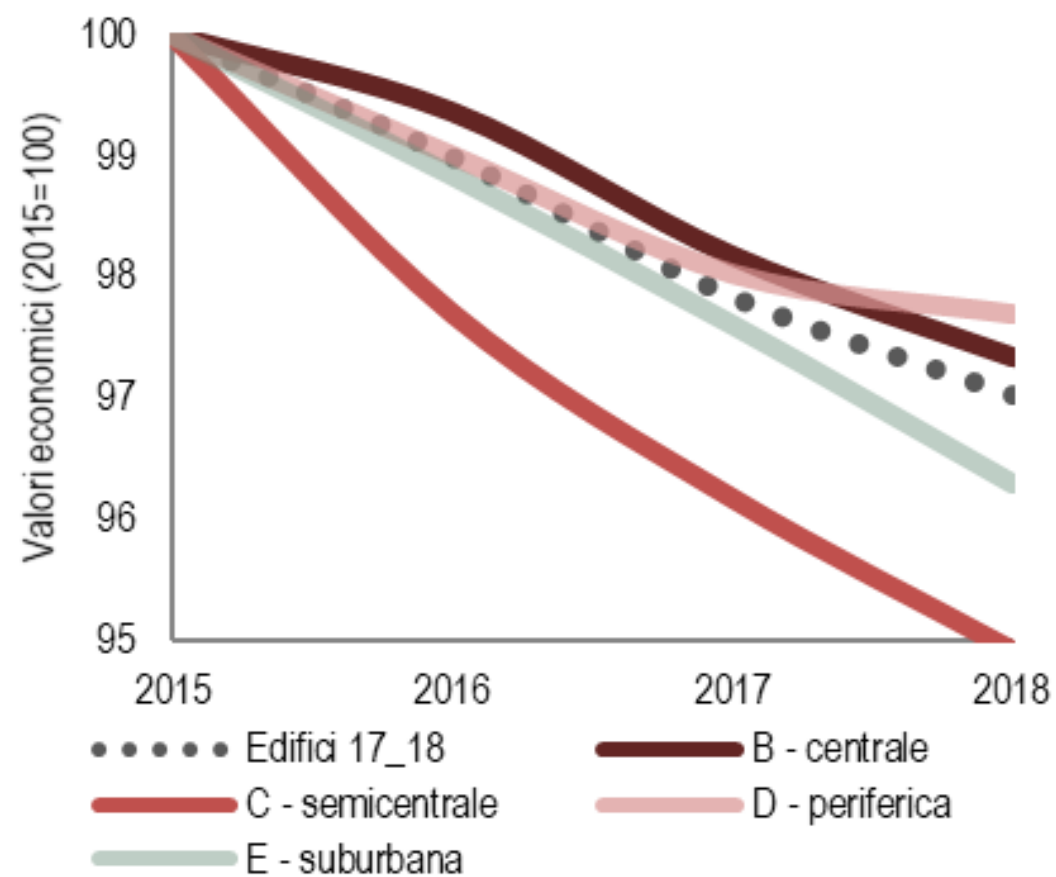
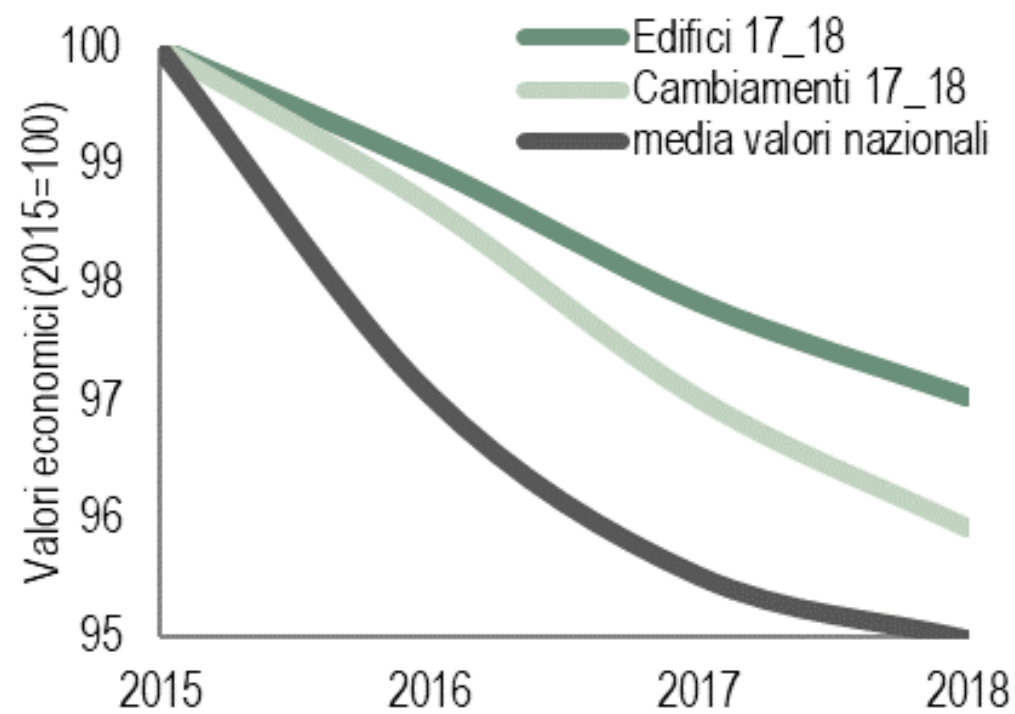


TURIN



Indice di dipendenza	Consumo di suolo 2017-18 (ha)	Consumo di suolo 2017-18 per edifici e fabbricati (ha)	Densità di consumo di suolo 2017-18 (m <sup>2</sup> /ha)
0-25	232	28	1,98
25-50	1.879	264	2,50
50-75	1.712	248	2,37
75-100	192	20	1,36
100-125	182	21	1,51
125-150	19	4	0,88
>150	40	3	1,34





# Land cover classification

## EAGLE Classification system

- Water and Snow
- Grass
- Forest and trees
- Bare soil (abiotic natural)
- Urban (abiotic artificial)



### Multitemporal Image selection

Sentinel-1

Sentinel-2

Pre-processing

Decision Tree

Sentinel-1  
Multitemporal  
Threshold  
setting on  
backscatter

Sentinel-2  
Multitemporal  
Threshold  
setting on  
indexes

Binary mask  
10 m resolution

- $NDVI = \frac{B8 - B4}{B8 + B4}$
- $NDSI = \frac{B11 - B3}{B11 + B3}$
- $NDWI = \frac{B3 - B8}{B3 + B8}$
- $NDCI = \frac{B8 - B11}{B8 + B11}$

# Land cover classification

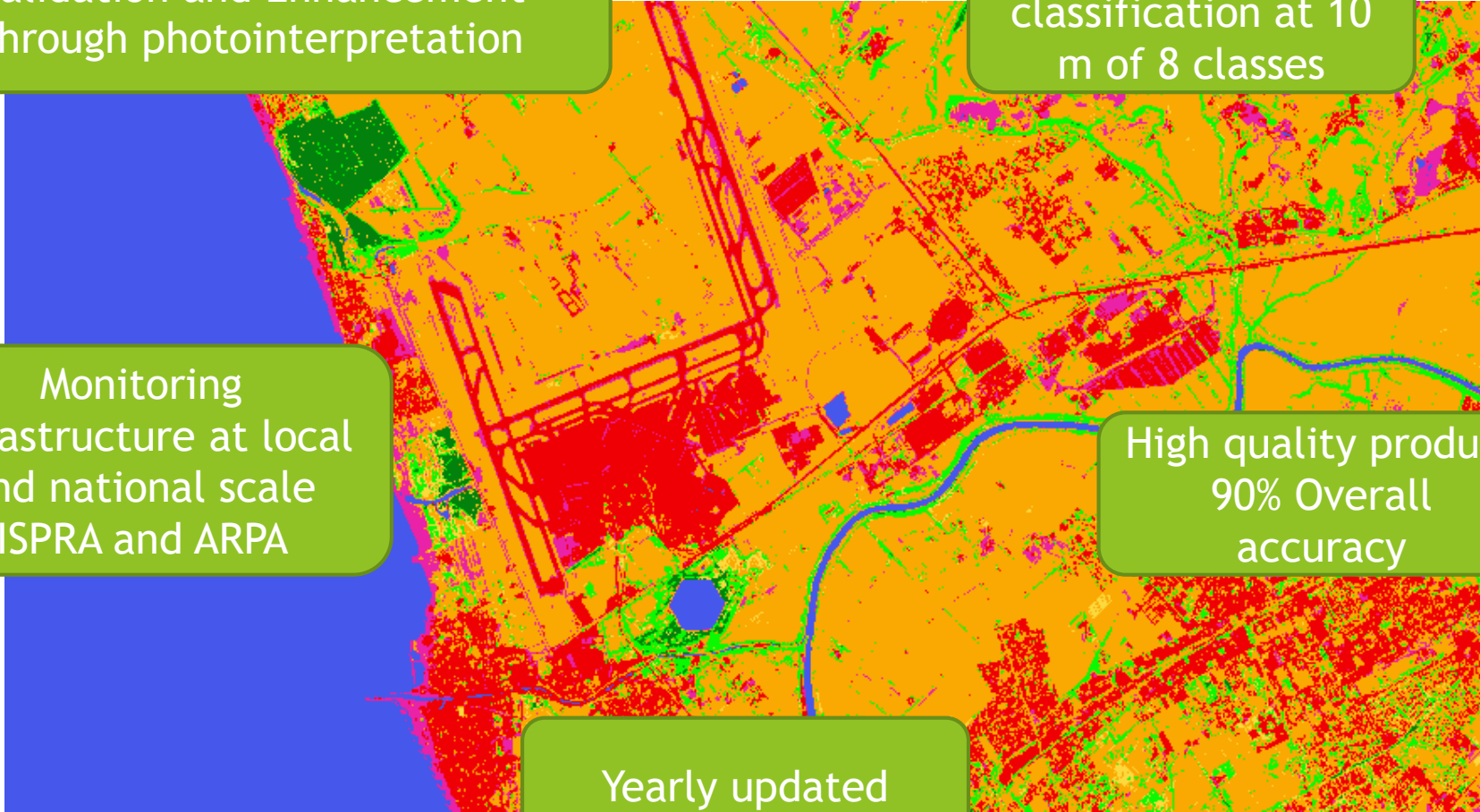
Validation and Enhancement  
through photointerpretation

Land cover  
classification at 10  
m of 8 classes

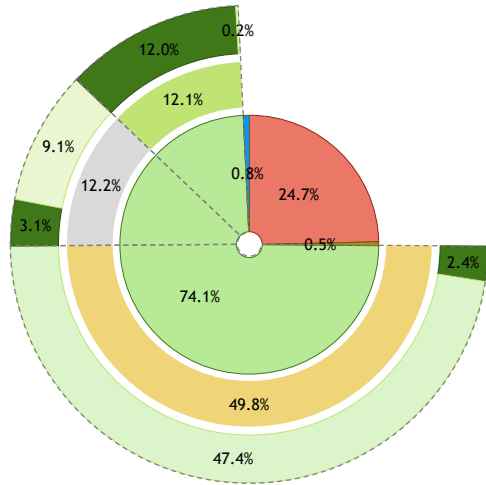
Monitoring  
infrastructure at local  
and national scale  
ISPRA and ARPA

High quality product  
90% Overall  
accuracy

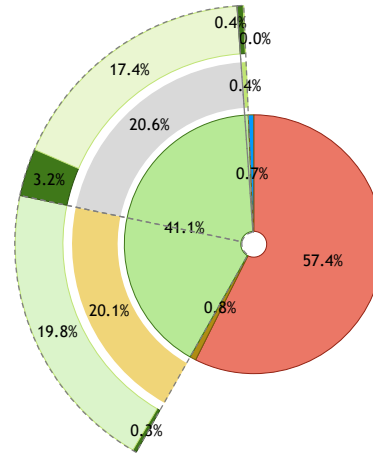
Yearly updated



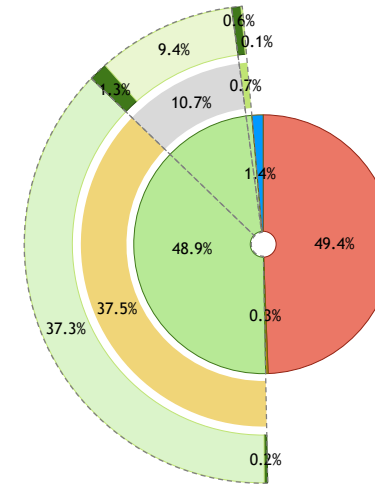
# Land cover classification results



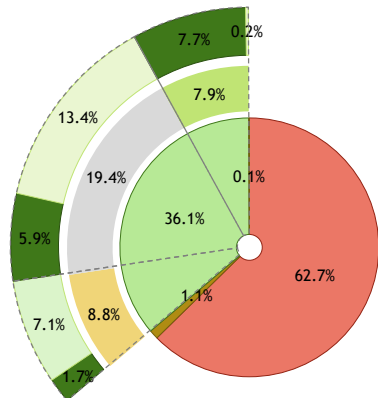
Rome (1.287 km²)



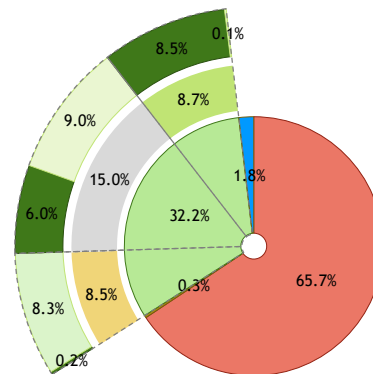
Milan (182 km²)



Padua (93 km²)



Naples (119 km²)



Turin (130 km²)

