ERMES

AN EARTH OBSERVATION MODEL BASED RICE INFORMATION SERVICE

A downstream service to support agro-production, planning and policy

Dimitrios Katsantonis
plant pathologist – agronomist

WP3 - Users' requirements and services' evaluation

WP3: Threre are two main objectives

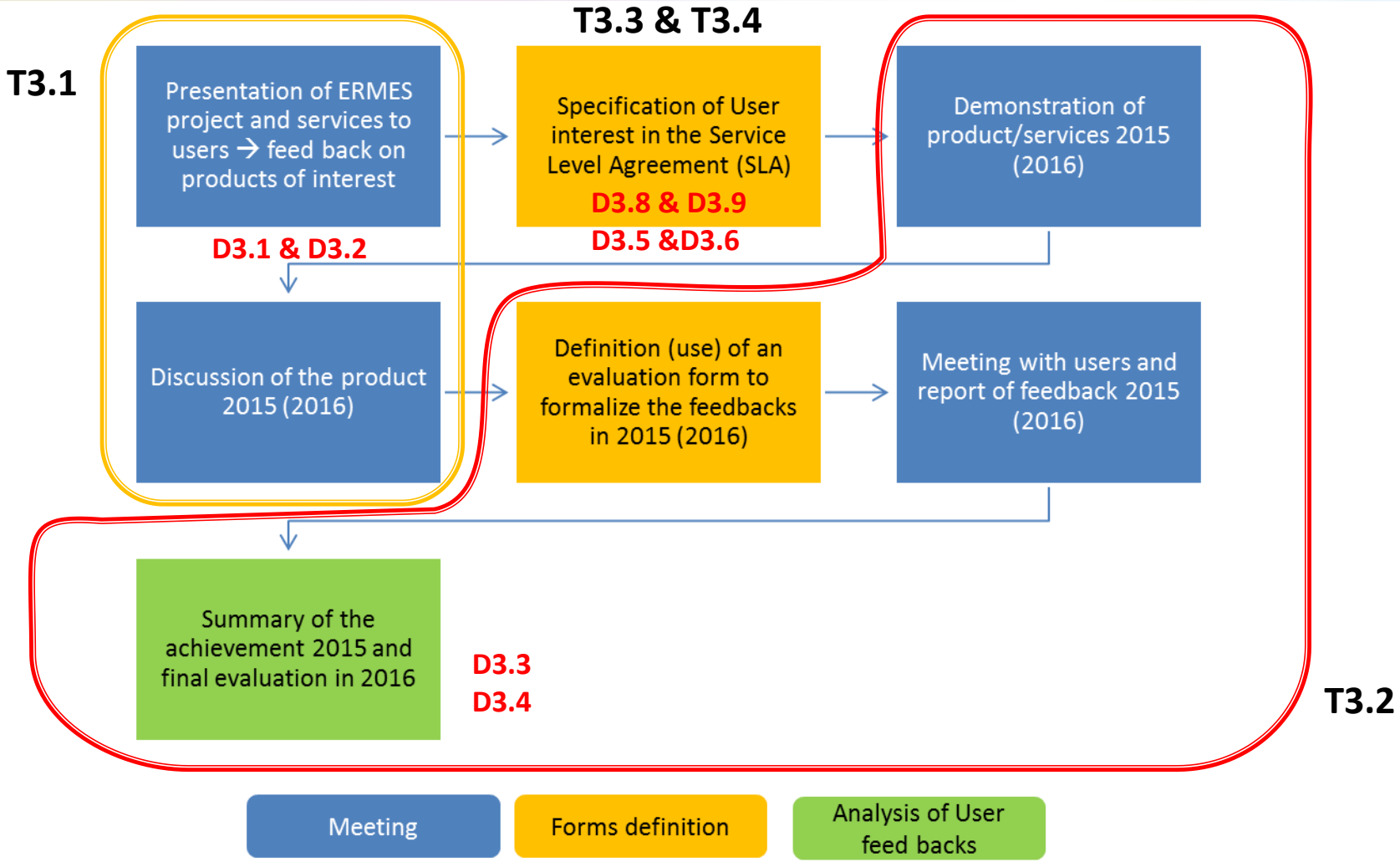
1. To **identify End-users requirements** for the design of ERMES services at regional and local scale

2. To **evaluate their satisfaction** after the service demonstration.

ERMES

- **T3.1 - User requirements and case study definition (M1-20)**
- **T3.2 - User evaluation and satisfaction assessment (M21-35)**
- **T3.3 - Project information for user data protection (M2-24)**
- **T3.4 - Service level agreement (M5-35)**

Strategy User involvement, Interaction and satisfaction assessment



ERMES

- **T3.1 - User requirements and case study definition**
- T3.2 - User evaluation and satisfaction assessment
- T3.3 - Project information for user data protection
- T3.4 - Service level agreement

Interactions with end-users and collection of the interests/requirements: EUROPE

Involved/contacted end-users: IT

1. Farmers group “Distretto agricolo "Risaie della Lomellina”
2. Meeting with farmers and technician of SPEKTRA AGRI Company
3. Ente Nazionale Risi (ENR) / Open day participation 10/9/2015
4. Regione Lombardia - Servizio Fitosanitario (Regional Plant Health Service)
5. Cattolica assicurazioni

Involved/contacted end-users: GR

6. Meeting with the president of TOEV of Chalastra-Kalochori
7. Kanakas Bros Ltd (Milling industry and farming)
8. AGRINO SA
9. ACRICULTURAL COOPERATION CHALASTRA B
10. Farming school in Kalochori with Coop Chalastra B (16-7-2015)
11. BEGAS AGRO SA
12. ACRICULTURAL COOPERATION OF CHALASTRA A
13. Aparroz-Agrupamento De Produtores De Arroz Do Vale Do Sado (Portugal)
14. Meeting with AGROTECH SA (John Deere Greece)
15. Interim Open day at Thessaloniki – Sindos (2-12-2015)

Involved/contacted end-users: SP

16. Consejo Regulador Denominación de Origen Arroz de Valencia
17. IVIA
18. GVA

Interim Open day at Sindos-Thessaloniki (12/2015)

Attendance >40 people

Interactions with end-users and collection of the interests/requirements: West Africa

1. AfricaRice

2. Meeting with IFAD and The Gambia Ministry of Agriculture

ERMES

- T3.1 - User requirements and case study definition
- T3.2 - User evaluation and satisfaction assessment
- **T3.3 - Project information for user data protection**
- **T3.4 - Service level agreement**

T3.3 - Project information for user data protection [M2-24]

Preparation of Informed Consent Forms and data usage information sheets (WP1, D1.11). These were signed and kept filed by the end-users (D3.5 M12 and D3.6 M24).

- **The scope was to ensure data protection, confidentiality, privacy and duration of storage of personal data.**

T3.4 - Service Level Agreement (SLA) [M5-35]

SLA is the document implements the user requirements and ERMES consortium commitments. SLA was defined in two steps:

1. **The preparation and definition of a 1st template (D3.7 M6)**
2. **Consequent sign of the agreement for future adoption of the service (D3.8 M12 & D3.9 M35).**

D3.9 Collection of signed Service Level Agreement v1

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Service Level Agreement

made between

HELLENIC AGRICULTURAL ORGANIZATION - DEMETER

on behalf of ERMES CONSORTIUM

AND

AGRICULTURAL COOPERATIVE OF AGIOS ATHANASIOS THESSALONIKIS

in the framework of the project

An Earth obseRvation Model based ricE smart information Service (ERMES)

Grant agreement no: 606983 - FP7 - SPA.2013.1.1-06

ART. 13. TERMINATION

1. Each Party shall have the right to terminate this Service Level Agreement with good reason. Good reason shall exist in case the cancelling Party cannot be reasonably expected to comply with its contractual obligations until the end of this Agreement.
2. The Service Provider shall have the right to terminate this Service Level Agreement in case that the Grant Agreement with the Commission is terminated or amended in a way which prevents the further delivery of the Service(s).
3. Any termination shall be valid only if made in writing and shall become effective within one month after notification to the other Party.

ART. 14. NOTICES

1. The contact persons of each Party will be:

SERVICE PROVIDER:

Name: Dimitrios Katsantonis
Email: dikatsa@cerealinstitute.gr
Telephone: +302310471544
Address: Hellenic Agricultural Organization, Plant Breeding and Genetic Resources Institute (former Cereal Institute), Ellinikis Georgikis Scholis, 57001, Thermi-Thessaloniki, Greece

USER:

ΑΓΡΟΤΙΚΟΣ ΣΥΝΕΤΑΙΡΙΣΜΟΣ ΑΓ. ΑΘΑΝΑΣΙΟΥ
Π. ΑΕΒΑΝΤΗ 2 - ΑΓ. ΑΘΑΝΑΣΙΟΣ ΘΕΣΣΑΛΟΝΙΚΗΣ 570 03
ΤΗΛ. - FAX: 2310 701927
Α.Φ.Μ.: 096028274 - Δ.Ο.Υ.: ΙΟΝΙΑΣ ΘΕΣΣΑΛΟΝΙΚΗΣ

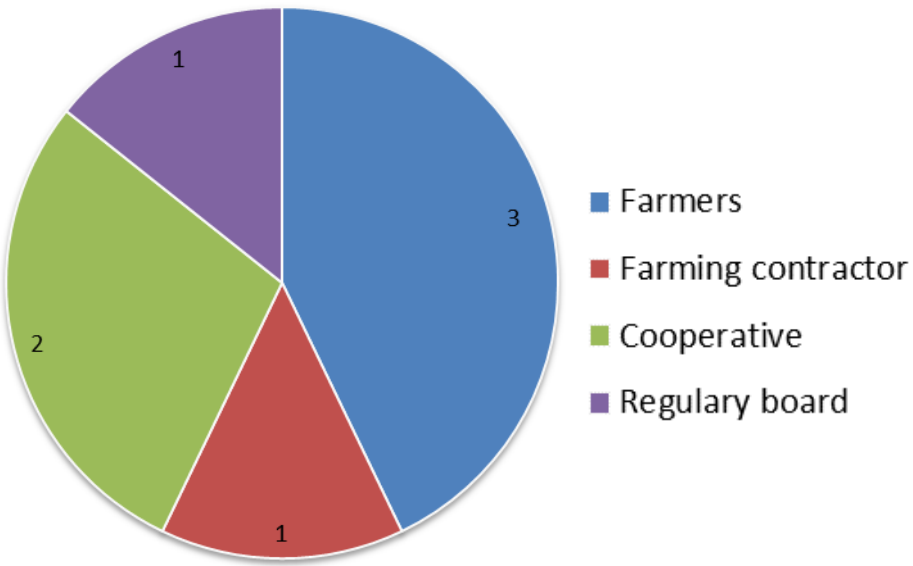
2. Each Party shall inform the other Party immediately in writing about changes regarding their respective contact persons.

ART. 15. MISCELLANEOUS

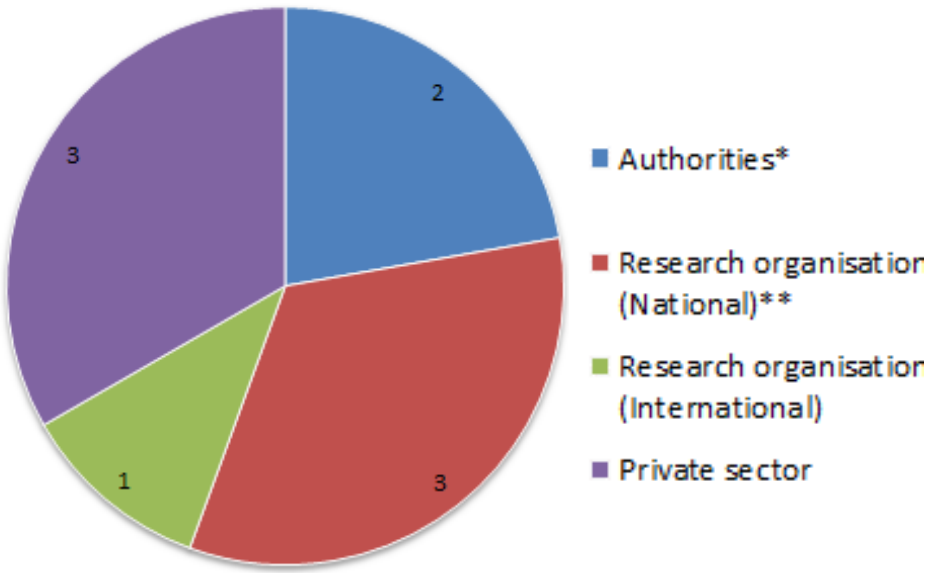
1. This Service Level Agreement shall be binding for both Parties and shall constitute the entire agreement between the Service Provider and the User with respect to the subject matter of this Service Level Agreement. Both Parties however acknowledge that the Service Provider is obliged to comply with the provisions of the Grant Agreement with the European Commission.

D3.9 Collection of signed Service Level Agreement v1

Local → 7 SLAs



Regional → 9 SLAs



Final conclusion:

The total of the <u>16 collected SLAs</u> represented a good level of user engagement in ERMES

User Interests collected from the SLAs and the bilateral meetings

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Requested data

- Cultivated area
- Yield forecasts
- Risk alerts
- Weather
- Stress alerts
- Lodging
- Grain moisture

Requested support on agro-practices

- Poor emergence
- Fertilization
  - N application
  - Fungicide application (time)
- Tools to support the in-field inspections

ERMES

- T3.1 - User requirements and case study definition
- **T3.2 - User evaluation and satisfaction assessment**
- T3.3 - Project information for user data protection
- T3.4 - Service level agreement

Development phase of a questionnaire for both D3.3 & 3.4

General structure of the questionnaire, divided into 3 sections:

1. User anagraph and recap of SLA products

2. General feedback on ERMES Service Utility

1. Utility
2. Technology risk assessment

3. Feedback on specific products/services specified in the SLA

1. Product Utility (Technical qualification)
2. Product Value (Advantages and disadvantages over conventional data sources)
3. Product Integration (Possibilities of include of Product in workflow/practices)
4. Product cost effectiveness*
5. Additional comments on evaluation of the ERMES product.
6. Additional comments specific for advance users on
    1. ERMES EO product;
    2. ERMES modeling solution and outputs;
    3. ERMES tools.

In addition a 2nd questionnaire was developed to evaluate 1) the Open days quality and 2) to escalate ERMES's satisfaction assessment

A snapshot of the Users' satisfaction questionnaire

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Section 1: User information and recap on agreed services/products

End User Information	
Name	Organization
Country	phone / email
User Type	Date of SLA signature
Date of interview _____	Signature _____

Recap of products/Services of interest according to the SLA	
ERMES Product Code	Product Description

Section 3: General feedback on ERMES Service Utility

On the basis of the products that have been delivered to you, or presented to you during specific meetings during 2016, please provide a **ranking of the overall performance of the ERMES Services demonstration** in terms of each of the key criteria.

Product Utility Evaluation Table	
Quality of the information provided	☐ Low ☐ Fair ☐ Good ☐ Excellent ☐ Can Not Answer
Efficiency and timeliness of information provision	☐ Low ☐ Fair ☐ Good ☐ Excellent ☐ Can Not Answer
Ease of access to the information	☐ Low ☐ Fair ☐ Good ☐ Excellent ☐ Can Not Answer
Ease of use/understanding of the information	☐ Low ☐ Fair ☐ Good ☐ Excellent ☐ Can Not Answer
Benefit of the information	☐ Low ☐ Fair ☐ Good ☐ Excellent ☐ Can Not Answer
Value for money	☐ Not ☐ Fair ☐ High ☐ Can Not Answer

A. Could the delivered product provide an additional value?

☐ Yes, it could improve my efficiency practices/workflow

☐ Yes, it could reduce my cost

☐ Yes, Comment: _____

☐ No, Comment: _____

B. Are you interested to further test/use the service, and think that service continuity should be guaranteed?

☐ I'm interested in the maintained or improvement of the service

☐ I'm interested only in a part of the service

☐ I'm not interested

Comment: _____

C. Would you be willing to pay for this product?

☐ Yes

☐ *If yes how much would you be willing to pay for an annual cost per ha?*

☐ €1-5 ☐ €5-10 ☐ €10-20 ☐ €20-30 ☐ €30-40

A snapshot of the Open Days questionnaire

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ERMES | Work Package 11

1. What is your profession? Is your main occupation in the sector of agriculture (active farmer?)

.....

2. What was the size of the area you cultivated during the last 3 years?

2014.....
2015.....
2016.....

3. What was the average yield per ha of the rice paddies during the last three years?

2014.....
2015.....
2016.....

4. What was the total amount of money you spent, per hectare, during the last cultivation period (including land rent)?

.....

5. What was your net profit per hectare during the last cultivation period?

.....

6. Please, write down which one of the services presented during this session, comes first in mind

.....

7. Do you believe that the services provided by ERMES are able to cover your needs in improving the rice cultivation?

☐ Yes
☐ Maybe

ERMES | Work Package 11

☐ No

8. Which of the following services, presented to you in today's session, do you remember or do you think is the most important for you?

☐ Plant growth stage prediction for supporting farming techniques (time for herbicide/fertilizer application)

☐ Support the application of surface fertilization for increased and homogenous yield.

☐ Creation of yield maps

☐ Prediction for the product's sell value

☐ Rice blast prediction

☐ Weeds appearance prediction

9. Please, tell us how you estimate the date of appearance of the different growth stages in rice cultivation (such as tillering, booting ect)

☐ Empirically, by in situ observation of the fields
☐ By counting the days after sowing
☐ Other .....

10. Report the main way of supporting the surface fertilization applied in your rice fields

☐ Empirically, by estimating the date of tillering and heading
☐ By counting the days after sowing
☐ I own remote sensing instruments attached on my tractor
☐ I have implemented drone technology to create fertilization maps

Developed in En and translated into It, Sp, Gr

ERMES developed services, products and tools assessed at Local Scale

1. Constant patterns maps
2. Seasonal pattern maps
3. Biophysical parameters
4. Homogeneity maps
5. Phenological stages
6. Rice blast risk alerts

Modeling

7. Geoportal
8. AgriNotebook

How the assessments were carried out?

1. By interviews/meetings/collaborations with local farmers, consortia, agro-business, consultants ect
2. By organizing dedicated sessions for presenting ERMES with the developed tools
3. By the visualization of the provided information depending on the users' interest/requests
4. By the provision of high level information and the implementation of them into end-users' workflow

Overview of results of the evaluation of User satisfaction report in Europe at Local Scale

1. All users manifested their interest in the remote sensing products, since they believe that precision agriculture is a way of reducing the inputs and the cultivation cost
2. Constant, Seasonal and Homogeneity maps, to support fertilization, were evaluated as very useful in combination with VRT use. (Exploitation mostly in Italy and without VRT in Greece)
3. Biophysical parameters were positively evaluated in Spain for the good correlation with the biotic constrains
4. The Homogeneity maps were very helpful to monitor poor emergence in Italy
5. Rice blast alerts were evaluated as extremely helpful in all countries, since it is the major rice disease and the most effective active substance is considered to be permanently banned by EU

Overview of results of the evaluation of User satisfaction report in Europe at Local Scale

6. Users considered the ERMES products to be very satisfactory in the term of timeliness/frequency/spatial resolution/thematic content judging from:
   - The operational level
   - The quality and the user friendly ERMES tools (Geo-portal & AgriNotebook)
   - The potential of a more mature service in the near future
7. A major suggestion appeared to be the need of experienced consultation for better implementation of the information
8. Many farmers even expressed their willingness to invest in smart machinery in order to exploit/utilize the provided information

Overview of results of the evaluation of User satisfaction report in Europe at Local Scale

9. Service cost was rated from 5 to 30 €/ha (varying between the 3 countries)

GR: Average cost 2465 €/ha, Average willing cost 26.7 €/ha (1.1%)

10. A trend appear of sharing the costs between group of farmers, cooperatives, contact farming or authorities (free of charge)

- **Two constrains were identified:**
  - ⇨ Difficulty to be adopted by farmers with small size properties
  - ⇨ The need of specialized consultation (dependence)

ERMES services, products and tools at Regional Scale

1. Rice cultivated area and agro-practices
2. Biotic risk alerts
3. Rice yield forecasts and estimation
4. Agro-meterological and geo-spatial analysis for the issuing of bulletins

5. Geo-portal

Overview of the results of the evaluation of User satisfaction report in Europe at Regional Scale

1. Users (key actors) ranged risk alters and yield estimation as very useful
2. The issuing of agro-bulletins is important contribution to the public mandate
3. Rice cultivation area and agro-practices were requested in Italy with very positive evaluations
4. JRC identified the potential the service to be adopted in EU crop model they operate.

Services, products in West Africa

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Services/product provided:

1. Rice/Land cover maps, phenological maps at coarse and high resolution (2003-2016)
2. NDVI, LAI and meteorological maps (2003-2016)

Adoption and perspective case: (IFAD and AfricaRice)

- ✓ Great interest for Senegal and Gambia (no alternative solutions available)
- ✓ **Under consideration:**
  - ✓ Time analysis of rice crop land cover maps
  - ✓ Detection of anomalities
- ✓ **Potential end-users**
  - ✓ Irrigation management organizations
  - ✓ Trading companies

The nutshell of the end-users satisfaction

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For the Farmers

- ✓ They are interested in the maps related to plant health/conditions.
- ✓ Some own VRT or others are aiming to reduce the cultivation costs.
- ✓ They could pay for the service but they prefer to share the costs
- ✓ They need specialists to analyze the data and consultancy-like activities

For the Private agro-sector

- ✓ They find useful to use ERMES like services for policy making

For the Public authorities

- ✓ The interest vary in the three countries. JRC manifested an interest.
- ✓ They share a common interest in rice blast.
  - **However, the adoption can more difficult due to limitations:**
    - Funding
    - Investment beneficial impact is difficult to be measured
    - Decision making for public is more difficult especially when it is not based on traditional ways or governmental services **(out of the ordinary)**

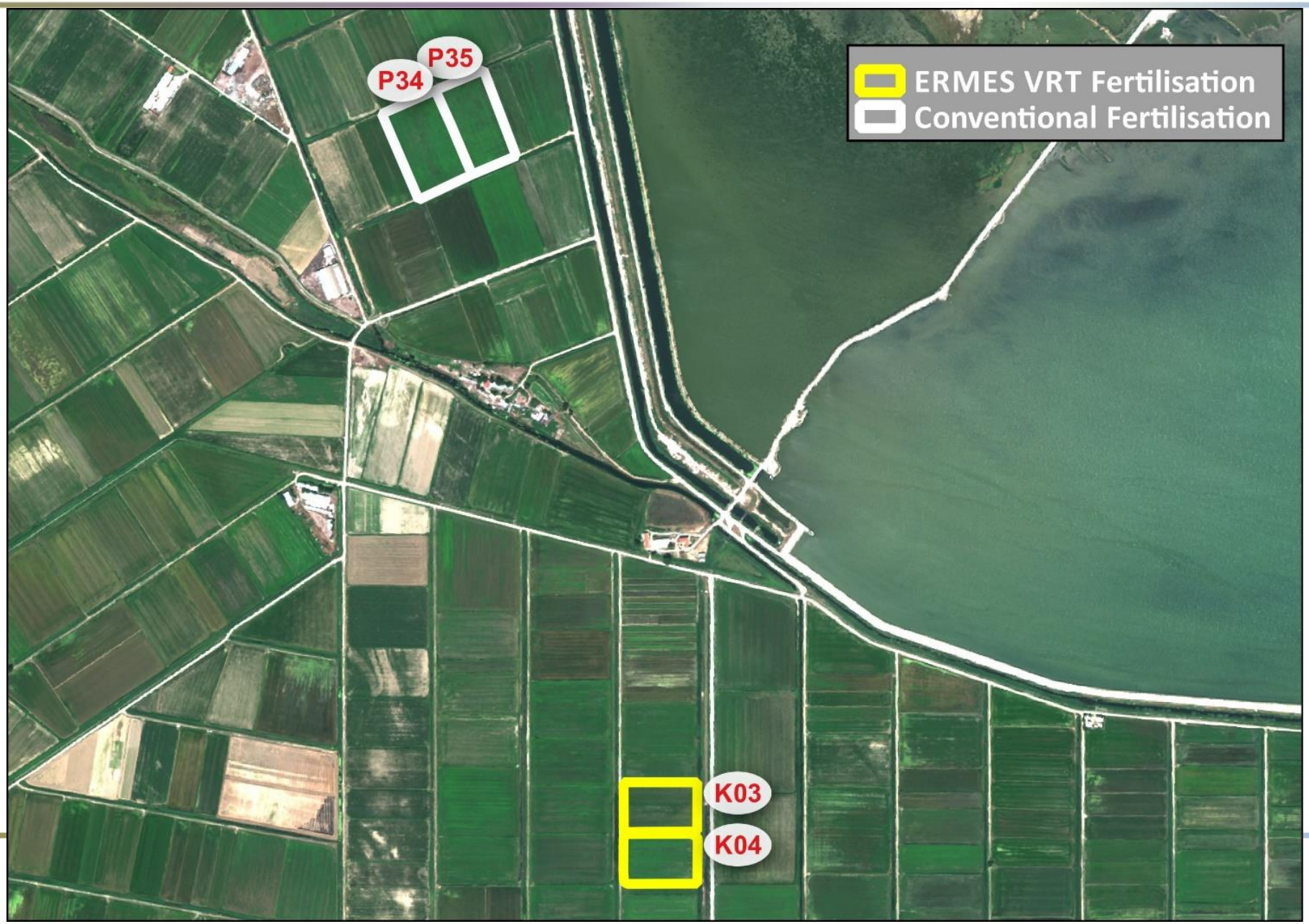
Implementation of ERMES service "Seasonal maps"

in Variable Rate Technology

Demonstration in Greece 2016

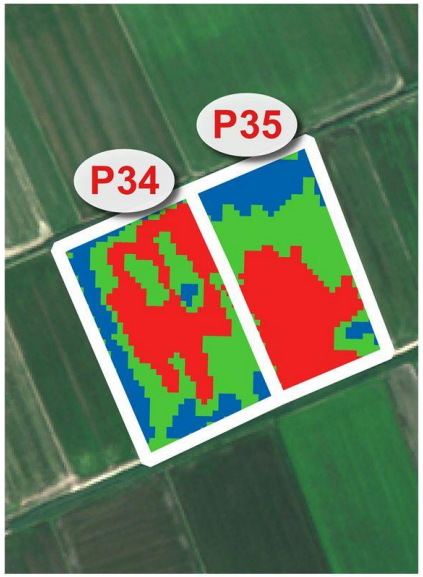
the economic benefit

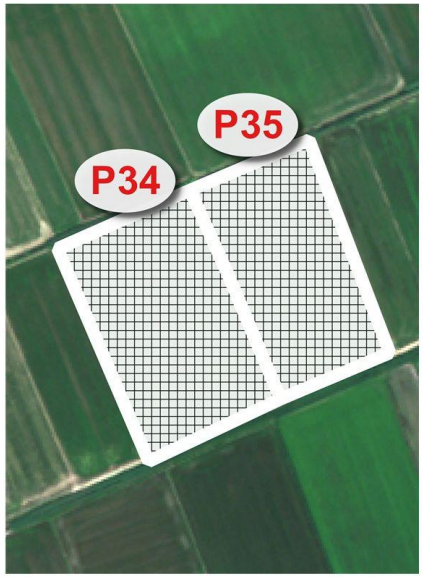
Two parcel sets; Same vriety Ronaldo variety; Yield: 8000 kg/ha



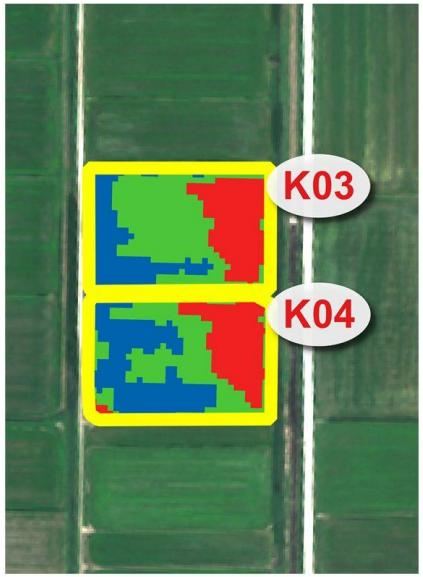
Development of Seasonal maps for the four experimental plots

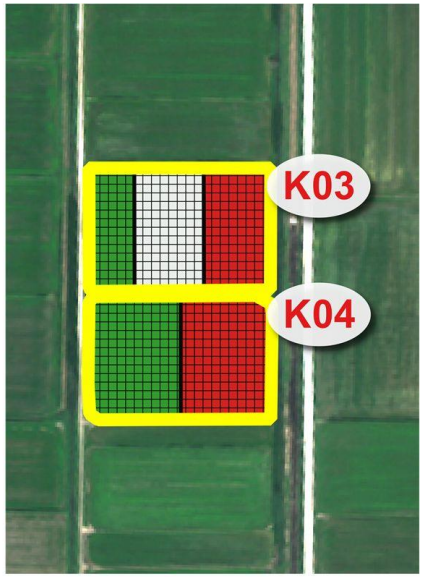
Conventional Fertilization





ERMES-managed Fertilization





Legend

N prescription

- Lower (96 N/ha)
- Typical (120 N/ha)
- Higher (180 N/ha)

Intra-field variability [Classes]

- Less than average
- Average
- More than average

Variable rate technology demonstration in Greece 2016

Conventional fertilization (P34 & P35)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	**120**
1st Surface	AMIDAS (40-0-0)	300	**120**
2nd Surface	AMIDAS (40-0-0)	150	**60**
Total			**300**

ERMES-managed fertilization (K03 & K04)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	**120**
1st Surface	AMIDAS (40-0-0)	240/300/450	**137**
2nd Surface	—	—	
Total			**257**

Variable rate technology demonstration in Greece 2016

Conventional fertilization (P34 & P35)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	**120**
1st Surface	AMIDAS (40-0-0)	300	**120**
2nd Surface	AMIDAS (40-0-0)	150	**60**
Total			**300**

Yield: 8 ton/ha

ERMES-managed fertilization (K03 & K04)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	**120**
1st Surface	AMIDAS (40-0-0)	240/300/450	**137**
2nd Surface	—	—	
Total			**257**

Reduction in N/ha of 14%

Yield: 8 ton/ha

Cost benefit analysis of the use of ERMES product Seasonal maps in Greece 2016

Conventional fertilization (P34 & P35)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	120
1st Surface	AMIDAS (40-0-0)	300	120
2nd Surface	AMIDAS (40-0-0)	150	60
Total			**300**

Yield: 8 ton/ha

ERMES-managed fertilization (K03 & K04)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	120
1st Surface	AMIDAS (40-0-0)	240/300/450	137
2nd Surface	—	—	
Total			**257**

Yield: 8 ton/ha

Reduction in N/ha of 14%

Profit from ERMES management			
	Conventional	*ERMES*	*Difference*
Cost	**453 €/ha**	**388 €/ha**	**65 €/ha**

Average cost with rental
2465 €/ha
2.7% reduction

Hypothesis: Analysis with Precise VRT fertilisation

Conventional fertilization (P34 & P35)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	120
1st Surface	AMIDAS (40-0-0)	300	120
2nd Surface	AMIDAS (40-0-0)	150	60
Total			300

ERMES-managed fertilization (K03 & K04)			
	Type	*kg/ha*	*N/ha*
Basic	30-10-10	400	120
1st Surface	AMIDAS (40-0-0)	150/300/450	124
2nd Surface	—	—	
Total			244

Reduction in N/ha of 19%

Profit from ERMES management			
	Conventional	*ERMES*	*Difference*
Cost	453 €/ha	370 €/ha	83 €/ha

Average cost with rental
2465 €/ha
3.7% reduction

Thank you for your attention