



INNOVATION IS THE
PROCESS OF TURNING IDEAS
INTO MANUFACTURABLE
AND MARKETABLE FORM

Task 1.3: Benchmarking of best practice of water use in industry

Deliverable 1.5: Benchmarking database

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Summary

One of the objectives of the INNOWATER project is to develop a benchmarking system that can be used to enable assessment of the individual SME performance in view of water use and pollution and comparison to good EU practice.

During the project implementation, a benchmarking tool concept was developed to include results from the INNOWATER water audits (IWA) in Spain as well as European Water Stewardship audits (EWS) in Cyprus and other locations in Europe. The benchmarking concept is based on the assumption that the companies that make use of the benchmarking tool would apply the IWA as a first audit with a technical focus and then apply the EWS system as a more robust benchmarking tool that allows to look outside the company gates. In conjunction with the Berlin roadshow with the airport sector, the results of the pilot audits of the participating airports were benchmarked and presented in this report.

On the basis of this, we concluded that the EWS system is best suited to be used as a benchmarking tool to assess individual SME performance in line with its stated principles and standards. The EWS standard aims to be applicable to a broad range of water users that may affect the availability and quality of water while still respecting the complexity of impacts linked to water use and therefore:

1. Comprises environmental, social and economic aspects;
2. Is valid on global scale but based on local assessment with focus on Europe; and
3. Is valid across all sectors.

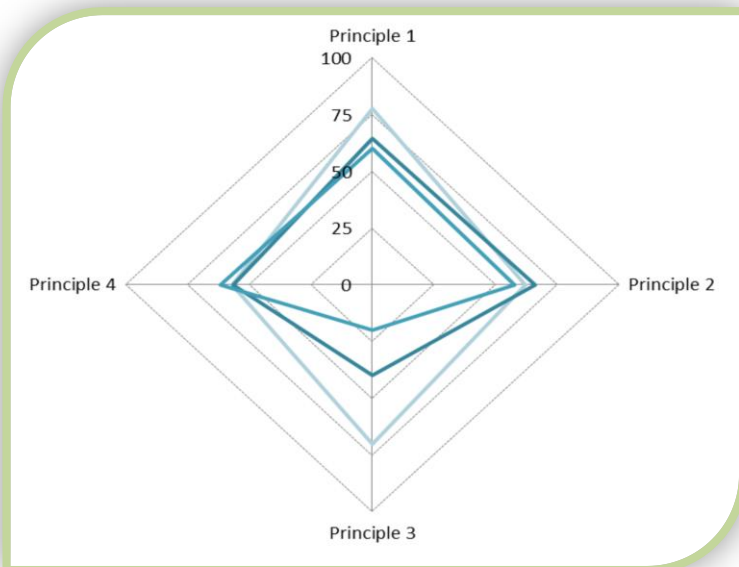
The **EWS standard** aims to give indicators for the whole water cycle: from extraction to re-allocation and to map, grade and evaluate water management based on redesign, reuse, recycle and re-allocate measures. This standard includes:

1. Four principles, which outline the overarching, aims of the standard and associated criteria.
2. The 15 criteria are further divided into indicators, which is used to evaluate compliance with the principles and criteria.
3. Forty-nine Indicators are classified as major indicator (◆◆), minor indicator (◆), or as recommendation. This classification acknowledges that some indicators might require more time in order to achieve compliance.

The principles include the definition of EWS indicators and the respective assessment criteria and the benchmarking was formulated to be a 'rolling benchmark', as it allows SMEs to compare their performance on sustainable water management within the different production sites and/or with the performance of other companies or within the sector that have implemented the EWS indicators.

Accreditations: Gold, silver and bronze accreditations (made public by the EWS) function as the database of best practice and enables the visualisation of performance and provides incentives for upgrading. The classification is achieved if a production site has achieved compliance with ALL indicators classified as major (♣♣) plus:

- >50% compliance with all indicators classified as minor (♣) = BRONZE
- >70% compliance with all indicators classified as minor (♣) = SILVER
 - >90% compliance with all indicators classified as minor (♣) = GOLD



In conjunction with the Berlin Road Show with the airport sector, the results of the pilot audits of the participating airports were benchmarked. The graphical representation of the benchmarking in the graph shows compliance with the standard on each principle. The closer the shape to the outer limits of the diagram, the greater compliance the airport obtained.

The conclusion drawn from this work was that the EWS audits were best suited to be used to assess individual company performance in view of water use and pollution and to compare them to good EU practice. Since EWS is an established programme that will continue after the INNOWATER project is over, INNOWATER cooperated with EWS programme to ensure continuation of the INNOWATER results and tools to support EWS as part of the exit strategy for the project.

Description of the task

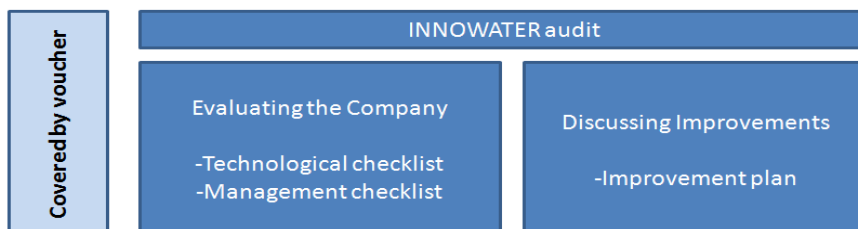
One of the objectives of the INNOWATER project is to develop a benchmarking tool in order to be able to assess individual SME performance in view of water use and pollution and compare them to good EU practice (see task 1.3 in the Description of Work). The benchmark needs to be sector-sensitive (i.e. benchmark for water use and waste in the textiles sector, in agroindustry, etc.). The work needs to include the definition of relevant indicators and respective assessment criteria, a methodology for comparison, expected results, definition of the benchmark etc. It needs to be developed in close link to the water quick scans and the water audits conducted in Work Package 5. The benchmarking tool has been used as a 'rolling benchmark', in the sense that it included the results of the water audits (developed in Tasks 4.2 and tested in Task 5.5). This has also been the reason why the benchmark tool has been finalized at the end of the INNOWATER project and described in this document.

The Innwater Water Audit

The benchmarking tool is based on the results coming out of the Innwater Water Audits (IWA) as well as audits performed in the framework of the European Water Stewardship (EWS) standard.

To support the water-using industry, the INNOWATER Water Audit has been set up. This audit enables consultants to evaluate the water use of an industry, both on technology as well as on water management issues, based on two checklists.

- Phase 1 - Evaluation of the company (data gathering)
 - technological aspects
 - management aspects
- Phase 2 - Improvement plan



Phase 1 - Evaluation of the company – data gathering phase

The evaluation phase consists of two parts. The first part is specifically addressing the processes in which water is used in the company, i.e. the technological aspects; the second part looks at the way water is managed in the company, i.e. the water management aspects. The data gathering phase of the INNOWATER Water Audit therefore consists of two connected checklists to provide the consultant with a strong basis to evaluate both the technological aspects of the water use and the management aspects of the water use in the company. Both checklists are used by the consultant for checking the company.

Evaluation of the water-use, technological details

The first part of the data gathering phase consists of a detailed evaluation of the technological aspects of the water-use of the company guided by the questionnaire. In this evaluation, the consultant checks in detail the amount of water used, the technologies used, water re-used, water quality requirements in production processes, treatment of waste-water, etc.

Evaluation of the water-use, management aspects

The management aspects are to be tackled through the European Water Stewardship Audit which checks into detail the water management of a company. On the basis of the results of this Audit the company could be granted the status of 'good water steward'. The Stewardship Audits are performed by an independent certification body (see next section for more details).

Phase 2 - Improvement plan

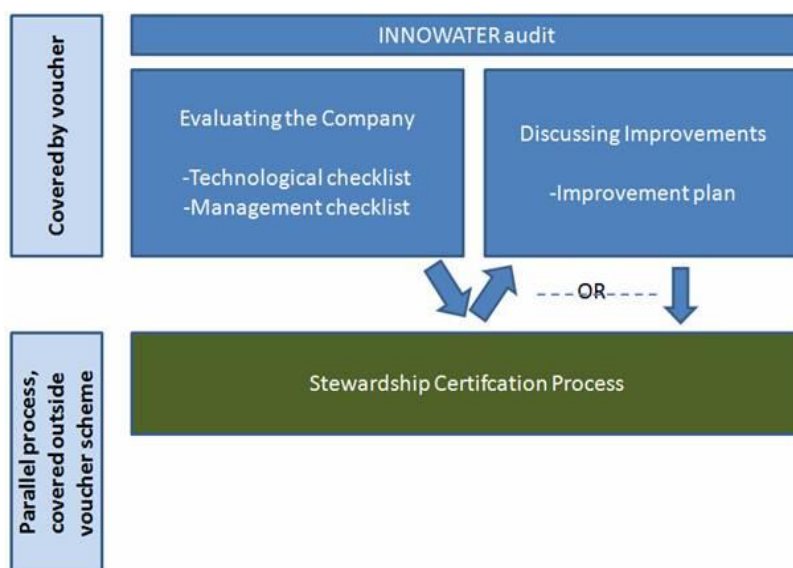
On the basis of the two evaluations the consultant will discuss together with the company an improvement plan. This plan should include an identification of the improvement possibilities at the company, a selection of the improvements with most impact, an overview of the possibility for implementing these improvements and an action plan to implement the improvements.

The improvement plan includes:

- identification of technological and management problems/lacks in process and facilities
- proposal of improvement actions
- analysis and selection of 5 actions with most impact, based on 5 criteria (applicability, cost and ROI, impact- pollution reduction and water savings, risk analysis and operating cost)
- overview of the driving forces for investment
- action plan proposal: actions, responsible, deadlines

The European Water Stewardship Audit

As outlined in the explanation of the first phase, the water management part of the INNOWATER Audit is evaluating the water management of the company and indicates whether the company would be able to potentially pass a Water Stewardship Audit and meet EWS standard. During the INNOWATER Water Audit, the consultant will discuss the benefits of a full Water Stewardship Audit with the company and decide together whether the company is willing and able to go for this Stewardship Audit. If the company is willing to do so, this Water Stewardship Audit will be performed by an independent third party, and will be financed outside the INNOWATER Vouchers.



Using EWS standard as a benchmarking tool

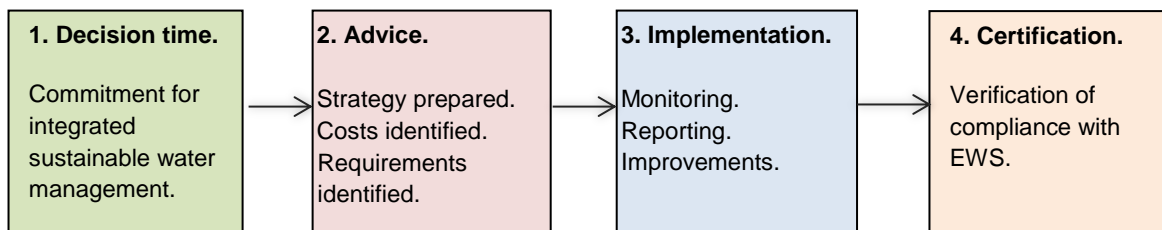
During the project implementation, a benchmarking tool concept was tested on results from the INNOWATER water audits in Spain as well as EWS audits in Cyprus. Based on this, we concluded that EWS system is best suited to act as a benchmarking tool due to the fact that EWS standard aims to be applicable to a broad range of water users and sectors that may affect the availability and quality of water while still respecting the complexity of impacts linked to water use and therefore:

- Comprises environmental, social and economic aspects.
- Is valid on global scale but based on local assessment with focus on Europe.
- Is valid across all sectors.

Introduction to the European Water Stewardship

The European Water Stewardship standard has been developed within the stakeholder process coordinated by the European Water Partnership (EWP). The European Water Stewardship (EWS) operates within the context of EU Policy, helps to implement EU water legislation and will ultimately contribute to the current flagship activities of the European Commission to achieve “Resource Efficiency” and to implement the EU Water Blueprint.

All activities that utilize water resources be they very small farms or multi-national industries; have a very clear interest to minimize the use of natural resources and to optimize their resources efficiency. There are clear steps that need to be completed prior to the possibility, commercially viable or even desirability of certification.



Step 1

The decision, not only to reduce water use, but to aim for a sustainable water management, must be taken at the highest possible level of management as the investment can be high at the outset with long periods before return on investment. Irrespective of business size, the decision to reduce water AND to consider all other aspects of water use in management decisions also demonstrates clear corporate social responsibility – the value of which must not be under-estimated.

Step 2

Technical advice can range from discussions with colleagues, observations of other practices, experience, independent technical expertise or support through membership of an association or group. The important aspect is that a clear strategy is prepared and fully costed with benefits clearly identified.

Step 3

The EWS standard is implemented on-site and the compliance with the standard requirements are monitored and reported in the internal system plan. Points of improvement shall be identified and taken over in the management strategies.

Step 4

Certification is an independent verification that the water management system is compliant

with EWS requirements. The decision to go through with certification must be taken for the correct reasons – whether it be for access to new markets, corporate responsibility or legal requirements, etc. Certification can be performed as individual certification or as part of group scheme.

The European Water Stewardship Standard

The EWS Standard aims to give indicators for the whole water cycle: from extraction to re-allocation. The main aim is to map, grade and evaluate water management based on redesign, reuse, recycle and re-allocate measures.

This standard includes

- 4 **principles**, which outline the overarching aims of the EWS Standard, and associated criteria.
- The 15 **criteria** are further divided into indicators which shall be used to evaluate compliance with the principles and criteria.
- 49 **Indicators** are classified as major indicator (♦♦), minor indicator (♦) or as recommendation. This classification acknowledges that some indicators might require more time in order to achieve compliance.

EWS principles and criteria

The principles cover the following areas of sustainable water management:

- **Principle 1-** Achieve and maintain sustainable water abstraction in terms of water quantity. The criteria are established as follows: information is first provided on water use (quantities) and sources, and then the impact of this water use is assessed followed by the actions being taken to mitigate such impact.
- **Principle 2-** Ensure the achievement and maintenance of good water status in terms of chemical quality and biological elements. The criteria are established as follows: first information is provided on water discharge and potential pollutants existing on site (quality), and then the impact of these pollutants and effluents is assessed followed by actions to mitigate the identified impact.
- **Principle 3-** Restore and preserve water-cycle related High Conservation Value (HCV) areas. The criteria are established as follows: first information is provided on HCV areas around the site, and then the impact of the site's activities and services on these HCV areas is assessed followed by the establishment of actions to mitigate those impacts.
- **Principle 4-** Achieve equitable and transparent water governance. It includes basic water stewardship concepts such as the need to engage with stakeholders, transparency (internal and external), continuous improvement and integrated resource management.

Bronze, Silver, Gold status

The classification in bronze, silver and gold enables to visualize development in performance and provides incentives for upgrading. The classification is achieved if a production site has achieved compliance with ALL indicators classified as major (♣♣) plus:

- >50% compliance with all indicators classified as minor (♣) = *BRONZE*
- >70% compliance with all indicators classified as minor (♣) = *SILVER*
- >90% compliance with all indicators classified as minor (♣) = *GOLD*

Non Compliance

- Non-compliance with an indicator that is shown as “major” (♣♣) will result in major non-conformity.
- Non-compliance with an indicator that is shown as “minor” (♣) will result in minor non-conformity.
- A certificate of compliance will only be awarded when all major indicators (♣♣) and 50% of all minor indicators (♣) have been met to the satisfaction of the certification body.
- Major non-conformities raised during a surveillance assessment must be dissolved, to the satisfaction of the certification body within 30 days. Failure to do so will result in the suspension of the certificate. Failure to dissolve the major non-conformity after this suspension period will result in the withdrawal of the certificate and the requirement of a new main compliance assessment.
- Minor non-conformities must be addressed in a timely manner as determined by the certification body. Failure to do so will result in a minor non-conformity with the associated implications given in the referring certification scheme.

(Non) applicability

- Applicability of the indicators is not related to size or kind of the production site unless stated otherwise.

EWS Evaluation and scoring system

General procedure for evaluation of water management performance

The evaluation of the EWS audit results in a certification that is defining and ensuring compliance with the EWS standard requirements. This evaluation aims at assessing the water management performance of a water user, revealing its critical points and setting targets for improvement in order to achieve sustainable water management.

The evaluation scheme provides information on the current performance level, ensuring the compliance with the defined minimum (= baseline) requirements and providing the basis for a ranking in three levels of performance (Bronze, Silver, Gold). This ranking is considered to serve as improvement target and communication tool for operational water management performance.

Determination of compliance

Compliance (= Certification) is achieved when:

- All major requirements are accomplished, AND
- At least 50% of all minor requirements are accomplished.

Major non-compliances:

- Major Non-compliance raised during an initial assessment will prevent a positive certification decision being made and a one-month period is given to close out the non-compliance after which a complete new audit will be necessary. In case the major non-compliance(s) is not closed within one month, the certification shall be denied. Non-compliances closed later on will result in a complete new audit.
- Major Non-compliance raised during a follow up audit (an audit carried out when the operator is certified) will put the integrity of the standard at risk. A maximum of one month is given to close out the non-compliance before suspension of the certificate. In case the operator would like to reinstate his certified status, he needs to correct the non-conformity during the period of suspension. In case they are not closed during the period of suspension, the certificate shall be withdrawn. Non-compliances closed after withdrawal, shall result in a complete, new audit.
- Failing (less than 3) or zero scores must be justified by critical observations (identification of deficiencies in reporting, in order to inform the reporting organization).

Minor non-compliances:

- In case the operator meets less than 50% of all minor requirements, major non-compliance shall be given. The operator is free to choose which minor non-compliance to close to reach 50% compliance within the above mentioned deadlines.

Compilation of major and minor indicators and recommendations in the EWS Standard

Principle	Major	Minor	Recommendation
P 1	7-6	2	0-1
P 2	9-10	1	1-2
P 3	1	4	1
P 4	8-9	7-8	5

NOTE: There can be some variation on the number of major, minor and recommended indicators due to the fact that some indicators are sector specific and some major turn to minor or recommendation depending on size and other factors.

Ranking the performance of operational water management

Ranking the performance of the water management results in: **Classification:**
Bronze/Silver/Gold performance

= Compliance with ALL major requirements plus:

- *>50% compliance with all minor requirements = BRONZE*
- *>70% compliance with all minor requirements = SILVER*
- *>90% compliance with all minor requirements = GOLD*

EWS Benchmarking System

The operation's performance is scored per principle, based on scores given per indicator. The performance per indicator is scored from 0 – 5 by independent auditors during the audit, based on the scoring grid (below) and as defined in the "Requirements for Compliance".

Compliance with an indicator is achieved with a score ≥ 3 .

Scoring Grid for Benchmarking

Score	Level of information.	Guidance
0	No information available	Non-compliance or improvement noted.
1	Very poor information.	Non-compliance noted.
2	Poor information.	Non-compliance noted.
3	Adequate information.	Adequate implementation.
4	Good information.	Good performance and compliance.
5	Very good information.	Excellent compliance and total commitment.

Guidelines and Recommendations for Evaluators

The following guidelines have been prepared to structure the coherence of the evaluation.

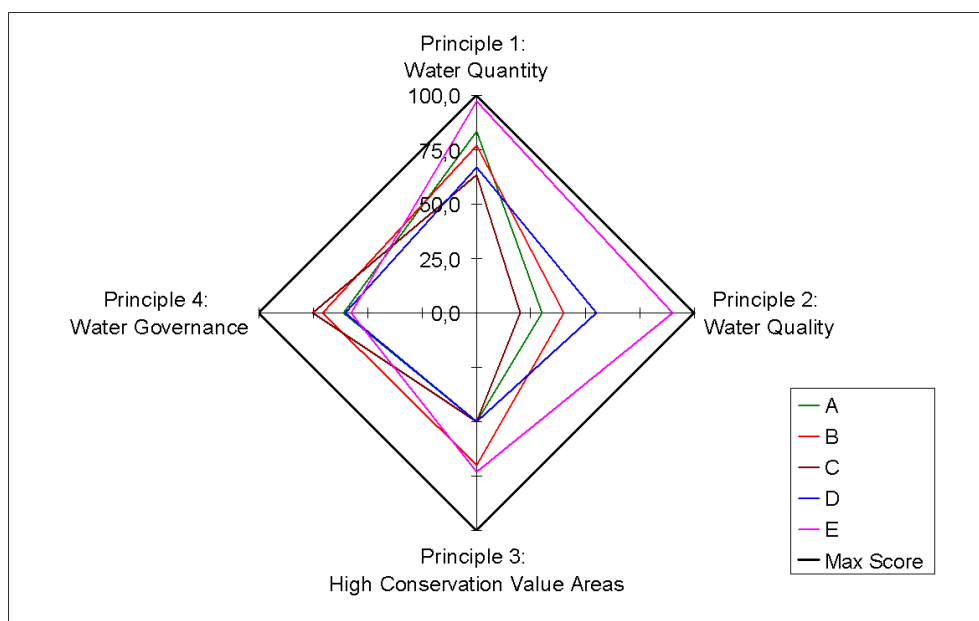
The following recommendations are to be used by the evaluators.

1. The score and supporting comments for each indicator must address at least the specific issues referred in the checklist (e.g. use of annexes and other recommended documentation) and in the evaluation table.
2. Additional professional observations, positive and negative are also welcome. (General/stereotype comments without suitable qualification (or where possible quantification) shall be avoided.
3. Failing (less than 3) or zero scores must be justified by critical observations (identification of deficiencies in reporting, in order to inform the reporting organization).
4. High scores must be equally as well justified with positive observations (potential reporting suggestions) and comments.

5. Scores of ½ points are allowed (e.g. 2.5/5).
6. A summary of comments shall be provided at the end of the evaluation. Points which in the opinion of the evaluator, must be clarified with further information (providing complementary data, reports) and also the strengths of the organisation. Also a list of recommendations should be highlighted in this summary providing the reporting organisation with the gaps and deficiencies of their water management.

Spider web diagram

A Spider web diagram has been considered as a useful tool for benchmarking and internal communication. Example of what it may look like is below.



EWS evaluation and benchmarking in the airport sector

The EWS benchmarking system was applied to the airport sector specifically to three volunteer sites, Malaga Airport, Brussels Airport and Göteborg Landvetter Airport. The process began with an important on-site EWS training of airport operators, followed by an exhaustive data collection process on the water performance of the airports leading up to pilot audits of the airport. Communication of EWS along the pilot study demonstrated several common challenges for airport water management.

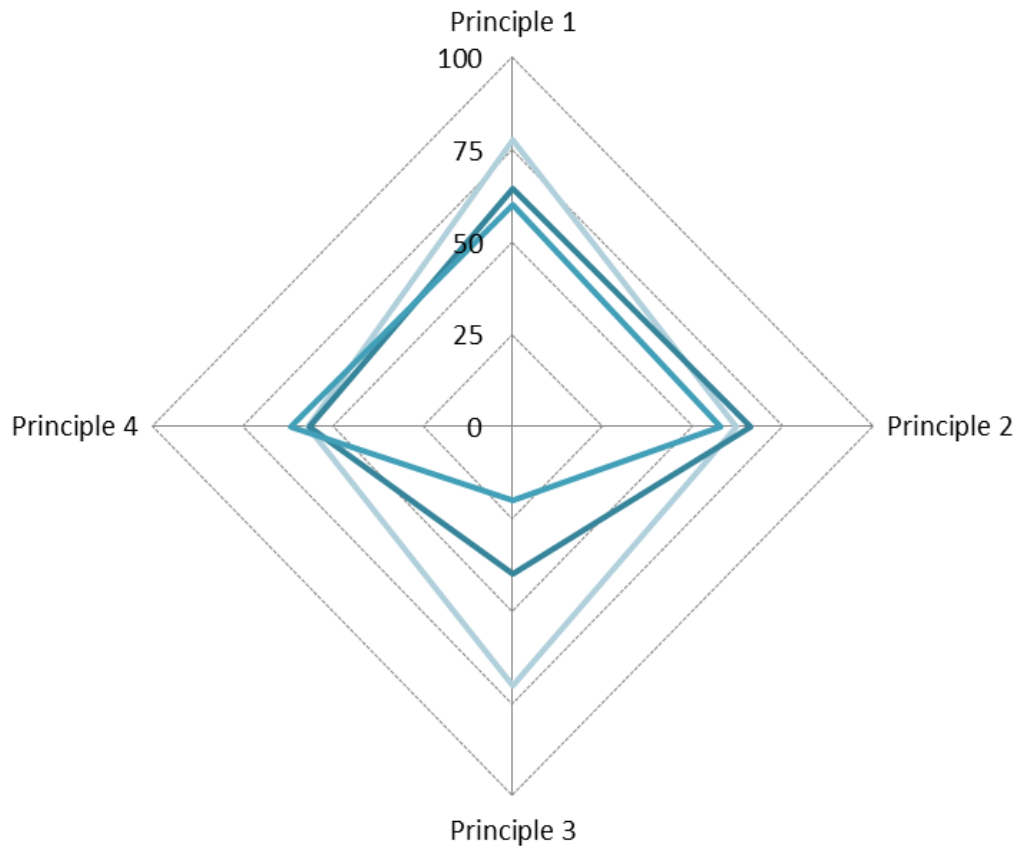
Location of airports in population nuclei: Creates collective water quality issues and requires careful management of storm water over the large areas of impermeable surfaces to

prevent flooding.

Fluctuations in discharge : The quality of runoff depends largely on the use of various substances to de-ice aircrafts and runways for safety reasons as well as potential fuel spills. This fluctuation requires careful and extensive monitoring grid to manage effluents properly and prevent contamination of nearby water bodies.

Natural climatic and environmental factors shape unique, site-specific challenges. For example, airports located in naturally drier climates, which experience with demand peaks attributed to tourism during water stressed summer months creates risks associated to water supply, incremented by dependence on a sole water supply source. Alternatively, managers of airports located in northern countries deal with large quantities of storm water and de-icing needs during winter months, are confronted with a different series of management responsibilities.

For each indicator the airport was rated between 0 to 5 (where 0 means that no information has been provided or is available to prove compliance up to 5 that means all measures have been taken). The following diagram is an objective visual representation of airports compliance with the standard on each principle. The closer the shape to the outer limits of the diagram, the greater compliance the airport obtained. The diagram serves to provide a general overview on the performance level throughout the sector with the EWS standard.



The results of the EWS Audits on Malaga Airport, Brussels Airport, and Göteborg Landvetter Airport are an exemplary opportunity to demonstrate how to address sustainable water management across an entire sector and provided an excellent comparison of the standard implementation on sites with unique site-specific challenges. The process of the pilot study from training to data collection and audits demonstrated not only the common challenges shared by airport water management but also unique ones which require individualized solutions.

Results from the airport assessment showed that one of the principle challenges that airports face in water management is in regards to their location in population nuclei. This creates collective water quality issues and requires careful management of storm water over the large areas of impermeable surfaces to prevent flooding from affecting surrounding areas. Additionally, communication with airports revealed that fluctuations in discharge associated to seasonal patterns are another complicated challenge for management. The quality of runoff depends largely on the use of various substances to de-ice aircrafts and runways for safety reasons as well as potential fuel spills. This fluctuation requires careful and extensive monitoring grid to manage effluents properly and prevent contamination of nearby water bodies.

In regards to site specific challenges, results showed the manner in which these challenges stem from shaped by their various climatic and environmental differences. For example, airports located in naturally drier climates, which experience with demand peaks attributed to tourism during water stressed summer months creates risks associated to water supply, incremented by dependence on a sole water supply source. Alternatively, managers of airports located in northern countries deal with large quantities of storm water and de-icing needs during winter months, deal with a different set of management responsibilities.

Conclusions

The conclusion drawn from this work was that the EWS audits were best suited to be used to assess individual company performance in view of water use and pollution and to compare them to good EU practice. Since EWS is an established programme that will continue after the INNOWATER project is over, INNOWATER cooperated with EWS programme to ensure continuation of the INNOWATER results and tools to support EWS as part of the exit strategy for the project.