D4.2 Research and Funding agendas Watch

***IASON**:* Fostering sustainability and uptake of research results through Networking activities in Black Sea & Mediterranean areas

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[1] **R** = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

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Aristotle University of Thessaloniki (AUTH) Greece

National Research Council of Italy (CNR-IIA) Italy

Univerzitet u Novom Sadu (UNS) Serbia

University of Geneva (UNIGE) Switzerland

HCP International (HCP) The Netherlands

GeoImaging (GEO) Cyprus

Instituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) Italy

International Centre on Environmental Monitoring (CIMA) Italy Albanian Branch

Centre Regional Africain des Sciences et Technologie de l' Espace en Langue Francaise, affilié à l'ONU (CRASTE-LF) Morocco

University of Split (UNIST) Croatia

Ekinoks Surveying Software Engineering Ltd (EKINOKS) Turkey

Geographic GIS&RS Consulting Centre (GEOGRAPHIC) Georgia

Technical University of Cluj-Napoca (UTC) Romania

Coastal Protection Agency (APAL) Tunisia

ABBREVIATIONS

Term	Explanation
ASRT	academy of scientific research and technology (Egypt)
AFOLU	agriculture, forest and other land use
AOD	aerosol optical depth
AUTH	Aristotle university of Thessaloniki
BES	border security and external security
BG	blue growth
BMGF	Bill and Melinda Gates foundation
BS	Black Sea
BSC	Black Sea commission
BSCPS	commission on the protection of the Black Sea
BSEC	organisation of the Black Sea economic cooperation
BSNN	Black Sea NGO network
BSRN	Black Sea research network
BST	Black Sea trust for regional cooperation
BSTDB	Black Sea trade and development bank
BSUN	Black Sea university network
CBC	cross border cooperation
CBD	convention on biological diversity
CCA	climate change action
CFP	common fisheries policy
CIDA	Canadian international development agency

CIMA	international centre for environmental monitoring
CIP	common information platform
CNR-IIA	national research council (Italy)
CoP	conference of the parties
COST	European cooperation in science and technology
CRA	collaborative research action
CRASTE-LF	African regional centre for space science and technology in the French language
D	deliverable
DABLAS	Danube and Black Sea task force
DANIDA	Danish development assistance
DRBM	Danube river basin management
DRR	disaster risk reduction
DRS	disaster resilience and climate change
DUE	data user element
EC	European Commission
ECE	economic commission for Europe
EEAA	Egyptian environmental affairs agency
EEIF	Egyptian environmental investment fund
EFFIS	European forest fire information system
EGIDA	coordinating earth and environmental cross-disciplinary projects to promote GEOSS
EIA	environmental impact assessment
EIB	European investment bank
EIP	European innovation partnership

ENI	European neighbourhood instrument
ENPI	European neighbourhood partnership instrument
EO	earth observation
EOPOWER	earth observation for economic empowerment
EPAP	Egyptian pollution abatement project
EPF	environmental protection fund (Egypt)
ERA	European research area
ERC	European research council
ERSAP	Economic reform and structural adjustment programme
ESA	European space agency
ESAPS	Earth system analysis and prediction system
ESFRI	European strategy forum on research infrastructures
ESP	environmental sector programme
EU	European Union
EUROMED	Euro-Mediterranean partnership
EUSDR	EU strategy for the Danube region
EUWI	EU water initiative
EW-MFA	economy-wide material flow accounts
FEMIP	facility for Euro-Mediterranean investment and partnership
FP7	seventh framework programme
GDP	gross domestic product
GEF	global environment facility
GEO	group on earth observations

GEO	Geoimaging Ltd
GEOBON	GEO biodiversity observation network
GEOSS	global earth observation system of systems
GHG	greenhouse gases
GNI	gross national income
GOOS	global ocean observing system
GSRT	general secretary for research and technology (Greece)
GTZ	German technical cooperation
HCST	higher council of science and technology (Egypt)
IAS	invasive alien species
IASON	fostering sustainability and uptake of research results through networking activities
IAOOS	integrated Atlantic Ocean observing system
ICBSS	international centre for Black Sea studies
ICMM	international council on mining and metals
ICZM	integrated coastal zone management
ICPDR	international commission of the protection of the Danube river
ICT	information and communication technology
IDSC	information and decision support centre (Egypt)
IF	individual fellowships
IGFA	international group of funding agencies for global change research
IMC	industrial modernisation centre (Egypt)
IMP	industrial modernisation programme (Egypt)
IMPACTMIN	impact monitoring of mineral resources exploitation

INFRAIA	integrating and opening research infrastructures of European interest
INSPIRE	infrastructure for spatial information in the European Community
IPCC	intergovernmental panel on climate change
ISO	international standards organisation
ISPRA	higher institute for research and monitoring of the environment
ITAC	information technology academia collaboration (Egypt)
ITIDA	information technology industry development agency (Egypt)
IUU	illegal, unreported and unregulated
JBIC	Japan bank for international cooperation
JOP	joint operational programme
JPI	joint programming initiative
KIC	knowledge and innovation community
LCA	life cycle assessment
LDCF	least developed countries fund
LIFE+	financial instrument for the environment
MAP	Mediterranean action plan
MARCOM+	marine and maritime science community
MDG	millennium development goal
MED	Mediterranean
MSFD	marine strategy framework directive
MSY	maximum sustainable yield
MONERIS	modelling nutrient emissions in river systems
MOSR	ministry of scientific research (Egypt)

MRV	measurement, reporting, verification
MSCA	Marie Skłodowska-Curie actions
MSEA	ministry of state for environmental affairs
MP	Montreal protocol on substances that deplete the ozone layer
NCP	national contact point
NCRT	national council for research and technology (Greece)
NGO	non-governmental organisation
NPIF	Nagoya protocol implementation fund
NSFRI	national strategy framework for research and innovation (Greece)
ODA	official development assistance
PABSEC	parliamentary assembly of the Black Sea economic cooperation
PM	particulate matter
POP	persistent organic pollutant
PPSI	private public sector industry project
PROVIA	programme of research on climate change vulnerability impact and adaptation
PSU	programme support unit
R&D	research and development
R&D&I	research and development and innovation
R&I	research and innovation
Ramsar	convention on wetlands of international importance
RISE	research and innovation staff exchange
RJGC	royal Jordanian geographic centre
RTD	research and technology development

S&T	science and technology
SC5	low carbon, resource efficient economy with a sustainable supply of raw materials
SCCF	special climate change fund
SCST	supreme council for science and technology (Turkey)
SDG	sustainable development goal
SDI	spatial data infrastructure
SEAM	support for environmental assessment and management
SEEA	system of environmental-economic accounts
SFD	social fund for development
SFM	sustainable forest management
SFS	food security
SGP	small grants programme
SME	small and medium enterprises
SMEDUP	small and medium enterprise development in Upper Egypt
SRIA	strategic research and innovation agenda
STDF	science and technology development fund (Egypt)
STI	science, technology, innovation
tCO2e	tonne carbon dioxide equivalent
TEPAV	economic policy research foundation of Turkey
TUBITAK	scientific and technological research council of Turkey
UNCCD	UN convention to combat desertification
UNDP	UN development programme
UNEP	UN environment programme

UNFCCC	UN framework convention on climate change
UfM	union for the Mediterranean
UNIGE	university of Geneva
UNIST	university of Split
UN	United Nations
UNS	university of Novi Sad
US	United States
UTC	Cluj-Napoca university of technology
V	version
WAVES	wealth accounting and the valuation of ecosystem services
WCRP	world climate research programme
WFD	water framework directive
WP	work package
WSSD	world summit on sustainable development

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EXECUTIVE SUMMARY

This report is a working document that supports and forms the basis of the IASON deliverable *research and funding agenda watch*.

The subjects that are dealt with are the main focal point of the IASON project:

- Coastal monitoring, representing the pillar of climate action,
- Water and soil resources management, representing resource efficiency,
- Mining and mineral exploration, representing raw material management,

and earth observation in general, which is covered by looking at the spatial dimension of the different subjects, priorities and indicators. Of course, the Mediterranean and Black Sea regions receive special attention.

The European research agenda is determined by the Horizon 2020 programme. This programme is very important for the *research and funding agenda watch*. Many elements of the Horizon 2020 programme are derived from European directives and regulations. There are other European programmes that support compliance with and implementation of these directives and regulations that may provide opportunities for research (funding). National research agendas are mostly limited to subjects of local interest and open to local parties only. At the national level, however, they may be the major source for research funding. Cross-border cooperation in the Mediterranean and Black Sea region is usually not directed at research funding, but occasionally opportunities may arise. There is a trend towards coordination and integration of the international research agenda, especially with respect to global challenges. The scope of funding has, until now, been quite limited, but developments are interesting. Equally interesting to follow are the process of formulation and (later) implementation of sustainable development goals (and associated activities) and developments around international agreements, taking into consideration that opportunities for research funding are most likely to be achieved in an indirect way.

The IASON sustainable funding toolkit is the next step of the research and funding agenda activity and will be derived from a combination of sources: the research and funding agenda watch, the IASON funding opportunities database, the EGIDA methodology (developed further by the IASON and EOPOWER projects) and the EOPOWER impact assessment methodology.

1. INTRODUCTION

The deliverable that concerns the *research and funding agenda watch* is not a report but the agenda watch itself: results, updates and opportunities will be published on the IASON website. However, the background information and analysis that forms the basis for the start of *research and funding agenda watch* is published here in the form of a working document. The term working document implies that, although it is a snapshot of the situation in time, it contains useful information and the initial analysis of the *research and funding agenda watch*.

The subjects that are dealt with are the main focal point of the IASON project:
- Coastal monitoring, representing the pillar of climate action,
- Water and soil resources management, representing resource efficiency,
- Mining and mineral exploration, representing raw material management,

and earth observation in general, which is covered by looking at the spatial dimension of the different subjects, priorities and indicators. Of course, the Mediterranean and Black Sea regions receive special attention.

Research funding can be divided in the following elements: personnel, infrastructure, data and literature, equipment, running costs, (research) training and networking (conferences, exchanges, etc.). Governments tend more and more to reduce budgets for basic research funding, transferring (part of) those funds to programmes with specific objectives that are administered by independent organisations, such as national research organisations. The idea behind this that activities will be streamlined towards certain government objectives and researchers will compete for available funds and that the best proposals will win. There is a certain dichotomy in this approach, because although this type of funding is often meant to be supplementary, the researchers feel the budget squeeze from the government and their own management and perceive obtaining these funds as a condition for mere survival. On the other hand a situation where for all the research is completely lacking rarely occurs.

It is therefore worth noting that the *research and funding agenda watch* is not a panacea for obtaining complete funding for all research activities. The *research and funding agenda watch* identifies trends and opportunities: often different resources will have to be combined to achieve the desired goal (including a required own contribution). Most researchers will be aware of relevant opportunities, but will be less familiar with developments in a broader context. This agenda watch aims at assessing

and pre-analysing the bigger picture, to extract the relevant information and to make it more accessible and easier digestible.

The approach followed is to analyse a number of relevant topics for the identification of trends and opportunities. The topics are: the European research agenda, European directives and regulations, national research agendas, Mediterranean and Black Sea region agreements and organisations, the international research agenda, the sustainable development goals and international agreements. Interesting aspects for each of these topics will be highlighted in the following chapters of this report.

The concluding chapter gives a short overview of the road from the research and funding agenda watch to the sustainable funding toolkit, which is the next deliverable of this work package for the IASON project. The sustainable funding toolkit will be derived from a combination of sources: the *research and funding agenda watch*, the IASON funding opportunities database, the EGIDA methodology (developed further by the IASON and EOPOWER projects) and the EOPOWER impact assessment methodology.

2. EUROPEAN RESEARCH AGENDA

The new European research agenda is determined by the Horizon 2020 programme. Below extracts from the work programme 2014 - 2015 are given, re-ordered by the subjects of coastal monitoring, water and soil resources management, mining and mineral exploration and a general category. The paragraphs on impact in particular give a direct indication of what (long-term) results are expected and therefore very relevant for targeted the research effort. They are presented in normal font, while other relevant information is presented in inclined font. The extracts aim to provide quick guidance to interesting topics and to help focus future work on *the research and funding agenda watch.* For the ERC frontier research grants (starting, consolidator and advanced grants) that are of a more general and individual nature, reference is made to the literature.

“

Coastal monitoring

HORIZON 2020 WORK PROGRAMME 2014 – 2015

9. Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy

Food security

SFS-9-2014: Towards a gradual elimination of discards in European fisheries

Common Fisheries Policy

Expected impact:

- Support through research and innovation a key orientations for the CFP regarding discards elimination
- Contribute to implement the Marine Strategy Framework Directive (MSFD) requiring moving towards good environmental status and in particular the descriptors related to 1: biological diversity, 3: population of commercial fish and shellfish, 4: elements of marine foodwebs
- Improved social and societal acceptance of conservation measures
- Increased level of control, compliance and enforcement of rules

Blue growth

BG-1-2015: Improving the preservation and sustainable exploitation of Atlantic marine ecosystems

Expected impact:

- Improve resources management (ecosystem approach) and governance to preserve them and unlock their potential for the sustainable production of the new products and industrial applications.
- Improve cooperation among EU Member States with respect to Atlantic ecosystem based research as well as with International partner countries
- Contribute to the implementation of the EU Integrated Maritime Policy, its environmental pillar the Marine Strategy Framework Directive (MSFD), The Common Fisheries policy (CFP), the EU 'Maritime Strategy for the Atlantic Ocean Area', and the Galway Statement on Atlantic Ocean Cooperation.
- Contribute to the implementation of international agreements to conserve Vulnerable Marine Ecosystems and Ecologically or Biologically Sensitive Areas.

BG-2-2015: Forecasting and anticipating effects of climate change on fisheries and aquaculture

Expected impact:

- Support fisheries management and aquaculture development by reducing uncertainties and risk, while optimising the scientific advice, policies implementation and production planning.
- Allow regulators, fisherman and aquaculture operators to anticipate, prepare and adapt to different scenarios driven by climate change, while minimising economic losses and social consequences.
- Identify opportunities that might occur under the different scenarios and prepare to reap the potential benefits for the European fisheries, aquaculture and seafood sectors and for consumers.

BG-5-2014: Preparing for the future innovative offshore economy

Expected impact:

- Prepare the ground for demonstration activities of most promising offshore business models;
- Significantly increase investments by the key European level maritime stakeholders (industrial, scientific communities) in the offshore economy;
- Support the EU Blue Growth and maritime spatial planning policy objectives.

See also:

Directive 2013/30/EU on safety of offshore oil and gas prospection, exploration and production activities Offshore Protocol of the Barcelona Convention in the Mediterranean

BG-8-2014: Developing in-situ Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources

Integrated Atlantic Ocean Observing System (IAOOS)

Expected impact

- Enhance societal and economic role of the Atlantic Ocean in Europe.
- Provide leadership for Europe in implementing GEOSS.
- Increase temporal and geographic coverage of observational data in the Atlantic Ocean.
- Integrate standardised in-situ key marine observations including biological, (meta)genomic data into process models and forecast systems.
- Improve modelling outputs and reduce cost of data collection in support of ocean-related industrial and societal activities.
- Increase competitiveness of European industry and particularly SMEs within the marine industrial sector.
- Increase safety for offshore activities and coastal communities
- Contribute to make better informed decisions and documented processes within key sectors (manufacturing, ICT, maritime industry, environment technology, marine science and fisheries).
- Improve the implementation of European maritime and environmental policies (e.g. Marine Strategy Framework Directive, Common Fisheries Policy, *EU Integrated Maritime Policy*).

BG-11-2014: Monitoring, dissemination and uptake of marine and maritime research

Expected impact:

- Identify and make available ready-to-use knowledge/results to advance the Blue Growth Agenda and/or support the implementation of the EU Marine Strategy Framework Directive and the revised Common Fisheries Policy

- Demonstrate value creation from research results that are transferred during the project
- Strengthen communication, dissemination and exploitation of knowledge/technological developments between marine and maritime stakeholders
- Enhance the visibility and impact of marine/maritime research in society.

BG-13-2014 Ocean literacy – Engaging with society – Social Innovation

Expected impact:

- Develop citizens' understanding of the importance of Seas and Ocean Health, as well as interactions and interdependencies between the two, fostering behavioural change;
- Support the ecosystem based approach in the management of maritime activities and contribute to the objectives of the Marine Strategy Framework Directive,
- Maximise the societal impact of EU funded marine and maritime research.

See also:

Strategic Research and Innovation Agenda (SRIA) of JPI Oceans

12. Climate action, environment, resource efficiency and raw materials

Coastal monitoring indirectly included in climate action, environment, resource efficiency and raw material themes on ecosystems (see also general)

14. Secure societies – Protecting freedom and security of Europe and its citizens

Disaster resilience and climate change

DRS-9-2014/2015: Disaster Resilience & Climate Change topic 1: Science and innovation for adaptation to climate change: from assessing costs, risks and opportunities to demonstration of options and practices

Expected impact:

- Better coordination, dissemination and communication of research and innovation activities on disaster risk management, climate change adaptation and synergies among EU-funded (e.g. ClimateAdapt, Climate KIC, FP projects),

Member State-funded (e.g. JPIs, national programmes) and international activities in the field (e.g. UNEP/PROVIA).

- Improved and concise information for decision making (at both public and private sectors) on climate change impacts, disaster risks and relevant options to address them. Enhanced implementation in the medium-term of the EU Adaptation Strategy and national and local efforts towards climate-proofing of key European economic sectors and services, as well as of the EU Disaster Prevention Framework.
- Rapid large-scale deployment and market uptake of innovative technological and non-technological climate change adaptation solutions with high replicability. Contribution to the development of technological and performance standards for adaptation options.

Maritime border security

BES-1-2015: Maritime Border Security topic 1: radar systems for the surveillance of coastal and pre-frontier areas and in support of search and rescue operations

BES-2-2015: Maritime Border Security topic 2: affordable and easily deployable technologies for EU coastal border surveillance with reduced impact on the environment

The use of low cost and "green" technologies is expected to become mandatory for future border control systems in environmentally sensitive areas. Systems of passive (or low emission) radar technologies or other relevant technologies provide promising results for the detection of targets in areas that cannot be covered by active systems. Passive systems fit this application, due to electromagnetic invisibility, lower detectability and cost and the possibility of use practically anywhere.

Water and soil resources management

HORIZON 2020 WORK PROGRAMME 2014 – 2015

9. Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy

Food security

SFS-2-2014/2015: Sustainable crop production

More sustainable crop management strategies are needed to maintain or increase soil fertility. Inappropriate soil and water management and the overuse of external inputs in intensive crop production systems, represent an economic loss for the farmer and a significant burden for the environment and subsequent impact on human health, as they contribute significantly to ground water and surface water pollution, GHGs emissions, the build-up in soil contaminants, such as heavy metals and organic pollutants. Better soil management and optimisation of fertilisers and water are of paramount importance for conciliating the necessary competitiveness and the long-term sustainability of the entire intensive crop production sector in Europe.

Expected impact:

- Improvement of ground and surface water quality.
- Reduction of soil contaminations with toxic compounds and heavy metals.
- Conservation of biodiversity and wildlife.
- Improved human health, through the reduced release of pollutants and GHGs.
- Scientific support to relevant EU policies19
- Sound scientific evaluation of benefits and drawbacks of soil-improving cropping systems and techniques.
- Reduction of soil erosion and improvement of soil quality and structure
- Increased European farmers' competitiveness through the reduction of production costs.
- Reduction of the negative environmental impact of crop production through less soil disturbance, better exploitation of soil biodiversity and functions and more rational use of external inputs, water and natural resource base.

SFS-4-2014: Soil quality and function

Agricultural soils provide the basis for crop and animal production and in turn are impacted by the different types of land use, water quality, management practices, choice of crops, cultivars and genotypes. Effects include not only changes to chemical and physical soil properties but also to the composition of the soil biological community and plant-soil-microbial interactions. Understanding this complex and fragile interplay is crucial for developing on-farm soil management and conservation practices to increase agricultural productivity whilst avoiding degradation of this virtually non-renewable resource in environmentally sustainable ways.

Expected impact:

- Improved capacity and methods to assess soil-management interactions and their impact on soil functions
- widely accessible and cost efficient tools to monitor the 'health status' of agricultural soils by practitioners in the agricultural sector
- increases in crop productivity, quality, and yield stability in conventional and organic farming systems through improved practices for soil husbandry including crop rotations
- enhanced climate and environmental performance of agricultural activities (e.g. through reduced adverse impacts on agricultural soils)
- support to CAP environmental objectives and development of further policies in the area.

12. Climate action, environment, resource efficiency and raw materials

Waste

WASTE-7-2015: Ensuring sustainable use of agricultural waste, co-products and by-products

Expected impact:

- Improved soil quality and crop productivity – through an optimal use of crop waste (taking into account the need to maintain soil organic matter levels) and nutrient recovery.
- Improved water quality – reducing pollution and eutrophication of ground waters, and thus indirectly marine waters.

Link other soil & water programmes:

- *INFRAIA 1-2014/2015: Integrating and opening existing national and regional research infrastructures of European interest (research infrastructures for hydrological/hydrobiological research; research infrastructures for long-term ecosystem and socio-ecological research; research infrastructures for environmental hydraulic research)*
- *SFS 2 - 2014/2015: Sustainable crop production*

See also:

European Innovation Partnership (EIP) Water

Water innovation

WATER-2-2014/2015: Integrated approaches to water and climate change

Despite considerable progress over the past ten years, the forecasting of natural water cycle variability and extreme weather events in the short and medium term still suffers from severe limitations. Improved understanding of the impacts of climate change on the hydrological cycle is necessary in order to better inform decision makers and ensure sustainable water supply and management of water systems, and quality of water bodies, in the EU.

Expected impact:

a) [2014] Water cycle under future climate

More efficient management of water resources in Europe due to better knowledge of the water cycle under the future climate. Contribution to management planning across the EU in support of the Blueprint to safeguard Europe's water resources, the EU Climate Change Adaptation Strategy and the relevant priority areas of the EIP 'Water'. Contribution in the longer-term to the development of reliable climate services in relation to the water cycle.

Expected impact:

b) [2015] Integrated approaches to food security, low-carbon energy, sustainable water management and climate change mitigation

Increased understanding of how water management, food and biodiversity policies are linked together and to climate and sustainability goals. Reduction of the uncertainties about the opportunities and limitations of low-carbon options, such as bioenergy technologies and resource efficiency measures, in view of relevant near-term policy initiatives. Contribution to future assessments, including those of the IPCC, with multidisciplinary and integrated tools.

WATER-3-2014/2015: Stepping up EU research and innovation cooperation in the water area

WATER-4-2014/2015: Harnessing EU water research and innovation results for industry, agriculture, policy makers and citizens

Effective use and market exploitation of water research results is often limited by the lack of adequate knowledge exchange practices and mechanisms. The same applies for research that gives answers to policy implementation, like achieving good status under the Water Framework Directive (WFD) or good environmental status under the

Marine Strategy Framework Directive and achieving the objectives of other EU water legislation.

See also:

'Smart Cities and Communities' EIP

Expected impact:

- implement measures to showcase, exchange, test and transfer water management solutions to end-users in the agricultural sector in view of improving water use efficiency and quality in agricultural practices. Activities should benefit various types of agriculture and pedo-climatic zones;
- contribute to a 'thematic network' on water in agriculture with broad involvement of practitioners and other stakeholders throughout Europe to compile, disseminate and further develop solutions; and
- support the integration of water relevant issues in the *EIP on 'Agricultural Productivity and Sustainability'*, including linking up with EIP operational groups and related actions of the EIP on 'Water'.

a) Enhanced science- and evidence-based decision making in the field of water. Application of best management practices and new developments to address needs and opportunities in the water field. Enhanced interface between water and innovation policies. Rapid market uptake of research results in line with the priority areas of the EIP 'Water'. A more integrated community of researchers and users extending across disciplines, countries, organisations and sectors. Improved public engagement in research and improved public understanding of the dynamic nature of water systems and the role of innovation in the water sector. Integration of the water and waste sectors into the Smart Cities EIP, reinforcing its ultimate goal of contributing to achieving the 3 bottom line objectives (20-20-20).

b) Enhanced interface between knowledge (practical, scientific) and agricultural user communities in the area of water use efficiency and water quality. Increased application of water-related solutions (at technological, management or organisational levels) by end-users in agriculture resulting in reduced pressure for water from agricultural practices. Support to the implementation of the EIPs on 'Agricultural Productivity and Sustainability' and 'Water'.

WATER-5-2014/2015: Strengthening international R&I cooperation in the field of water

14. Secure societies – Protecting freedom and security of Europe and its citizens

Disaster resilience and climate change

DRS-9-2014/2015: Disaster Resilience & Climate Change topic 1: Science and innovation for adaptation to climate change: from assessing costs, risks and opportunities to demonstration of options and practices

Expected impact:

- Better coordination, dissemination and communication of research and innovation activities on disaster risk management, climate change adaptation and synergies among EU-funded (e.g. ClimateAdapt, Climate KIC, FP projects), Member State-funded (e.g. JPIs, national programmes) and international activities in the field (e.g. UNEP/PROVIA).
- Improved and concise information for decision making (at both public and private sectors) on climate change impacts, disaster risks and relevant options to address them. Enhanced implementation in the medium-term of the EU Adaptation Strategy and national and local efforts towards climate-proofing of key European economic sectors and services, as well as of the EU Disaster Prevention Framework.
- Rapid large-scale deployment and market uptake of innovative technological and non-technological climate change adaptation solutions with high replicability. Contribution to the development of technological and performance standards for adaptation options.

Mining and mineral exploration

HORIZON 2020 WORK PROGRAMME 2014 – 2015

12. Climate action, environment, resource efficiency and raw materials

Low Carbon, Resource Efficient Economy with a Sustainable Supply of Raw Materials

SC5-13-2014/2015: Coordinating and supporting raw materials research and innovation

Mineral policies are sometimes not clear, too dispersed in their implementation or insufficiently linked to other related policies (e.g. land-use planning and management) to be fully effective. A common understanding of which mineral deposits are of public importance is lacking. Permitting procedures can be lengthy and sometimes conflict with other public authorities' requirements. Knowledge of raw materials reserves and resources is dispersed, terminology is often heterogeneous and reporting standards vary throughout the Member States. There is no raw materials knowledge infrastructure at EU level.

Research and development in the area of raw materials is scattered between different players.

a) [2014] Mineral deposits of public importance

See also:

Strategic Implementation Plan of the European Innovation Partnership (EIP) on Raw Materials

General

HORIZON 2020 WORK PROGRAMME 2014 – 2015

2. Future and Emerging Technologies

FETPROACT 1 - 2014: Global Systems Science (GSS)

Expected impact:

- Level to which research proposed is rooted in policy needs, promotes system thinking, and is delivering consistent messages from conflicting data and model results.

- Level of use/uptake of GSS tools and methods in the policy and societal processes, including in EC policies.
- Capacity of GSS to help integrate societal responses across policy domains and cross-cutting authorities by development of a system-wide integrated evidence base of data and models.

3. Marie Skłodowska-Curie Actions

MSCA-IF-2015: Marie Skłodowska-Curie Individual Fellowships (IF)

Expected impact:

- Individual Fellowships are expected to add significantly to the development of the best and most promising researchers active in Europe, in order to enhance and maximise their contribution to the knowledge-based economy and society.
- The action will also strengthen the contact network of both the researcher and the host organisation.
- The fellowship will contribute to realising the full potential of researchers and to catalysing significant development in their careers in both the academic and non-academic sectors.
- Some researchers will be resuming a research career in Europe after a break, or reintegrating within Europe after living abroad.

MSCA-RISE-2015: Marie Skłodowska-Curie Research and Innovation Staff Exchange

Expected impact:

- Research and innovation activities under RISE are expected to build or enhance new and existing networks of international and intersectoral cooperation. They will significantly strengthen the interaction between organisations in the academic and non-academic sectors, and between Europe and third countries.
- In terms of knowledge sharing and broad skills development, they will better align different cultures and expectations, with a view to a more effective contribution of research and innovation to Europe's knowledge economy and society.

MSCA-COFUND-2015: Marie Skłodowska-Curie Co-funding of regional, national and international programmes

Expected impact:

- Enabling the relevant regional, national and international actors to contribute significantly to the development within their own setting of high quality human resources, by introducing and/or further developing the trans-national dimension of their offers;
- Increasing the numerical and/or qualitative impact, in terms of supported researchers or working/employment conditions;
- Combating fragmentation in terms of objectives, evaluation methods and working conditions of regional, national or international offers in this area.

5. Leadership in enabling and industrial technologies iii. Space

EO 1 – 2015: Bringing EO applications to the market

If space investments made in earth observation are to generate economic return, it is essential that EO products and information generation are taken out of the research environment and products are put into the market. Such EO products often realise highly automated processes with minimum manual intervention. For such applications and developments to succeed, the product needs to be shaped according to users' demands, to be validated and proven. This needs to be achieved in an environment integrated at the user, in order for users to accept the innovative potential which the product promises. This will require also specific attention to be given to the various processes in place in the users' workflows which incorporate the EO information. Furthermore, the commercial providers will have to prove that they can sustain their product operationally based on market revenues. To this end a credible planning for the 3 years after the end of public funding shall be part of the proposal.

Expected impact:

Proposals are expected to establish sustainable supply chains for innovative EO applications with demonstrated commercial value with targeted client communities. Complete integration into the customer's existing business processes and processing chains, as well as the economic viability of the application is to be demonstrated.

Proposals are expected to enhance the European industry's potential to take advantage of market opportunities and establish leadership in the field, and to boost business activity.

It is expected that proposals lead to new or improved products, processes or services on the market, which are capable of generating within 3 years after the end of public funding a significant turnover for the participants, and create a significant number of new jobs.

12. Climate action, environment, resource efficiency and raw materials

Low Carbon, Resource Efficient Economy with a Sustainable Supply of Raw Materials

SC5-14-2014: Consolidating global knowledge on the green economy in support of sustainable development objectives in the EU and internationally

Innovative ways are required to mobilise all relevant global actors, exchange best practices, resolve trade-offs, manage conflicting interests, addressing in-context specificities, including cultural aspects, increase participation of citizens in decision-making and improve both public awareness and business uptake of research results beyond the borders of the EU.

Expected impact:

Enhanced impact of EU research and innovation activities through evident synergies with relevant international research and innovation programmes and other initiatives. Greater EU influence in multilateral processes and better support to implementation of international commitments. Significant contribution to evidence-based policy and appropriate, cost-effective management, planning and adaptation decisions by the public sector, businesses, industry and society addressing global challenges in the EU and beyond through the provision and effective communication of trustworthy science-based information. Increased coordination between different actors and stakeholders to minimise the risk of overlaps and duplication of efforts. Strengthened synergies on green economy and sustainability issues and increased awareness of both technologically and socially eco-innovative solutions. Demonstrated improved science-based evidence in support of sustainability decision making at national, regional and global level and for the implementation of sustainable development goals. Demonstrated increased multi-stakeholder participation as well as general public and private sector engagement in support of the transition to a green economy.

SC5-15-2015: Strengthening the European Research Area in the domain of Earth Observation

Expected impact:

Decision makers require access to the information they need, when they need it, and in a format they can use.

Proposals should pool the necessary resources from national (or regional) research programmes with a view to implementing a joint transnational call for proposals with EU co-funding on observing and monitoring changes affecting the Earth's atmosphere, oceans, cryosphere and landscapes, with human activities being a major driver of these changes in the domain of climate, environment and resource efficiency.

SC5-16-2014: Making Earth Observation and Monitoring Data usable for ecosystem modelling and services

Expected impact:

Significant use of the GEO resources in decision making in the domains of climate, environment, resource efficiency and natural hazards.

Improved evidence-based environmental policy making and political decisions.

SC5-18-2014/2015: Coordinating and supporting Earth Observation research and innovation in the EU, and in the North African, Middle East, and Balkan region

a) [2014] Coordinating European Observation Networks to reinforce the knowledge base for climate, natural resources and raw materials

Expected impact:

Improved assessment and prediction of future changes through continuous provision of timely and accurate information, forecasts and projections. Coherent European monitoring and observation of the Earth Systems. Improved planning for future Earth Observation and information systems. Upgraded and expanded Earth observations capacity by harnessing national and regional investments in scientific and technological advances and innovative approaches. Preparation of further integration of research and innovation programmes in the domain of Earth Observation in the EU.

b) [2015] Integrating North African, Middle East and Balkan Earth Observation capacities in GEOSS

Expected impact:

Improved food security, access to raw materials and energy, and adaptation to climate change in the North-African, Middle-East, and Balkan regions due to improved Earth Observation data and information services. Rapid re-installation of the required infrastructures by the relevant public services and decision makers. Future investments in this region, leading to sustainable development of resources and activities. Strengthened competitiveness and performance of critical economic and social sectors such as tourism, agriculture, transportation, health, research, and education.

SC5-19-2014/2015: Coordinating and supporting research and innovation in the area of climate action, environment, resource efficiency and raw materials

b) [2015] Mapping Member State research and innovation in climate change, environment, resource efficiency and raw materials

Identifying baselines, trends, good practices, threats, opportunities and potential synergies between EU, national and regional programmes, over the entire duration of Horizon 2020, building on existing sources, studies and databases, including ERA-Watch.

Expected impact

Evidence-based policy and appropriate, cost-effective management, planning and adaptation decisions by the public sector, businesses, industry and society through the provision and effective communication of trustworthy and timely science-based information. Enhanced impact of research and innovation activities through better identification of R&I priorities, improved coordination of EU and Member State research and innovation programmes and funded activities, and synergies with international research and innovation programmes. Evidence-based R&I policy-making at EU and national/ regional as well as international levels; knowledge-based support to business management decisions; synergy between international, EU, national and regional programmes; recommendations for European Semester.

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3. EUROPEAN DIRECTIVES AND REGULATIONS

The Europe 2020 strategy (made public in 2010) is the key element for European policy and target setting. The Horizon 2020 programme is one of the instruments to achieve the goals of the Europe 2020 strategy. The main points of the strategy are summarised below:

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The EU headline targets for 2020 are:

– 75 % of the population aged 20-64 should be employed.

– 3% of the EU's GDP should be invested in R&D.

– The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).

– The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.

– 20 million less people should be at risk of poverty.

The Commission is putting forward seven flagship initiatives to catalyse progress under each priority theme:

– "Innovation Union" to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.

– "Youth on the move" to enhance the performance of education systems and to facilitate the entry of young people to the labour market.

– "A digital agenda for Europe" to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and firms.

– "Resource efficient Europe" to help decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernise our transport sector and promote energy efficiency.

– "An industrial policy for the globalisation era" to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally.

– "An agenda for new skills and jobs" to modernise labour markets and empower people by developing their of skills throughout the lifecycle with a view to increase labour participation and better match labour supply and demand, including through labour mobility.

– "European platform against poverty" to ensure social and territorial cohesion such that the benefits of growth and jobs are widely shared and people experiencing poverty and social exclusion are enabled to live in dignity and take an active part in society.

The analysis also identifies a number of structural weaknesses for Europe:

- Europe's average growth rate has been structurally lower than that of our main economic partners, largely due to a productivity gap that has widened over the last decade. Much of this is due to differences in business structures combined with lower levels of investment in R&D and innovation, insufficient use of information and communications technologies, reluctance in some parts of our societies to embrace innovation, barriers to market access and a less dynamic business environment.

- In spite of progress, Europe's employment rates – at 69% on average for those aged 20-64 – are still significantly lower than in other parts of the world. Only 63% of women are in work compared to 76% of men. Only 46% of older workers (55-64) are employed compared to over 62% in the US and Japan. Moreover, on average Europeans work 10% fewer hours than their US or Japanese counterparts.

- Demographic ageing is accelerating. As the baby-boom generation retires, the EU's active population will start to shrink as from 2013/2014. The number of people aged over 60 is now increasing twice as fast as it did before 2007 – by about two million every year compared to one million previously. The combination of a smaller working population and a higher share of retired people will place additional strains on our welfare systems.

Therefore, three priorities should be the heart of Europe 2020:

– Smart growth – developing an economy based on knowledge and innovation.

– Sustainable growth – promoting a more resource efficient, greener and more competitive economy.

– Inclusive growth – fostering a high-employment economy delivering economic, social and territorial cohesion.

Some other interesting and relevant facts for research and innovation: R&D spending in Europe is below 2%, compared to 2.6% in the US and 3.4% in Japan, mainly as a result of lower levels of private investment. It is not only the absolute amounts spent on R&D that count – Europe needs to focus on the impact and composition of research spending and to improve the conditions for private sector R&D in the EU. Our smaller share of high-tech firms explains half of our gap with the US.

Country reporting will be required for Europe 2020 and Europe 2020 guidelines will be developed.

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Older and younger than the Europe 2020 strategy are European directives and regulations. Although directives and regulations are not primarily research-oriented, important indications for current and future research and innovation priorities can be derived from them. Key points of those that are relevant to the IASON subjects are given here, starting with the flagship initiative under the Europe 2020 strategy. The flagship initiative on “Innovative Union” is the one most relevant for the *research and funding agenda watch.*

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A resource-efficient Europe – Flagship initiative under the Europe 2020 strategy (2010)

This flagship initiative aims to create a framework for policies to support the shift towards a resource-efficient and low-carbon economy which will help us to:

– boost economic performance while reducing resource use;

– identify and create new opportunities for economic growth and greater innovation and boost the EU's competitiveness;

– ensure security of supply of essential resources;

– fight against climate change and limit the environmental impacts of resource use.

Typical examples of synergies:

- jobs created in sectors linked to sustainable growth are often more secure, with high potential for exports and economic value creation;
- action on climate change and energy efficiency can increase energy security and reduce vulnerability to oil shocks;

- low-carbon technologies reduce emissions and often bring benefits in terms of air quality, noise and public health;
- taxes and subsidies on the use of energy or other resources can be used both to steer behaviour leading to reduced and more efficient consumption and to help restructure public finances away from labour taxation, which benefits job creation and economic growth;
- increasing recycling rates will reduce the pressure on demand for primary raw materials, help to reuse valuable materials which would otherwise be wasted, and reduce energy consumption and greenhouse gas emissions from extraction and processing;
- improving the design of products can both decrease the demand for energy and raw materials and make those products more durable and easier to recycle. It also acts as a stimulus to innovation, creating business opportunities and new jobs;
- improving energy efficiency reduces the need to generate energy in the first place and the need for infrastructures. This, in turn, eases pressure on land resources. For example, decreasing EU energy consumption by 1% would mean that we would not need the equivalent of 50 coal power plants or 25 000 wind turbines.

Having the information needed to weigh different choices will help policy makers decide where to focus efforts. These are some examples:

- action to reduce unilaterally greenhouse gas emissions domestically may have an impact on the competitiveness of energy-intensive industry and lead to production and the associated greenhouse gas emissions and employment being shifted abroad if corrective measures are not maintained;
- just-in-time production processes reduce the energy needed to store products in warehouses but may also require more transport. This may also be true for the collection of waste and recycling;
- deployment of 'green' vehicles reduces the use of fossil fuels but increases the demand for electricity and certain raw materials, some of which are subject to supply restrictions and concentrated in a few geographical areas (e.g. rare earth elements for electronic components and fuel cells, lithium for batteries);

- land used to produce food may compete with land use for energy and both may compete with land which supports biodiversity or provides ecosystem services such as absorbing carbon from the atmosphere;
- materials to improve insulation can significantly reduce the amount of energy required to heat a building, but could be more energy-intensive to produce;
- expanding nuclear power can reduce carbon emissions but requires further enhancing of nuclear safety, waste management and non-proliferation;
- desalination can provide a solution to water supply problems but it may increase fossil fuel consumption and greenhouse gas emissions.

The key components of the long-term framework will come in the form of a series of coordinated roadmaps to:

- Outline what the EU needs to do to create a low-carbon economy in 2050, cutting greenhouse gas emissions by 80-95%, as part of global efforts to fight climate change, while improving energy security and promoting sustainable growth and jobs;
- Analyse how the EU can create an energy system by 2050 which is low-carbon, resource-efficient, secure and competitive. This should provide the necessary certainty for investors, researchers, policy makers and regulators;
- Present a vision for a low-carbon, resource-efficient, secure and competitive transport system by 2050 that removes all obstacles to the internal market for transport, promotes clean technologies and modernises transport networks;
- Define medium and long-term objectives and means for achieving them with the main aim to decouple economic growth from resource use and its environmental impact.

Medium-term measures should be consistent with this long-term framework. A number of such measures have already been identified. These include:

- An energy efficiency plan with a time horizon of 2020 which will identify measures to achieve energy savings of 20% across all sectors, and which will be followed by legislation to ensure energy efficiency and savings;
- Proposals to reform the Common Agricultural Policy, the Common Fisheries Policy, Cohesion Policy, energy infrastructure and trans-European networks for transport in

the context of the next EU budget to align these areas with the requirements of a resource-efficient, low-carbon economy;

- A new EU biodiversity strategy for 2020 to halt further loss to and restore biodiversity and ecosystem services in the light of pressures on ecosystems;
- Measures to tackle the challenges in commodity markets and on raw materials which will, amongst others, periodically assess critical raw materials and define a trade policy to ensure sustainable supplies of raw materials from global markets. These measures will help ensure coherence between the EU's raw materials and external policies, including the promotion of good governance, transparency of activities and creation of local valued added in developing countries. It will promote extraction, recycling, research, innovation and substitution inside the EU;
- A strategy to make the EU a 'circular economy', based on a recycling society with the aim of reducing waste generation and using waste as a resource;
- Early action on adaptation to climate change to minimise threats to ecosystems and human health, support economic development and help adjust our infrastructures to cope with unavoidable climate change;
- A water policy that makes water saving measures and increasing water efficiency a priority, in order to ensure that water is available in sufficient quantities, is of appropriate quality, is used sustainably and with minimum resource input, and is ultimately returned to the environment with acceptable quality.

Europe 2020 flagship innovative union (2010)

Concretely, to achieve Innovation Union, the following is needed:

1. In times of fiscal constraints, the EU and Member States need to continue to invest in education, R&D, innovation and ICTs. Such investments should where possible not only be protected from budget cuts, but should be stepped up.
2. This should go hand in hand with reforms to get more value for money and tackle fragmentation. EU and national research & innovation systems need to be better linked up with each other and their performance improved.
3. Our education systems at all levels need to be modernised. Excellence must even more become the guiding principle. We need more world-class universities, raise skill levels and attract top talent from abroad.
4. Researchers and innovators must be able to work and cooperate across the EU as easily as within national borders. The European Research Area must be

completed within four years – putting in place the frameworks for a truly free movement of knowledge.

5. Access to EU programmes must be simplified and their leverage effect on private sector investment enhanced, with the support of the European Investment Bank. The role of the European Research Council should be reinforced. The framework programme's contribution to nurturing fast-growing SMEs must be boosted. The European Regional Development Fund should be fully exploited to develop research and innovation capacities across Europe, based on smart regional specialisation strategies.
6. We need to get more innovation out of our research. Cooperation between the worlds of science and the world of business must be enhanced, obstacles removed and incentives put in place.
7. Remaining barriers for entrepreneurs to bring "ideas to market" must be removed: better access to finance, particularly for SMEs, affordable IPR, smarter and more ambitious regulation and targets, faster setting of interoperable standards and strategic use of our massive procurement budgets. As an immediate step, agreement should be reached on the EU patent before the end of the year.
8. European Innovation Partnerships should be launched to accelerate research, development and market deployment of innovations to tackle major societal challenges, pool expertise and resources and boost the competitiveness of EU industry, starting with the area of healthy ageing.
9. Our strengths in design and creativity must be better exploited. We must champion social innovation. We must develop a better understanding of public sector innovation, identify and give visibility to successful initiatives, and benchmark progress.
10. We need to work better with our international partners. That means opening access to our R&D programmes, while ensuring comparable conditions abroad. That also means adopting a common EU front where needed to protect our interests.

Future programmes to focus more on societal challenges, streamline funding instruments and radically simplify access through a better balance between a control-based and a trust-based system.

European Innovation Partnerships:

- Smart cities
- Water-efficient Europe
- Sustainable supply of non-energy raw materials for a modern society
- Smart mobility for Europe's citizens and businesses
- Agricultural productivity and sustainability

Roadmap resource efficiency (2011)

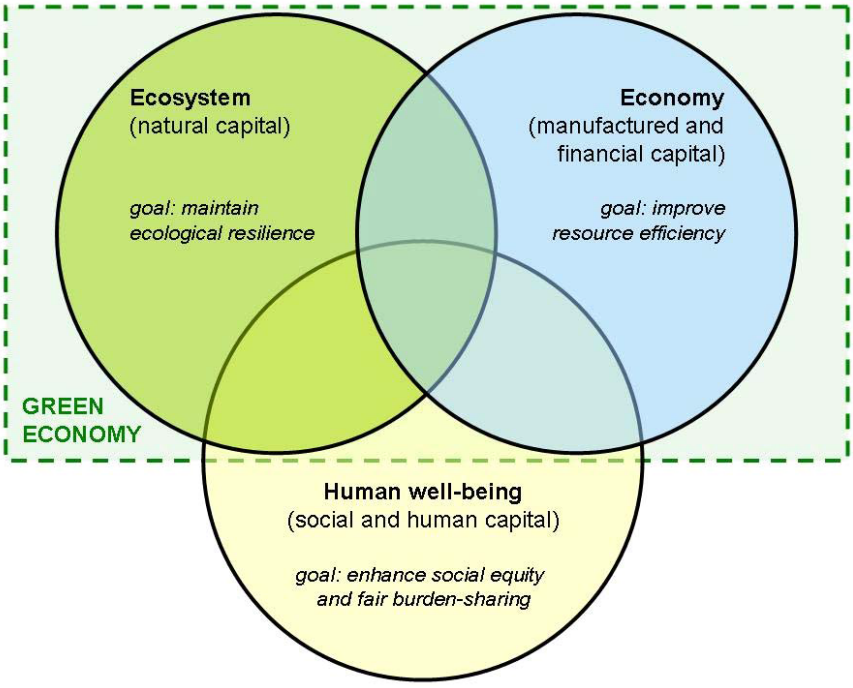

Figure 1: Relation between ecosystem, economy, human well-being and the green economy (source: roadmap resource efficiency)

Two levels of indicators are provisionally formulated:

(1) A provisional lead indicator - "Resource Productivity" - to measure the principal objective of this Roadmap, of improving economic performance while reducing pressure on natural resources;

(2) A series of complementary indicators on key natural resources such as water, land, materials and carbon, that will take account of the EU's global consumption of these resources.

The EU and its Member States should strive to remove barriers that hold back resource efficiency and so create the right set of incentives for production and consumption decisions.

This will require:

– Addressing markets and prices, taxes and subsidies that do not reflect the real costs of resource use and lock the economy into an unsustainable path;

– Encouraging more long-term innovative thinking in business, finance and politics that leads to the uptake of new sustainable practices and stimulates breakthroughs in innovation, and develops forward thinking, cost effective regulation;

– Carrying out the research to fill the gaps in our knowledge and skills and provide the right information and training;

– Dealing with international competitiveness concerns, and seeking to get a consensus with international partners to move in a similar direction.

Milestone: By 2020, scientific breakthroughs and sustained innovation efforts have dramatically improved how we understand, manage, reduce the use, reuse, recycle, substitute and safeguard and value resources. This has been made possible by substantial increases in investment, coherence in addressing the societal challenge of resource efficiency, climate change and resilience, and in gains from smart specialisation and cooperation within the European research area.

Member States with the Commission will:

• Establish an appropriate framework and set of incentives to boost private sector investment into research and innovation for resource efficiency (continuous).

The Commission will:

• Develop 'Innovation Partnerships' for meeting resource efficiency goals, e.g. on water, raw materials and productive and sustainable agriculture (from 2011);

• Develop Joint Technology Initiatives or other forms of private-public partnerships, as well as Joint Programming Initiatives that pool national research efforts in areas of resource efficiency (continuous);

• Tackle barriers to eco-innovation (in 2011);

- Focus Union research funding (EU Horizon 2020) on key resource efficiency objectives, supporting innovative solutions for: sustainable energy, transport and construction; management of natural resources; preservation of ecosystem services and biodiversity; resource efficient agriculture and the wider bio-economy; environmentally friendly material extraction; recycling, re-use, substitution of environmental impacting or rare materials, smarter design, green chemistry and lower impact, biodegradable plastics.

Member States should:

- focus public research funding on key resource efficiency objectives (continuous).

Ecosystem services

The Commission will:

- Promote the use of innovative financial and market-based instruments and explore their wider potential, including a possible establishment of a biodiversity financing facility and payments for ecosystems services, to address challenges to ecosystems and biodiversity at national, EU and international level, in particular in cooperation with the European Investment Bank and through Public Private Partnerships (continuous);
- Put forward proposals to foster investments in natural capital, to seize the full growth and innovation potential of Green Infrastructure and the 'restoration economy', through a Communication on Green Infrastructure (in 2012), and a "No Net Loss" initiative (in 2015).

Member States, with the Commission, should:

- Map the state of ecosystems and their services (by 2014);
- Assess their economic value, and promote the integration of these values into accounting and reporting systems at EU and national level (continuous);
- Work with key stakeholders to encourage businesses to assess their dependency on ecosystem services building upon the EU Business & Biodiversity Platform (continuous).

Water framework directive (2000)

Purpose:

- the provision of the sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use,
- a significant reduction in pollution of groundwater,
- the protection of territorial and marine waters, and
- achieving the objectives of relevant international agreements.

Subjects:

- Coordination of administrative arrangements within river basin districts,

Coastal waters shall be identified and assigned to the nearest or most appropriate river basin district or districts.

- Environmental objectives: protection, restauration for surface bodies, groundwater, protected areas
- **Characteristics of the river basin district, review of the environmental impact of human activity and economic analysis of water use**
- Register of protected areas
- Waters used for the abstraction of drinking water
- Monitoring of surface water status, groundwater status and protected areas
- Recovery of costs for water services

River basin management plans, reporting and strategies against pollution are required. In the annexes checklists for assessing ecological status, links with other directives and lists of main pollutants and emission limit values are described.

Marine strategy framework directive (2008)

Each Member State shall, in respect of each marine region or subregion concerned, develop a marine strategy for its marine waters *and consequently carry out an* assessment*, formulate a* programme of measures *and establish* regional cooperation. *Key elements are assessment of the e*nvironmental status, monitoring programmes, and environmental targets. *Monitoring will be done through* reporting, updates and public consultation. *The strategy provides indicative* lists of characteristics, pressures

and impacts, indicative list of characteristics to be taken into account for setting environmental targets, a monitoring programmes overview, and a programme of measures overview.

Protocol Integrated Coastal Zone Management for the Mediterranean (1995)

The objectives of integrated coastal zone management are to:

(a) facilitate, through the rational planning of activities, the sustainable development of coastal zones by ensuring that the environment and landscapes are taken into account in harmony with economic, social and cultural development;

(b) preserve coastal zones for the benefit of current and future generations;

(c) ensure the sustainable use of natural resources, particularly with regard to water use;

(d) ensure preservation of the integrity of coastal ecosystems, landscapes and geomorphology;

(e) prevent and/or reduce the effects of natural hazards and in particular of climate change, which can be induced by natural or human activities;

(f) achieve coherence between public and private initiatives and between all decisions by the public authorities, at the national, regional and local levels, which affect the use of the coastal zone.

Principles of integrated coastal zone management:

(a) The biological wealth and the natural dynamics and functioning of the intertidal area and the complementary and interdependent nature of the marine part and the land part forming a single entity shall be taken particularly into account.

(b) All elements relating to hydrological, geomorphological, climatic, ecological, socio-economic and cultural systems shall be taken into account in an integrated manner, so as not to exceed the carrying capacity of the coastal zone and to prevent the negative effects of natural disasters and of development.

(c) The ecosystems approach to coastal planning and management shall be applied so as to ensure the sustainable development of coastal zones.

(d) Appropriate governance allowing adequate and timely participation in a transparent decision-making process by local populations and stakeholders in civil society concerned with coastal zones shall be ensured.

(e) Cross-sectorally organised institutional coordination of the various administrative services and regional and local authorities competent in coastal zones shall be required.

(f) The formulation of land use strategies, plans and programmes covering urban development and socio-economic activities, as well as other relevant sectoral policies, shall be required.

(g) The multiplicity and diversity of activities in coastal zones shall be taken into account, and priority shall be given, where necessary, to public services and activities requiring, in terms of use and location, the immediate proximity of the sea.

(h) The allocation of uses throughout the entire coastal zone should be balanced, and unnecessary concentration and urban sprawl should be avoided.

(i) Preliminary assessments shall be made of the risks associated with the various human activities and infrastructure so as to prevent and reduce their negative impact on coastal zones.

(j) Damage to the coastal environment shall be prevented and, where it occurs, appropriate restoration shall be effected.

Elements of ICZM:

- Protection and sustainable use,
- Economic activities,
- Specific coastal ecosystems,
- Coastal landscapes,
- Islands,
- Cultural heritage,
- Participation,
- Awareness-raising, training, education and research.

Cooperate in the training of scientific, technical and administrative personnel in the field of integrated coastal zone management, particularly with a view to:

(a) identifying and strengthening capacities;

(b) developing scientific and technical research;

(c) promoting centres specialised in integrated coastal zone management;

(d) promoting training programmes for local professionals.

This will be supported by scientific and technical assistance *to balance differences between countries.*

Strategic action plan for the rehabilitation and protection of the Black Sea (1996)

The plan focuses on:

- Reduction of pollution,
- Living resources management
- Sustainable human development (EIA, ICZM, sustainable aquaculture & tourism, participation)

The following advisory groups *are formed:*

- Environmental and safety aspects of shipping
- Pollution monitoring and assessment
- Control of pollution from land based sources
- Development of methodologies for ICZM
- Conservation of biological diversity
- Fisheries and other living marine resources
- Information and data exchange

Directive on the assessment of the effects of certain public and private projects on the environment (2011)

The principles of the assessment of environmental effects should be harmonised.

General principles for the assessment of environmental effects should be laid down with a view to supplementing and coordinating development consent procedures governing public and private projects likely to have a major effect on the environment.

The European Community signed the UN/ECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (the Aarhus Convention) on 25 June 1998 and ratified it on 17 February 2005.

Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects.

The environmental impact assessment may be integrated into the existing procedures for consent to projects in the Member States, or, failing this, into other procedures or into procedures to be established to comply with the aims of this Directive.

The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case and […] the direct and indirect effects of a project on the following factors:

(a) human beings, fauna and flora;

(b) soil, water, air, climate and the landscape;

(c) material assets and the cultural heritage;

(d) the interaction between the factors referred to in points (a), (b) and (c).

Elements related to water and soil, coastal monitoring and mining and mineral exploration:

1. AGRICULTURE, SILVICULTURE AND AQUACULTURE

(c) Water management projects for agriculture, including irrigation and land drainage projects;

(g) Reclamation of land from the sea

2. EXTRACTIVE INDUSTRY

(a) Quarries, open-cast mining and peat extraction (projects not included in Annex I);

(b) Underground mining;

Selection criteria for environmental impact assessment are presented in an annex (Annex IV)

Directive on the assessment of the effects of certain plans and programmes on the environment (2001)

Relevant treaties referred to in the directive are:

- The Convention on Biological Diversity,
- The United Nations/Economic Commission for Europe Convention on Environmental Impact Assessment in a Transboundary Context (1991).

Action is therefore required at Community level to lay down a minimum environmental assessment framework, which would set out the broad principles of the environmental assessment system and leave the details to the Member States, having regard to the principle of subsidiarity. Action by the Community should not go beyond what is necessary to achieve the objectives set out in the Treaty.

This Directive is of a procedural nature, and its requirements should either be integrated into existing procedures in Member States or incorporated in specifically established procedures. With a view to avoiding duplication of the assessment, Member States should take account, where appropriate, of the fact that assessments will be carried out at different levels of a hierarchy of plans and programmes.

The objective of this Directive is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment.

Regulation on European environmental economic accounts (2011)

Important elements:

- Air emissions accounts
- Environmentally related taxes by economic activity
- Economy-wide material flow accounts (EW-MFA)

Flood risks directive (2007)

The directive requires flood risk hazard maps, risk maps and management plans:

It is necessary to provide for the establishing of flood hazard maps and flood risk maps showing the potential adverse consequences associated with different flood scenarios,

including information on potential sources of environmental pollution as a consequence of floods.

Flood risk management plans should focus on prevention, protection and preparedness. With a view to giving rivers more space, they should consider where possible the maintenance and/or restoration of floodplains, as well as measures to prevent and reduce damage to human health, the environment, cultural heritage and economic activity. The elements of flood risk management plans should be periodically reviewed and if necessary updated, taking into account the likely impacts of climate change on the occurrence of floods.

Directive on the conservation of wild birds (2009)

The preservation, maintenance and re-establishment of biotopes and habitats shall include primarily the following measures:

(a) creation of protected areas;

(b) upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones;

(c) re-establishment of destroyed biotopes;

(d) creation of biotopes.

Account shall be taken of:

(a) species in danger of extinction;

(b) species vulnerable to specific changes in their habitat;

(c) species considered rare because of small populations or restricted local distribution;

(d) other species requiring particular attention for reasons of the specific nature of their habitat.

Monitoring and reporting is required on:

(a) National lists of species in danger of extinction or particularly endangered species, taking into account their geographical distribution.

(b) Listing and ecological description of areas particularly important to migratory species on their migratory routes and as wintering and nesting grounds.

(c) Listing of data on the population levels of migratory species as shown by ringing.

(d) Assessing the influence of methods of taking wild birds on population levels.

(e) Developing or refining ecological methods for preventing the type of damage caused by birds.

(f) Determining the role of certain species as indicators of pollution.

(g) Studying the adverse effect of chemical pollution on population levels of bird species.

(Habitats) Directive on on the conservation of natural habitats and of wild fauna and flora (1992)

A coherent European ecological network of special areas of conservation shall be set up under the title Natura 2000.

Each member state prepares a list of areas of conservation.

Member States shall endeavour, where they consider it necessary, in their land-use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora.

Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species.

Reporting *takes place* every two years:

(a) the species which are subject to the derogations and the reason for the derogation, including the nature of the risk, with, if appropriate, a reference to alternatives rejected and scientific data used;

(b) the means, devices or methods authorised for the capture or killing of animal species and the reasons for their use;

(c) the circumstances of when and where such derogations are granted;

(d) the authority empowered to declare and check that the required conditions obtain and to decide what means, devices or methods may be used, within what limits and by what agencies, and which persons to carry out the task;

(e) the supervisory measures used and the results obtained.

Reporting on implementation of measures *is mandatory* every six years.

STAGE 1:

Criteria for selecting sites eligible for identification as sites of community importance and designation as special areas of conservation are given for different types of habitats and species (presented in the annexes). On the basis of these criteria, Member States will classify the sites which they propose on the national list as sites eligible for identification as sites of Community importance according to their relative value for the conservation of each natural habitat type in Annex I or each species in Annex II. That list will show the sites containing the priority natural habitat types and priority species selected by the Member States on the basis of the criteria in A and B above.

STAGE 2: Assessment of the Community importance of the sites included on the national lists

1. All the sites identified by the Member States in Stage 1 which contain priority natural habitat types and/or species will be considered as sites of Community importance.

2. The assessment of the Community importance of other sites on Member States' lists, i.e. their contribution to maintaining or re-establishing, at a favourable conservation status, a natural habitat in Annex I or a species in Annex II and/or to the coherence of Natura 2000 will take account of the following criteria:

(a) relative value of the site at national level;

(b) geographical situation of the site in relation to migration routes of species in Annex II and whether it belongs to a continuous ecosystem situated on both sides of one or more internal Community frontiers;

(c) total area of the site;

(d) number of natural habitat types in Annex I and species in Annex II present on the site;

(e) global ecological value of the site for the biogeographical regions concerned and/or for the whole of the territory referred to in Article 2, as regards both the characteristic or unique aspect of its features and the way they are combined.

2020 biodiversity strategy (2010)

The 2020 Biodiversity Strategy follows on from the 2006 EU Biodiversity Action Plan, learning lessons from its implementation and raising the level of ambition for 2020. Consequently, in addition to halting the loss of biodiversity, the new strategy also highlights, for the first time, the immense value of ecosystem services and the urgent need to maintain and restore these for the benefit of both nature and society.

Although action to halt biodiversity loss requires money, the cost of inaction is expected to be even higher. Biodiversity loss is in fact very costly for society, particularly for sectors that depend heavily on ecosystem services. Many farmers, for instance, depend on insect pollination for their harvests. Within the EU as a whole, the estimated economic value of insect pollination is b15 billion a year.

By 2020, a set of biodiversity indicators should help determine whether there has been an overall improvement in the state of Europe's biodiversity, in particular whether the following has been achieved:

- A reduction in the number of species threatened with extinction. Currently almost 25% of European animal species face the risk of extinction.
- An increase in the number of species and habitat types protected under EU nature legislation that are in favourable conservation status. At present only 17% of assessed habitats and species are in a favourable conservation status.
- An improvement in the state of ecosystems and the services they provide. Most of Europe's ecosystems are now assessed to be degraded.
- A strengthening of Europe's green infrastructure. Today, nearly 30% of the EU-27 territory is considered to be highly to moderately fragmented.
- A decline in the over-exploitation of natural resources. Europeans currently consume more than twice what the EU's land and sea can deliver in terms of natural resources.

The six targets covered by the EU strategy focus on:

1. The full implementation of the EU nature legislation;
2. Better protection and restoration of ecosystems and the services they provide, and greater use of green infrastructure;
3. More sustainable agriculture and forestry;
4. Better management of EU fish stocks and more sustainable fisheries;
5. Tighter controls on Invasive Alien Species; and
6. A greater EU contribution to averting global biodiversity loss.

TARGET 1: FULLY IMPLEMENT THE BIRDS AND HABITATS DIRECTIVES

To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments: (i) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status; and (ii) 50% more species assessments under the Birds Directive show a secure or improved status.

Action 1: Complete the establishment of the Natura 2000 network and ensure good management

1a) Member States and the Commission will ensure that the phase to establish Natura 2000, including in the marine environment, is largely complete by 2012.

1b) Member States and the Commission will further integrate species and habitats protection and management requirements into key land and water use policies, both within and beyond Natura 2000 areas.

1c) Member States will ensure that management plans or equivalent instruments which set out conservation and restoration measures are developed and implemented in a timely manner for all Natura 2000 sites.

1d) The Commission, together with Member States, will establish by 2012 a process to promote the sharing of experience, good practice and cross-border collaboration on the management of Natura 2000, within the biogeographical frameworks set out in the Habitats Directive.

Action 2: Ensure adequate financing of Natura 2000 sites

2) The Commission and Member States will provide the necessary funds and incentives for Natura 2000, including through EU funding instruments, under the next multiannual financial framework. The Commission will set out its views in 2011 on how Natura 2000 will be financed under the next multi-annual financial framework.

Action 3: Increase stakeholder awareness and involvement and improve enforcement

3a) The Commission, together with Member States, will develop and launch a major communication campaign on Natura 2000 by 2013.

3b) The Commission and Member states will improve cooperation with key sectors and continue to develop guidance documents to improve their understanding of the requirements of EU nature legislation and its value in promoting economic development.

3c) The Commission and Member States will facilitate enforcement of the nature directives by providing specific training programmes on Natura 2000 for judges and public prosecutors, and by developing better compliance promotion capacities.

Action 4: Improve and streamline monitoring and reporting

4a) The Commission, together with Member States, will develop by 2012 a new EU bird reporting system, further develop the reporting system under Article 17 of the Habitats Directive and improve the flow, accessibility and relevance of Natura 2000 data.

4b) The Commission will create a dedicated ICT tool as part of the Biodiversity Information System for Europe to improve the availability and use of data by 2012.

TARGET 2: MAINTAIN AND RESTORE ECOSYSTEMS AND THEIR SERVICES

By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems.

Action 5: Improve knowledge of ecosystems and their services in the EU Member States, with the assistance of the Commission, will map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020.

Action 6: Set priorities to restore and promote the use of green infrastructure

6a) By 2014, Member States, with the assistance of the Commission, will develop a strategic framework to set priorities for ecosystem restoration at sub-national, national and EU level.

6b) The Commission will develop a Green Infrastructure Strategy by 2012 to promote the deployment of green infrastructure in the EU in urban and rural areas, including through incentives to encourage up-front investments in green infrastructure projects and the maintenance of ecosystem services, for example through better targeted use of EU funding streams and Public Private Partnerships.

Action 7: Ensure no net loss of biodiversity and ecosystem services

7a) In collaboration with the Member States, the Commission will develop a methodology for assessing the impact of EU funded projects, plans and programmes on biodiversity by 2014.

7b) The Commission will carry out further work with a view to proposing by 2015 an initiative to ensure there is no net loss of ecosystems and their services (e.g. through compensation or offsetting schemes).

TARGET 3: INCREASE THE CONTRIBUTION OF AGRICULTURE AND FORESTRY TO MAINTAINING AND ENHANCING BIODIVERSITY

3A) Agriculture: By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.

B) Forests: By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM), are in place for all forests that are publicly owned and for forest holdings above a certain size (to be defined by the Member States or regions) and communicated in their Rural Development Programmes) that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services as compared to the EU 2010 Baseline.

Action 8: Enhance direct payments for environmental public goods in the EU Common Agricultural Policy

8a) The Commission will propose that CAP direct payments will reward the delivery of environmental public goods that go beyond cross-compliance (e.g. permanent pasture, green cover, crop rotation, ecological set-aside, Natura 2000).

8b) The Commission will propose to improve and simplify the GAEC (Good Agricultural and Environmental Conditions) cross-compliance standards and consider including the Water Framework Directive within the scope of crosscompliance once the Directive has been implemented and the operational obligations for farmers have been identified in order to improve the state of aquatic ecosystems in rural areas.

Action 9: Better target Rural Development to biodiversity conservation

9a) The Commission and Member States will integrate quantified biodiversity targets into Rural Development strategies and programmes, tailoring action to regional and local needs.

9b) The Commission and Member States will establish mechanisms to facilitate collaboration among farmers and foresters to achieve continuity of landscape features, protection of genetic resources and other cooperation mechanisms to protect biodiversity.

Action 10: Conserve Europe's agricultural genetic diversity

10) The Commission and Member States will encourage the uptake of agrienvironmental measures to support genetic diversity in agriculture and explore the scope for developing a strategy for the conservation of genetic diversity.

Action 11: Encourage forest holders to protect and enhance forest biodiversity

11a) Member States and the Commission will encourage the adoption of Management Plans, inter alia through use of rural development measures and the LIFE+ programme.

11b) Member States and the Commission will foster innovative mechanisms (e.g. Payments for Ecosystem Services) to finance the maintenance and restoration of ecosystem services provided by multifunctional forests.

Action 12: Integrate biodiversity measures in forest management plans

12) Member States will ensure that forest management plans or equivalent instruments include as many of the following measures as possible:

– maintain optimal levels of deadwood, taking into account regional variations such as fire risk or potential insect outbreaks;

– preserve wilderness areas;

– ecosystem-based measures to increase the resilience of forests against fires as part of forest fire prevention schemes, in line with activities carried out in the European Forest Fire Information System (EFFIS);

– specific measures developed for Natura 2000 forest sites;

– ensuring that afforestation is carried out in accordance with the Pan-European Operational Level Guidelines for SFM33, in particular as regards the diversity of species, and climate change adaptation needs.

TARGET 4: ENSURE THE SUSTAINABLE USE OF FISHERIES RESOURCES

Achieve Maximum Sustainable Yield (MSY) by 2015. Achieve a population age and size distribution indicative of a healthy stock, through fisheries management with no significant adverse impacts on other stocks, species and ecosystems, in support of achieving Good Environmental Status by 2020, as required under the Marine Strategy Framework Directive.

Action 13: Improve the management of fished stocks

13a) The Commission and Member States will maintain and restore fish stocks to levels that can produce MSY in all areas in which EU fish fleets operate, including areas regulated by Regional Fisheries Management Organisations, and the waters of third countries with which the EU has concluded Fisheries Partnership Agreements.

13b) The Commission and Member States will develop and implement under the CFP long-term management plans with harvest control rules based on the MSY approach. These plans should be designed to respond to specific time-related targets and be based on scientific advice and sustainability principles.

13c) The Commission and Member States will significantly step up their work to collect data to support implementation of MSY. Once this objective is attained, scientific advice will be sought to incorporate ecological considerations in the definition of MSY by 2020.

Action 14: Eliminate adverse impacts on fish stocks, species, habitats and ecosystems

14a) The EU will design measures to gradually eliminate discards, to avoid the by-catch of unwanted species and to preserve vulnerable marine ecosystems in accordance with EU legislation and international obligations.

14b) The Commission and Member States will support the implementation of the Marine Strategy Framework Directive, including through providing financial incentives through the future financial instruments for fisheries and maritime policy for marine protected areas (including Natura 2000 areas and those established by international or regional agreements). This could include restoring marine ecosystems, adapting fishing activities and promoting the involvement of the sector in alternative activities, such as eco-tourism, monitoring and managing marine biodiversity, and combating marine litter.

TARGET 5: COMBAT INVASIVE ALIEN SPECIES

By 2020, Invasive Alien Species (IAS) and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.

Action 15: Strengthen the EU Plant and Animal Health Regimes

15) The Commission will integrate additional biodiversity concerns into the Plant and Animal Health regimes by 2012.

Action 16: Establish a dedicated instrument on Invasive Alien Species

16) The Commission will fill policy gaps in combating IAS by developing a dedicated legislative instrument by 2012.

TARGET 6: HELP AVERT GLOBAL BIODIVERSITY LOSS

By 2020, the EU has stepped up its contribution to averting global biodiversity loss.

Action 17: Reduce indirect drivers of biodiversity loss

17a) Under the EU flagship initiative on resource efficiency, the EU will take measures (which may include demand and/or supply side measures) to reduce the biodiversity impacts of EU consumption patterns, particularly for resources that have significant negative effects on biodiversity.

17b) The Commission will enhance the contribution of trade policy to conserving biodiversity and address potential negative impacts by systematically including it as part of trade negotiations and dialogues with third countries, by identifying and evaluating potential impacts on biodiversity resulting from the liberalisation of trade and

investment through ex-ante Trade Sustainability Impact Assessments and ex-post evaluations, and seek to include in all new trade agreements a chapter on sustainable development providing for substantial environmental provisions of importance in the trade context including on biodiversity goals.

17c) The Commission will work with Member States and key stakeholders to provide the right market signals for biodiversity conservation, including work to reform, phase out and eliminate harmful subsidies at both EU and Member State level, and to provide positive incentives for biodiversity conservation and sustainable use.

Action 18: Mobilise additional resources for global biodiversity conservation

18a) The Commission and Member States will contribute their fair share to international efforts to significantly increase resources for global biodiversity as part of the international process aimed at estimating biodiversity funding needs and adopting resource mobilisation targets for biodiversity at CBD CoP11 in 2012.

Soil thematic strategy (2006)

The soil thematic strategy deals with problems, such as erosion, organic matter decline, salinisation, compaction and landslides

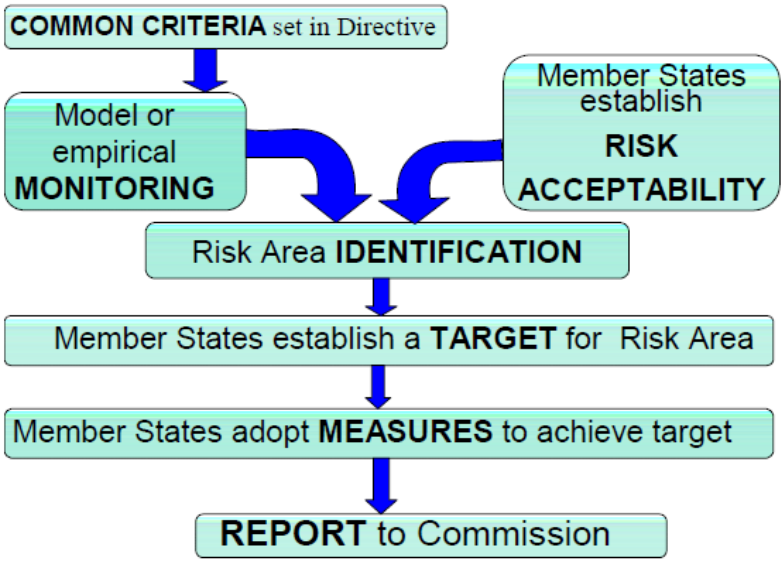

Figure 2: General scheme for compliance with the directive (source: soil thematic strategy)

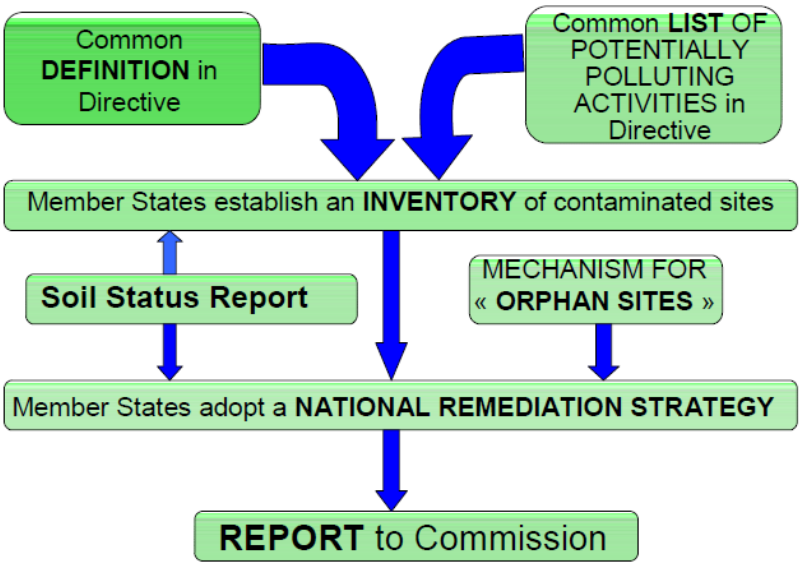

Figure 3: Scheme for compliance with the directive on the subject of contamination (source: soil thematic strategy)

Proposal directive for establishing a framework for the protection of soil (soil framework directive) (2006)

A new generation of environmental legislation is adopted. In 2005 and 2006, the European Commission adopted seven thematic strategies — on soils, pesticides, air pollution, the marine environment, waste prevention and recycling, natural resources and the urban environment. They are now going through the EU decision-making process (EU Council of Ministers, European Parliament, etc.) in view of being implemented by the Member States.

Directive on the landfill of waste (1999)

This directive is related to water and soil resources management (contamination).

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4. NATIONAL RESEARCH AGENDAS

Most, if not all, countries in the Mediterranean region and the Black Sea region have their own national research agenda. Of course, depending on the country, there are differences in priorities, available means and ambitions. In most cases the implementation of national research programmes is guided and supervised by a central organisation. Obviously, communication and documents about the programmes and funding opportunities are in the local language. Access to funding is in most cases limited to local entities. There are a few programmes that focus on cross-border cooperation, generally focusing on training and exchange. Local target groups are usually familiar with these programmes and the associated funding opportunities. This, combined with the limited opportunities for non-local parties, the *research and funding agenda watch* will focuses mainly on the international aspects of the national research agendas. Below short descriptions of elements of a number of national research agendas are presented that are relevant to the IASON subjects.

Greece

The two major sources for research funding in Greece are:

a) Public funding through budget appropriations, programmes cofounded by structural funds and R&D EU FP programmes, and

b) Private funding.

The General Secretariat for Research and Technology under the Greek ministry of education and religious affairs is the major entity engaged in drawing up and implementing R&D policies in Greece. The GSRT is backed by the National Council for Research and Technology (NCRT) in developing research policies. Other ministries involved in R&D are the Ministries of Development, Agriculture, and National Defence[3].

An overview of the research policy pillars funded by GSRT under 3 Community Support Frameworks (1994 - 2013) is presented in the following figure.

[3] http://www.ekt.gr/content/display?ses_mode=rnd&ses_lang=en&prnbr=14885

(RESEARCH POLICY PILLARS FUNDED BY GSRT UNDER THE 3 CSFs)								
	A/A	POLICY PILLAR	EPET II (2° CSF) [1994-1999]		EPAN (3° CSF) [2000-2006]		ESPA (NSRF)* [2007-2013]	
			(€)	%	(€)	%	(€)	%
	1	LINKING RESEARCH WITH BUSINESS SECTOR	135.881.805	33%	100.951.317	17%	226.795.327	21%
	2	INNOVATION	43.276.332	11%	112.578.605	19%	180.657.751	17%
	3	HUMAN RESEARCH POTENTIAL	62.218.632	15%	220.466.133	38%	440.777.924	41%
	4	RESEARCH INFRASTRUCTURES	120.948.904	30%	93.722.367	16%	149.225.790	14%
	5	EUROPEAN AND INTERNATIONAL COOPERATION	8.267.959	2%	41.281.937	7%	77.514.077	7%
	6	SCIENCE AND SOCIETY/RESEARCH POLICY SUPPORT	35.577.236	9%	17.896.052	3%	7.029.969	1%
		TOTAL	406.170.867		586.896.411		1.082.000.838	

*Source : GSRT - * for ESPA(NSRF) numbers refer to budget as per the 3rd quarter of 2012 (12/7/12).*

Figure 4: Research policy pillars funded by GSRT

In the period 2010-2013 the NCRT developed the Greek 2014-2020 National Strategic Framework for Research & Innovation (NSFRI). An overview of the distribution of funding in the eight disciplinary areas, of Humanities, Social sciences, Energy – Environment, Engineering, Math-ICT, Natural sciences, Agro-BioFood, and Biosciences is presented in the following figure.

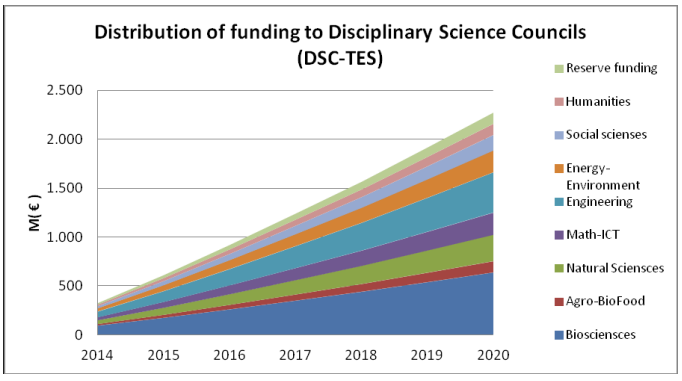

Figure 5: Proposed distribution of funding to sciences by discipline (source: [4])

[4]http://www.gsrt.gr/Financing/Files/ProPeFiles81/ESPEK%202014-2020%20by%20ESET%282010-2013%29.FIN.v.3.pdf

Furthermore the NSFRI proposes a new structure for Research, Development and Innovation (Figure 6):

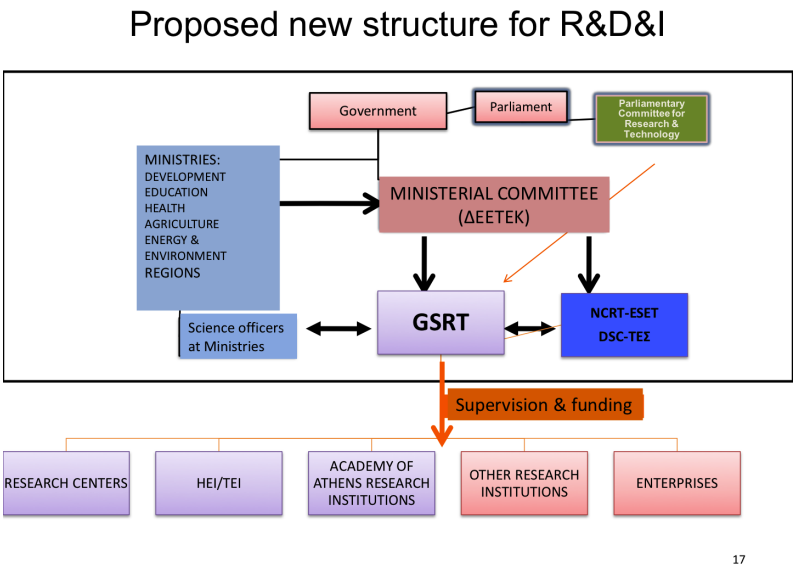

Figure 6: Proposed new structure for R&D&I

The NSFRI also defined R&D priorities for the 8 discipline areas. In the following table the ones relevant to IASON research priorities are presented.

Table 1: NSFRI discipline areas relevant to IASON research priorities

	Scientific Field	Energy	Environment	Engineering Sciences
Research Priority		Reduction of CO_2 Emissions	Study of the consequences of natural disasters and anthropogenic interventions on the environment	Computational engineering
		Renewable Energy Sources	Research in solid and liquid waste management	Technologies for the Hydrogen Economy
		New Technologies for exploration and detection of petroleum and gas deposits	Study of water resources	Technologies for capturing and using CO_2 for the production of fuels
		Monitoring of radioactivity in the environment	Specialized Research for the study of marine climate changes and natural disasters in the Greek domain	

In addition the proposed distribution of funds for each scientific field and research priority is presented in the following figures.

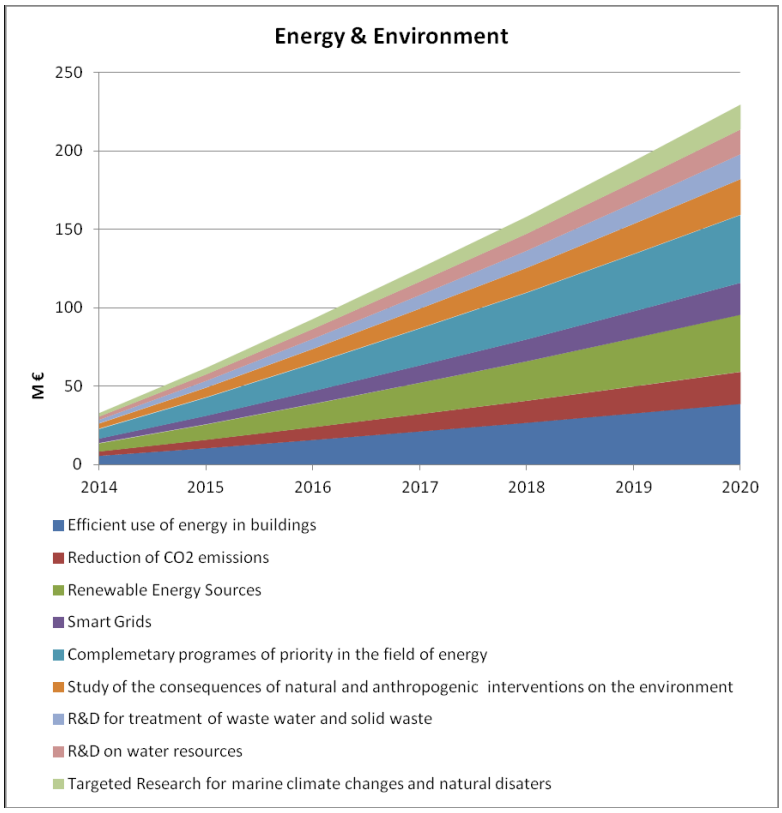

Figure 7: Proposed distribution of funds for Energy & Environment

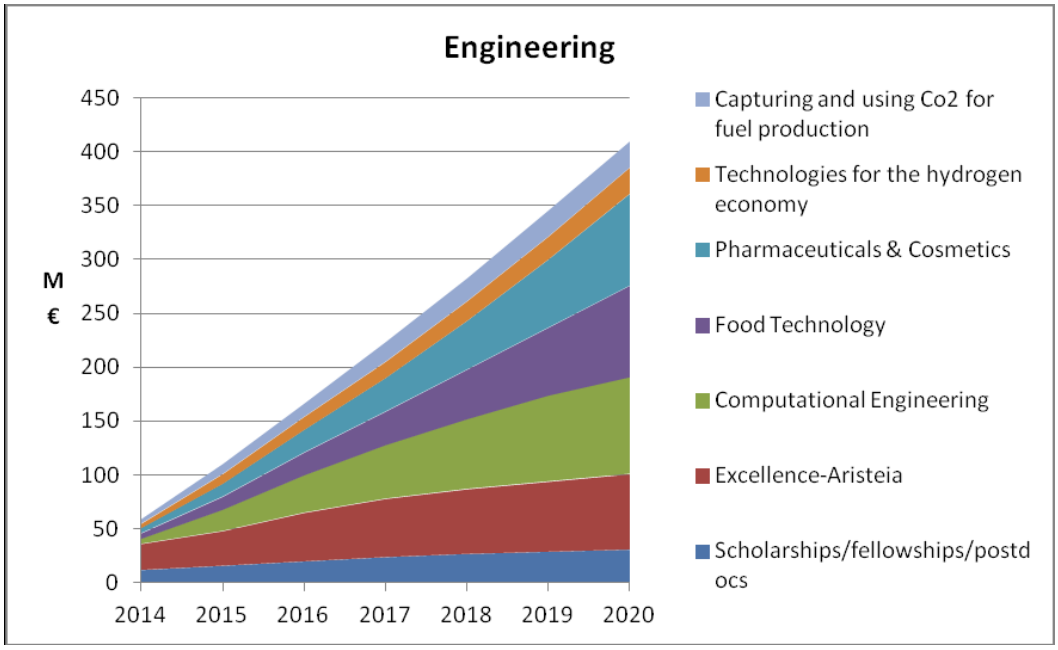

Figure 8: Proposed distribution of funds for Engineering

Albania

The Albanian national budget allocation to EO programs is realised by the Ministry of Environment, Forestry and Water management. Furthermore the Albanian Government has signed treaties and agreements with the EU and neighbouring countries in order to participate in European research programmes or projects.

There are also some environmental-orientated research programmes and funding initiatives, which are related to international organisations. In addition other research programmes and funding initiatives that focus on environmental issues are implemented under the umbrella of UNDP, the World Bank, the EU, and neighbouring countries.

Reference: FP7 Project Observe D2.5 Roadmap and strategy plan for strengthening EO capacity in the Balkans for environmental monitoring

Slovenia

The national budget allocation to EO research programmes is limited. Most of the national funding comes from the Slovenian Research Agency in the following themes: public tenders; basic and applicative research projects, targeted research projects; co-financing post-graduate study for young researchers. Additional funding comes from International programmes such as the EU Framework Programmes, Interreg programmes, COST, etc.

Reference: FP7 Project Observe D2.5 Roadmap and strategy plan for strengthening EO capacity in the Balkans for environmental monitoring

Palestine (Occupied Territories)

In Palestine there is no specific budget allocation for EO and spatial information. Funding opportunities for research and development are also limited in Palestine, and mostly provided by international organizations, such as the World Bank.

Reference: ENPI-CBCMED Project Local Sats D4.1.1 Report about the cities sustainability and geotechnologies use in the Mediterranean Basin.

Jordan

National funding for research and innovation in the fields of Spatial information and EO in Jordan is managed by the Royal Jordanian Geographic Centre (RJGC). “(RJGC) is hosting the “UN Regional Centre for Space Science and Technology Education for

Western Asia" since 2012 in cooperation with Jordan Meteorological Department, Al al-Bayt University and Jordan University of Science & Technology.

The Centre grants a Master degree in Remote Sensing, GIS, Satellite Communications, Space Sciences and Astronomy and Meteorology, in addition to short and long-term courses in these areas, which lasts 3-9 months."

Reference ENPI-CBCMED Project Local Sats D4.1.1 Report about the cities sustainability and geotechnologies use in the Mediterranean Basin.

Turkey

Turkey's National Research Agenda is run by TÜBITAK (the Scientific and Technological Research Council of Turkey), which is the leading agency for management, funding and conduct of research in Turkey. It was established in 1963 with a mission to advance science and technology, conduct research and support Turkish researchers. The Council is an autonomous institution and is governed by a Scientific Board, whose members are selected from prominent scholars from universities, industry and research institutions. TÜBİTAK acts as an advisory agency to the Turkish Government on science and research issues, and is the secretariat of the Supreme Council for Science and Technology (SCST), the highest S&T policy making body in Turkey (for more information, please refer to http://www.tubitak.gov.tr/en). TUBİTAK funds research projects (that are carried out in universities and other public and private organizations), conducts research on strategic areas, develops support programmes for the public and private sector, publishes scientific journals, popular science magazines and books, organizes science and society activities and supports undergraduate and graduate students through scholarships.

National Strategies

TUBITAK has developed several strategies, such as the National Science and Innovation Strategy 2011-2016, the Science and Technology Human Resources Strategy 2011-2016, Vision 2023, the National Energy R&D Innovation Strategy, the National Water R&D Innovation Strategy, the National Food R&D Innovation Strategy, etc. (for more information see http://www.tubitak.gov.tr/en/about-us/content-policies).

Funding Opportunities

The types of funding that TUBITAK supports, are organized under six different subjects. These are: academic funds, business/industry funds, public institutions funds,

entrepreneurship funds, scientific events, science and society. Table 2 at the end of this section shows the major national and international TÜBITAK funding programmes.

Scholarships

Besides the funding programmes, there are several scholarship programmes for both national and international students and researchers.

- For Undergraduates and Graduates International Programmes

2205 - Undergraduate Scholarship Programme for International Students,

2215 - Graduate Scholarship Programme for International Students,

2216 - Research Fellowship Programme for International Researchers,

2235 - Graduate Scholarship Programme for the Least Developed Countries.

- Postdoctoral International Programmes

2216 - Research Fellowship Programme for International Researchers,

2221 - Fellowships for Visiting Scientists and Scientists on Sabbatical Leave,

2236 - Co-Funded Brain Circulation Scheme (Co-Circulation Scheme).

Horizon 2020

Turkey, under the leadership of TÜBITAK, has a dedicated internet site for the Horizon 2020 Programme. It includes all the news for beginners, programme calls, conferences on Horizon 2020, partners search, advice on guidance, and information on operational projects and partners. Although the webpage is in Turkish, more detailed information can be found at http://www.h2020.org.tr/.

Other support

Besides TÜBITAK, the Ministry of Science, Industry and Technology offers support in order to produce national added-value products. Different programmes have different duration and funding amounts.

The San-Tez programme (Industry-Thesis programme) supports projects that are prepared in cooperation with universities and nation-wide resident businesses with the aim of to create added-value.

The Techno-Initiative capital support programme is designed in order to fund technology and innovation-focused business ideas and to turn these ideas into enterprises, which have high potential to create added-value and qualified employment.

Students, who graduate from any undergraduate, graduate or doctorate programme of a formal education university in one year, or young entrepreneurs, who completed any undergraduate, graduate or doctorate programme not more than five years ago before the pre-application, can apply to this programme.

Table 2: Major TÜBITAK funding programmes

Academic	**National Support Programmes**	**International Supports Programmes**	**International Researchers Fellowship Programmes**
	1001 - The Support Program for Scientific and Technological Research Projects 1002 - Short Term R&D Funding Program 1003 - Primary Subjects R&D Funding Program 1007 - Public Institutions Research Funding Program 1008 - Patent Application Promotion and Funding Program 1011 - The Support Program for Participation in International Scientific Research Projects (UBAP) 1010 - Global Researcher Program (EVRENA) 3501 - Career Development Program (CAREER)	ERA-NET COST Action Bilateral Projects Supports	2236 - Co-Funded Brain Circulation Scheme (Co-Circulation Scheme) 2221 - Fellowships for Visiting Scientists and Scientists on Sabbatical Leave 2216 - Research Fellowship Programme for International Researchers
Business / Industry	**National Support Programmes**	**International Support Programmes**	**Industrial Encouragement**
	1512 - Entrepreneurship Progressive Funding Program 1301 - Scientific & Tech. Cooperation Nets and Platforms Establishing Efforts 1501 - TUBITAK Industrial R&D Projects Grant Programme 1503 - Project Marketing Funding Programme	1509 - TÜBİTAK International Industrial R&D Projects Grant Programme EU 7th Framework Programme Horizon 2020	TR Ministry of Finance R&D Reduction

	1507 - TUBITAK SMEs R&D Starting Funding Programme 1511 - TUBITAK Priority Areas Research Technology Development and Innovation F.P. 1514 - Enterprise Capital Funding Programme 1602 - TUBITAK Patent Funding Programmes 1505 - University - Industry Cooperation Funding Programme 1515 - Prioroty R&D Labs Funding Programme 1007 - Public Institutions R&D Funding Programme 1601 - Capacity Building Funding Programme on Innovation and Entreprenuership 1513 - Technology Transfer Offices Funding Programme		
Public Institutions	**National Support Programmes**	**International Supports Programmes**	
	1007 - Public Institutions R&D Funding Programme 1301 - Scientific & Tech. Cooperation Nets and Platforms Establishing Efforts	EU 7th Framework Programme Horizon 2020	
Enterpreneurship	**National Support Programmes**	**International Supports Programmes**	
	1008 - Patent Application Promotion and Funding Program 1512 - Entrepreneurship Progressive Funding Programme 2238 - Entrepreneurship and Innovation Competition Program 2239 - Entrepreneurship and Innovation Education and Research Activities Fund. Prog. 1514 - Enterprise Capital Funding Programme 1601 - Capacity Building Funding Programme on Innovation and Entrepreneurship	1008 - Patent Application Promotion and Funding Program	

Scientific Events	**National Support Programmes**	**International Supports Programmes**	
	Events Organising Supports Events Attending supports	ICGEB (International Centre for Genetic engineering and Biotechnology) Supports	
Science & Society	**National Support Programmes**	**International Supports Programmes**	
	5001 - Call for Academic e-Book 5002 - Call for Academic e-Lesson 4003 - Science Centre Setting Up Funding Programme 4004 - Nature Education and Science Schools 4005 - Science & Society Innovative Education Practice 4006 - TUBITAK Science Fairs Funding Programme	EU 7th Framework Programme	

Egypt

Three major sources for research funding in Egypt are:

A. **Government funding through ministries and other government organizations**

B. **Other national funding channels.**

C. **Co-funding programmes**

A. Government funding

1. **Ministry of Scientific Research funding channels**

- **Science and Technology Development Fund (STDF) – (www.stdf.org.eg), which constitutes the major and largest national fund.**

The Science and Technology Development Fund (STDF) was established by Presidential decree number 218/2007. Its mandate is to promote science and technology (S&T) through funding scientific research and technological development in a way that supports the complete cycle of innovation. STDF's specific objectives are to

improve Egypt's research and development (R&D) environment, to fund S&T activities and to develop the innovation capacity in Egypt. STDF implements its objectives within the context of the national S&T development strategy, which is established by the Higher Council for Science & Technology. The Egyptian ministries with the strongest impact on Egypt's national economy are represented in the council to direct the research activities towards the S&T activities which have a direct influence on the national development plans. Since its establishment, STDF has disbursed millions of pounds to researchers in Egyptian universities and research institutions to improve the research capabilities and competitiveness of Egyptian Institutions in science, technology and innovation. Starting from 2013, i.e. second phase of National STI plan, all STDF funding mechanisms have been concentrated on projects of tangible outcomes and positive impact on science and society. This new policy reflects STDF's intention to build upon what has been achieved so far in a more focused and efficient manner, to maximize the benefits, and to better utilize and develop the available national fund and research capabilities in applications that meet the needs of society.

It is well known that the appropriate utilization of science, technology and innovation (STI) deliverables could strongly support the economic prosperity of nations. The Science and Technology Development Fund (STDF) has stimulated the Egyptian scientific society by funding distinguished research papers and establishing scientific partnerships with scientists from many advanced countries in order to keep track of quickly advancing technology, and be open to different societies, as well as, new economic unions, compete on the international arena, link scientific research to technological development and cooperate with civil society institutions to activate their role in the integrated scientific research system.

In addition, STDF has been built to strengthen S&T through capacity building of community and infrastructure in the valued strategic areas of Egypt's long-term competitiveness and development.

STDF system in Egypt comprises

- Higher Council of Science and Technology (HCST),
- Ministry of Scientific Research (MOSR),
- Academy of Scientific Research and Technology (ASRT),
- Science and Technology Development Fund (STDF),
- Research institutions and universities

STDF funding mechanism

1- National Research Grants; which includes:

- **Basic and Applied Research funds,** which are directed towards any researcher/group of researchers of all ages and all disciplines that are willing to participate in competitive research in Egypt. This grant allows the researcher(s) to work on the re-settlement of excellent research in Egypt.
- **Targeted Call for Proposals**, This type of funding is based on the working document of the Higher Council for Science and Technology and the foresight document on research in Egypt in 2030, developed by the Information and Decision Support Centre (IDSC), Egyptian Cabinet.
- **Technology Incubator Programme.** The new STDF Incubation Programme is a mechanism for commercialization of Research and Development (R&D) results. It is an integrated support programme designed to assist entrepreneurs in the development of new technology-based firms, both start-ups and fledglings. It seeks to effectively link talent, technology, capital and know-how to leverage entrepreneurial talent in order to accelerate development of new companies and speedy commercialization of R&D and innovation. It also helps in value reorientation by creating an environment for changing the attitude towards personal initiative and creativity.
- **Targeted Capacity building programme.** This is a targeted capacity building grant based on existing capabilities and competences, to establish labs, research units, centres of scientific excellence, which serve the development priority areas of Egypt, to promote top-level research, and to improve the research quality in Egypt. This programme also offers support for the establishment of digital libraries, short-term fellowships and support to scientific events.
- **Development and Innovation Grants.** These include the following types: Technology Development; Innovation Grants; Faculty For Factory (3F); Demand Driven Projects; Research Centres Networks and Joint Fund with Industry (IMC).
- **National Challenge programme** is concerned with innovation-based capabilities around specific technology challenges with the aim to fulfil immediate and specific requirements related to the country's needs and frontier

technologies. Challenges focus on short term projects (1-3 years) run by small purpose-built teams. The listed challenges are determined based on real existing industrial and societal needs. Submitted solutions /proposals are preferred to be implemented on semi industrial/industrial scale.

2- Joint Research Grants

With the aim of promoting bilateral research cooperation between Egypt and other countries in all over the world in the areas of mutual interest, Joint Research Grants are to be provided to give researchers, including young scientists, an opportunity to address new areas of scientific research. Research results generated in these grants are to be developed into concrete applications. In addition, a further aim of the Joint Research fund is to help to build scientific networking and help to apply for other funding instruments.

- ***There are the following types of international cooperation joint grants:***

Egypt-Jordan Cooperation Programme for Scientific Research

German-Egyptian Research Fund (GERF)

Capacity Building Grant

Egypt - Italian Grant

Egypt - Russia Joint Cooperation Call (STDF - ERJCG)

Egypt-France Cooperation (STDF-IFE)

Egypt-France Cooperation (STDF-IRD)

Egypt-Korea Cooperation Programme for Scientific Research (STDF- NRF)

Egypt-UK Cooperation(Newton Fund For Researcher Connect)

Egypt-UK Cooperation(Newton Fund Researcher Links: Institutional Links)

Egypt-UK Cooperation(Newton Fund Researcher Links: Travel Grants)

Egypt-UK Cooperation(Newton Fund Researcher Links: Workshops)

Egypt-UK Cooperation(Researcher Links: Travel Grants)

Egypt-UK. Cooperation: Newton-Mosharafa Programme: SCIENCE PARK STUDY TOUR

ERAfrica (Renewable Energies/ Interfacing Challenges)

ERANETMED

German Egyptian Mobility Programme for Scientific Exchange and Excellence Development (GE-SEED)

Joint Egyptian Japanese Scientific Cooperation (JEJSC)

STDF - IFE Egyptian French

UK Workshops

US-Egypt Grant Cycle XVII

2. State Ministry of Environment funding opportunities

1. Egyptian Environmental Protection Fund (EPF)

The Environmental Protection Fund (EPF) is a fund established under Law 4/1994 within the Egyptian Environmental Affairs Agency (EEAA). Its goal is to stimulate investment in the environmental sector in Egypt to support the government's environmental, social and economic policies. To realize this goal, the EPF provides financial assistance on a competitive basis for projects that benefit the environment. In addition, the EPF seeks to foster partnerships between the financial community and both the public and private business sectors to increase investment in environmental initiatives.

http://www.eeaa.gov.eg/epf/english.htm

2. Support for Environmental Assessment and Management (SEAM Programme)

Support for Environmental Assessment and Management (SEAM) is a major environmental programme implemented by the Egyptian Environmental Affairs Agency with support from the UK Department for International Development.

SEAM I (1994 - 1999), developed Governorate Environmental Action Plans (GEAPs) for Sohag and Dakahleya, built environmental capacity and demonstrated the tangible benefits of improved environmental management.

SEAM II (2000 - 2004), built on SEAM I successes by improving environmental planning and services for the poor and strengthening decentralized environmental management. SEAM aims at Environmental Management amelioration and protection in an integrated fashion in the governorates of Dakahleya, Sohag, Qena and Damietta. Its main outputs are represented in fully functional environmental management and planning systems in Sohag and Dakahleya (these systems to be replicated in Qeana and Damietta by EEAA), poverty alleviation in the four governorates, and enhanced communication participation and awareness. SEAM

activities are poverty focused. Capacity building and working towards sustainable development are integral issues being addressed in all SEAM activities.

http://www.seamegypt.com/

3. Egyptian Pollution Abatement Programme (EPA)

The Egyptian Pollution Abatement Programme is a major initiative of the Ministry of State for Environmental Affairs (MSEA) to help industry improve performance and comply with environmental regulations. Eligible industries in Greater Cairo and Alexandria can take advantage of funds available through the Egyptian Pollution Abatement Project (EPAP I& II) while those in Upper and Lower Egypt can apply for funding through the Private Public Sector Industry Project (PPSI). PPSI is available to eligible private and public companies (excluding multinationals) in Upper and Lower Egypt (excluding Greater Cairo and Alexandria) wishing to implement pollution abatement projects. PPSI is supported by KfW with a grant facility of 6.7 million euros for project implementation and 0.6 million euros for institutional and advisory support. Preferential financing is available to SMEs with an annual turnover of less than LE20 M.

B. Other national funding channels

1- Industrial Modernization Programme (IMP) / Industrial Modernization Centre (IMC) http://www.imc-egypt.org/

The Industrial Modernization Programme is a national initiative, with a total budget of 430 million Euros, of which 250 million is funded by the European Union, making it the largest industrial support programme the European Union has ever funded in the Southern Mediterranean countries. The overall goals of the IMP are:

- Upgrade Egyptian technological skills to International Standards.
- Improve the performance of the workforce at all levels.
- Enhance investment opportunities.
- Develop an appropriate business environment for better efficiency.

The achievement indicators of the IMP are clearly indicated in the agreement between the European Union and the Ministry of Industry and Technological Development. Certain goals were set aiming at the upgrading of the Egyptian Industries in order to qualify it to compete within the International arena.

2. Information Technology Industry Development Agency (ITIDA)

Information Technology Academia Collaboration (ITAC) programme aims to develop Egypt ICT industry through funding research projects-the fruit of collaboration between researchers in universities, research centres and ICT companies connecting scientific research and the ICT industry from one side and market needs from the other side.

The programme comprises three research areas the first of which is specialized for strategic research fields and includes nine fields, most prominent of which are research on network security, electronics design and ICT applications in security, transport, health, agriculture, energy, education and helping people with disabilities. The second area comprises six research fields representing latest technologies, research interests and global ICT market trends including, among others, mobile applications, cloud computing, applications of content analysis, social media and businesses, and data analysis. The third area comprises specific research points in line with requests from government bodies, ministries or governorates.

Among most prominent projects that have received funding is the project for establishing an independent security system to sense water pollution with nanotechnology sensors.

Since its inception in 2006, ITAC has funded 84 joint research projects between companies and research bodies. ITIDA has signed four new funding projects, making the number of winning research projects reaches 10 out of 38 projects that took part in round 15 of the Information Technology Academia Collaboration (ITAC) programme.

C. Co-funding programmes

Funding through specific programmes cofounded by structural funds and programmes, like EU, USA and UN, World Bank,…

- Canadian International Development Agency (CIDA) - *CIDA Egypt Programme Support Unit (PSU)*

In 2001, the Canadian International Development Agency (CIDA) celebrated 25 years of its development cooperation programme in Egypt. Since 1976, CIDA has provided over CDN $1 billion in support of approximately 540 projects across the whole spectrum of development - agriculture, the environment, energy, education, technical assistance and economic and social growth.

Projects in Egypt; -Egyptian Environment Initiatives Fund (EEIF); -Privatization of Egyptian Public Sector Enterprises; -Small and Medium Business Support Project; -Small and Medium Enterprise Development in Upper Egypt (SMEDUP).

http://www.acdi-cida.gc.ca/CIDAWEB/webcountry.nsf/VLUDocEn/Egypt-Projects

- Danish Development Assistance

Denmark informed during the Danish-Egyptian Annual Consultations in May 2003 that Danida was to phase-out its bilateral Development Assistance on a grant basis to Egypt over a 6-year period. The decision had been taken in consideration of the fact that Egypt was one of the middle per capita income countries according to the World Bank standards.

During the phasing-out the Environment Sector Programme (ESP) will continue to support the Egyptian Government in its efforts to improve the environment, the institutional capacity and to create the framework for the respect of the national law governing the environment.

ESP Components:

- DEM Decentralise Environmental Management.
- CEM Communication in Environmental Management.
- EMG Environmental Management in the Governorates.
- ACI Achieving Compliance with environmental regulation in Industry.
- EIMP Environmental Information and Monitoring Programme.
- SPA Technical assistance to Shore Protection Agency.
- KIMA Fertilizer and Ferrosilicon Plant.

- European Investment Bank (EIB) - http://www.eib.org/index.asp

The European Investment Bank has committed more than 2.7 billion euro in loans since 1978. Major sectors include energy, transport, industry, farming, and water sewage. The EIB's operations, which have expanded in recent years, received a boost with the setting up of the Facility for Euro-Mediterranean Investment and Partnership (FEMIP), which prompted the EIB to open an office in Cairo, its first in the southern Mediterranean. Lending activity is geared to five operational priorities:

- Regional development and economic and social cohesion within the Union.
- Implementation of the "Innovation 2000" initiative.
- Environmental protection and improving the quality of life.
- Preparing the Accession Countries for EU membership.
- Community development aid and cooperation policy in the Partner Countries.

➢ European Union (EU)

Egypt received a total of 661 million euro from the European Community budget. Funds concentrated on promoting market economy approaches in agriculture and investing in socio-environmental infrastructure. Programmes in economic co-operation, energy, industry, and health were also included.

http://europa.eu.int/comm/external_relations/egypt/intro/index.htm

➢ German Technical Cooperation in (GTZ) in Egypt

Due to its strategic location in the Middle East, Egypt is one of Germany's most important partners for international development cooperation. The first project of Egyptian German technical cooperation began in 1956, and in 1981 GTZ opened an office in Cairo.

German technical cooperation is mainly organised in programmes and its advisory services are three fold:

- Policy advisory units influence the framework conditions moving towards an open and market-oriented society.
- At the mid-level, local government and private associations are supported.
- At the local level, projects cooperate directly with the population of the area.

In all programmes, participation of stakeholders is crucial: central and local government, private sector, and civil society are to be involved in all stages.

http://www.gtz.de/english/

- Global Environment Facility (GEF)

The Global Environment Facility (GEF), established in 1991, helps developing countries fund projects and programmes that protect the global environment. GEF grants support projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

http://www.gefweb.org

- Industrial Modernization Programme (IMP) / Industrial Modernization Centre (IMC)

The Industrial Modernization Programme is a national initiative, with a total budget of 430 million Euros, of which 250 million is funded by the European Union, making it the largest industrial support programme the European Union has ever funded in the Southern Mediterranean countries. The overall goals of the IMP are:

1. Upgrade Egyptian technological skills to International Standards.
2. Improve the performance of the workforce at all levels.
3. Enhance investment opportunities.
4. Develop an appropriate business environment for better efficiency.

The achievement indicators of the IMP are clearly indicated in the agreement between the European Union and the Ministry of Industry and Technological Development. Certain goals were set aiming at the upgrading of the Egyptian Industries in order to qualify it to compete within the International arena.

http://www.imc-egypt.org

- Japan Bank for International Cooperation (JBIC)

JBIC is active in lending and other financing operations for projects that contribute to environmental conservation and improvement in the developing countries by making use of a broad range of financial instruments available in its international financial operations and overseas economic cooperation operations. JBIC provides financial support by effectively using various financial facilities to support environmental projects, and carries out stringent checks for the environmental impact of financed projects based on "JBIC Guidelines for Confirmation of Environmental and Social Considerations" to confirm that the project proponent has made appropriate environmental considerations.

http://www.jbic.go.jp/

- Social Fund for Development (SFD)

Since the establishment of SFD in 1991, it has played different roles at the development arenas of Egypt, and pioneered in most. Initially, it was designed as a social safety net associated with the government of Egypt's agreement to undertake its extensive Economic Reform and Structural Adjustment Programme (ERSAP). Therefore, the Fund was considered essential to the actual success of the reform programme. Serving as a vanguard of economic empowerment, quality human resources, and an enabling environment for human development, SFD creates employment opportunities for start-up entrepreneurs and provides them with credit, technical assistance, skills, and technological know-how both Egyptian and international.

http://www.sfdegypt.org

5. MEDITERRANEAN AND BLACK SEA REGION AGREEMENTS AND ORGANISATIONS

This chapter presents interesting aspects of agreements and organisations that can be relevant for the *research and funding agenda watch*. They are divided in a section on coastal monitoring and a general section that also touches upon water and soil resources management and, to a much lesser extent, mining and mineral exploration. A common characteristic is that the programmes and initiatives are directed at the Mediterranean or Black Sea region. Some of the programmes are already described in chapter 3, such as the Protocol Integrated Coastal Zone Management for the Mediterranean and the Strategic Action Plan for the rehabilitation and protection of the Black Sea. The relation with research may be indirect, although some of the initiatives provide opportunities for research funding. A number of initiatives is already described in the IASON project document.

Coastal monitoring

The GEF Strategic Partnership for the Mediterranean Large Marine Ecosystem

The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading organisations (regional, international, non-governmental, etc.) and countries sharing the Mediterranean Sea towards the protection of the marine and coastal environment of the Mediterranean. The MedPartnership is being led by UNEP/MAP and the World Bank and is financially supported by the Global Environment Facility (GEF), and other donors, including the EU and all participating countries.

The project is being implemented in close association with other relevant regional initiatives, such as the Horizon 2020 Initiative to de-pollute the Mediterranean, the Integrated European Maritime Policy, and the World Bank/GEF Sustainable Mediterranean Program, etc. The project also contributes to the sustainable development objectives of the Union for the Mediterranean.

The Project is being carried out in the following GEF eligible countries: Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Lebanon, Libya, Morocco, Montenegro, Syria, Tunisia and Turkey. The Palestinian Authority also participates.

The Project ends or has ended in 2014 (see also the general section on GEF in the next chapter on the international research agenda).

Horizon 2020 initiative for de-pollution of the Mediterranean Sea by 2020 (SOE) -

The "Horizon 2020 Initiative" aims to de-pollute the Mediterranean by the year 2020 by tackling the sources of pollution that account for around 80% of the overall pollution of the Mediterranean Sea.

A report (2014) on the initiative is available.

Commission on the Protection of the Black Sea Against Pollution and the International Commission for the Danube River

The Black Sea Protection Commission, or Black Sea Commission (BSC), is responsible for the sustainable management of the Black Sea. The International Commission for the Danube River (ICPDR) has joined forces with the Black Sea Commission to remedy the environmental degradation of the Black Sea through the Danube by establishing a Joint Technical Working Group. This body is currently drafting guidelines for achieving good environmental status in the coastal waters of the Black Sea, in line with EU legislation. The Black Sea Commision adheres to the Bucharest Convention (Convention on the Protection of the Black Sea Against Pollution) of 1992.

General

Mediterranean Sea Basin Joint Operational Programme

The Mediterranean Sea Basin Joint Operational Programme 2007-2013 is a programme under the European Neighborhood & Partnership Instrument (ENPI) of the EU. the general objective of the Programme is to contribute to promoting the sustainable and harmonious cooperation process at the Mediterranean Basin level by

dealing with the common challenges and enhancing its endogenous potential. A new ENI (European Neighbourhood Instrument) CBC MED programme is under development for the period 2014 – 2020. Regular calls for proposals are part of this programme.

Euro-Mediterranean Partnership (EUROMED)

The Union for the Mediterranean promotes economic integration and democratic reform across 16 neighbours to the EU's south in North Africa and the Middle East. EUROMED builds on the Barcelona Declaration of 1995, cooperation agreements were re-launched in 2008 as the Union for the Mediterranean (UfM).

The UfM has a number of key initiatives on its agenda:

- the de-pollution of the Mediterranean Sea, including coastal and protected marine areas;
- the establishment of maritime and land highways that connect ports and improve rail connections so as to facilitate movement of people and goods;
- a joint civil protection programme on prevention, preparation and response to natural and man-made disasters;
- a Mediterranean solar energy plan that explores opportunities for developing alternative energy sources in the region;
- a Euro-Mediterranean University, inaugurated in Slovenia in June 2008;
- the Mediterranean Business Development Initiative, which supports small businesses operating in the region by first assessing their needs and then providing technical assistance and access to finance.

The first three bullets are relevant for IASON subjects.

The EU Strategy for the Danube Region (EUSDR)

The EU Strategy for the Danube Region (EUSDR) is a macro-regional strategy adopted by the European Commission in December 2010 and endorsed by the European Council in 2011. The Strategy was jointly developed by the Commission, together with the Danube Region countries and stakeholders, in order to address common challenges together. The Strategy seeks to create synergies and coordination

between existing policies and initiatives taking place across the Danube Region. UNS, IASON partner and coordinator of one of the EU clustered projects, is participating in the Danube strategy and considers it as one of the most important EU initiatives which tackles the geographical scope of this project. In the framework of the Danube strategy, UNS coordinates Priority Area 7 - To develop the knowledge society through research, education and information technologies.

The main topics of the strategy that are relevant to the IASON subjects are summarised below:

Four Pillars address the major issues. Each comprises Priority Areas, distinct fields of action. These are:

(1) Connecting the Danube Region,

(2) Protecting the Environment in the Danube Region

- To restore and maintain the quality of waters
- To manage environmental risks
- To preserve biodiversity, landscapes and the quality of air and soils

(3) Building Prosperity in the Danube Region

- To develop the knowledge society through research, education and information technologies
- To support the competitiveness of enterprises, including cluster development
- To invest in people and skills

(4) Strengthening the Danube Region

- To step up institutional capacity and cooperation
- To work together to promote security and tackle organised and serious crime

An EC communication and action plan on the Danube strategy is available.

Danube river basin management plan (2009)

The Danube river basin management plan is developed under the umbrella of the ICPDR. It guides the way to achieving at least good status for all waters of the Danube River Basin. The current plan covers the period from 2009 until 2015. In the Danube River Basin District, all countries (including non-EU member countries) have been

working on their national management plans. As these plans need to be established for each river basin, the countries are also cooperating on the international level.

They use the ICPDR as a platform to discuss and agree on the transboundary aspect of the management of the water resources. Jointly, the countries of the Danube River Basin have developed the Danube River Basin Management Plan including measures that ensure that at least good status is reached by 2015. The plan is supplemented with thematic maps. The Danube river basin management plan is available.

Some elements relevant to IASON subjects are highlighted below:

There is still a high uncertainty regarding the cause-effect relationships between nutrient pollution and the ecological status of the surface water bodies of the Danube and the Black Sea. Therefore further research and monitoring is needed, as is a continuous improvement and calibration of the MONERIS scenarios.

In order to respond to uncertainties and fill existing knowledge gaps regarding various management issues highlighted in this DRBM Plan, joint actions should be undertaken to enable access to EU and international funding, particularly for research projects relevant at the basin-wide scale.

Black Sea Basin Joint Operational Programme

The Black Sea Basin Joint Operational Programme 2007-2013 (hereafter Black Sea JOP) is a programme under the European Neighbourhood & Partnership Instrument (ENPI) of the EU. It aims to contribute to: “a stronger and sustainable economic and social development of the regions of the Black Sea Basin”. A new Black Sea Basin ENI (European Neighbourhood Instrument) CBC programme is under development that covers the period 2014 – 2020. The draft programme is available.

Organisation of the Black Sea Economic Co-operation (BSEC)

The Black Sea Trade and Development Bank (BSTDB) was established by the eleven Member States of the Organisation of the Black Sea Economic Co-operation (BSEC) in 1998 as a regional multilateral development financial institution. The organisation is based in Thessaloniki, Greece. An overview of programmes, projects, calls and funding opportunities is available at www.bsecprojects.com.

Black Sea Trust for Regional Cooperation

The Black Sea Trust is a programme of the German Marshall Fund of the United States. The Black Sea Trust will fund programs that strengthen cross-border ties, civic participation, democratic governance, and the rule of law in the wider Black Sea region. The broad goals of the Black Sea Trust include building trust among citizens in their public institutions and to strengthen this critical set of institutions; affirming the value of citizen participation in the democratic process; and fostering regional, cross-border ties in the public, private, and non-profit sectors. The programme has no focus on research per se, but occasionally opportunities may arise.

Commission on the Black Sea

The Commission on the Black Sea (not to be confused with the Black Sea Commission) is a civil society initiative developed and launched jointly in 2009 by the Bertelsmann Stiftung, the Black Sea Trust for Regional Cooperation, the Economic Policy Research Foundation of Turkey (TEPAV), and the International Centre for Black Sea Studies (ICBSS). Activities are policy oriented, but research is not excluded.

Black Sea Global Ocean Observing System

The Black Sea GOOS is a local Association formed by the Black Sea riparian countries in order to foster Operational Oceanography in the region and set up links with other regional and global organisations (with similar objectives). Black Sea GOOS activities have been funded through the ESA Data User Element.

INOGATE Programme

The INOGATE Programme is an international energy cooperation programme between the European Union, the littoral states of the Black & Caspian Seas and their neighbouring countries. The programme focuses more on policy, renewable energy and technology transfer than on research, but research may be part of projects that are funded through this programme.

6. INTERNATIONAL RESEARCH AGENDA

There is a tendency towards synchronisation, if not integration, of research agendas. The Belmont Forum and Future Earth (presented below) are examples of such initiatives. The need for integration is especially felt when global challenges need to be addressed. Another trend is a stronger focus on application of research results. In view of tackling global challenges this is understandable, after all, something has to be done about the problems, writing publications is not enough. This is compatible with the trend to use research funding to strengthen local or regional economic positions. Although this has been a traditional motivation for research funding, the requirements concerning coverage of the whole innovation chain are becoming stricter. There is a potential conflict of interest between the goal of gaining comparative advantage and the goal of tackling global challenges. In practice, solutions are sought along the lines of improved coordination and research funding remains restricted to the traditional national or regional target groups. Others can usually participate, but bringing their own funding. It is no surprise that the size of truly international research funding has been quite limited. Apart from the examples of the Belmont Forum and Future Earth, the Global Environment Facility is presented as an interesting partnership to watch, although research funding is not the prime mandate of the facility, there could be interesting opportunities. The same applies to the process around the Sustainable Development goals that will be dealt with in the next chapter.

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Belmont Forum

The International Group of Funding Agencies for Global Change Research (IGFA) is a forum for national scientific funding agencies to collaborate in addressing the challenges and opportunities of global environmental change.

The Belmont Forum, a group of high-level representatives from major funding agencies across the globe, is the Council of Principals for IGFA. The Belmont Forum is guided by the charge embodied in the Belmont Challenge *(see references)*, which is a “funders' vision for the priority knowledge and capabilities derived from environmental research that society needs, and the underpinning research challenges over the next decade to deliver them.” In order to meet the goals of the Belmont Challenge, the Belmont Forum coordinates funding for collaborative research actions (CRAs). These high-priority research activities improve the way funding agencies collaborate with each

other and develop opportunities for research. *The aim is* to deliver knowledge needed for action to avoid and adapt to detrimental environmental change including extreme hazardous events.

This requires:

- Assessments of risks, impacts and vulnerabilities, through regional and decadal-scale analysis and prediction
- Information on the state of the environment, through advanced observing systems
- Interaction of natural and social sciences
- Enhanced environmental information service providers to users
- Effective international coordination mechanisms

With priority foci being:

- Coastal vulnerability
- Freshwater Security
- Ecosystem Services
- Carbon Budgets
- Most vulnerable societies

These challenges will be integrated into a seamless, global Earth System Analysis and Prediction System (ESAPS), which will provide decision-makers with a holistic decision support system. *Contributions are requested through regular calls for proposals.*

Future Earth

Future Earth is the global research platform providing the knowledge and support to accelerate our transformations to a sustainable world.

Bringing together existing programmes on global environmental change, Future Earth will be an international hub to coordinate new, interdisciplinary approaches to research on three themes: Dynamic Planet, Global Development and Transformation towards Sustainability. It will also be a platform for international engagement to ensure that knowledge is generated in partnership with society and users of science. It is open to scientists of all disciplines, natural and social, as well as engineering, the humanities and law.

Future Earth is rather a coordinating platform to connect existing programmes, than a provider of research funding.

Global Environment Facility

The Global Environment Facility is a partnership for international cooperation where 183 countries work together with international institutions, civil society organisations and the private sector, to address global environmental issues.

Since 1991, the GEF has provided $12.5 billion in grants and leveraged $58 billion in co-financing for 3,690 projects in 165 developing countries. For 23 years, developed and developing countries alike have provided these funds to support activities related to biodiversity, climate change, international waters, land degradation, and chemicals and waste in the context of development projects and programs.

Through its Small Grants Programme (SGP) the GEF has made more than 20,000 grants to civil society and community based organisations for a total of $1 billion.

Among the major results of these investments, the GEF has set up protected areas around the world equal roughly to the area of Brazil; reduced carbon emissions by 2.3 billion tonnes; eliminated the use of ozone depleting substances in Central and Eastern Europe and Central Asia; transformed the management of 33 major river basins and one-third of the world's large marine ecosystems; slowed the advance of desertification in Africa by improving agricultural practices—and all this while contributing to better the livelihood and food security of millions of people.

The GEF serves as financial mechanism for the following conventions:

- Convention on Biological Diversity (CBD)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Stockholm Convention on Persistent Organic Pollutants (POPs)
- UN Convention to Combat Desertification (UNCCD)
- Minamata Convention on Mercury
- The GEF, although not linked formally to the Montreal Protocol on Substances That Deplete the Ozone Layer (MP), supports implementation of the Protocol in countries with economies in transition.

The GEF administers the LDCF and SCCF which were established by the Conference of the Parties (COP) to the UNFCCC. The GEF also administers the Nagoya Protocol

Implementation Fund (NPIF) that was established the Convention on Biological Diversity (CBD). In addition, the GEF Secretariat hosts the Adaptation Fund Board Secretariat.

The GEF is not a research funding organisation, but research may be an integrated part of projects or programmes that are funded through the facility.

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There are more organisations that are interesting for the *research and funding agenda watch*, such as the **Bill and Melinda Gates Foundation (BMGF)**. Occasionally challenges are published for finding solutions to societal problems, but the Foundation sometimes opt for direct contracting. In both cases the funding is not directed at research, but a research element could be part of the project or programme.

7. SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) are an initiative that started (officially) at the Rio+20 conference "as an agreement of the member states to launch a process to develop new goals, which will build upon the Millennium Development Goals and converge with the post-2015 agenda". The process is not finished. Below a number of extract is presented:

- An extract from the Rio+20 document "The future we want" that underlines the relevance of the spatial dimension and earth observation in particular,
- A figure showing the process envisaged in "The future we want",
- A figure showing trends in a new approach to sustainable development (by the Independent Research Forum),
- A table showing the Sustainable Development Goals and a list of proposed indicators that are relevant to IASON subjects (2014),
- An extract from an earlier proposal for Sustainable Development Goals and a list of indicators.

The last extract is shown, because it gives more attention to the spatial dimension. It seems that in the discussions and negotiation process around the Sustainable Development Goals there is a trend, just as with the Millennium Development Goals, towards a certain level of abstraction and the spatial dimension is eliminated or marginalised in this process (all the more reason for marketing and promotion!).

As indicated, the process of formulating the Sustainable Development Goals, actions and indicators has not finished[5], but the table presented below gives an insight in the probable priorities. From these the need for research, and consequently the opportunities for obtaining research funding, can be derived. It must be noted that UN-organisations aim at performing a leading role in the process and in implementation: apart from the lofty general goals, the Sustainable Development Goals provide a unique opportunity for each UN-organisation for self-preservation.

Extract from "The future we want"

[5] One notices still the occurrence of relative indicators, such as "increasing the percentage of protected forest in relation to the total forest area". In absence of an absolute indicator, this leads to the sustainability-defeating conclusion that maintaining some protected areas and chopping down the rest of the forest achieves the highest-rated result!

274. We recognise the importance of space-technology-based data, in situ monitoring, and reliable geospatial information for sustainable development policy-making, programming and project operations. In this context, we note the relevance of global mapping and recognise the efforts in developing global environmental observing systems, including by the Eye on Earth network and through the Global Earth Observation System of Systems. We recognise the need to support developing countries in their efforts to collect environmental data.

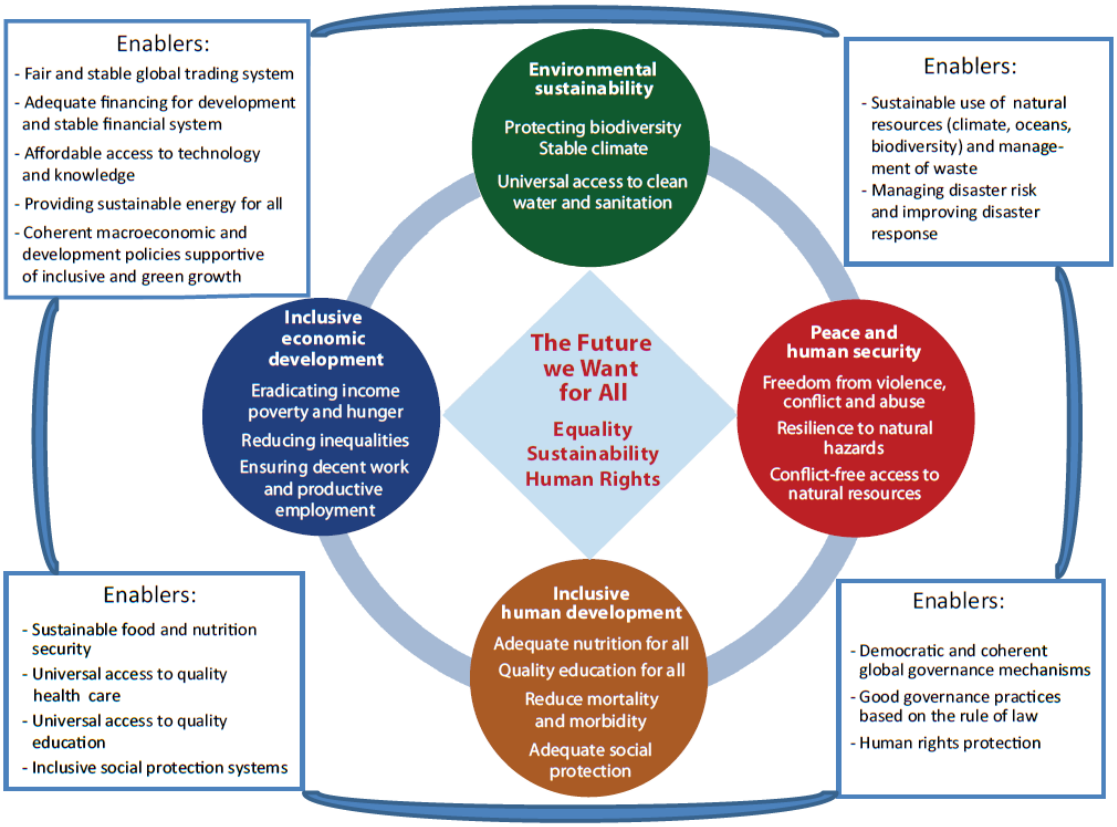

Figure 9: Process towards "the future we want" (source: renewed global partnership for development)

From		To
Development assistance	→	A universal global compact
Top-down decision making	→	Multi-stakeholder decision-making processes
Growth models that increase inequality and risk	→	Growth models that decrease inequality and risk
Shareholder value business models	→	Stakeholder value business models
Meeting "easy" development targets	→	Tackling systemic barriers to progress
Damage control	→	Investing in resilience
Concepts and testing	→	Scaled up interventions
Multiple discrete actions	→	Cross-scale coordination

Figure 10: Trends in a new approach to sustainable development (source: post-2015: framing a new approach to sustainable development)

Indicators for sustainable development goals (2014 preliminary draft for public consultation)

Table 2: Sustainable development goals and indicators relevant to coastal monitoring, water and soil resource management and mining and mineral exploration

Goal and Target	***Issue to measure (with spatial component)***	***Potential and Illustrative Indicator***
GOAL 01: End Extreme Poverty including Hunger		
Target 01a. End extreme poverty, including absolute income poverty ($1.25 or less per day).	Related relevant core indicator: Urban green space per capita	
Target 01b. End hunger and achieve food security, appropriate nutrition, and zero child stunting.		
Target 01c. Provide enhanced support for highly vulnerable states		

and Least Developed Countries, to address the structural challenges facing those countries, including violence and conflict.		
GOAL 02: Promote Economic Development and Decent Jobs within Planetary Boundaries		
Target 02a. Each country reaches at least the next income level and promotes decent work.		
Target 02b. Countries report on their contribution to planetary boundaries and incorporate them, together with other environmental and social indicators, into expanded GDP measures and national accounts.	Nitrogen and phosphorus fluxes	Excessive loss of reactive nitrogen [and phosphorus] to the environment (kg/ha) – indicator to be developed
	Aerosol concentrations	Aerosol optical depth (AOD)
	Related relevant core indicators: Annual change in forest area and land under cultivation (modified MDG Indicator) Red List Index (by country and major species group) Percentage of total water resources used (MDG Indicator) Country implements and reports on System of Environmental-Economic Accounting (SEEA) accounts	
Target 02c. Realise sexual and reproductive health and rights for all, and promote the rapid reduction in fertility to replacement level or below through exclusively voluntary means.		

GOAL 03: Ensure Effective Learning for All Children and Youth for Life and Livelihood		
Target 03a. All children under the age of 5 reach their developmental potential through access to quality early childhood development programs and policies.		
Target 03b. All girls and boys receive quality primary and secondary education that focuses on a broad range of learning outcomes and on reducing the dropout rate to zero.		
Target 03c. Ensure that all youth transition effectively into the labour market.		
GOAL 04: Achieve Gender Equality, Social Inclusion, and Human Rights		
Target 04a. Monitor and end discrimination and inequalities in public service delivery, the rule of law, access to justice, and participation in political and economic life on the basis of gender, ethnicity, religion, disability, national origin, and social or other status.		
Target 04b. Reduce by half the proportion of households with incomes less than half of the national median income (relative poverty).		
Target 04c. Prevent and eliminate violence against individuals, especially women and children.		

GOAL 05: Achieve Health and Wellbeing at all Ages		
Target 05a. Ensure universal coverage of quality healthcare, including the prevention and treatment of communicable and non-communicable diseases, sexual and reproductive health, family planning, routine immunisation, and mental health, according the highest priority to primary health care.		
Target 05b. End preventable deaths by reducing child mortality to [20] or fewer deaths per 1000 births, maternal mortality to [40] or fewer deaths per 100,000 live births, and mortality under 70 years of age from non-communicable diseases by at least 30 percent compared with the level in 2015.		
Target 05c. Implement policies to promote and monitor healthy diets, physical activity and subjective wellbeing; reduce unhealthy behaviours such as tobacco use by [30%] and harmful use of alcohol by [20%].		
GOAL 06: Improve Agriculture Systems and Raise Rural Prosperity		
Target 06a. Ensure sustainable food production systems with high yields and high efficiency of water, soil nutrients, and energy; supporting nutritious diets with low food losses and waste.	Staple crop yields	Crop yield gap (actual yield as % of attainable yield)
	Sustainability of agriculture	Crop nitrogen use efficiency (%)
	Water productivity	[Crop water productivity

		(tons of harvested product per unit irrigation water) – indicator to be developed]
	Food loss	Global Food Loss Indicator [or other indicator to be developed to track the share of food lost or wasted in the value chain after harvest]
	Tier 2 Indicators: o Cereal yield growth rate (% p.a.). o [Indicator on irrigation access gap]— to be developed. o Livestock yield gap (actual yield as % of attainable yield).	
Target 06b. Halt forest and wetland conversion to agriculture, protect soil resources, and ensure that farming systems are resilient to climate change and disasters.	Conversion of land to agricultural and other uses	Annual change in forest area and land under cultivation (modified MDG Indicator)
	Degradation of agricultural land	Annual change in degraded or desertified arable land (% or ha)
	Impact of extreme climate events	Economic losses from disasters in rural areas, by climatic and non-climatic events (in US$) [Indicator to be specified]
	Tier 2 Indicators: o [Farmers with nationally appropriate crop insurance (%)] – indicator to be developed].	
	Related relevant core indicator: [Excessive loss of reactive nitrogen [and phosphorus]	

	to the environment] - indicator to be developed	
Target 06c. Ensure universal access in rural areas to basic resources and infrastructure services (land, water, sanitation, modern energy, transport, mobile and broadband communication, agricultural inputs, and advisory services).	Rural infrastructure and services	Access to all-weather road (% access within [x] km distance to road)
GOAL 07: Empower Inclusive, Productive and Resilient Cities		
Target 07a. End extreme urban poverty, expand employment and productivity, and raise living standards, especially in slums.	Slum conditions	Percentage of urban population living in slums or informal settlements (MDG Indicator)
Target 07b. Ensure universal access to a secure and affordable built environment and basic urban services including housing; water, sanitation and waste management; low-carbon energy and transport; and mobile and broadband communication.		
Target 07c. Ensure safe air and water quality for all, and integrate reductions in greenhouse gas emissions, efficient land and resource use, and climate and disaster resilience into investments and standards.	Air quality	Mean urban air pollution of particulate matter (PM10 and PM2.5)
	Urban green space	Urban green space per capita
	Vulnerability to extreme climate events	Economic losses from disasters in urban areas, by climatic and non-climatic events (in US$) [Indicator to be specified]
	Tier 2 Indicators:	

	o [Climate Change Action (CCA) Index]— Indicator to be developed. o [Disaster Risk Reduction (DRR) Index]— Indicator to be developed. o City Biodiversity Index (Singapore Index).	
GOAL 08: Curb human induced climate change and ensure sustainable energy		
Target 08a: Decarbonise the energy system, ensure clean energy for all, and improve energy efficiency, with targets for 2020, 2030 and 2050.	GHG emissions	Total energy and industry-related GHG emissions by gas and sector, expressed as production and demand-based emissions (tCO2e)
	Related relevant core indicator: Annual change in forest area and land under cultivation (modified MDG Indicator) Losses from disasters in rural areas, by climate and non-climate-related events (in US$ and in lives lost)	
Target 08b: Reduce non-energy related emissions of greenhouse gases through improved practices in agriculture, forestry, waste management, and industry.	GHG emissions from land-use change	Net GHG emissions in the Agriculture, Forest and other Land Use (AFOLU) sector (tCO2e)
	Related relevant core indicator: Losses from disasters in rural areas, by climate and non-climate-related events (in US$ and in lives lost)	
Target 08c: Adopt incentives, including pricing greenhouse gases emissions, to curb climate change and promote technology transfer to developing countries.		

<table>
<tr><td colspan="3">GOAL 09: Secure Ecosystem Services and Biodiversity, and Ensure Good Management of Water, Oceans, Forests and Natural Resources</td></tr>
<tr><td rowspan="5">Target 09a. Secure ecosystem services by adopting policies and legislation that address drivers of ecosystem degradation, and requiring individuals, businesses and governments to pay the social cost of pollution and use of environmental services.</td><td>Oceans</td><td>Ocean Health Index (national index)</td></tr>
<tr><td>Biodiversity</td><td>Red List Index (by country and major species group)</td></tr>
<tr><td>Critical biome management</td><td>[Protected areas overlay with biodiversity (national level)]</td></tr>
<tr><td colspan="2">Tier 2 Indicators:
o [Eutrophication of major estuaries]— Indicator to be developed.
o [Indicator on the implementation of spatial planning strategies for coastal and marine areas]— to be developed.</td></tr>
<tr><td colspan="2">Related relevant core indicators:
[Excessive loss of reactive nitrogen [and phosphorus] to the environment] - indicator to be developed
Crop nitrogen use efficiency (%)
[Crop water productivity (tons of harvested product per unit irrigation water) – indicator to be developed]
Global Food Loss Indicator [or other indicator to be developed to track the share of food lost or wasted in the value chain after harvest]
Annual change in forest area and land under cultivation (modified MDG Indicator)
Annual change in degraded or desertified arable land (% or ha)
Country implements and reports on System of Environmental-Economic Accounting (SEEA) accounts</td></tr>
</table>

Target 9b. Participate in and support regional and global arrangements to inventory, monitor, and protect ecosystem services and environmental commons of regional and global significance and curb trans-boundary environmental harms, with robust systems in place no later than 2020.	Oceans	Ocean Health Index (regional index)
	Sustainable fisheries management	Percentage of fish stocks within safe biological limits (MDG Indicator)
	Biodiversity	Red List Index (for Internationally Traded Species)
	Critical biome management	Protected areas overlay with biodiversity (regional and global)
	Trans-boundary river-shed management	[Reporting of international river shed authorities on trans-boundary river-shed management - indicator to be developed]
	Tier 2 Indicators: o Abundance of invasive alien species. o Area of coral reef ecosystems and percentage live cover.	
	Related relevant core indicators: [Excessive loss of reactive nitrogen [and phosphorus] to the environment] - indicator to be developed Annual change in degraded or desertified arable land (% or ha) Net GHG emissions in the Agriculture, Forest and other Land Use (AFOLU) sector (tCO2e)	
Target 09c. All governments and businesses commit to the sustainable, integrated, and	Water resource management	Percentage of total water resources used (MDG Indicator)

transparent management of water, agricultural land, forests, fisheries, mining, and hydrocarbon resources to support inclusive economic development and the achievement of all SDGs.	Forest management	Area of forest under sustainable forest management as a percentage of forest area
	Related relevant core indicator: Percentage of fish stocks within safe biological limits (MDG Indicator)	
GOAL 10: Transform Governance and Technologies for Sustainable Development		
Target 10a. Governments (national and local) and major companies support the SDGs, provide integrated reporting by 2020, and reform international rules to achieve the goals.	Integrated government reporting	Country implements and reports on System of Environmental-Economic Accounting (SEEA) accounts
Target 10b. Adequate domestic and international public finance for ending extreme poverty, providing global public goods, capacity building, and transferring technologies, including 0.7 percent of GNI in ODA for all high-income countries, and an additional $100 billion per year in official climate financing by 2020.		
Target 10c. Accelerate adoption of new technologies for the SDGs.	Sustainable Technologies and ICT	[Index on ICT infrastructure performance]—indicator to be developed

Proposal of the open working group for Sustainable Development Goals (elements relevant to coastal monitoring, water and soil resource management and mining and mineral exploration)

Goal 1. End poverty in all its forms everywhere

Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

2.1 by 2030 end hunger and ensure access by all people, in particular the poor and people in vulnerable situations including infants, to safe, nutritious and sufficient food all year round

2.2 by 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons

2.3 by 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment

2.4 by 2030 ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality

Goal 3. Ensure healthy lives and promote well-being for all at all ages

3.9 by 2030 substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination

Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all

Goal 5. Achieve gender equality and empower all women and girls

Goal 6. Ensure availability and sustainable management of water and sanitation for all

6.1 by 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 by 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 by 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally

6.4 by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity

6.5 by 2030 implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all

7.1 by 2030 ensure universal access to affordable, reliable, and modern energy services

7.2 increase substantially the share of renewable energy in the global energy mix by 2030

7.3 double the global rate of improvement in energy efficiency by 2030

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.4 improve progressively through 2030 global resource efficiency in consumption and production, and endeavour to decouple economic growth from environmental degradation in accordance with the 10-year framework of programmes on sustainable consumption and production with developed countries taking the lead

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

9.1 develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

9.4 by 2030 upgrade infrastructure and retrofit industries to make them sustainable, with increased resource use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, all countries taking action in accordance with their respective capabilities

Goal 10. Reduce inequality within and among countries

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

11.1 by 2030, ensure access for all to adequate, safe and affordable housing and basic services, and upgrade slums

11.2 by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

11.3 by 2030 enhance inclusive and sustainable urbanisation and capacities for participatory, integrated and sustainable human settlement planning and management in all countries

11.4 strengthen efforts to protect and safeguard the world's cultural and natural heritage

11.5 by 2030 significantly reduce the number of deaths and the number of affected people and decrease by y% the economic losses relative to GDP caused by disasters, including water-related disasters, with the focus on protecting the poor and people in vulnerable situations

11.6 by 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management

11.7 by 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities

Goal 12. Ensure sustainable consumption and production patterns

12.2 by 2030 achieve sustainable management and efficient use of natural resources

12.3 by 2030 halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses

12.4 by 2020 achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimise their adverse impacts on human health and the environment

12.8 by 2030 ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

Goal 13. Take urgent action to combat climate change and its impacts

13.1 strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries

13.2 integrate climate change measures into national policies, strategies, and planning

13.3 improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

14.2 by 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans

14.3 minimise and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

14.4 by 2020, effectively regulate harvesting, and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices and implement science-based management plans, to restore fish stocks in the shortest time feasible at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

14.5 by 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15.1 by 2020 ensure conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.2 by 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests, and increase afforestation and reforestation by x% globally

15.3 by 2020, combat desertification, and restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world

15.4 by 2030 ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits which are essential for sustainable development

15.5 take urgent and significant action to reduce degradation of natural habitat, halt the loss of biodiversity, and by 2020 protect and prevent the extinction of threatened species

15.7 take urgent action to end poaching and trafficking of protected species of flora and fauna, and address both demand and supply of illegal wildlife products

15.8 by 2020 introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems, and control or eradicate the priority species

15.9 by 2020, integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17. Strengthen the means of implementation and revitalise the global partnership for sustainable development

17.6 enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation, and enhance

knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, particularly at UN level, and through a global technology facilitation mechanism when agreed

17.7 promote development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed

17.18 by 2020, enhance capacity building support to developing countries, including for LDCs and SIDS, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts

17.19 by 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement GDP, and support statistical capacity building in developing countries

8. INTERNATIONAL AGREEMENTS

Several international agreements have already been mentioned in chapter 6. Below some examples are given that are relevant to the IASON subjects:

- Convention on Biological Diversity (CBD),
- United Nations Framework Convention on Climate Change (UNFCCC),
- UN Convention to Combat Desertification (UNCCD),
- Kyoto protocol,
- Convention on Wetlands of International Importance (Ramsar),
- Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention).

With respect to mining and mineral exploration the relation is an environmental one, with a focus on waste, pollution and other environmental damage. The work of the ICMM (International Council on Mining and Metals) should also be mentioned here. Then there are, what could be called, the international processes, such as the WSSD (World Summit on Sustainable Development) – see also the previous chapter -, the IPCC (Intergovernmental Panel on Climate Change) and the WCRP (World Climate Research Programme). As the name suggests, the latter has a focus on research. In terms of funding however, developments around the agreements and processes are interesting to watch, but opportunities are created by the member states that subscribe to the agreements and develop more detailed plans and agreements. In some cases there are possibilities, such as the study that GEOBON has done on the feasibility and cost of the use of earth observation for CBD goals, but the focus of this activity was more advice than research. International agreements and process will therefore be kept on the backburner of the *research and funding agenda watch*.

A tool used internationally, particularly in mining is the life cycle assessment (LCA), as described in the IMPACTMIN report on socio-economic indicators. It is “an ISO 14000 recommended tool used to assess the environmental and social impact of a product throughout its useful life; from its start as a raw material to disposal. Mining is the first phase in the lifecycle of a material, and as such it is extremely important; it can often set a material on the path to be used responsibly throughout its lifecycle. In its efforts towards sustainability, the mining industry has used several environmental and economic indicators to assess its performance”.

9. TOWARDS A SUSTAINABLE FUNDING TOOLKIT

As mentioned in the first chapter, the sustainable funding toolkit will be derived from a combination of sources: the *research and funding agenda watch*, the IASON funding opportunities database, the EGIDA methodology (developed further by the IASON and EOPOWER projects) and the EOPOWER impact assessment methodology.

The objective of the sustainable funding toolkit is to facilitate access to research resources. The toolkit will focus on the IASON subjects of coastal monitoring, water and soil resource management and mining and mineral exploration, with earth observation as a common element. The target group of toolkit users are the researchers and research administrators (or those in charge of leveraging resources). The aim is to gain insight in where the proposed research fits into the different agendas and the whole value chain that runs from fundamental research to application of solutions, to see if it is possible to find funding for the research and to assess whether the objective and/or the approach of the research needs to be modified to be more in line with national and international research agendas (or vice versa, and more ambitious, if national and international research agendas need to be modified to be more in line with the proposed research).

An important, but often neglected, element is the cost-benefit calculation of the (ultimate) results of the research. Partly this has to do with the culture of science and partly with subjects themselves. Especially in the field of climate changes and the environment, the value of resources is not incorporated in the current economic system. Attempts to address this, in the form of a System of Environmental-Economic Accounting (SEEA) have been mentioned in this report. Many countries have applied or experimented with the system, but in most cases the results have not gone beyond the presentation of shadow accounts or the projection of future scenarios. This is in part due to resistance to change from the current economic system (“if we are the first to apply this, the others will take advantage”) and in part due to complexities with assessing the value of the environment and the effect of interventions. The subject warrants a field of research in itself. However, not only governments and international organisations have made attempts to introduce such systems (the WAVES partnership is a good example), also consulting and accounting companies have developed their own versions in anticipation of general adoption somewhere down the road. This

shows that it is important to give attention to environmental accounting and the subject will therefore be included in the sustainable funding toolkit.

The EGIDA methodology is focused on research and consists of networking and technical activities. The networking activities are:

1. Identification of stakeholders,
2. Assessment of the awareness of GEO/GEOSS in the proposed network,
3. Dissemination of the GEO/GEOSS initiative in the proposed network,
4. Establishment and operation of the network,
5. Address sustainability of the (re-)engineering process.

The technical activities are:

1. Definition of the management structure and process for capacity building,
2. Identification and removal of barriers to information sharing,
3. Design of a national/regional resource sharing system,
4. Implementation of the system,
5. Assessment and evaluation,
6. Integration with GEOSS and other infrastructures.

The EOPOWER impact assessment is focused on marketing of innovative solutions. It raises first a few questions to assess where the proposed solution fits in the economic framework, taking into account a possible future adoption of environmental accounting systems. It then rates the following characteristics of geospatial solutions:

- fit-for-purpose,
- comparative advantage,
- complexity to user / ease- of-use,
- elegance,
- cost-benefit,
- sustainability,
- resilience,
- reproduction capacity / flexibility,
- acceptance,
- level of knowledge transfer required,

- ethics, transparency, public accountability, objectivity & impartiality.

This is combined with a rating of the business environment to arrive at the optimum marketing approach:

- Willingness to pay (by clients),
- Embedding (in organisational processes),
- Openness (transparency and ease of doing business, access to markets),
- Institutions (is the institutional environment conducive to doing business, acceptance of new solutions?).

The sustainable funding toolkit will combine these elements and provide tools for linking research and innovation, funding, and practical application of solutions. The toolkit will be in the form of a powerpoint presentation, facilitating changes and add-ons by users.

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