Regione Lombardia - Consiglio Nazionale delle Ricerche
Accordo Quadro di collaborazione

Beyond the dissemination of projects' results: stakeholders and users involvement and project co-design

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Science in Public Research Network

Science Communication and Education a research area at CNR

- Plan, study and test communication and public engagement inititives involving different actors: students, policy makers, researchers, citizens, enterprises, using partecipative methoologies

- Use social sciences approaach for understanding the relationscipe between science and society, considering the different actors (interviews, inquiries, focus group, etc.)

- The results of this investigative activity are then used to rethink and use new ways and methodologies to communicate and to interact between science and society within the research workflow (Dissemination of projects, WP, Capacity building and Public enggement initiatives, etc.)

Institute for the Remote Sensing of Environment, Italian National Research Council, Milano
Unit of Communcation and Education Studies

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International Science in Public
July 2015 Conference
Bristol

A more responsible research and innovation: a challenge for the scientific communit

- In last years there has been a request towards a more **responsible research** within the various funding programs. In particular scientists are asked to make a shift from a self-referential and not aware to a more responsible research where scientific knowledge is only one of the drivers of innovation together with others coming from other actors.
- This orientation is part of the approach of **Horizon 2020**, that defines the problems in accordance with the **Europe 2020** strategy
- This orientation is also considered part of the **RRI** approach, aiming at doing **science with and for society**, including the involvement of society very upstream in the processes of research and innovation to align their outcomes with the values of society.

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A more responsible research and innovation: a challenge for the scientific communit

Considering the Space research, also **Copernicus initiative (ex GMES**) aiming at promoting downstream services based on **Earth Observation** (EO) technologies and research recommends researchers to:

- supply/technology push vs user pull (Eurisy, Position Paper, 2010)
- go beyond over selling of EO products and proposing (real) services for real users
- shift from demonstration research to operation ones (Meteo, GPS)

5. From a Technology-push to a Demand-driven Paradigm

The previous sections investigated the two main challenges to the development of specific services. In addition to these issues there is a more general challenge to the long-term development of space-based services in Europe. The transition from a technology-push to a demand-driven paradigm that is necessary for the successful development of space-based services in Europe requires adaptation of the current organisations of the space sector and of their programmes.

5.1. Challenges for existing organisations

The space sector is currently efficiently structured to develop and manufacture space systems in a technology-push approach, as long as the current sources of funding are maintained. However, for the successful development of services, a transition from technology-push to a demand-driven approach is necessary.
The structure of the space sector is adapted to the characteristics of its main product. Satellites are usually unique and customised systems and their development is associated with long cycles, high costs and high levels of financial and technical risk. These characteristics have resulted in a few large space agencies in Europe and a concentrated and stable industrial structure.
Up to now, the space industry has mainly focused on infrastructure and has developed satellites used mainly by scientific communities, with the major exception of the telecommunications sector. As a result, both development agencies and industry are today efficiently structured to develop satellites for

implementation cycles are
the costs and level of risk
Moreover, the field of
broader and has a wide
communities which are
differently than the cor
addressed by the space se
least, services require the
interact with other sectors
has not much data. The
reflected in the developm
programme, which goes
traditional space program
both vertical and horizont
the activities. Services
require the combination ar
variety of ground-based
tools. All these eleme
adaptation of the space
"service paradigm" on a
than today. Addressing u
efficient way requires the
multidisciplinary teams.
community of users requir
composition on a case-b
space agencies, adaptation
to create multidisciplinary
by specialised teams, wit
programme. These multi
should include experts
services that are avai
solutions based on terrestr
well as experts able to as
sustainability of new
expertise should be acquir
by space agencies/offices a
The differences between t
paradigm" and the "spa
paradigm" are summarised

EUROPEAN COMMISSION
ENTERPRISE AND INDUSTRY DIRECTORATE-GENERAL
Aerospace, Maritime, Security and Defence Industries
Copernicus : Services

Guidance document for proposers of Horizon 2020 projects in support of EO service activities (downstream or Copernicus service evolution)

The Horizon 2020 Work Programme calls for a number of topics which are in support of the Europe's capacities to provide services in the context of Earth Observation and the Copernicus Programme (previously called GMES – Global Monitoring for Environment and Security). Such activities may address downstream service opportunities (addressing national/regional/specific market niche) or may aim at evolution of EO products for future Copernicus service evolution.

In order to provide support to proposers, this guidance document has been prepared to communicate lessons learnt from Framework Programme 7, and best practices recognised to be valuable.

It has repeatedly been recognised that research and development activities striving to build up pre-operational delivery capabilities for Copernicus or downstream services or innovative exploitation of European space data need to take into account the user community they intend to serve, and the exploitation environment they will have to operate in after completion of their activities. Hence proposals must demonstrate:

- **A structural capacity for providing a sustainable service on an operational basis (preferably supported through a proven record).**
- **A clear focus on the operationalisation of services, and thus sustainability of the service during subsequent operations, by defining and further consolidating the economic model for service provision (e.g. through a business plan).**

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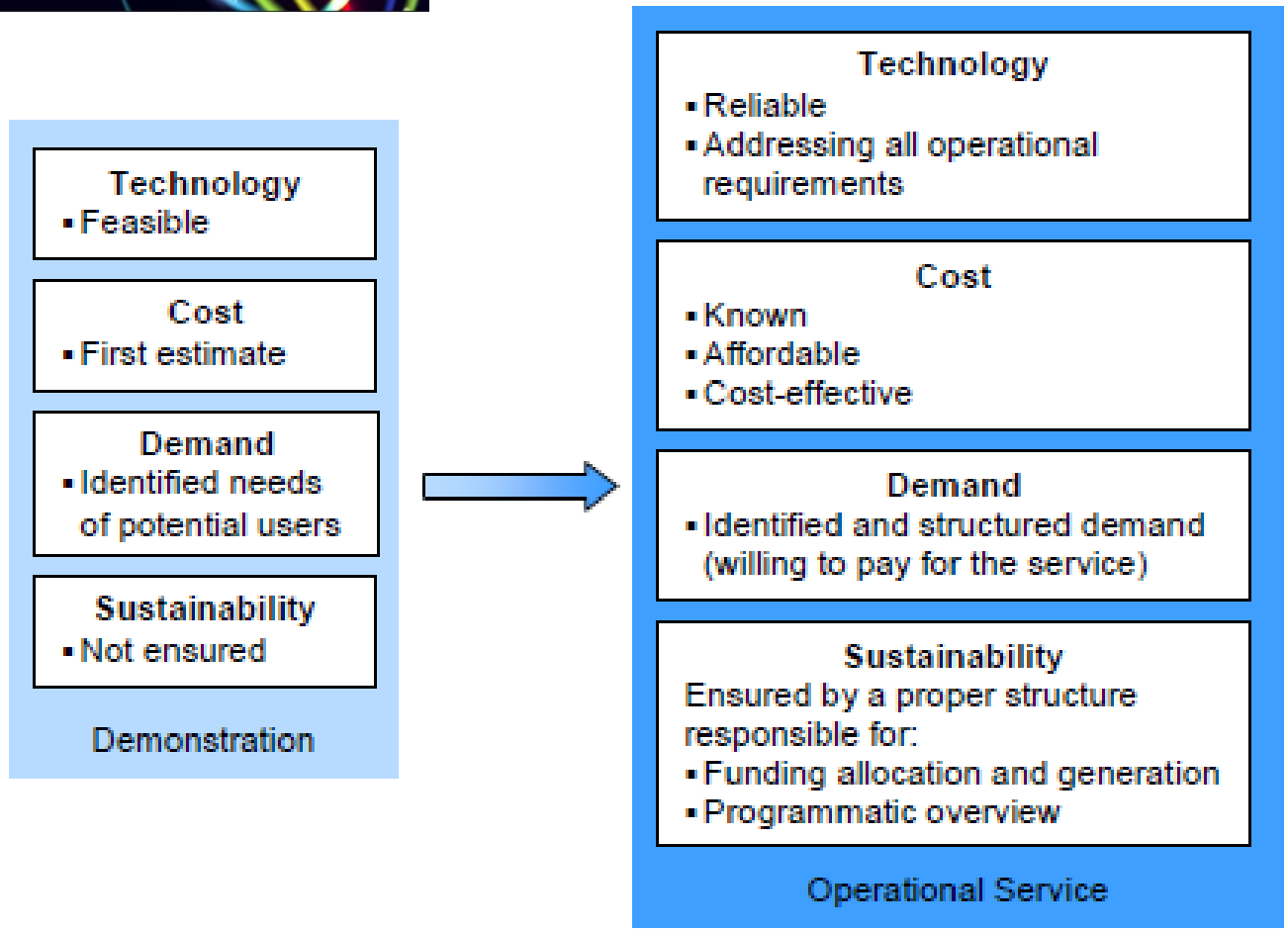

ESPI
European Space Policy Institute

SPACE-BASED SERVICES IN EUROPE
ADDRESSING THE TRANSITION BETWEEN DEMONSTRATION AND OPERATION
Report 17, March 2009
Charlotte MATTHEU

Figure 8: The different requirements for demonstration and operation

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A more responsible research and innovation: a challenge for the scientific communit

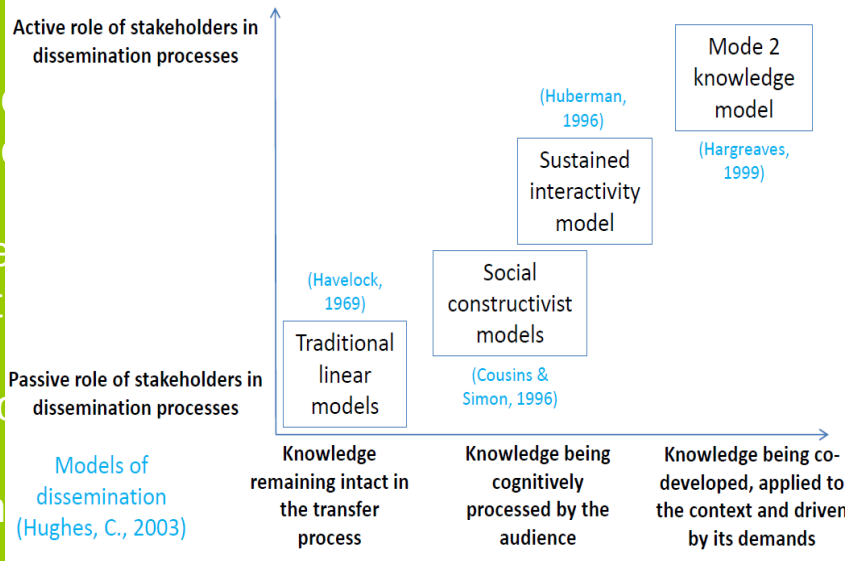
What does all this mean in the practice of a research project????

- **Workpackages of Dissemination and Exploitation of results** are since long time considered as mandatory at the European level helping the Project Management find innovative knowledge transfer strategies and enhance the pr outcomes and impact. However, Dissemination ar considered:
- activity to be carried out at the end of the proce
- activity with a passive role of stakeholders, wit impact on the research cycle
- activity where no indicators or evaluation metho are considered (like in research activities)
- activity carried out by the Project Manager with specific skills

RESULTS: many projects do not have impact on policy- making and society (not so responsible!!)

DESIRE

What models of dissemination have be described to bridge the academic-practitioner gap?



A more responsible research and innovation: a challenge for the scientific communit

What does all this mean in the practice of a research project????

- A more innovative declination of Dissemination activities is necessary
- Besides such activities actions of public engagement are necessary since the first steps of project proposal.
- In this context ***stakeholders engagement and users requirements analysis*** have gained more attention in the project design. Such activities introduced as WP are able to consider needs and expectations of stakeholders and potential users and to involve them as research co-actors and co-designers.

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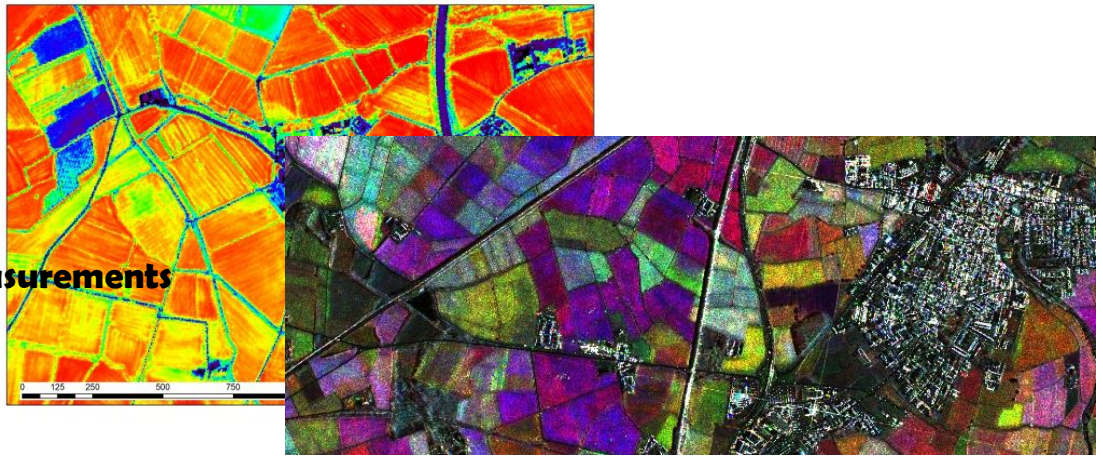
The project Space4Agri

Innovative Methodologies of Earth Observation supporting the Agricultural sector in Lombardy

On field measurements



RegioneLombardia

Remote sensing observations

Web 2.0/Smart App support for data collection /VGI for Earth Observation

UAV support for precision data collection

3 INSTITUTES OF CNR – LOMBARDY REGION 2013-2015 AGREEMENT

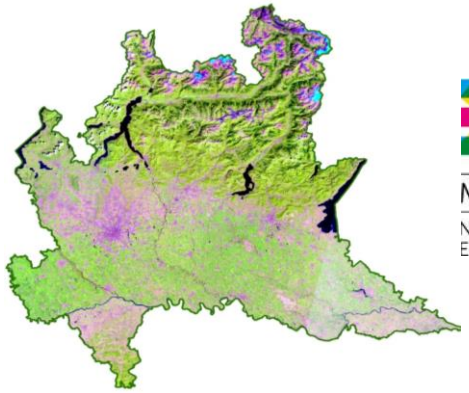
The project Space4Agri

Involving users and stakeholders: who, how and why?

Regione Lombardia, the first Italian Agricultural Region, which produces 42% of milk, 42% of rice in Italy; has a population of farmers of 2% who take care of 80% of the national territory**.**

At present the information on the agriculture on the regional territory is based on local observations, not sufficient to provide adequate vision on a global scale.
Often the different sources do not communicate each other, and are able to make an assessment of crops only **at the end of the season** rather than in the course of the same.

Aim of S4A is *to test methods for improving the supply chain **DATA - INFORMATION - SERVICE** and support the planning and management system of the agricultural sector in the Lombardy on a regional and a local scale.*



MILANO 2015
NUTRIRE IL PIANETA
ENERGIA PER LA VITA

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The project Space4Agri

Involving users and stakeholders in a research project during workflow: how?

WP0: Gestione del progetto

WP1: Analisi dello stato dell'arte, dei bisogni degli utenti, dei requisiti dei sistemi

WP2: SPACE: estrazione di informazioni sullo stato delle colture da dati satellitari

WP3: AERO: progettazione e sviluppo di ambienti a supporto delle riprese da piattaforme UAV

WP4: IN SITU: sviluppo di sistemi 2.0 per acquisizione dati e scambio informazioni in situ

TUNING *TUNING* *TUNING*

WP5: Test delle metodologie sviluppate per il monitoraggio agricolo lombardo

WP6: Valutazione dell'impatto delle tecnologie sviluppate sul territorio lombardo

WP7: Diffusione dei risultati

STATE OF ART, USERS NEEDS REQUIREMENTS OF THE SYSTEM TO DEVELOP (months 0-4)

3 ACTIVITIES FOR INVOLVING USERS AND STAKEHOLDERS IN THE PROJECT WORKFLOW

EVALUATION OF IMPACT

DISSEMINATION OF RESULTS

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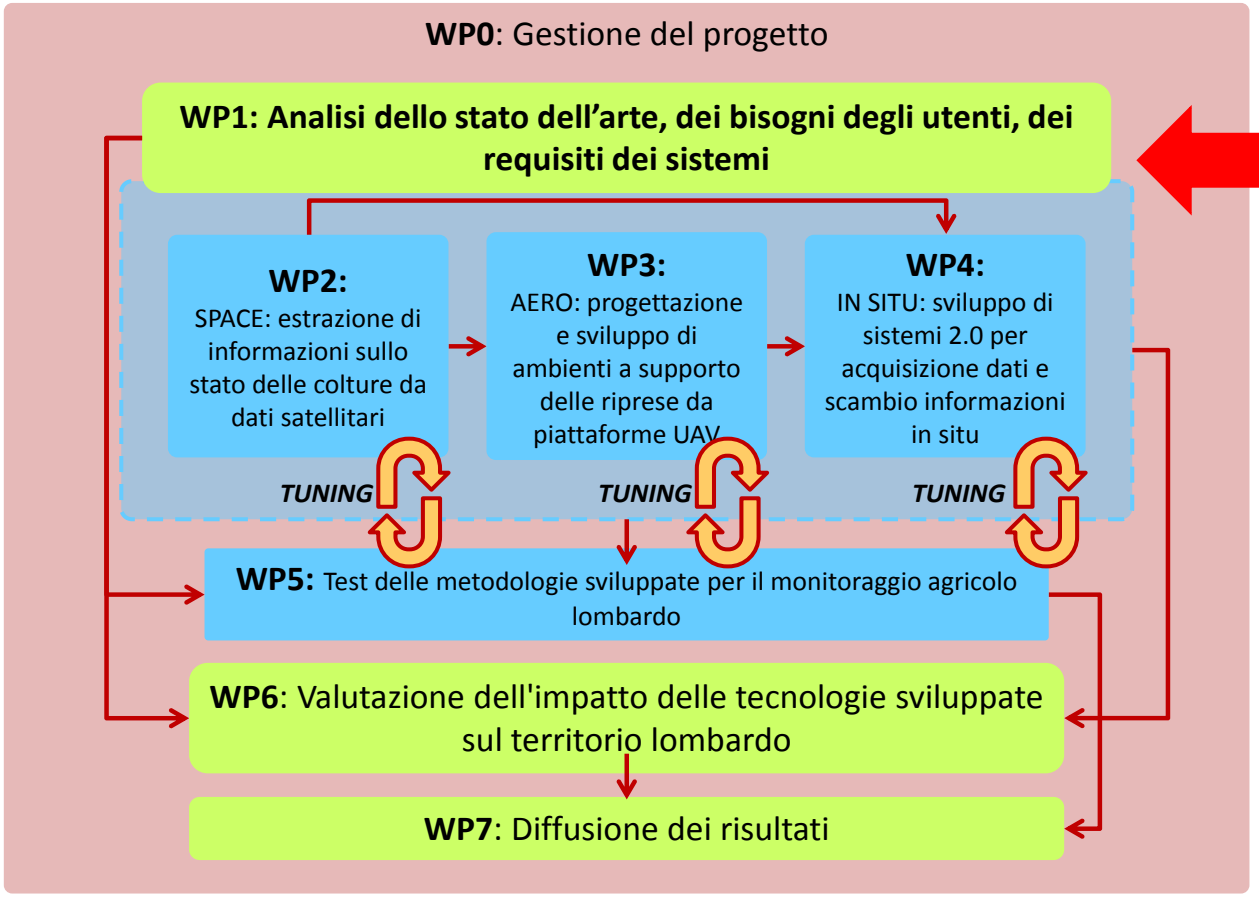
The project Space4Agri

Involving users and stakeholders in a research project during workflow: how?



STATE OF ART, USERS NEEDS REQUIREMENTS OF THE SYSTEM TO DEVELOP (months 0-4)

- **Identify target users and map stakeholders (PA)**
- **Set a methodology for defining users needs and requirements of the project products**
- **State of art on the basis of emerged needs**

The project Space4Agri

Involving users and stakeholders from the first steps of S4A: who, how and why?

RegioneLombardia

Need for information and decision support tools in particular climatic conditions and unexpected critical (eg . The 2012 season with an unexpected drop in maize production -20 % compared with 2011 and sensitive impacts on the entire agro - livestock of the Po Valley)

efsa

«**Aflatoxins** are known to be genotoxic and carcinogenic. They may be present in food products such as peanuts, nuts, maize, rice, a result of fungal contamination occurred before and after collection." (EFSA- European Food Security Authority)

EOI - Expression of Interest

Aermatica

ARPA LOMBARDIA
Agenzia Regionale per la Protezione dell'Ambiente

distretto aerospaziale lombardo

Neos s.r.l.
neos.to

ICC
Institut Cartogràfic de Catalunya

aviotrace SWISS
training academy

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Analyzing stakeholders needs: an iterative and recursive process

Requirements → Products/ methods → Feedback users → Requirements

The methodology for collecting requirements of stakeholders was iterative and implied many interactions among partners and external beneficiaries
Feedback on the products make sure that the project's objectives and expected results are always more responsive to their needs (not the static compliance to the Technical Project)

SPACE → AEREO → IN SITU → SPACE

ARPA L

DG AGRI

We used tools of qualitative analysis of social research: in-depth interviews, supported by semi-structured questions with open answers.
Answers were then processed in interpretative grids

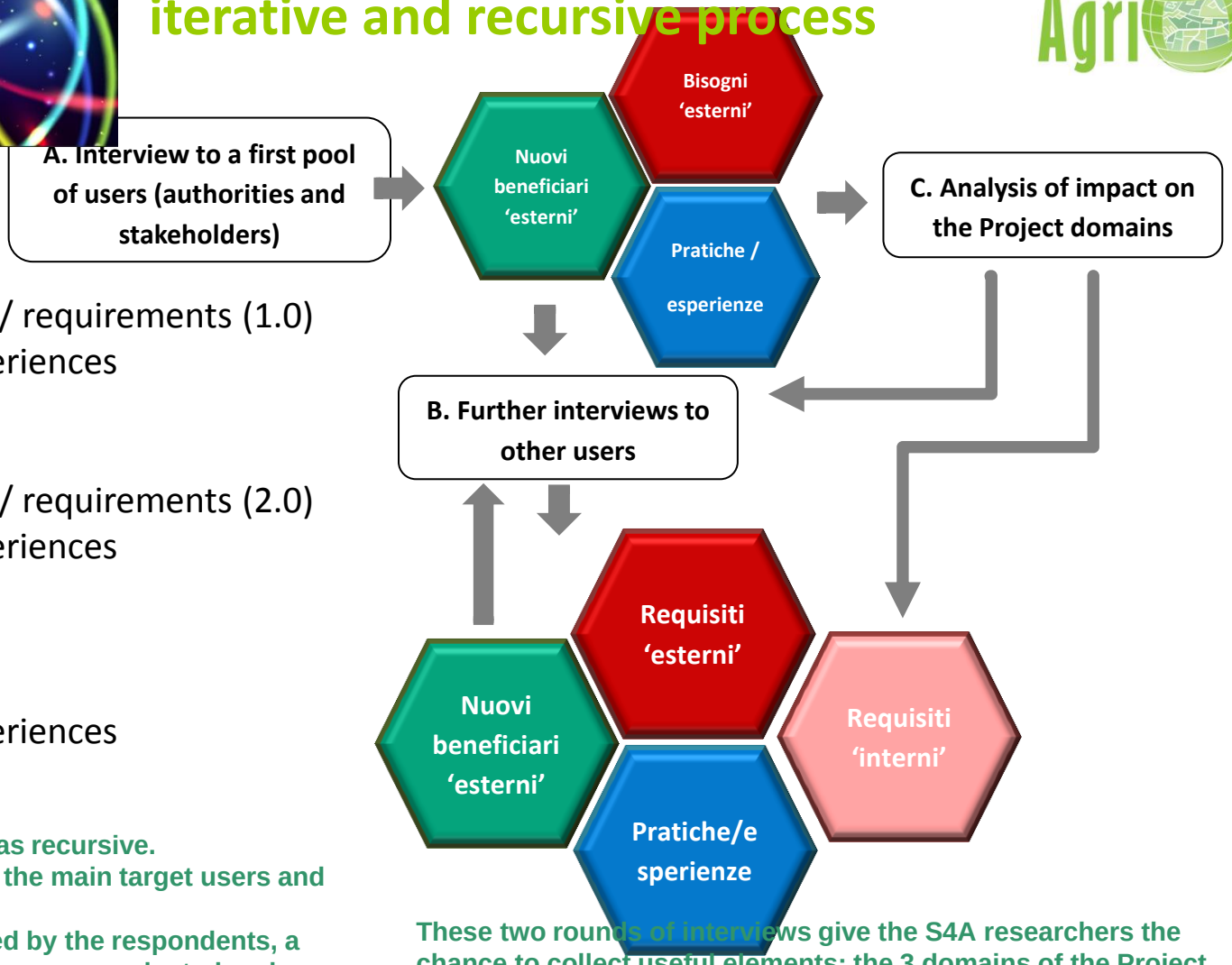
Qualitative semi- structured interviews
Interpretative grids

Analyzing stakeholders needs: an iterative and recursive process

Fase A to obtain:
- external needs/ requirements (1.0)
- practices/ experiences
- new contacts

Fase B to obtain:
- external needs/ requirements (2.0)
- practices/ experiences
- new contacts

Fase C to obtain:
- internal needs
- practices/ experiences
- new users



The methodology implemented was recursive.
At first, the researchers identified the main target users and explored their "external needs".
Thanks to the information provided by the respondents, a second round of deeper interviews were conducted and further (new) beneficiaries were derived.

These two rounds of interviews give the S4A researchers the chance to collect useful elements: the 3 domains of the Project reconstructed their own state of the art, researchers collected users' requirements and planned a co-designed workflow encountering as more as possible the needs of the different stakeholders

Results:

state of art and contributions

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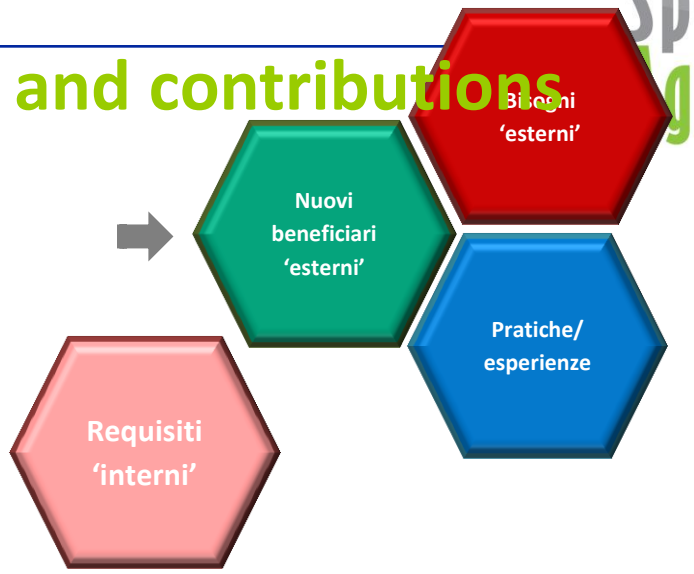
Contributo di S4A al sistema di monitoraggio delle colture lombardo	**C1.**	**DG Agri** si aspetta i seguenti contributi dal progetto S4A: a. supporto alla conoscenza dello stato delle colture nel tempo attraverso alcuni parametri di interesse; miglioramento della frequenza di rilevamento del dato nel tempo e nello spazio; b. sviluppo e integrazione dei parametri da raccogliere, cioè un aumento delle informazioni sulla coltura; c. progresso nella raccolta e nell'uso dei dati che attualmente sono sotto utilizzati e sotto diffusi Utente: **DG Agricoltura Regione Lombardia**
	C2.	**ARPA** si attende: contributo alla base conoscitiva per la gestione della risorsa idrica; in particolare fabbisogni e consumi reali idrici facendo delle previsioni e degli scenari di stima dell'evapotraspirazione (ET) potenziale per le colture in atto con frequenza mensile per il mese successivo (adesso solo per il mese in corso) Utente: **ARPA Lombardia**

Stato dell'arte	**SPACE**	**Mappatura delle colture in atto** (SIARL, iCOLT, Programma Statistico AGRIT, CROPLAND Data Layer, Crop Progress and Condition Maps (CPCS), **Stima evapotraspirazione** (Bollettino idrologico mensile - ARPA Lombardia, Bollettino AgroMeteo settimanale e mensile – ARPA Emilia-Romagna)
	AERO	Interfacce uomo computer, APR e applicazioni in agricoltura
	IN SITU	**Strumenti APP** disponibili per acquisizione di informazione di interesse agronomico: APP per il supporto fitosanitario, APP per il supporto alle attività in campo, APP agro news, APP Agrometeo **Informazione già disponibile "in situ":** Mappatura delle colture in atto (tipologia, fenologia), Informazioni meteo di ARPA Lombardia e modalità di accesso ai dati meteo **Infrastrutture di dati esistenti** in Italia per la pubblicazione di informazioni di interesse agronomico: regioni **Bollettini agronomici o agrometeorologici** pubblicati da Siti italiani o stranieri



During the research cycle, a second category of needs, called "internal", emerged and was collected. These requirements derived from the mutual interactions between the 3 scientific domains revealed interesting issues concerning the communication within and outside the scientific community and the perception of project co-design by all partners.
The overall approach finally combined external and internal needs highlighting critical issues and operational difficulties but also providing interesting ideas for possible applications and future developments in the Science and Technology Studies

Results:

further beneficiaries involved

Nuovi beneficiari 'esterni'

List of further users as a result of the interviews to the first pool of stakeholders	1. Farmers (users of information and maps on crops and any stress) 2. Technical staff of Regione Lombardia (users of information produced by Regione Lombardia) 3. Enterprises that utilize products from agriculture 4. Agronomists, business consultants or technicians of private companies as potential developers of services based on EO technologies

The work with the users made the researchers better understand the state of art of their topic

Conclusions:

positive and critical aspects of involving users (and researchers)

EXTERNAL-INTERNAL / methodological

- stakeholders involved from the beginning felt part of the research process ; they collaborated a lot and the interviews were also perceived as a way to reflect on own internal communication flow (from both stakeholders, users and researchers).
- **Methods** are based on tools of social sciences methodologies, not always present in a research team; Interviews and interactions are time consuming, energy consuming and not always clear for researchers ; sometimes researcher perceived it as «**too restrictive for the autonomy of researcher**», and this opened a discussion on to what extent a researcher has to meet the external needs.
- Researchers tend to interact among them de visu, via **informal ways**, such interactions are not easy to follow and this can have an impact on the reconstruction of the process

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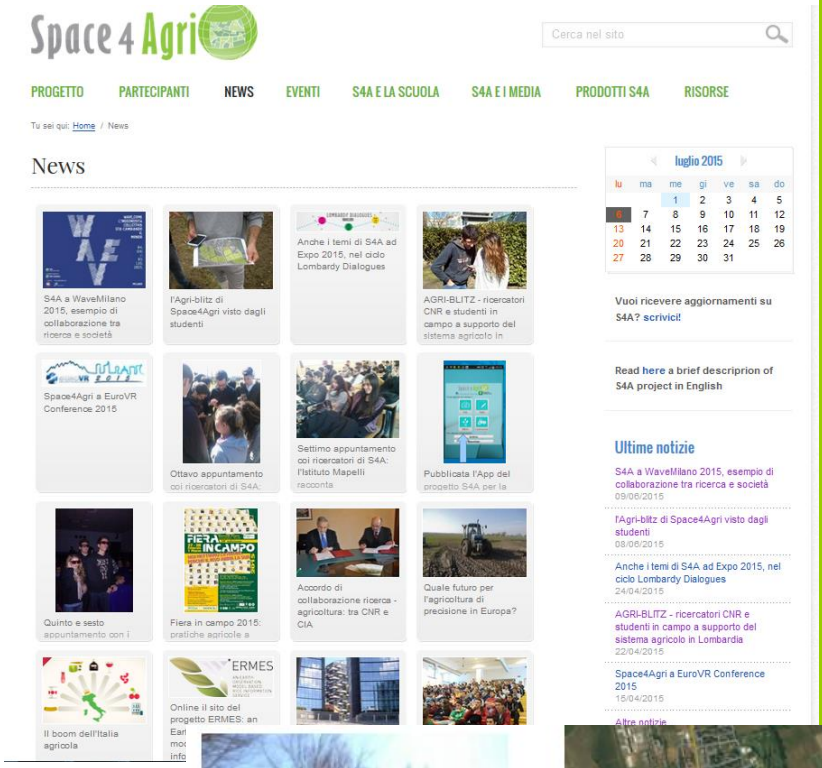
Conclusions:

positive and critical aspects of involving users (and researchers)



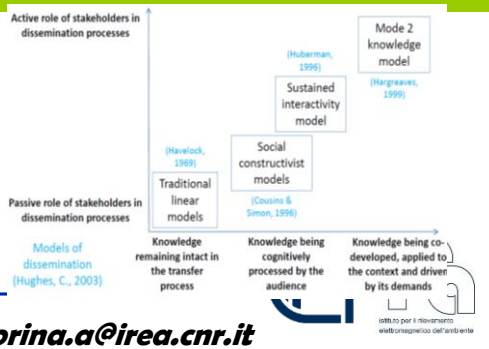
Lessons learnt from the practice

- Services and products,tailored according to needs of external users; always need to be validated during the workflow or the project (continuous evaluation process, recursive and iterative process) not only for benefit of stakeholders but also researchers
- It is necessary to plan **more time** in the WP (as for Dissemination from the starting to the conclusion of the project)
- It is necessary to make the different WP interact each other more (we did it with Dissemination of results, involving students, making them part active of the connection between the researchers and the stakeholder)
- Coproduction, that is «knowledge being co-developed considering the needs of all actors is also a cultural shift, and as such it implies a long process of reciprocal understanding.

studenti e ricercatori CNR in campo

area agricola di Noverasco

insegnanti e ricercatori in classe studiano il percorso dell'Agri-blitz



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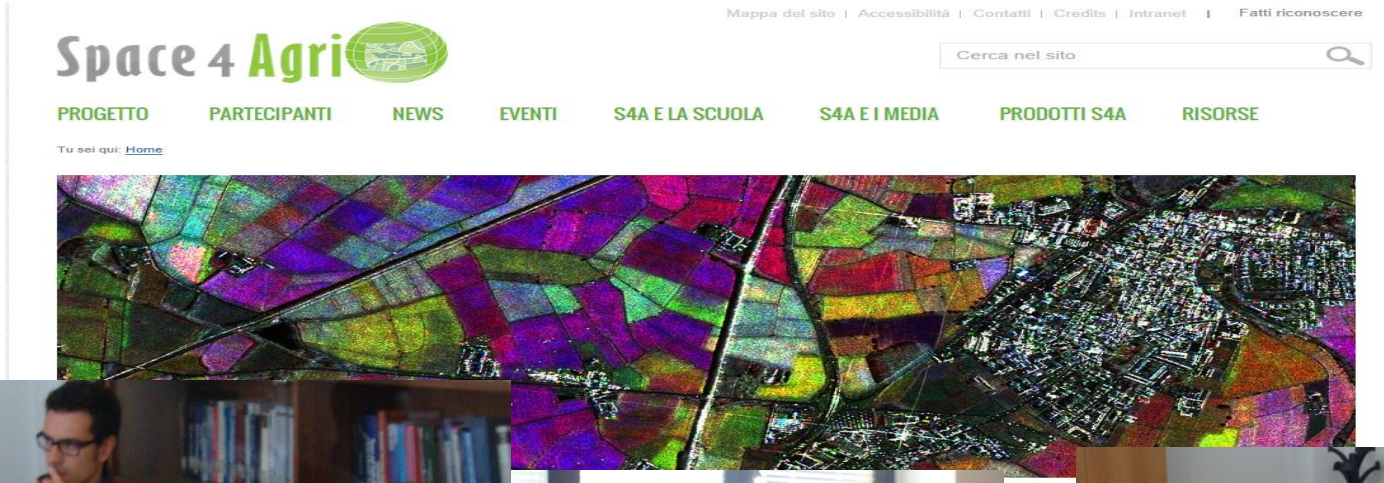
Conclusions:

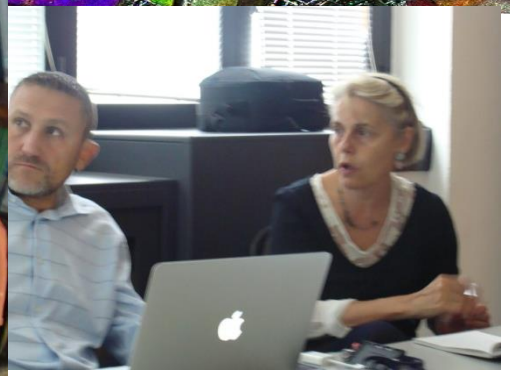
Science in Public: research – practice - impact

Open Innovation Platform of Regione Lombardia: a way to bring together all actors of innovation in an effective dialogue with other actors (farmers, technicians, citizens etc.)

VGI4EO
VOLOUNTEER GEOGRAPHIC INFORMATION FOR EARTH OBSERVATION
Aimed at discussing and sharing critical aspects and to co-produce knowledge and innovation

http://space4agri.irea.cnr.it/





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Thanks for attention