

INCONET-GCC Research Priorities

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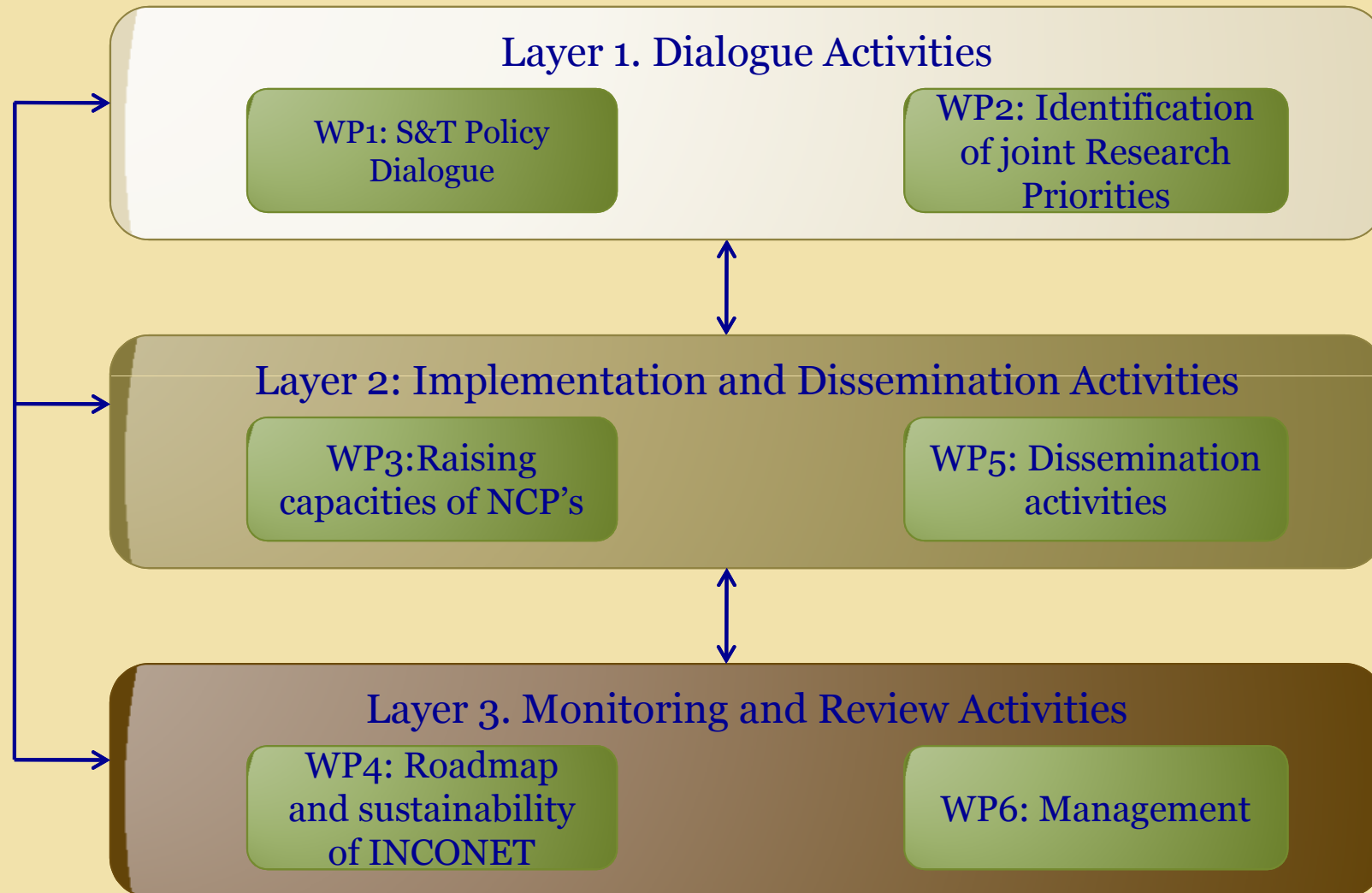
R&D and the Innovation scheme

- Global priority in virtually any region of the world is to identify the most competitive areas in S&T, where the different countries can shape their competitiveness
- Only top class science will have an international impact, and the conditions for creativity in research usually requires the development of regional and international collaboration.
- In this context, the objective of the INCONET programme is the identification of the most promising research areas of common interest to mutual benefit from S&T cooperation.
- Key areas will be evaluated in terms of implementation of STI policy decisions, which are essential in achieving a competitive advantage for a country/region.
- The strategic choices in the area of Science and Technology Policy are essentially important for the purpose of developing best policy practices of relevance for the Gulf Cooperation Council (GCC) countries in their collaboration with the European Union.

R&D and the Innovation scheme



- The role of science and technology in shaping innovation systems is central to the performance and excellence of the innovation schemes.
- The development of a performing science and research framework cannot be disconnected from the development of human capital through education and from the development of a performing Higher Education system in a competitive international context
- In particular, the development of a Higher Education system of high academic standards requires the presence of multi-disciplinary and internationally related academic institutions giving to the researchers mobility and access to a wide international context and attracting national and international talents.
- The impact of a traditional scheme of bilateral cooperation on some focused area can be compared to the benefits of broader network R&D activities as very important instruments for science and technology capacity building and essential vehicles for knowledge and innovation development.
- Such collaborative R&D environments give graduates greater opportunities for learning, developing their competencies and skills and concretise their innovative ideas offering also larger opportunities for industry and academia collaborations.



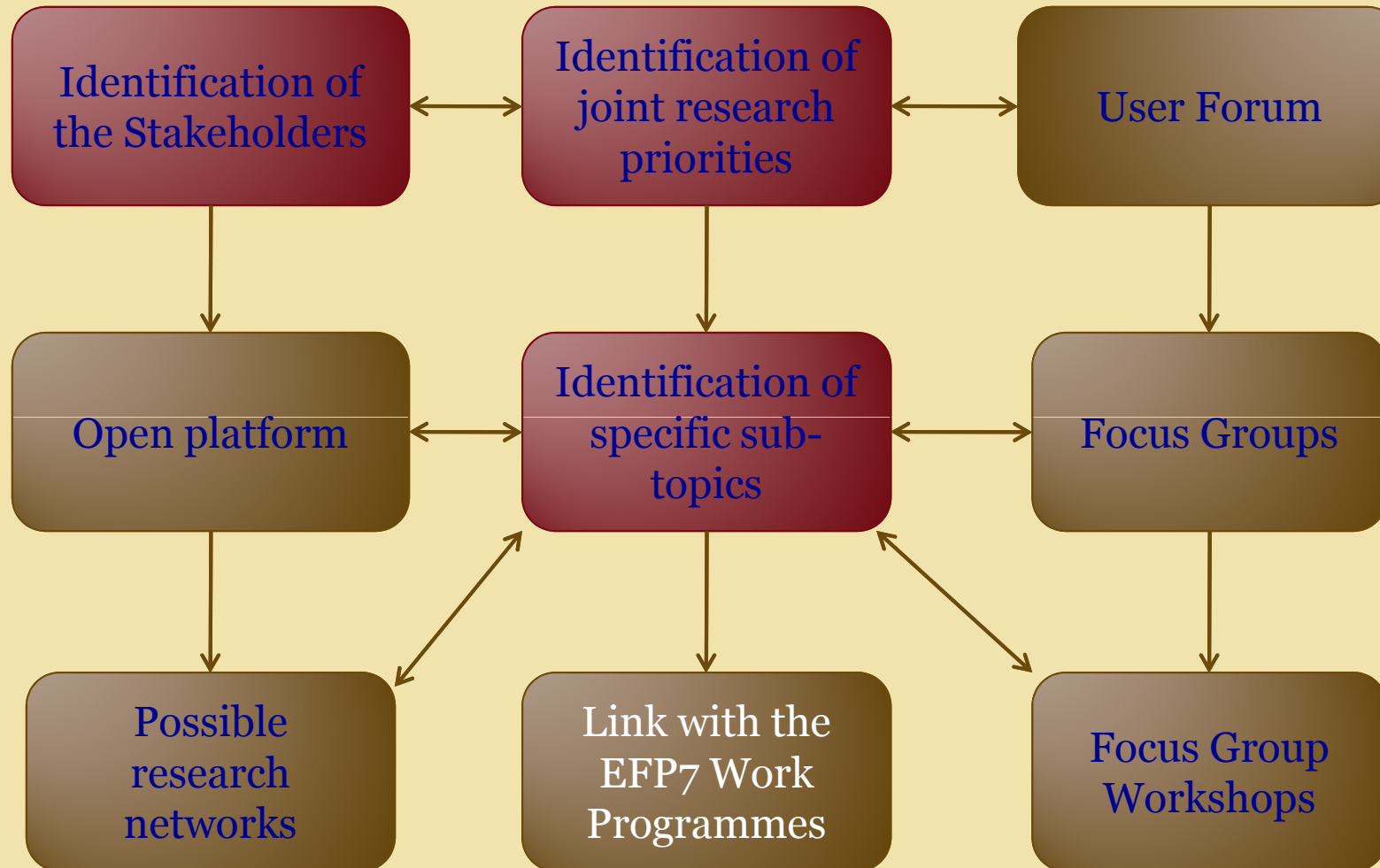
Layer 1. Dialogue Activities

WP1: S&T Policy
Dialogue



WP2: Identification
of joint Research
Priorities

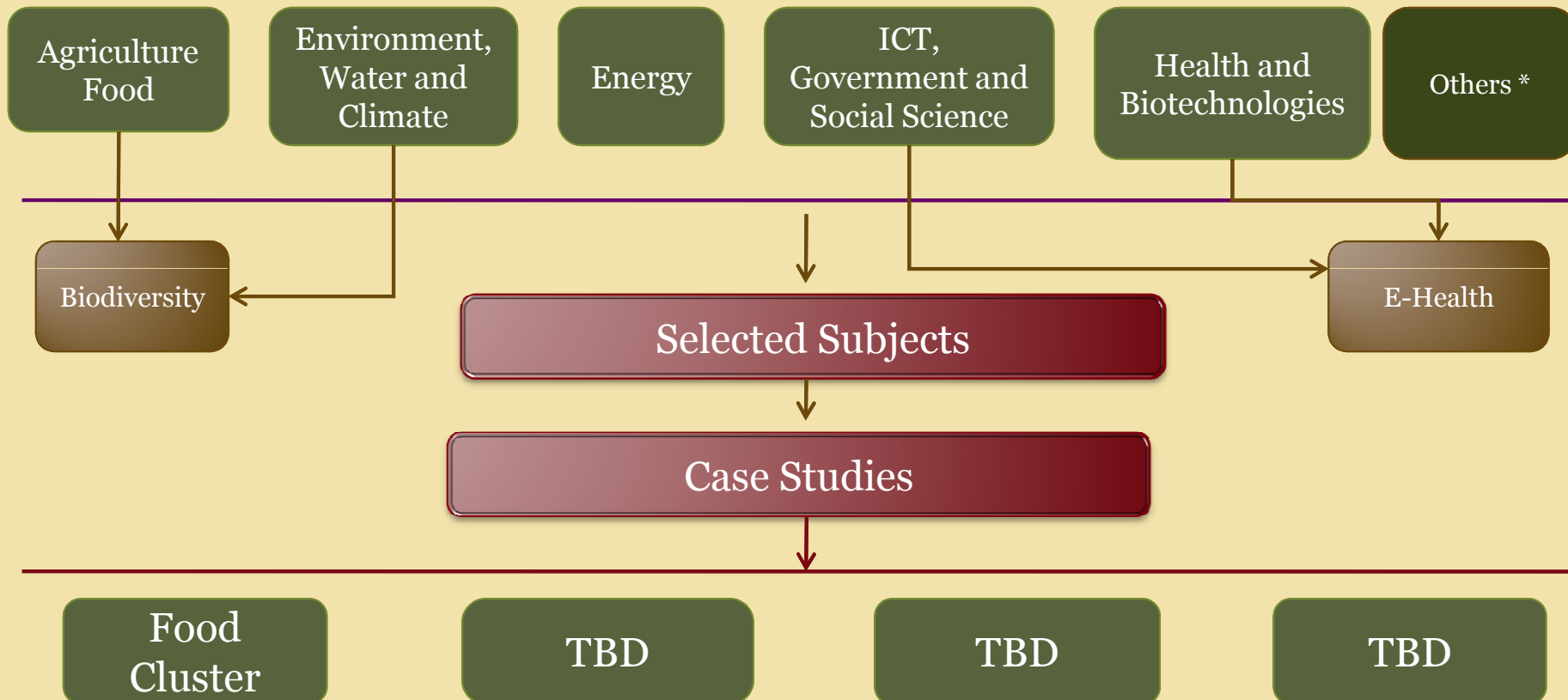
- Review current methodologies in Europe and GCC S&T policy advisory
 - Survey the current main R&T interests and programmes.
- Identification of common themes and practices in S&T policy
 - Identification of joint research priorities
- Establish concrete plan of collaboration in S&T policy advisory
 - S&T mapping for concrete network cooperations



WP2 Implementation

- The identification of the “*S&T Research and Development Priority Areas*” has been pursued following a bottom-up approach, in order to take advantage of the existing activities and excellence in both regions.
- Preliminary mapping shows of common R&D activities showed a very wide and interconnected range of subjects, highlighting a very interesting framework for EU-GCC cooperation in a lot of different fields.
- Of a particular interest are the multidisciplinary aspects of the most promising field of cooperation.
- Three steps have been identified to pursue this selection.
 1. *Priority Areas,*
 2. *Priority Subjects,*
 3. *Case Studies.*

Priority Areas



* Nanotechnologies, Materials ,Transport, Aerospace

1.- Priority Areas

The *Priority Areas* have been identified using different sources of information and the following criteria:

- A survey of the existing research interest in the GCC (WP2)
- A guideline of the EC-GCC bilateral priorities (WP2)
- Common GCC interests (WP2)
- National GCC priorities (WP1, WP2)

2.- Priority Subjects

The selection of the *Priority Subjects* draws on various kinds of inputs and perspectives

- The main existing bi-lateral co-operation lines (WP2, WP1.3)
- EU - GCC research priority in the different areas (WP2)
- Stakeholders communities (WP1, WP2, WP 3.5)
- Regional and international impact (WP1, WP1.2)
- Multidisciplinary implications (WP2)

Research Priority Subjects



Energy

- The European Union (EU) energy policy address the major energy challenges facing Europe today, i.e. climate change, the increasing dependence on imports, the strain on energy resources and access for all users to affordable, secure energy.
- The EU is putting in place an ambitious energy policy – covering the full range of energy sources from fossil fuels (oil, gas and coal) to nuclear energy and renewables (solar, wind, biomass, geothermal, hydro-electric and tidal
- Renewable sources of energy are essential alternatives to fossil fuels
- The “Directives on Renewable Energies” sets ambitious targets, such a 20% share of energy from renewable sources by 2020 and a 10% share of renewable energy specifically in the transport sector.
- Targets are: Greenhouse Gas Reductions (20%), Energy Generation (20%), Energy Efficiency (20%).



- Greenhouse Gas Reductions
Novel technologies for Carbon Capture and Storage
Natural Gas, New processes based on natural gas
- Energy Generation, Non-fossil sources:
Solar thermal, Photovoltaic, Bio-fuel, Wind
Fuel cells
- Alternatives
Gas to liquids
Development of sustainable chemistry (i.e., chemical intermediates, commodity and advanced polymers).
- Energy efficiency
Energy storage, development of tools for energy system analysis and planning
Smart grid, electricity networks for future
Green-building (LEED, ...), efficient use of energy in buildings
Efficient oil/gas production
Clean Combustion
Impact on water efficiency

Environment, Water and Climate

The long-term prospects for the region should be focused on the development and application of new advanced methods/technologies and innovative tools for integrated analysis and protection of the environment. In addition, a strategy for control, assessment and treatment of environmental pollution is an essential point, with emphasis on specific social and economic areas of national interest.

Environment, water and Climate include a wide range of issues and can be divided into four broad categories:

- Environment and health
- Climate change and air quality
- Water quality
- Marine environment and ecosystems.

Environment, Water and Climate



- Climate change
Coupled atmosphere-ocean models, impact of climate change, desertification, greenhouse gases emissions and sinks, energy balance of the planet.
- Pollution
Air pollution prevention, new air quality sensors, air quality monitoring network, atmospheric pollutant deposition, hazardous waste in air/soil/water etc.).
- Emission & abatement:
Carbon Capture Storage/Carbon Management, Environmentally responsible oil and gas production, Effects of oil and gas production, Policies and regulations, Safety and Risk Assessment

Environment, Water and Climate

- Water
Water management (Novel production methods/desalination, Water use and wastewater, Water recycling and reuse, Impact on energy efficiency, Impact on water efficiency/water management, hydrology)
- Water quality (ecological quality of surface waters, biodiversity conservation and environmental restoration, integrated river basin management, water pollution assessment, remediation of aquatic systems).
- Marine environment and ecosystems
Deep sea environment and ecosystems, coastal- zone management, observation technologies, natural hazards, pollution risk assessment scenarios for oil marine transport in the European seas, alien marine species, harmful algal blooms).
- Environmental health
Systematic studies of pollutants, environmental and molecular epidemiology, environmental toxicology, gene-environment interactions and toxicogenomics).

ICT

Current trends lead to miniaturization via the application and further evolution of Nano-technologies and nanosystems to provide an integrated ambient intelligence Environment for the future.

- E-Services

Full range of e-services for economic and social challenges. Better use of ICT to support national policies. Modernization of the region's public sector, etc.,

- Social science

Arabization & Arabic Content, knowledge, cognitive and learning systems, interaction, robotics, National Heritage, Science research strategy and priorities

ICT

- Security
Personal emergency system, protection against crime and terrorism, Secure home environment.
- Communications
Wireless Communications & Sensor Networks, Cloud computing, protection of privacy, Multiple input Multiple Output systems
- E-Health
Real time diagnostics, Bio-chips, Body sensors
- Mobility and Transports
Safety on the road, Integrated Transposrt Systems, prévention of pollution

Agriculture and food

- Research and development in food science involves a multidisciplinary approach involving physiology, chemistry, biology, microbiology, engineering and other interdisciplinary fields.
- Support of food research is critical in order to develop and sustain the necessary know how that will differentiate the products produced by the national food sectors. This scientific knowledge, within the context of the international state of the art research, has to be adaptable and specific to the national applications and food products to allow them to build a competitive edge built on technology and innovation.
- A Common Fisheries Policy for the region will lead to improving the overall strategic approach, rather than simply making incremental changes to existing policies.
- Aquaculture, probably the fastest growing food-producing sector, now accounts for almost 50 per cent of the world's food fish and is perceived as having the greatest potential to meet the growing demand for aquatic food.

Agriculture and food

- Agriculture biotechnologies, Bio-saline agriculture
- Fisheries Genetics/Biotechnology: Genetic and genomic monitoring of fish populations, genetic monitoring of fisheries – marine biodiversity interactions.
- Food Security, Food Industry, Optimized animal health production and welfare across agriculture, fisheries and aquaculture
- Food Production, Diversification of production by introduction of new species, Preparation of new technologies and methods for tomorrow aquaculture and domestication of the sea
- Coastal area management

Transports

The transport system serves key roles in the transportation of people and goods at the local, regional, national and international context. It is essential to a country's prosperity and closely linked to economic growth. The current framework aims at the development of technological solutions that will result in a safer, “greener”, more intelligent and as personalized as possible transport system.

- Safe transport.
- Information provision.
- Road pricing.
- Traffic control.
- Transport fuels – environmental issues.
- Planning issues, land use-transportation interactions

Health and Life Sciences

The importance of Health Life Sciences in the international research arena is well established, providing the basis for understanding nature, fighting diseases and developing innovative products in the biotechnology, pharmaceutical, food, agricultural and other sectors.

The new developments in Life Sciences research are widely expected to have a tremendous impact on societies and their economies worldwide. It is imperative that the region does not miss the opportunity to play an active role in this international effort.

- Detection of diseases, biomarkers predicting the onset or initiation of a disease.
- Nanomedicine, Nanodelivery systems providing a significant therapeutic payload.
- Medical and Pharmaceutical Biotechnologies
- Stem Cells, Genetics, Neurogenetics, Genomic Screening
- Diabetes, and Obesity, Liver Disease, Genetic Immunology,
- Electromagnetic Imaging,
- Cardiology, Physiology

Aerospace and Earth's Observation

- GMES (Global Monitoring for Environment and Security) is a joint programme between the European Space Agency and the European Commission.
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- The programme is devoted to the research and service support activities using EO (Earth Observation) data from space.
- This include two kind of activities
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- 1.- GMES Service Elements, GSE
- Development and validation of pre-operational GMES services and products for end-users
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- 2.-Global Monitoring of essential climate variable, Climate Change Initiative (CCI)
- Development and validation of algorithms for global satellite data products from multi-sensors data archives, strength interdisciplinary cooperation between international Earth observation, climate and environmental research and modelling communities.

Aerospace and Earth's Observation

Marine

- Services integrate detection and monitoring technologies involved in water quality, oil spill and meteorological and biological information into a durable network.
- They contribute to the protection and the sustainable management of living marine resources in particular for aquaculture, fishery research or regional fishery organizations and provide physical and marine biogeochemical components useful for water quality monitoring and pollution control, marine biology and sea level rise helping to predict coastal erosion.
- Services are also useful for selecting locations for offshore windmill parks or thermal energy conversion fields, reanalysis of hydrodynamic and ecosystem models

Aerospace and Earth's Observation

Terrestrial

- Benefiting from Earth Observation satellite data, the GMES land monitoring service provides accurate and cross-border harmonized geo-information at global to local scales.
- Services provide geographical information on land cover including its seasonal and annual changes and monitor variables such as the vegetation state or the water cycle.
- It has a wide range of applications for use in land use / land cover change, soil sealing, water quality and availability, spatial planning, forest monitoring and global food security.
- Services can address efficient water resource management in water-scarce environments, and water for food production with the perspective of a sustainable agriculture in the context of integrated river-basin management, including drought management.
- They aim at developing innovative and new service capacities for the user community of irrigation water management and sustainable food production.

3.- Case Studies

The identification of case studies will mainly follows direct request for cooperation from research institutions and stakeholders from EU and GCC Countries.

One first Case Study for the implementation of a Food Cluster initiative has started in Oman.

- The implementation of a Food cluster has been identified as a national priority in Oman.
- The Food Cluster Pilot Project has started as a Bilateral Cooperation between Oman and the EU
- Oman can be included in the EU Food Cluster initiative already existing in the EU.