

CHAPTER 1

ERDF 156 - Developing a National Environmental Monitoring Infrastructure and Capacity: Shifting the State of Access

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Introduction

Malta, through an initiative spanning 9 years, has completed an exercise aimed at obtaining a complete set of data that will serve as a basis for cross-thematic research. This is made achievable through the creation of essential datasets that will give the public, terrestrial and bathymetric baseline information for free. Such was made possible through an initiative as part of a project, entitled “Developing a National Environmental Monitoring Infrastructure and Capacity”.

The Malta Environment and Planning Authority (MEPA) was the lead partner of this project together with the University of Malta (UoM), the Malta Resources Authority (MRA), the Environmental Health Directorate (EHD) and the National Statistics Office (NSO) as external partner organisations.

The project had a total budget of €4.9M, of which €4.8M was co-funded by ERDF (85%) and National Funds (15%) under the Operational Programme 1 – Investing in Competitiveness for a Better Quality of Life. MEPA’s funding contribution to this project was €180K. Of these, €4.26M were utilised due to savings pertaining to the tendering process.

The aim of this chapter is to describe the project aims, process and outcomes.

Rationale

The environment provides a vital function to the Maltese economy, acting as a source of both renewable and exhaustible resources, and as a sink for all emissions and waste generated by every economic and social activity. In spite of this familiarity between the environment and the economy, a reliable government policy aimed at preserving natural resources and managing the environment would be impossible without detailed, dependable, up-to-date and easily accessible information on the state of the environment.

As a member of the EU and of the international community, Malta also has important obligations to report on the state of the environment and the effectiveness of policy measures addressing particular concerns, such as pollution. Failure to collect dependable and up-to-date environmental data, would not only make Malta more exposed to various environmental pressures due to poorly informed policy decisions, but will also subject the Islands to heavy economic penalties for non-compliance with EU reporting obligations that may exceed any potential costs of environmental monitoring.

Project Purpose and Description

The purpose of the project was to establish environmental monitoring strategies, infrastructure, methodologies and capacity on a national level, through:

- The drawing up of an environmental monitoring strategy for the Maltese Islands;
- The design and establishment of national monitoring programmes in the areas of air, water, radiation, noise, soil and marine;
- The compilation of baseline surveys leading to procurement of critical environmental data in the mentioned areas;
- An economic and social analysis of the use of marine waters, on the basis of which realistic environmental targets can be set for the management of human activities affecting the marine environment.
- The delivery of environmental monitoring equipment for air, noise and radiation monitoring, information management systems and training on the practical use of the equipment and systems delivered.

The project was divided into ten different Actions, being:

Action 1 - Project Management Consultancy Services to assist in Project Preparation and Development.

Action 2 - Development of noise monitoring strategy & baseline survey: A strategy for the monitoring of ambient noise in Malta based on the requirements of the Directive, technical specifications for the supply of noise monitoring equipment and noise monitoring software, the collection of all baseline data for noise mapping as required by the Directive, an interim model and noise maps; and expert recommendations on actions and measures.

Action 3 - Development of the Monitoring Strategy, Monitoring Programmes, and Baseline Surveys for the below themes:

- Air: Assessment of EU community, national and multilateral regulatory framework,

analysis of the current monitoring network and data management system, preliminary evaluation of the monitoring network compliance to the legal obligations, state of air quality; national emissions for modelling application, modelling, updating in definition of zones and agglomerations, strategy & criteria for the joint analysis of available data, definition of the monitoring network, compilation of the QA_QC procedures, the National Air Quality Reference Laboratory (NRL), assessment of alternative solutions for NRL, air quality monitoring reports, integrated assessment modelling system, components of an integrated assessment modelling system, definition of the possible future structures of the Malta Integrated Assessment Modelling System (MIAMS), and assessment of alternative solutions for the MIAMS.

- Water: Water legislation report, analysis of existing monitoring, comprehensive review of policy tools and legislative instruments, and development of a long-term strategy for water, recommendation to build institutional capacity, implementation plan for the monitoring strategy, an investigative monitoring plan; and surveys of coastal water reports.
- Radiation: Technical report, design of the programmes, rationale for the radiation monitoring system, feasibility study, report on soil monitoring, and report of water monitoring.
- Soil: Soil analysis, design of programmes, feasibility assessment of programmes, and soil monitoring survey analysis.
- Baseline surveys: Topographic LIDAR survey, aerial imagery, bathymetric LIDAR survey, and acoustic bathymetric scans.

Action 4 - Supply, installation, commissioning and testing of information resources systems and air monitoring systems:

- Air Monitoring: Intercomparison exercise on particulate matters, mobile station to act as a rapid response facility, monitoring of black dust source appointment, improved data capture - urban measurements, quality control, source contribution and pollution dispersion, emission inventory system,
- Licenses: MapInfo, Vertical Mapper, ArcInfo, Geomatica (LP360), Erdas IMAGINE Professional, ArcGIS Server, ArcPad 7, ArcGIS Spatial Analyst, 3D Analyst, Geostatistical, Analyst, Land Change,
- Hardware: ArcGIS Server, Storage Area Network and servers, GI workstations, Handheld 3D scanner, A3 Laser colour printer, GPS/GIS handheld receiver and accessories, Permanent Global Navigation Satellite System Station (GNSS) and geodetic receivers, Remote capture GPS receiver, and Satellite image - QuickBird, Landsat, EuroImage Geo-Eye-1.

Action 5 - Information and dissemination services for the project: Print media, broadcast media, events, internet and websites, promotional material, and signage.

Action 6 - Design of Shared Environmental Information System (SEIS) and development of a web-based GIS interface: Review and analysis of MEPA's national and EU-level requirements for the development and operation of the SEIS, taking into consideration all relevant factors, the design of Maltese component of SEIS, development and implementation of the SEIS, including a dedicated geo-portal; and training of MEPA staff on the use, operation, data analysis, maintenance and customisation of the developed SEIS.

Action 7 - Service Tender for a soil baseline survey: Baseline survey of soil quality with particular emphasis on monitoring specific components; and baseline surveys of pre-selected physical, chemical and biological parameters related to all known threats, which may be present in all local soil profiles, as identified in the soil thematic strategy promoted by the European Commission. Surveys also investigate similar land degradation issues addressed at a global level focusing on adaptability to drought and desertification risks, in accordance to a defined survey strategy.

Action 8 - Provision, installation, commissioning and testing noise mapping software, hardware and measuring equipment: Mobile noise measurement and mapping field survey rugged tablet computer, handheld sound level metres, vehicle with permanent telescopic mast, and noise measurement terminal with weather station, radar gun and video camera.

Action 9 - Provision, installation, commissioning and testing of environmental radiation monitoring equipment and early warning system: Environmental Monitoring Stations (EMS).

Action 10 - Service contract for the development of a long-term monitoring strategy for the marine environment, a social and economic analysis of the use of marine waters and costs of degradation, and baseline sediment survey in inland waters: 'Sediments Baseline Survey' for Inland Surface and Transitional Waters as per requirements of the Water Framework Directive (2000/60/EC), the Priority Substances Directive (2008/105/EC) and the Quality Assurance and Quality Control (QAQC) Directive (2009/90/EC); review of monitoring obligations pertaining to the marine environment and analysis of existing programmes, technical capacities and institutional arrangements; a long-term integrated National Marine Monitoring Strategy based on the most technically feasible, cost-effective and efficient ways and means of delivering monitoring objectives for the

area of marine waters. This marine strategy shall harmonize and streamline monitoring obligations stemming from the Marine Strategy Framework Directive with related EU Policies and Global and Regional monitoring obligations for the marine environment; a specific and detailed monitoring programme addressing the requirements of Article 11 of the MSFD (and Annex V). The monitoring programme shall include a series of assessment methodologies and technical specifications for the procurement of appropriate monitoring systems, equipment, hardware and software, which are required to implement the Marine Monitoring Strategy and in particular the MSFD monitoring programme; a report outlining the possible approaches to undertake the economic and social analysis of the use of marine waters and costs of degradation stating assumptions and sensitivity of analysis, with a recommended way forward or preferred options and respective justification; a report on the economic and social analysis of the use of the marine waters and of the costs of degradation of the marine environment as defined by the MSFD, stating assumptions and sensitivity of analysis and integration of this report in the MSFD Initial Assessment and duly filled-in MSFD reporting sheets on the economic and social analysis of the use of marine waters and of the costs of degradation.

Project Outputs

More specifically the project was aimed to:

- Deliver a national environmental monitoring strategy and a design of the monitoring programmes in the areas of air, water, radiation, noise, soil and marine. These programmes were drawn up on the basis of a feasibility study which identified the most technical and economical for the monitoring of the environmental state for the above mentioned areas. The environmental monitoring strategy and detailed monitoring programmes were designed to cover all monitoring requirements. The strategy includes detailed tender specifications for the procurement of equipment, systems, training and data collection requirements. It also provides a long-term strategic direction for environmental monitoring.
- Conduct baseline surveys, ensuring 100% baseline data coverage for the Maltese Islands, together with terrestrial spatial surveys and bathymetric surveys of coastal waters within 1 nautical mile which feeds into all plans, and policies that would require the use of such data, as well as reporting requirements to the EU.
- Procure, install, test and commission environmental monitoring equipment for air, radiation, noise and soil monitoring and train staff in its operation. This equipment and infrastructure based on the latest and cost-effective technologies will serve for many years, producing ongoing high quality monitoring data required for a variety of purposes, ranging from mandatory reporting to the EU to policy making and land use planning.

- Deliver information management systems in line with the requirements of the EU Shared Information System initiative. This system is a crucial component of the project as it ensures that all environmental data is processed and disseminated in the most coherent and efficient manner possible.
- Results of the project are disseminated to a wide range of stakeholders and the public. As a result, public awareness of issues pertaining to the environment will be improved, and better policy decisions can be taken in the field of the environment – vastly improved public awareness, environmental data quality and availability are amongst a range of long lasting benefits that will not only reduce the costs of diverse planning processes, but will also provide for all environmental and planning policies to be more implementable in the long term.

Needs and Requirements

At the time of the project cycle, environmental monitoring and reporting were incomplete or had inexistent monitoring strategies, there was a lack of baseline environmental data, poorly developed monitoring infrastructure and limited human resource capabilities. Certain thematic areas required a full review, upgrading or development.

In the case of Air monitoring, infrastructure strengthening was one of the major requirements for this project. The air monitoring systems and procedures in place correspond to approximately 70% of the requirements for a complete national programme. This project aimed to increase monitoring capabilities to 100% by improving data quality and enhance particulate matter (PM) monitoring capability. Activities that were delivered through this project helped contribute to compliance with obligations under 11 EU legislative instruments (Directives, Decisions and Regulations), amounting to between 20% and 80% (depending on Directive) of all monitoring obligations stipulated by this legislation.

In the cases of Radiation and Noise monitoring, capacity had yet to be established. This project contributed to 100% of implementation of monitoring obligations of two key legislative instruments in these areas being the First National Environment Radioactivity Surveillance Plan (FNERSP), and the Directive 2002/49/EC - Assessment and Management of Environmental Noise.

In the field of Water monitoring, the monitoring programme was very basic and required a complete revamp of the monitoring processes, systems and infrastructure. This project built capacity to enable Malta to implement the monitoring requirements for surface waters (inland, transitional and coastal waters up to 1 nautical mile from baseline) originating from the Directive 2000/60/EC - Water Framework Directive (WFD), Directive 91/676/EEC – the Nitrates Directive and Directive 91/271/EEC- the Urban Wastewater

Treatment Directive (UWWTD), but excluding the Nature Protection Directives (the Habitats and Birds Directive). It was estimated that the project would improve the baseline data coverage and strategic direction. This was achieved by designing a water monitoring programme and conducting a comprehensive baseline survey covering 100% of the Maltese Islands.

Soil monitoring needed capability requirements to be established in its entirety. It was envisaged that the project ensured compliance with 50% of the monitoring obligations of the proposed Soil Framework Directive (SFD) and the associated EEA reporting obligations related to soil monitoring.

In addition, spatial datasets and location-positioning equipment were required to enable efficient mapping and modelling of the environmental data collected and for the creation of environmental information systems.

Benefits: Who will benefit from such a project?

The following target groups were considered as main beneficiaries from this project:

- The Government will benefit through the improved availability and reliability of information on the state of the environment, which will enable the development of more informed and better targeted policy measures in all spheres of public policy, including fiscal, economic, social and environmental domains. In addition, through this project, the Government will acquire the necessary capacity within its institutions to sustain long-term effective and cost efficient environmental monitoring programmes. Furthermore, the project would enable the Government to fully comply, and excel beyond compliance with the (EU environmental Acquis) monitoring obligations;
- The public will benefit in the long-term by becoming more aware of the environmental trends affecting their health and quality of life, and the relation between these trends and human activities. The creation of a web-based environmental information system will allow the public to access quality first hand environmental data, and see the cause and effect of human and economic activity on their surrounding environment. Furthermore, the public would benefit from better Government regulation that would result from the improved provision of environmental information to Government decision makers, and ultimately, from a healthier environment;
- The business community will benefit in the long-term by becoming more aware of the risks and opportunities stemming from environmental trends and their local impacts, and by receiving better and more targeted regulation and guidance from the Government. Those economic sectors that are especially more vulnerable to certain environmental risks, notably the tourism industry, would benefit from an opportunity to enhance their competitiveness by introducing targeted measures to reduce their carbon footprint and adapt to negative environmental impacts such as better waste

management. Also, it will benefit from potential economic opportunities, stimulating long-term demand for environmental expertise, technology such as the supply of monitoring equipment and services like laboratory analysis. Furthermore, increased availability of quality environmental data will reduce the costs of environmental impact assessment processes, hence the cost and time of decision making on major development proposals;

- The scientific community will benefit from the enhanced knowledge based on the state of the environment and environmental trends due to wider access and cross-thematic knowledge gain;
- MEPA and partners will benefit as a result of the project being implemented as this will enable enhanced dissemination of information processes for use by MEPA internally. The Planning Directorate will gain the capacity to undertake better informed decision making processes concerning both spatial and environmental aspects. The Corporate Services Directorate will be enabled to build its Information Resources knowledge base as well as reliable, GI and GPS systems. The information produced through the project will be beneficial to the Environment Directorate, and will enable the Authority to give better directed advice to Government regards environmental policy making and implementation.

Conclusion

Principal to all the efforts undertaken, the major scope of the project remains the guarantee of free dissemination of all data to the general public. This is the end result of an integrated assignment to adhere to the obligations as outlined by the Commission's Communication COM (2008) 46 Final "Towards a Shared Environmental Information System (SEIS), the INSPIRE Directive and the Aarhus Convention. Public access was assured through the development of a viewing and analytical dissemination tool utilising a web portal, which is compliant to the EU's SEIS.

The project served a thematic need, through the employment of a technological means in order to serve a higher purpose: that related to the social need.