



CAP monitoring system in Italy

**Messages from first year of implementation and
perspectives for 2019**

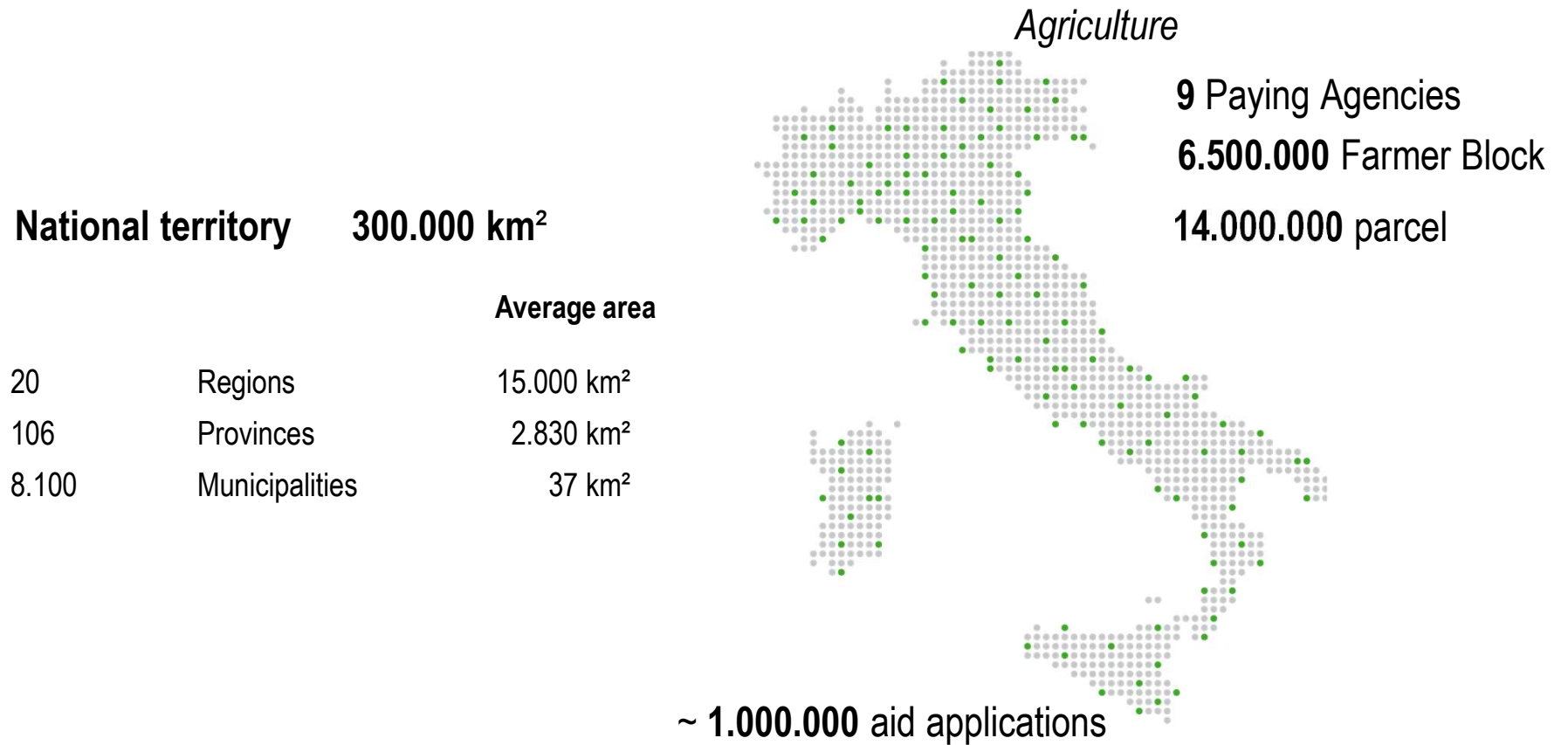
Francesco Sofia AGEA Coordinating body

Valladolid (ES) 10th april 2019

Summary

- AGEA monitoring 2018 Foggia (Puglia region): main tasks and results
- Follow up for inconclusive parcels procedures and issues (back office activities and geotagged photos apps)
- AGEA monitoring 2019: areas, criteria, schemes, possible advantages
- Possible integration of other resources (DIAS, SEN4CAP, ...) in 2019
- Challenges and conclusions

LPIS in Italy

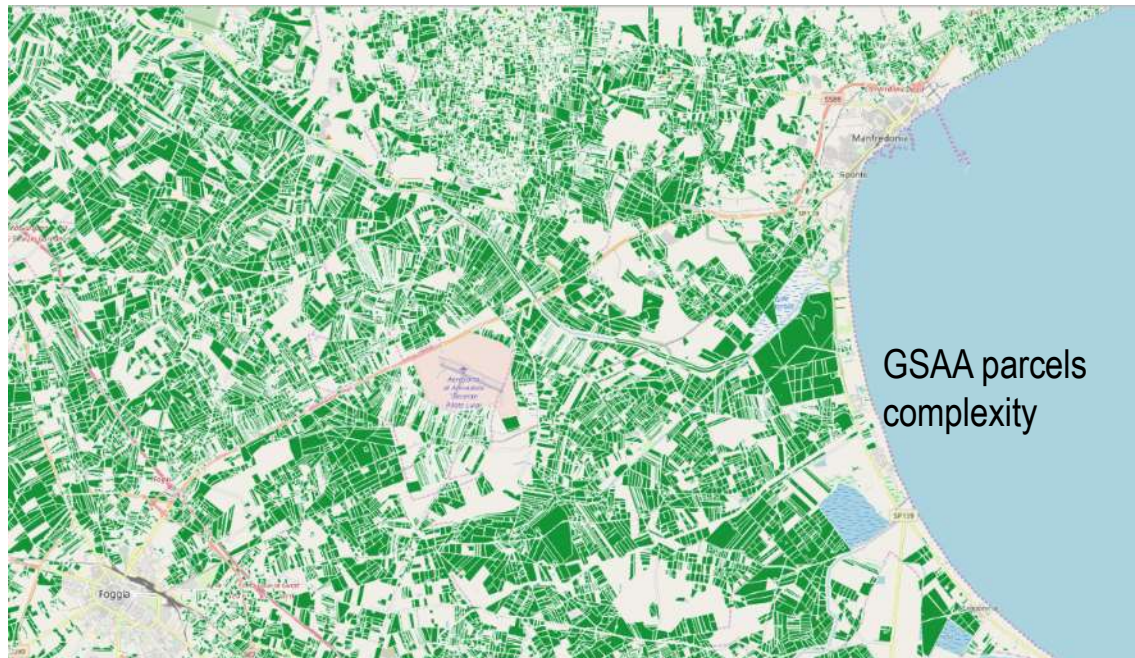


Foggia GSAA GeoSpatial Aid Application 2018

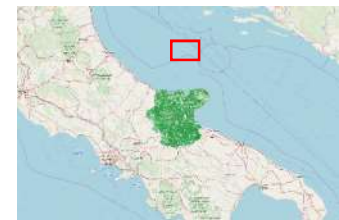
OBJECTIVE – CAP «Monitoring» (under the article 40a of EU R. 809/2014) procedure implementation, based on open satellite data for the generation of markers/scenarios at agricultural parcel level and subsequent farm level actions through a «flags/traffic-light» approach

Final decision to apply monitoring was made in July 2018

Chosen scheme for monitoring system: BPS + SFS



- About **635.000** parcels in 2018 GSAA for Foggia province
- High geometric complexity
- **7,007 skm**, the largest Italian Province



- Declared parcels divided into **14 groups** for which similar analysis rules can be applied => **Feature of Interest FOI**
- FOI: agricultural parcels with similar crops within the same farm *block*, let separated if
 - *With different period of phenology*
 - *With different type and density (UNAR) for permanent crops*
 - *Biological (for follow up only)*
- About 200,000 GSAA parcels are not subject to monitor: (forest, urban, etc)
- For each group, different markers and scenarios have been delineated and considered



3 Sentinel2 granules have been considered

GSAA parcels detail and FOI

GROUP	AGRICULTURE PARCELS	% ON TOTAL CHECKED
Autumn-winter arable land	117432	26.0%
Spring-summer arable land	30280	4.4%
Vegetables and medicinal plants arable	4051	2.0%
Autumn grassland (arable)	67	0.0%
Multiyear grassland (arable)	479	0.1%
Multi-season arable land	1978	0.4%
Lying fallow arable land	36672	8.3%
Generic arable land	10043	2.5%
Permanent crops (generic)	18843	5.2%
Vineyards	32269	9.0%
Olive trees	113566	26.2%
Permanent grassland	11959	2.6%
P. Grassland <i>pro-rata</i> (20%)	8647	1.3%
P. Grassland <i>pro-rata</i> (50%)	70504	11.9%
Other (not under payment requests)	202310	

A complex starting point: the parcels size distribution

49,5% of parcels under 0.2 ha

GROUP	SIZE			TOTAL AGRICULTURE PARCELS	PERCENTAGE DISTRIBUTION			
	< 0.2 ha	0.2-0.5 ha	>0.5 ha		< 0.2 ha	0.2-0.5 ha	>0.5 ha	OVER TOTAL
Autumn-winter arable land	30482	17860	69090	117432	26%	15%	59%	25,7%
Spring-summer arable land	8122	4169	17989	30280	27%	14%	59%	6,6%
Vegetables and medicinal plants arable	1463	722	1866	4051	36%	18%	46%	0,9%
Autumn grassland	10	5	52	67	15%	7%	78%	0,0%
Multiyear grassland	322	57	100	479	67%	12%	21%	0,1%
Multiseason arable land	886	313	779	1978	45%	16%	39%	0,4%
Lying fallow arable land	27017	3489	6166	36672	74%	9%	17%	8,0%
Generic arable land	7021	1010	2012	10043	70%	10%	20%	2,2%
Permanent crops generic	12065	2218	4560	18843	64%	12%	24%	4,1%
Vineyards	14739	5993	11537	32269	46%	18%	36%	7,1%
Olive trees	66266	21898	25402	113566	58%	19%	22%	24,9%
Permanent grassland	5767	1738	4454	11959	63%	14%	23%	2,6%
Pasture pro-rata	4609	1389	2649	8647	53%	16%	31%	1,9%
Pasture pro rata (50%)	47328	9384	13792	70504	67%	13%	20%	15,4%
TOTAL	226097	70245	160448	456790	49,5%	15,4%	35,1%	100%

**Selected and «extracted» markers
time series of around 70 Sentinel 2 on 3 granules
+ Sentinel 1, mainly used for grassland mowing**

- Markers :
 - *Ploughed*: ploughed terrain for seeding
 - *Growth*: parcel with growing vegetation
 - *Vegetation presence*: parcel with vegetation
 - *Harvested*: parcel harvested
 - *Mowed*: grassland mowed
 - *Removed*: grabbing of permanent cultivation, only in some case

**Example of Marker extraction through Sentinel:
ploughing for wheat parcels**



Example for Autumn-winter crops: Ploughing

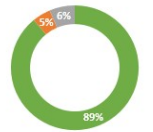
PARCELS STATS

ARABLE LAND : AUTUMN-WINTER CROPS

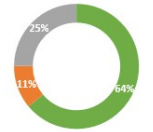
MARKER M01 - Ploughed (period 15/7/2017 - 30/10/2017)

	PLOUGHED	NOT PLOUGHED	NOT MEASURABLE	% OVER TOTAL
< 0,2 ha	19487	3418	7577	26%
0,2 - 0,5 ha	16961	899	0	15%
> 0,5 ha	67927	1153	0	59%
TOTAL	104375	5470	7577	100%

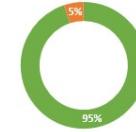
Ploughing marker
(100% parcels)



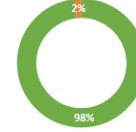
Ploughing marker
(< 0.2 ha parcels)



Ploughing marker
(0.2 - 0.5 ha parcels)

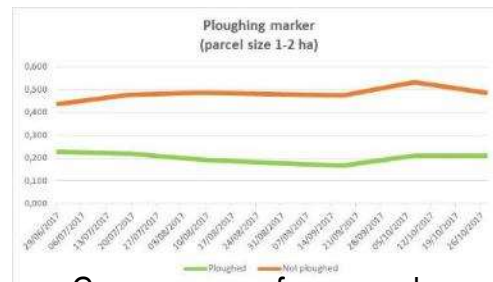


Ploughing marker
(> 0.5 ha parcels)



AREA STATS

Ploughing marker - Area



Green curve: reference values



ID 123244521
CROP declared:
WHEAT
DATE: 25/10/17

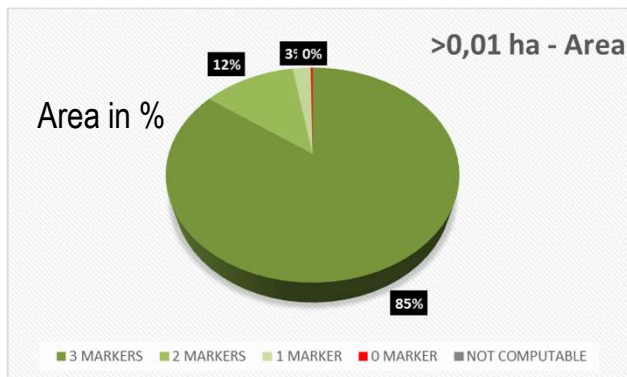
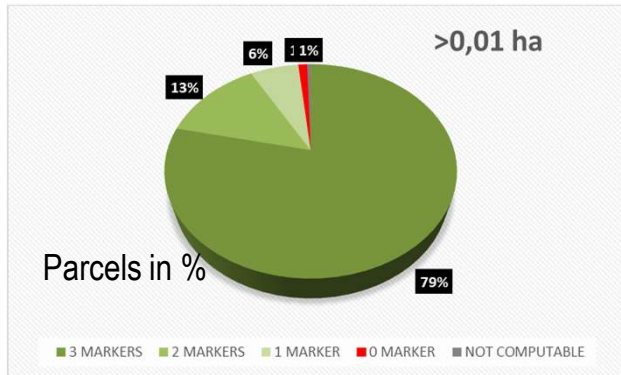


ID 338843694 CROP
declared: WHEAT

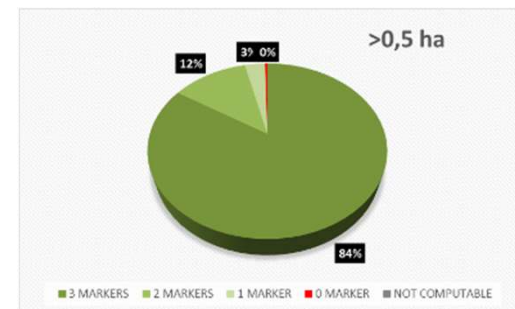
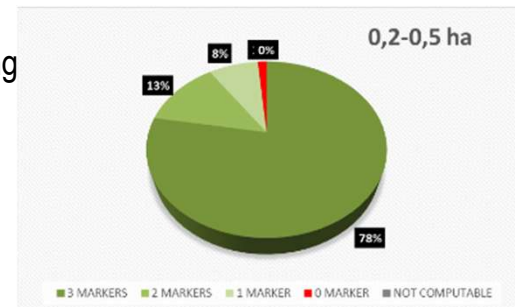
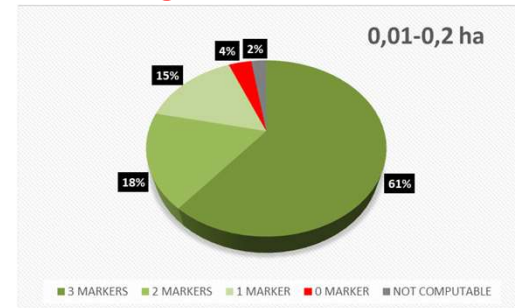


Example of Autumn-winter crops: summary for parcel size

SIZE	3 MARKERS	2 MARKERS	1 MARKER	0 MARKER	NOT COMPUTABLE
0,01-0,2	12747	3677	3226	776	511
0,2-0,5	13892	2278	1435	255	0
>0,5	58063	8480	2296	251	0
TOTAL	84702	14435	6957	1282	511

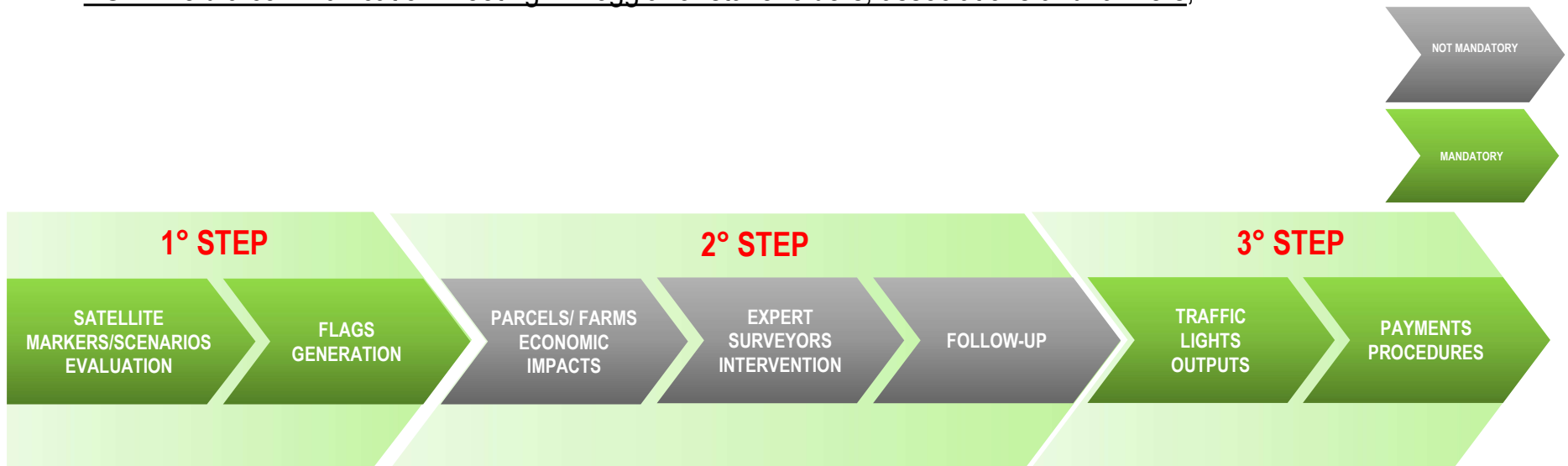


3 markers:
Ploughing
Vegetation growing
Harvest



Follow-up and administrative procedure after satellite flag generation

- Periodic and systematic procedure starting from **Sentinel Copernicus**;
- **Follow-up** activities where necessary, to finalize the requested subsidies admissibility;
- **Beneficiaries information** over the monitoring performance decision through adequate communication tools
AGEA held a communication meeting in Foggia for stakeholders, associations and farmers;

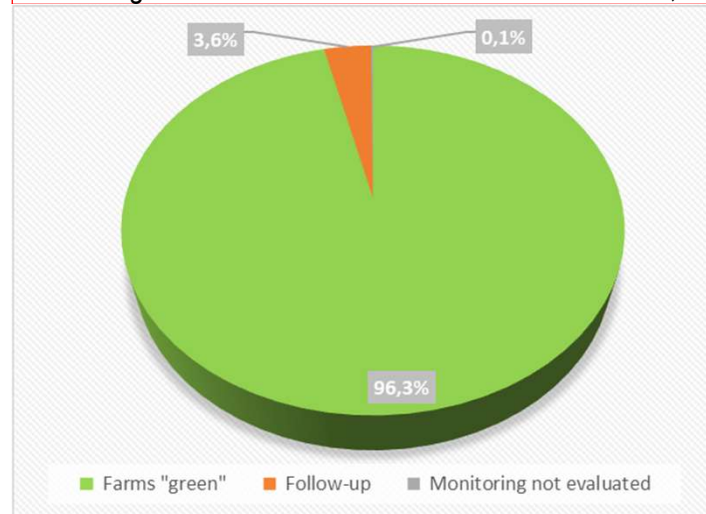


FOGGIA 2018 monitoring initial results (1/3)

After the 1st Step (automatic processing) -> OK TO PAY for **96,3%** of beneficiaries

The set of traffic lights "green" is divided as follows, based on the impact on payment:

Result	N. Farmers	%
Traffic lights "green"	29.728	96,3%
Expert judgement	1.106	3,6%
Monitoring not evaluated	43	0,1%



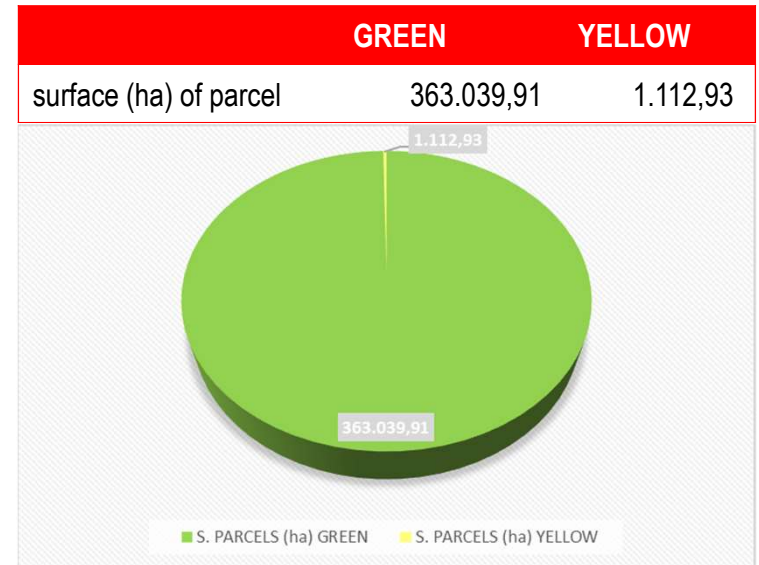
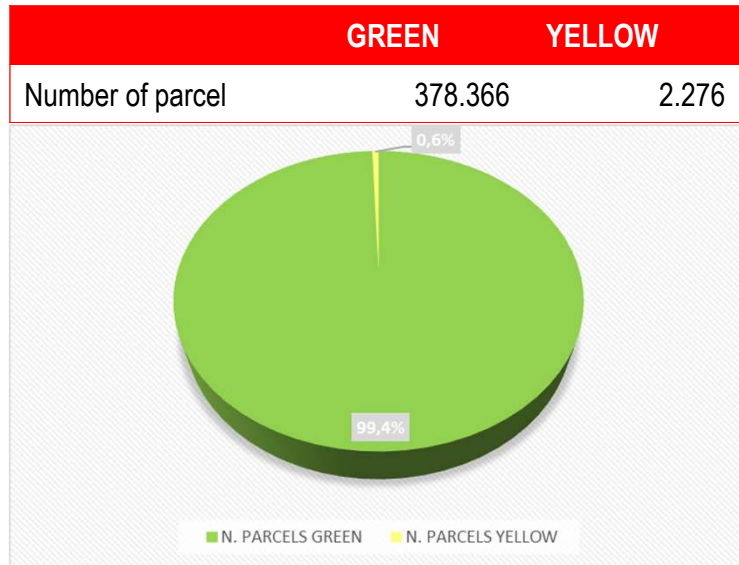
Impact on payment	N. Farmers
ALL GREEN	27.995
LOW	414
MID	1.319

Value of impact on payment:

- N.A. is when all the flags are "green" (or "white"), than the impact on payment is not calculated
- LOW: <50€
- MID: >50€ and <250€ not in the 5% sample
- HIGH: >250€ (need expert judgement)

FOGGIA 2018 monitoring initial results (2/3)

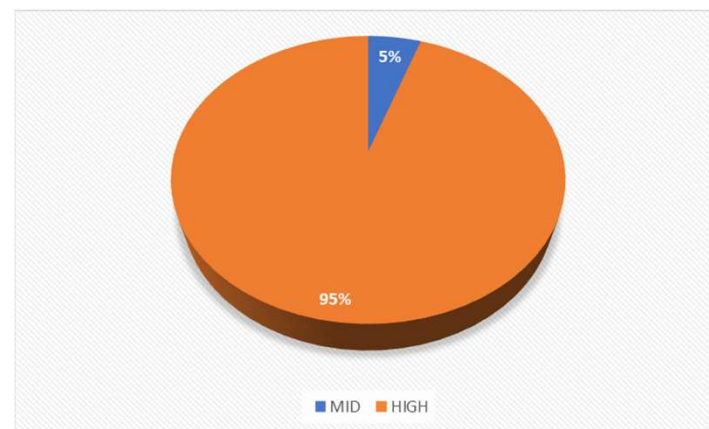
Detail of the parcels related to farmers (29.728) with traffic lights "green"



FOGGIA 2018 monitoring initial results (3/3)

The set of application (1.106) under expert judgement is divided as follows:

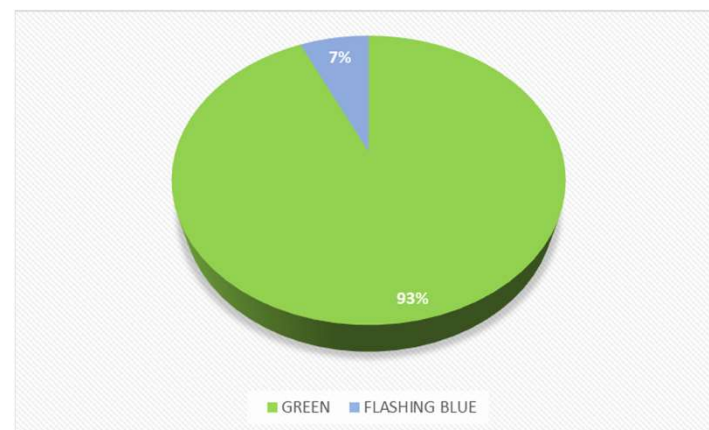
Impact on payment	N. Farmers
MID	58
HIGH	1.048



Detail of the parcels related to expert judgement and follow-up

	GREEN	FLASHING BLUE
Number of parcel	52.459	3.859

	GREEN	FLASHING BLUE
surface (ha) of parcel	50.401,22	6.612,03



FOGGIA 2018 monitoring current results (1/3)

99,15% of beneficiaries have traffic lights “green”

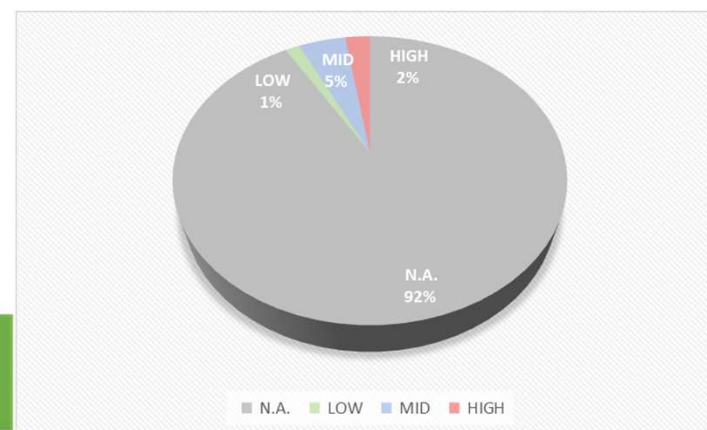
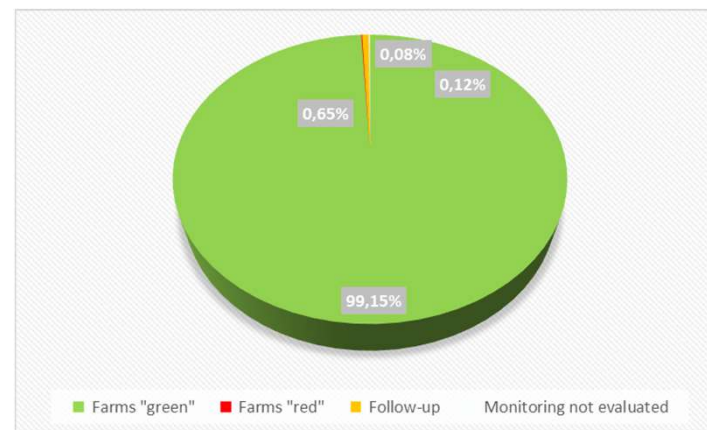
Result	N. Farmers	%
Farms "green"	30.604	99,15%
Farms "red"	24	0,08%
Follow-up	202	0,65%
Monitoring not evaluated	37	0,12%

The set of application “green” is divided as follows:

Impact on payment	N. Farmers
ALL GREEN	27.998
LOW	436
MID	1.422
HIGH	748

Breaking news ->

Descrizione	N. Aziende	%
Aziende semaforo verde	30.618	99,17%
Aziende semaforo rosso	25	0,08%
Aziende in follow-up	207	0,67%
Aziende in valutazione BO	20	0,06%
Monitoraggio non valutato	3	0,01%



FOGGIA 2018 monitoring current results (2/3)

Detail of the parcels related to application “green”

	GREEN	YELLOW
Number of parcel	419.160	2.310

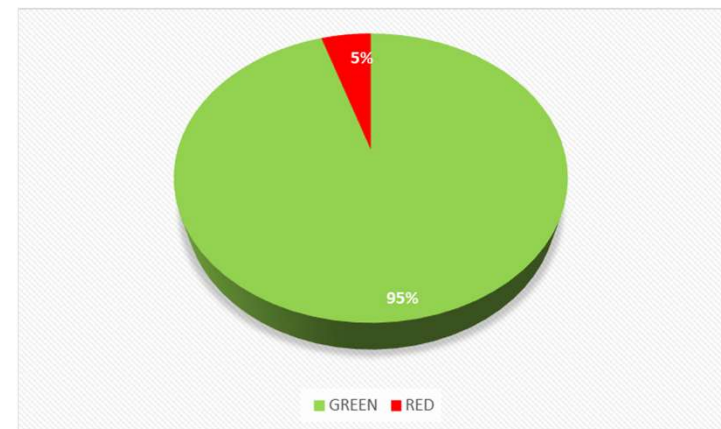
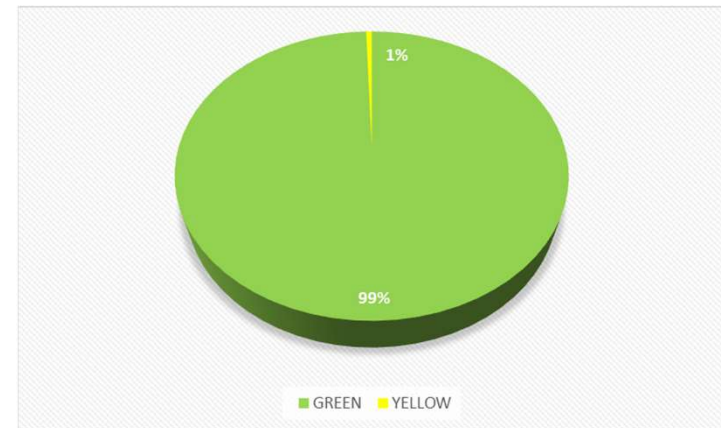
	GREEN	YELLOW
surface (ha) of parcel	401.984,00	1.068,00

Detail of the parcels related to application “red”*

	GREEN	RED
Number of parcel	696	36

	GREEN	RED
surface (ha) of parcel	938,20	350,38

*Traffic light is «red» if only one red flag is present



FOGGIA 2018 monitoring current results (3/3)

Expert judgment results:

- *Farms*: **1.106** (3,6% of total)
- *N. Parcels*: **3.935** (0,6% of total)
- *Surface*: **6.647,76 ha** (1,5% of total)

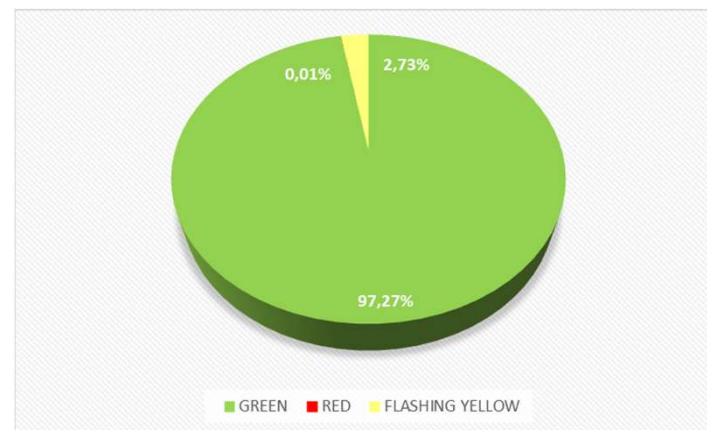
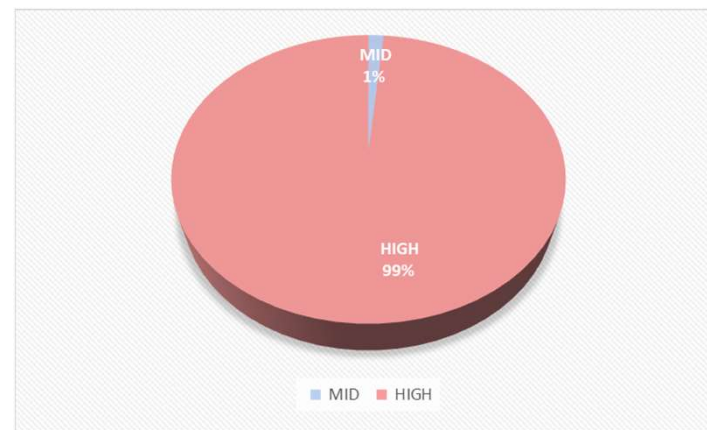
Now, the set of application on follow-up is divided as follows:

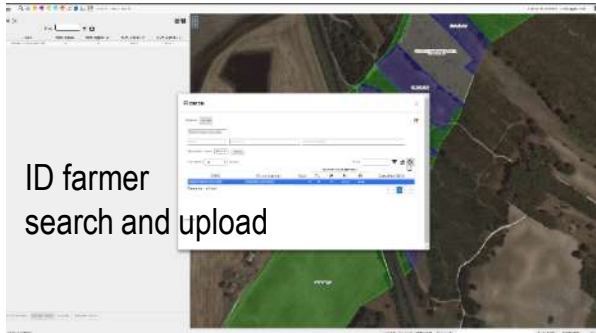
Impact on payment	N. Farmers
MID	3
HIGH	198

Detail of the parcels related to application on follow-up:

	GREEN	RED	FLASHING YELLOW
Number of parcel	15.491	1	434

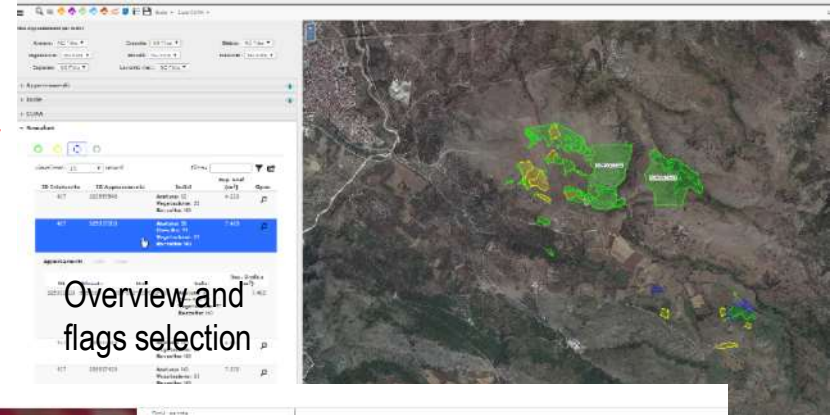
	GREEN	RED	FLASHING YELLOW
surface (ha) of parcel	16.698,37	0,34	807,74



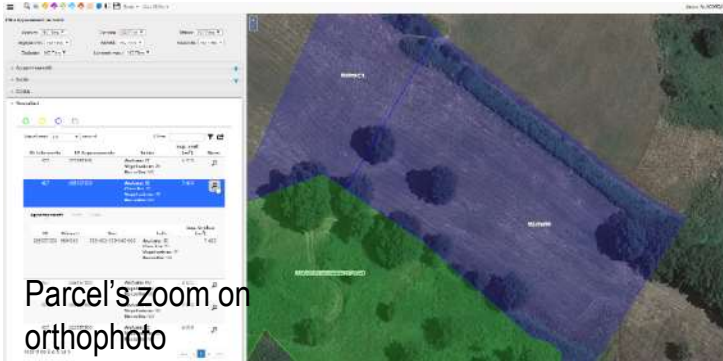


ID farmer search and upload

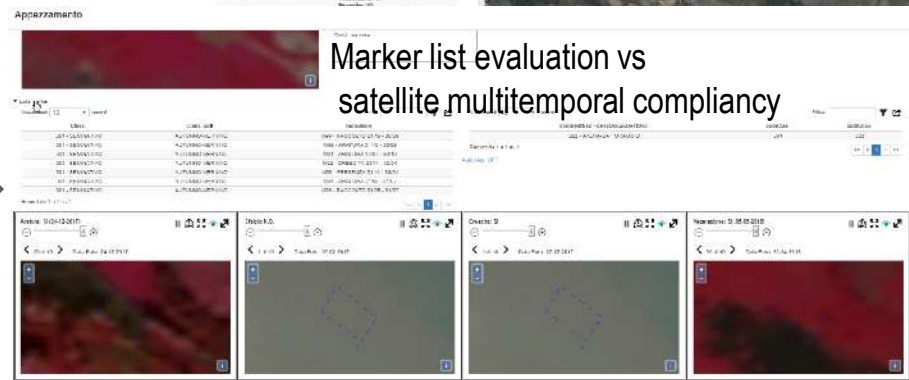
Yellow:
Back office activity



Overview and flags selection



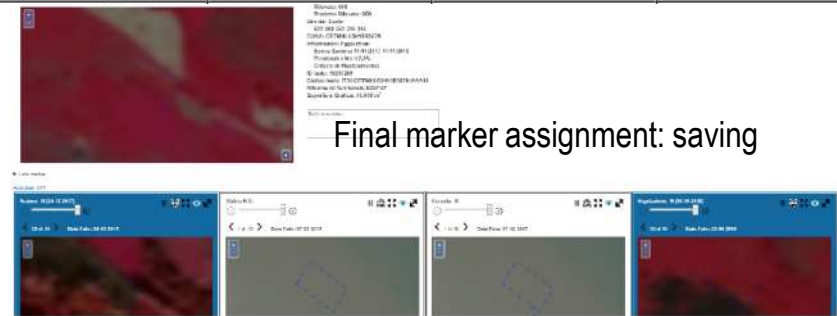
Parcel's zoom on orthophoto



Marker list evaluation vs satellite multitemporal compliancy



Parcel: editing



Final marker assignment: saving

Geo-tagged activity linked to AGEA IACS databases

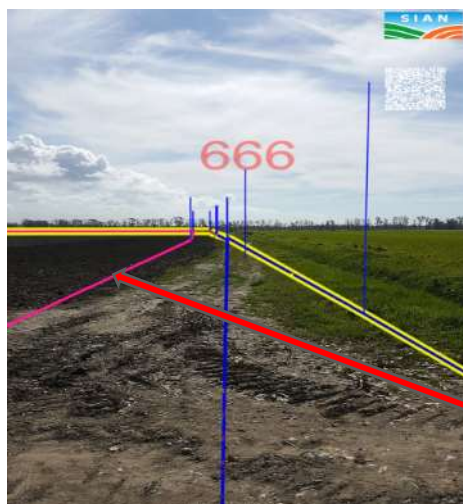
Mobile-enabled App:

- Take validated GSNN pictures with anti-fraud controls
- both surveyors (**currently for Foggia**) and farmers
- On-line and off-line working (matching through sequential codes)



⇒ RFV, crop diversification, durum wheat detection, EFA, grassland mowing proof, permanent crops change, RD measures, ...insurances, etc.

Land parcels always delimited by **yellow lines**
Vertical **blue sticks** indicate the parcels vertices



Precise “photo cones” identification of, in this case:
Arable 666 (left)
Water 690 (ditch in the middle)
Wooded road 650 (centre)

Each other colour of the lines (pink, brown, violet, etc) correspond to the different downloaded LPIS codes



Some messages form Foggia 2018 monitoring (1/2)

- Arable land monitoring BPS/SFS requirements worked properly
- FOI less than 0.2 ha are however problematic to be managed by Sentinel (large number of parcels but low surface)
- Permanent crops, pasture pro-rata and non eligible areas: => systematic monitoring through LPIS refresh (based on a cycle of 3 years). Sentinel results are marked in IACS/LPIS for next updated processes (e.g new declarations, LPIS alerts)
- Partial crop presence in the FOI or parcel may lead to negative result (yellow)
- Follow-up of yellow cases required back office photo-interpretation (to greatly reduce the need of geo-tagged photos or rapid field visit)
- Dissemination/learning to farmers is needed to improve their pro-active involvement in the monitoring process with the PAs. It's crucial to receive from them digital documentation and/or geo-tagged photos in a timely fashion.

Some messages from Foggia 2018 monitoring (2/2) : some benefits

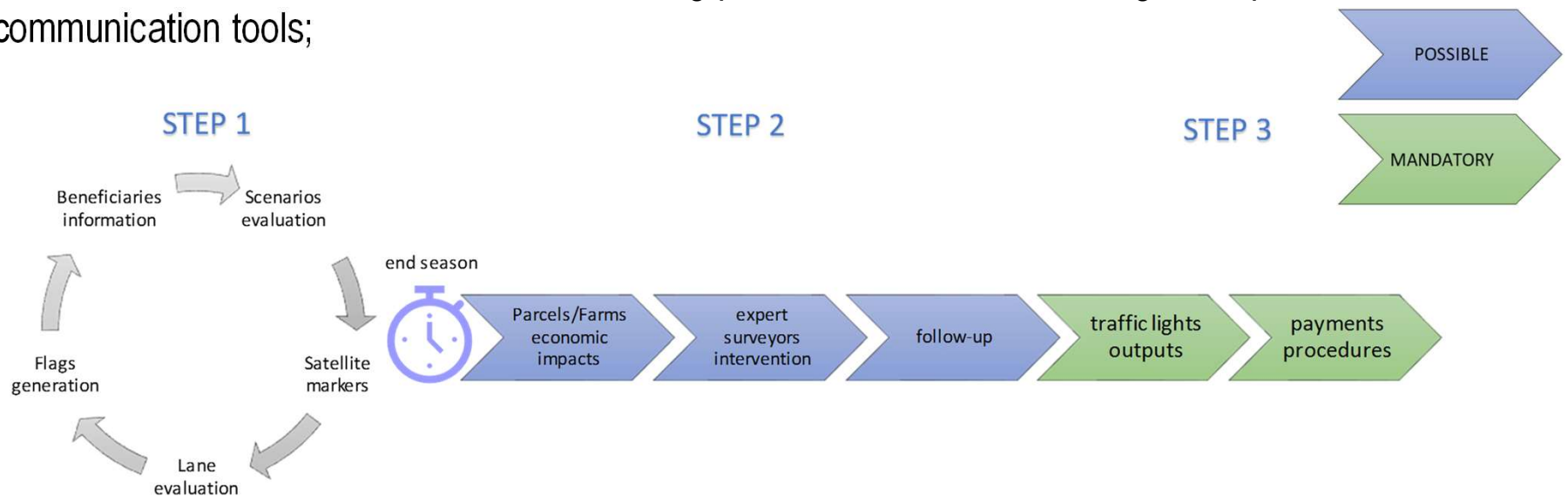
- Gradual approach to the new technologies for the mandatory CAP 2020+
- Immediate payment to farmers with “green light”: > 97% (compared with 5% sample)
- Deterrent effect on “inaccurate” declarations from farmers
- Complete agro-environment-land monitoring available as intermediate products to other sectors (fires, flooding, civil protection, main land changes, etc.)

AGEA 2019 selection areas: criteria

- Enlargement of monitored area: 6 provinces vs 1 (about 25.000 sqKm vs 7.000 sqKm)
- More Beneficiaries involved: 120,000 vs 35,000
- More geographic distribution: North, Centre, South of the Country: Pordenone (Friuli), Viterbo (Lazio), Foggia and Bari (Puglia), Cosenza and Crotona (Calabria)
- More morphologic variability: ranging from “*almost flat*” to more “*complex hilly zone*”
- Different crop groups and parcel size distribution
- Additional payment scheme introduced: coupled support for crops (durum wheat and legumes/protein crops in 3 provinces Cosenza, Crotona and Viterbo)

2019 - Follow-up and administrative procedure after satellite flag generation

- Periodic and systematic procedure starting from **Sentinel Copernicus**;
- Cycle until the end of the season to start any follow-up activity
- **Follow-up** activities where necessary, to finalize the requested subsidies admissibility;
- **Beneficiaries information** over the monitoring performance decision through adequate communication tools;



Integration of “external” resources on our system

1) DIAS with by JRC support

- Presently testing Mundi DIAS: Copernicus Application (or Analysis) Ready Data – CARD for receiving georeferenced, calibrated sensor data (mainly Sentinel2 level 2 in Italy)
- Our order of preference: S2 level2, S1 geocoded coherence, S1 geocoded backscattering coefficients
- Our S2 DIAS CARD points of attention: exhaustive cloud masks and complete time series co-registration (no pixel shifting)
- We are valuating flags generation, decision making, traffic lights, IACS data set uploading, etc to be run on DIAS or on premise.

2) SEN4CAP

Participating to SEN4CAP project, training ok, how and when to integrate?

Challenges for 2019 and beyond

- Full involvement of the farmer during monitoring activities -> Need to improve communication tools
- Clear and stable IT architecture (DIAS + private cloud + on premises)
- Develop vs integrate
- Monitorability of “complex territory” and some aid scheme
- Increasing cost-efficiency for monitoring financial sustainability



Thank you for your attention!

**Francesco Sofia
AGEA Coordinating body
ITALY
www.agea.gov.it**