



PROJECT FINAL REPORT

“Publishable”

Grant Agreement number: 21 1873 (ISSOWAMA) CSA-CA

Project acronym: ISSOWAMA

Project title: Integrated Sustainable Solid Waste Management in Asia

Funding Scheme: CSA-CA

Period covered: from **01.01.2009** to **30.06.2011**

Name, title and organisation of the scientific representative of the project's coordinator:

Dr.-Ing. Gerhard Schories – Technical Director

TTZ Bremerhaven (Water, Energy and Landscape Management)

Tel: **+49 (0) 471 9448 702**

Fax: **+49 (0) 471 9448 722**

E-mail: gschories@ttz-bremerhaven.de

Project website address: www.issowama.net

TABLE OF CONTENTS

1. FINAL PUBLISHABLE SUMMARY REPORT 3

2. USE AND DISSEMINATION OF FOREGROUND 27

3. REPORT ON SOCIETAL IMPLICATIONS 44

1. FINAL PUBLISHABLE SUMMARY REPORT

Executive Summary

The challenges of Solid Waste Management (SWM) are far from being solved. On the contrary, in countries with limited resources and rapid urban and/or industrial growth, the problems have intensified at great speed. The general inadequate, when existing, methods of collection and disposal of solid waste in most Asian cities are causing important environmental and social harms, as human diseases spreading, environmental pollution in general and ground and water pollution in particular.

In order to raise awareness, promote an adequate waste collection and treatment system and the economic growth of this activity sector in a technological efficient and sustainable way, **new waste management systems must be established which also take into account the informal sector**. This integrated approach should **comprise technical, environmental legal, socio-economic and financial aspects, involving the key actors at different levels** to ensure an effective implementation.

Therefore, addressing these issues, Asian and European solid waste experts joined forces to identify and overcome hurdles and practical difficulties. A group of partners from Europe and Asia, interlinking with other local organisations, set up the FP7 network **ISSOWAMA** and examined SWM issues in eight Asian **countries to develop a performance assessment system for integrated management scenarios**, which consisted of a set of qualitative sustainability criteria along with quantitative impact indicators enabling assessment of waste management strategies. The central focus was the integration of the sustainability aspects into the system, such as **environmental impacts, economic considerations and the social situation in the target region**, integrating appropriate low-cost and efficient technologies with community-based management and their relevant governance, institutional frameworks and socio-economic constraints, linking waste treatment with poverty reduction and improvement of welfare of the population. Targeted were research institutions, municipalities and other end users. These results were verified in different Asian cities, which was possible as the project consortium included countries in *South Asia* (**Bangladesh, India**), the *Greater Mekong Sub-region* (**Cambodia, Thailand, China, Vietnam**) and *South East Asia* (**Indonesia and Philippines**).

It also aimed at **bringing together experts and stakeholders in the field of SWM in Asian developing countries and Europe**. The project promoted **international cooperation** between research organisations, universities, and social and governmental stakeholders in a European and Asian context (local waste processors, local municipalities and policy makers, local NGOs representatives, etc.). An **in-depth understanding of the strengths, weaknesses, opportunities and threats in the specific local context** were fundamental when developing a robust and sustainable solution. This not only greatly enhances mutual learning among practitioners but also **enhances replication and improvements in practice**. Analysis of reasons for success or failure of waste management activities was the first step in this learning process.

With this aim, **a SWM expert and research co-ordination platform, and an expertise network**, was established in order to co-ordinate, assess and guide suitable research and strategic activities with the aim of identifying aspects like cost-effective treatment and sorting technologies, environmental impacts, gaps in technical knowledge and socio-economic and policy barriers to further execution. The network also proposed directions for future research and for local implementation.

Summary description of project context and objectives

The reasons for managing waste are to avoid negative impacts on public health, minimise pollution, and to reduce wasteful use of resources in a rapidly changing and dynamic world.

These goals should be achieved by considering the triple bottom line (triple bottom line means to take into account ecological and social performance in addition to financial performance), acting and reacting to social priorities and demands, minimizing risks to the actors directly involved or affected and achieving financial sustainability where the activity can be afforded by the community in the long run.

Rapid economic and industrial developments over the last decade in many Asian countries, combined with a rapid increase in urban population, have put extreme pressure on SWM. Despite some progress, the improvements are hardly visible, given rapid economic and demographic change. Much more work is needed to make a mark on urban settlements and achieve acceptable waste management practices. Identifying, planning, implementing, and operating sustainable solutions for waste collection, recycling, treatment and disposal are crucial tasks which provide the foundations of sustainable development. Moreover global experience over the last 30 years has shown that **it is not enough to rely on technological solutions as it is only a part of the larger picture towards sustainable SWM. Rather, an integrated approach is required, which considers social, economic, institutional, legal, technical and environmental issues and which tries to balance these, in order to obtain best practicable means to manage waste.**

The concept of Integrated Sustainable Waste Management (ISWM) (originally developed by the Collaborative Working Group (CWG) on SWM in Low and Middle-Income Countries (SKAT, 1995) and subsequently adapted by the ISSOWAMA consortium) recognises that success in SWM depends on engaging a range of stakeholders, capitalising on their strengths to build an effective team with clear distribution of roles and responsibilities for all team members. This involves attitudes and behaviour of service providers as well as service users thus including citizens and institutions generating waste, municipal waste management staff, employees of private enterprises and informal sector actors such as waste pickers, waste dealers and recyclers.

Problems may be aggravated not only by technical or financial factors, but also due to inadequate managerial capacity, a weak institutional framework, a challenging environment, or socio-cultural or conflict situations. In such cases, **it is not money or equipment that provides better solutions, but rather a change of social, institutional, legal or political conditions.** The ISWM concept was developed to reflect this reality, as a means to articulate a vision of waste management that would pay attention to all these various aspects. ISWM promotes technically appropriate, economically viable and socially acceptable solutions to waste management problems which take into account the particular conditions in the respective countries or cities. ISWM has three major dimensions: **the stakeholders** involved in waste management; **the technical elements** of a waste system from waste generation to collection, treatment and disposal; and **the enabling environment** to be taken into account when assessing, planning, operating and maintaining a waste management system. All waste management activities will impact the environment, society and economy - the three pillars of sustainability - which in return will influence the local enabling conditions (Figure 1). The “not in my back yard” effect of landfill disposal is a good example of this phenomenon. Deficient management of landfill disposal results in severe negative impacts such as noise, smell, air pollution and water pollution. Such an environmental hazard will not only reduce economic value of properties in the vicinity but will also anger nearby residents. With time this leads to an overall social resistance to landfills although, if well managed, they could be a cost effective and environmentally acceptable solution. ISWM must optimally find the balance between minimising negative impacts on health and environment and maximising economic benefits.



Fig. 1: The Integrated Sustainable Waste Management (ISWM) model (adapted from WASTE, 2001)

In SWM we hear of the same mistakes being made over and over again. This may comprise bad choice of equipment (e.g. vehicles) or failure to ensure effective management, operation and maintenance or a combination of various factors. Unfortunately, admitting and documenting mistakes is often not considered important and many hope that with silence the mistake will be forgotten. This is detrimental to mutual learning in SWM. On the other hand, success receives much more attention and discussion. Nevertheless, little priority is given to investigate which factors and actions were responsible for the success.

The ISSOWAMA project aimed at developing a tool which helps to structure a range of thoughts on the issue of sustainability and robustness of any solid waste project activity and helps to analyse the specific context and conditions for a specific case. It helps to recognise the measures taken or omitted which influenced success or failure of an activity. This is the starting point: a clear analysis of local conditions and factors, an understanding of the full range of important aspects which influence success of any activity, and an awareness of the systems that have already been developed by local actors.

Overall objective

The main objective of ISSOWAMA was to develop a performance assessment system for integrated waste management scenarios, which consists of a set of qualitative sustainability criteria along with quantitative impact indicators enabling assessment of waste management strategies. The central focus was laid on the integration of the sustainability aspects into the system, i.e.:

- **environmental impacts,**
- **economic considerations and**
- **the social situation in the target region.**

Scientific and technological objectives

- **Coordination of current research** in SWM in Asia, establishing a long term cooperation strategy.

A SWM expert and research co-ordination platform, and an expertise network, has been established in order to co-ordinate, assess and guide suitable research and strategic activities with the aim of identifying aspects like cost-effective treatment and sorting

technologies, environmental impacts, gaps in technical knowledge and socio-economic and policy barriers to further execution. The network also intended to propose directions for future research and for local implementation.

- To **analyse the main constraints for implementing new concepts** on municipal and industrial SWM (from waste collection to treatment) in Asia, compiling data on waste generation and treatment in Asian developing countries and identifying also common and urgent problems throughout the continent.

The methods currently used for collection and disposal of SW in most Asian cities are, when existing, in general inadequate and institutional capacity for the waste management industry must be strengthened. ISSOWAMA identified gaps in technical knowledge and socio-economic policy barriers in order to propose effective solutions and to initiate future R&D activities.

- To **find the most suitable and feasible solutions** through the study of the most appropriate adapted technologies on SWM for each specific problem based on local case studies in Asian countries.

Trends in technological development for SWM systems in Asia cannot be effective by direct transfer of technology from the west without adapting it to suit the situation in Asia. Moreover, what is appropriate in one location may not be appropriate in another. ISSOWAMA aimed at build sustainable capacity to make local decisions about the locally appropriated technologies and services as part of an ISWM system, and what adaptations are required according to the local needs and circumstances.

- Definition of an innovative **ISWM concept** specifically considering the recent situation and future trends in the participating Asian countries.

Past decisions on waste management strategy and the structure of waste management systems have relied either explicitly, or implicitly, on the "waste management hierarchy". This has varied in its exact form, but usually gives the following order of preference: waste reduction; re-use; materials recycling; composting; incineration with energy recovery; incineration without energy recovery; landfilling. Such use of a priority list for the various waste management options has serious limitations. Hierarchy is only useful as a list of options. What was needed was an **overall assessment of the whole system, which the hierarchy cannot provide**. The hierarchy does not address costs. Therefore it cannot help assess the economic affordability of waste systems, etc. There is no one 'best method' of waste management, which is a complex phenomenon with a range of consequences for the involved stakeholders and the society.

Description of the main S&T results / foregrounds

ISSOWAMA started on January 1st, 2009, and finished on June 30th, 2011. The work to be carried out within this action was organised in four coordinating work packages (WP 1 to WP 4), in which SWM networks had to be mapped and SWM case studies had to be screened and evaluated, EIA methods had to be reviewed and analysed and, using all this information, representative local case studies have been assessed; one disseminating work package (WP 5), devoted to dissemination and promotion of stakeholders participation; and a work package managing the project activities was foreseen in ISSOWAMA (WP6).

All these WPs and activities were designed in order to analyse the current state of SWM in Asian developing countries through the mapping of research activities and networks and the identification of representative case studies. They would be afterwards characterised according to the ISWM principles, what would allow the consortium to pre-select suitable case studies. On the other hand, the EIA methods and impact categories would be revised and integrated considering the peculiar geographical context in Asia, what would allow the consortium to design a common methodological approach on the environmental pressures and impact potentials from various methods of waste management even extracting priority areas for policy intervention, approach that would be tested in the assessment of the selected local case studies previously mentioned.

All this work lead to the development and implementation of assessment guidelines for different solid waste streams, the 'Asian Guidelines of ISWM assessment methods'.

Thus, the first step was the definition of the criteria to be used for characterising SWM networks, a definition that was discussed at the very beginning of the project. By using these criteria, the project partners were able to produce a compilation of the state of current research in SWM in their countries, as well as a database summarising all technical data on these researches, the people involved in such researches and the stakeholders considered and reached through these works. While carrying out these screening, the major gaps of knowledge were put in evidence and the barriers for a further implantation of SWM systems in these countries were identified. This information, in combination with the previous results on current research, has great importance in further initiatives design process.

Secondly, the consortium had to characterise and evaluate some local case studies in each of their countries. Once it was clarified what was being done and by whom regarding research, and which were the lacks and the barriers threatening the implementation of SWM it was necessary to check what, in fact, was being done in each of the target countries. With these aim, case studies from each of the countries were mapped and evaluated. Case studies were understood as activities in SWM that had been or were being implemented and that exemplified a characteristic problem in waste management in the region addressed, and even showed an innovative way of solving it, preferably by implementing the solutions proposed in ISWM schemes. Nevertheless, it was necessary to previously define the criteria to be used for their evaluation, what included the selection of the waste streams to be taken into account. This was difficult to agree, as relevant streams in some countries were not so influential in others; in addition, large countries like China and India were represented in the consortium, and therefore the variety of potential streams under consideration increased. Finally, the agreed waste streams to be considered were municipal solid waste (including construction and demolition wastes, wastes from incineration plants and other industrial wastes considered being relevant), health care waste, e-waste and other hazardous domestic / urban waste. As a result, a compilation of characterisation criteria and of case studies on the streams mentioned was produced. These case studies would be crucial for achieving some of the main project objectives, as some of them would be further chosen to test the assessment method to be designed.

Separately, the existing Environmental Impact Assessment (EIA) methods and impact categories were reviewed and analysed. The objective was to find a common approach to consider methodological uncertainties of different impact assessment approaches, establishing a comprehensive knowledge base about the environmental pressures and impact potentials from various methods of waste management. This resulted in an overview of relevant impact

categories (ISWM aspects), an overview of relevant technologies and an evaluation matrix of technologies versus environmental and human health impacts, followed by an evaluation of EIA, ENTA, ERA and LCIA, an integration of methods into a screening method concerning environmental and health impacts and the establishment of default values of environmental and health impacts of technologies. These results were the basis for the preparation of the most important project outcome, the Asian guidelines of ISWM assessment methods.

So, impact categories for waste management (ISWM aspects) were analysed by looking at the interrelationships between SWM systems and the societal conditions (subdivided into aspects using the well-known distinctions of the ISWM concept) in the situation under study. Societal circumstances may constitute constraints to the improvement of SWM systems. A crucial aspect in the success on the transition to more effective systems in Asian developing countries appears to be the collaboration of stakeholders through waste management chains. As such collaboration has to be organised at a large scale to be effective, governmental agencies have to be prepared to play a main initiating role. The most important positive impact of SWM systems resulted to be those in the field of safeguarding public health and the environment, and in reducing the rate of resources depletion by waste minimisation at source and increased recycling and reuse of valuable materials from wastes, having all of them beneficial economic impacts as well.

The resulting assessment tool assists its user to analyse SWM projects in a structured way. Providing answers for a list of questions of a specific SWM infrastructure or service, the user shall understand strengths and weaknesses of the project and subsequently learn about what factors can enhance a project and allow it to become a best practice. It has two sections: part A, that asks for a qualitative description of the case to be assessed, of lay out and functions of the system that you evaluate and its boundaries, and part B, that is structured according to impact categories (usually called aspects) of the ISWM framework, namely: technical, health, environmental, economic, institutional, socio-cultural and policy/legal aspects.

After evaluating the impact categories for waste management, four environmental and health assessment methods (Technology Assessment (TA), Environmental Impact Assessment (EIA), Risk Assessment (RA) and Life Cycle Assessment (LCA)) were reviewed and analysed in order to integrate them into a screening method. This is because these methods overlap and complement each other by covering different aspects and looking from different angles. The four mentioned assessment methods were described and typified, and it was discussed how they related each other and how they could be combined into the desired screening method. Then, the resulting screening method would be used to evaluate MSWM systems in some case studies selected from those reported in the ISSOWAMA project.

All this work led to the preparation of the Asian guidelines of ISWM assessment methods. As mentioned, representative local case studies selected from those identified in previous stages of the project were assessed in depth using the screening method created and the impact categories previously described. The objective of this second step analysis was to confirm the suitability of these impact categories and assessment methods in the particular context they are being applied. The applicability of different conventional environmental assessment methods or of a combination of them including the ISWM approach was studied, which provided a complete, holistic approach to the problem addressed. The assessment consisted of the compilation of the methodology used, followed by the description of each case study and the outcome of its evaluation.

It could be concluded that an in-depth understanding of the strengths, weaknesses, opportunities and threats in the specific local context are fundamental when developing a robust and sustainable solution. This can not only greatly enhance mutual learning among practitioners but also enhance replication and improvements in practice. Analysis of reasons for success or failure of waste management activities is the first step in this learning process. The Asian guidelines of ISWM assessment methods makes clear how SWM in Asian developing countries is influenced by the prevailing social, economic, institutional, legal, technical and environmental conditions, and points out the negative impacts of deficient SWM on environment, public health and economic development. It also describes existing methods which allow structured learning by assessing

impacts of solid waste project activities, be it a specific technology used to process waste or a set of technologies operated by a defined set of stakeholders which together constitute a full SWM system. Based on the ISSOWAMA project and expert dialogues, the guide furthermore provides an innovative assessment tool which, with simple and straightforward but structured questions, assists the user to learn from case studies. The questions cover specific issues from the different enabling domains which were derived from literature and case study evaluations. Using the concept of ISWM the assessment tool includes qualitative and quantitative inquiry methods.

The guide is targeted at project staff and decision-makers in local governments, municipalities, industry, non-governmental organisations and professional associations. It will assist those with limited experience and knowledge by providing a comprehensive overview on SWM in low and middle-income countries. With a brief overview of the many influencing factors and impacts of SWM, it further introduces the main elements of the waste management system. For those already familiar with these fundamentals, it gives guidance on how to conduct a structured analysis of existing cases to understand how to tackle the many facets which influence and determine sustainability.

These guidelines give an overview about different existing environmental assessment methods (TA, EIA, RA, LCA) and, by means of a decision tree, indicate in which situation what method is appropriate to use. Furthermore, the guidelines introduce the new ISSOWAMA assessment tool as a complementary method to evaluate existing waste management activities in the ISWM framework.

Furthermore, the guidelines were summarised in a report called 'Simplified Guide on ISWM in Asian developing countries', intended to be used as dissemination material on these topics and to be distributed among industrial associations, municipalities and governmental organisations and other stakeholders. In order to facilitate their understanding in the different target countries, they were produced in English and translated into 7 languages, concretely those spoken in the Asian countries represented the consortium: Khmer, Thai, Chinese, Hindi, Bengali, Bahasa and Vietnamese.

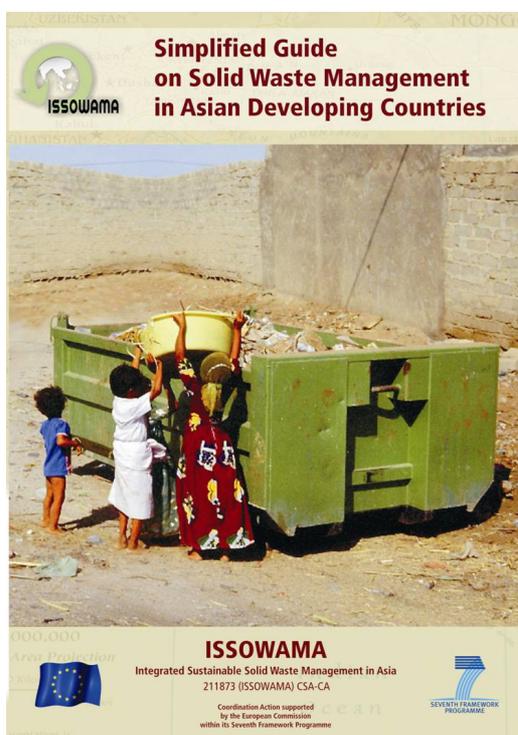


Fig. 2: ISSOWAMA project simplified guides – English

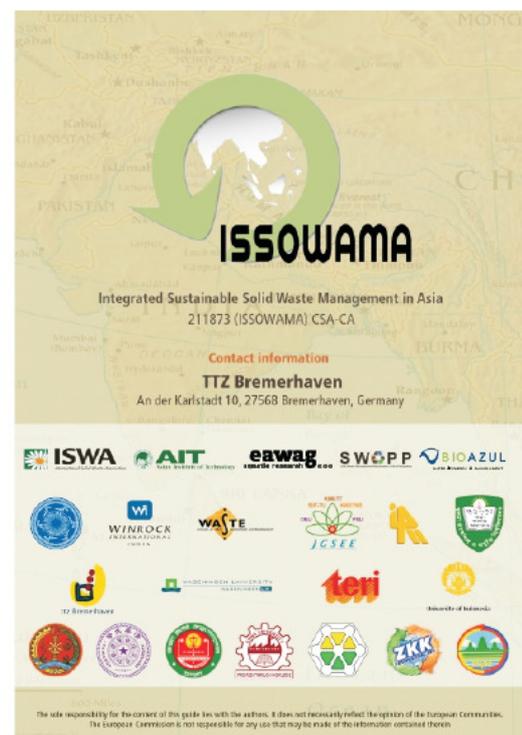


Fig. 3: ISSOWAMA project simplified guides – English

version (front cover)

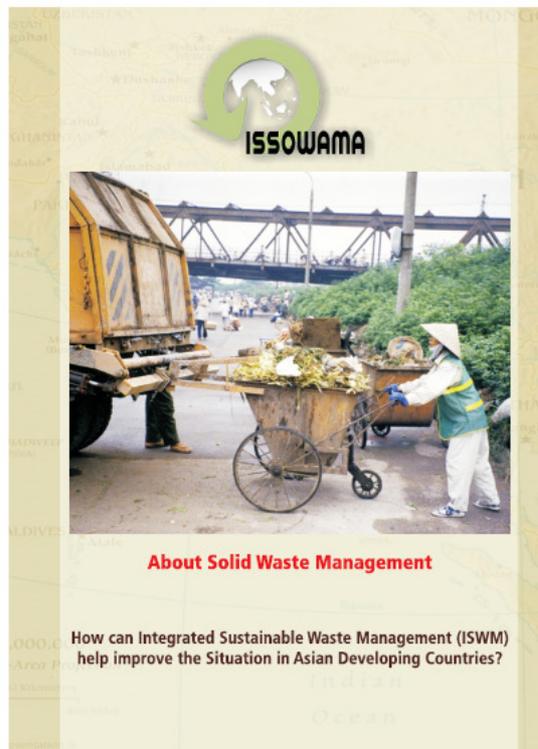


Fig. 4: ISSOWAMA project simplified guides – English version

version (back cover)

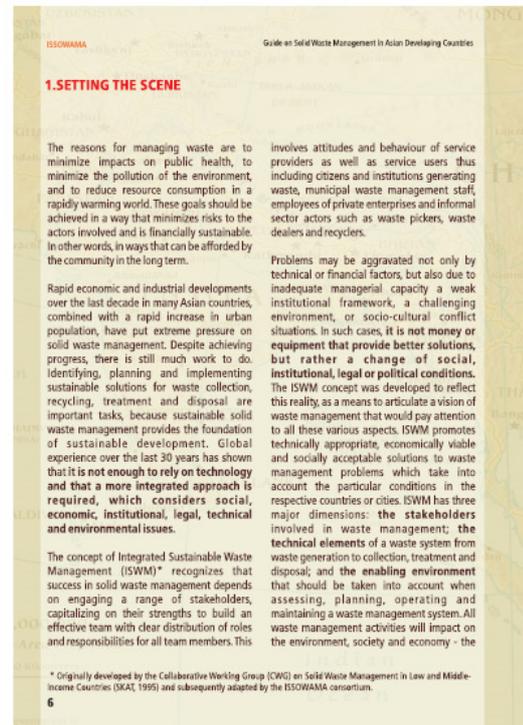


Fig. 5: ISSOWAMA project simplified guides – English version

In addition to all this work, and during the whole project duration, ISSOWAMA results had to be disseminated and promoted. Thus, a communication and dissemination programme was designed to reach important stakeholders and key actors. In addition, the implementation of national information campaigns and the development of mechanisms for the deployment of a further dissemination and extension strategy were foreseen.

The project website was established and has been continuously updated. It has a distinctive domain name, <http://www.issowama.net>, and it has a public area and a private area restricted for project beneficiaries only. The public area contains the ISSOWAMA project summary, description of its objectives, methods and expected benefits, the description of the beneficiaries and contact details, practical information adapted to the end users, collection of other results from previous and / or current studies, research projects, networks, etc. known by the project partners and / or identified within the project duration dealing with the same thematic as ISSOWAMA and creation of the database, publishable material produced within the project development, including press releases, all deliverables marked as “Public” produced within the project, public news area for results dissemination, advertising of the consortium activities, such as meetings, workshops, panel discussions, open e-conferences, etc. On the other hand, the password protected area for the project beneficiaries contained all reports, annexes and deliverables’ drafts when necessary, as well as other relevant information materials for the different project tasks.

It has resulted to be a very powerful dissemination tool, and its success becomes tangible when the visits and downloads are accounted: **the website has had a total of 22.209 visits**, and the Deliverables D1.2 (Current research in solid waste management in Asian developing countries), D1.4 (Evaluation of major gaps in knowledge and barriers) and D5.5 (Simplified guide on solid waste management on Asian developing countries) have been downloaded 151, 138 and 138

times respectively since they were uploaded, followed closely by D2.1 (Characterisation and evaluation criteria for solid waste management case studies), 120 downloads, the bundle of D5.1 and D5.2, which includes the database of projects, actors and existing networks, 75 downloads, and D5.12, the report with conclusions from the events held in the project, 97 downloads. In total, **the documents available in the website have been downloaded 1.932 times**, what gives a clear idea of the real success that the ISSOWAMA website represents.



Fig. 6: ISSOWAMA project website

The future joint activities for network enlargement and solidification were also mapped, including the organisation of e-conferences on specific topics. The aim was setting strategies for cooperation and cross-fertilisation of ideas. This way, potential roads for future collaboration were investigated and discussed. The main conclusions extracted regarding the network enlargement activities could be framed within two action lines. The first one consists in including new members in the network, at least ten new members per country and per year. It is expected to achieve this thanks to the ISSOWAMA network dissemination through each partner's network of contacts, direct contacts to other organisations related to ISWM and the use of social media, such as LinkedIn, Xing, etc. The second line of action is related to the creation of clusters in each ISSOWAMA country in order to strengthen the presence of the ISSOWAMA network. The existence of national groups will strengthen the network as a whole and will also attract more members. It is expected to achieve this using the opportunities available to cooperate with new members, what will create stronger bonds between organisations and, whenever possible, attending conferences and other ISWM-related events as members of the corresponding ISSOWAMA cluster.

However, it was also necessary to think about how to solidify the already existing network and ensure its survival in the future. The main conclusions extracted could be summarised in three action lines. The first and most important action line aims to achieve a permanent structure recognisable and easily accessible for the partners and new members. The best way of achieving this would be creating thematic clusters in each participating country and joining an already existing structure, being in our case ISWA. ISWA offered to implement an ISSOWAMA branch or platform to continue network activities. The second action line deals with becoming a permanent reference for information about ISWM for Asia and other developing countries. In this sense, it is necessary to ensure that the project website will be permanently online, what will be achieved through the migration of the website to the servers of at least five partners in different countries. The third action line one deals with ensuring the ISSOWAMA network financial stability. In order to carry out future research and technology implementation sufficient financial resources are

required. Some of the partners involved have the capacity to carry out joint research from their own resources. However, this is limited and will not fund all the activities required to achieve the general objective. For this reason, it would be necessary to acquire funds for new research (for those partners that cannot fund such activities from their own resources) as well as for further dissemination activities. The way of achieving this would be applying for new proposals. It is also aimed to continue publishing and disseminating the ISSOWAMA results on ISWM, producing at least 5 publications per year. For the research partners, it is anticipated that this aim falls into their routine activities and therefore, is taken for granted. The NGOs present in the project have as well this activity as part of their outreach to train and inform target groups. The desired outcome would be joint publications, result of cooperation on research activities. For this reason, the achievement of this goal is linked to the first line on action on network solidification.

The organisation of the international e-conferences on specific project topics was carried out, participating both project partners and external members. Finally, the consortium proposed and discussed strategies for network solidification, what included future joint research activities even if the scope was slightly different, but aiming to continue the work of ISSOWAMA, coordinating research and encouraging collaboration between stakeholders of different sectors.

Dissemination material was also very important for this project, mostly taking into account that its main aim is promoting and raising awareness on SWM issues. Thus, different items were created, concretely the official project logo, the project leaflet and the project poster. As the Simplified Guide on ISWM in Asian developing countries, they were produced in English and translated into 7 languages, concretely those spoken in the Asian countries integrating the consortium: Khmer, Thai, Chinese, Hindi, Bengali, Bahasa and Vietnamese.

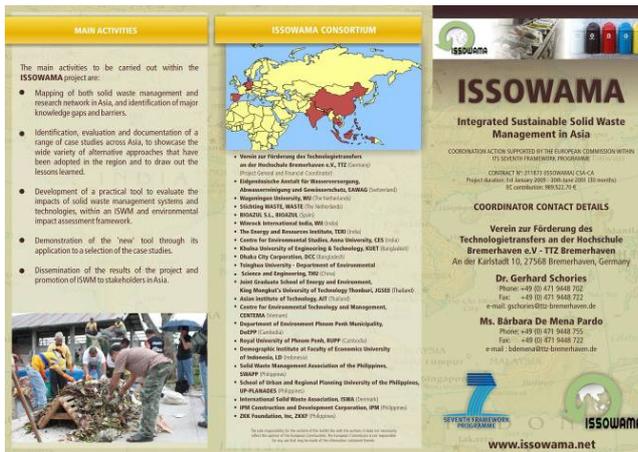


Fig. 7: ISSOWAMA project leaflet (front)

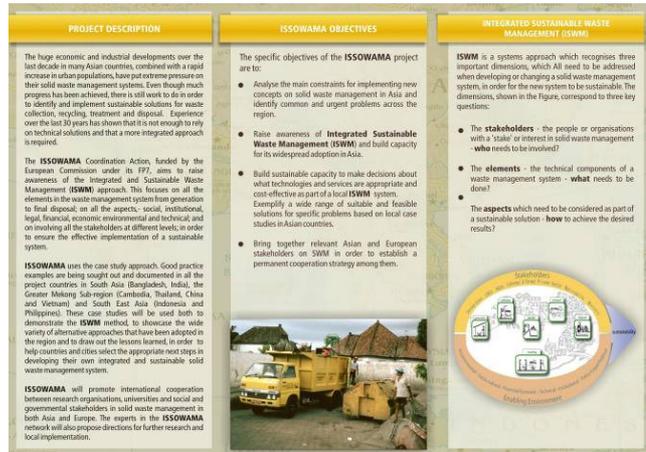


Fig. 8: ISSOWAMA project leaflet (back)



Fig.9: ISSOWAMA project poster



Fig. 10: ISSOWAMA project logo

Furthermore, eight publications were prepared, being related to the identified relevant potential impacts of SWM in Asian developing countries, the revised methodologies for EIA methods related to SWM in Asian developing countries and the results of case studies assessment. The articles were the following: 'Application of Integrated Solid Waste Management in the Tourist Resort of Boracay Island, Philippines'; 'Extended methodology for environmental technology assessment method'; 'Evaluation of various Environmental Technology Assessment tool for waste Management to evolve a comprehensive assessment tool suitable for Asian Countries'; 'Integrated Sustainability Assessment of Solid Waste Management in Asia: Case Study of Nonthaburi in Thailand'; 'Determinants of sustainability in Solid Waste Management – the case of Gianyar waste recovery project, Indonesia'; 'National Level Sound Material-cycle Society (SMS): Recognising Role of Private Recycling Business Sector in Thailand' and 'Higher education needs for capacity building at local level for solid waste management through 3R in Asian developing countries' and 'From Tragedy to Opportunity: Analysis of the Case Study Assessment on the Controlled Disposal Facility in Payatas, Quezon City, Philippines'.

Together with the dissemination materials, awareness-raising, dissemination and promotion and discussion events were also organised. In this sense, three thematic panel discussions (TPD) were organised. The first TPD, called 'Relevant potential impacts of Solid Waste Management in Asian developing countries', was held in Manila, Philippines. There were three major topics discussed at the TPD: 1) Municipal Waste, 2) Healthcare Waste, and 3) Industrial waste. The second TPD, called 'Methodologies for Environmental Impact Assessment Methods of Solid Waste Management in Asia', was held in Bangkok, Thailand. The objectives were to present the relevant methodologies designed to assess the sustainability of SWM systems and to identify issues or additional parameters/aspects that are lacking in the current methodology and should therefore be included. The third and final TPD, based on the 'Asian Guidelines of assessment methods of different solid waste streams' was held in Delhi, India, and included a site visit to Ghazipur dumpsite, East Delhi. The topics discussed were: 1) Asian Guidelines for assessment methods of different solid waste streams, 2) Network enlargement activities and solidification strategies, 3) Waste assessment guidelines for construction and demolition waste, 4) Remediation of municipal landfill, 5) Role of informal sector in waste management, 6) E-waste management for Bhutan.

In addition to these events, specially designed to discuss on the topics mentioned with relevant stakeholders of the different countries addressed, regional workshops on adapted waste treatment technologies and services were also held. They were organised for municipalities, SMEs, industries and stakeholders from the informal sector, having the objective of dissemination in a broad level. They also served to introduce new relevant actors like local waste processors

and regulators to the existent networks, as well as to raise awareness and promote good practices and environmental sound technologies. Nine workshops in total were organised in India, China, Bangladesh, Thailand, Vietnam, Cambodia, Indonesia (two workshops) and the Philippines. In all cases, special efforts were made in order to include municipalities to extent their know-how and expertise on this field and to include local producers and the private sector of waste treatment technologies in the dialogue. Results of the case studies on SWM practices were shared, as well as recommendations and possible options on how to apply the most suitable treatment technologies in different specific conditions were also proposed.

Both events, TPD and the workshops, have given deeper insight on the current status and initiated the dialogue between different stakeholder groups, which will contribute to the implementation of ISWM on the long run. Furthermore, the main conclusions about this status of waste management in general and ISWM in particular in Asian developing countries are:

1. **The ISWM approach is suitable for the Asian developing countries.** All the feedback received from discussions in the workshops pointed out that integrating technologies and stakeholders is the right way to go.
2. **The main difficulties for this approach are engaging and coordinating all groups.** Some informal groups (waste pickers, slum-dwellers...) are reluctant to participate in the dialogue leading to a new waste management strategy. Some government groups find also difficult to overcome the “business as usual” scenario and to engage in an open conversation with members of all groups. The strategy to follow to achieve everyone’s participation will have to be specific for each country.
3. **Public awareness is an issue in all countries.** Practitioners and researchers on the sector agree that the public needs education in order to understand the problems that arise from inadequate solid waste management, the correct way to deal with SWM and the opportunities it might represent, such as recycling. The main hurdles in this regard are the lack of access to educational measures for some groups and lack of funds to develop comprehensive strategies.

In order to achieve success at the country level, **deeper involvement of all levels of government is needed.** Different government bodies have to make stronger efforts in applying the laws currently in force and to achieve transparency.

Nevertheless, the impact and the achievements vary from one country to another. The main achievements of ISSOWAMA have been summarised from the partner level to a higher scale. The most relevant cases are the following:

Bangladesh

DCC has been implementing the Clean Dhaka Master Plan formulated with the technical assistance of JICA with a target of improving the solid waste management situation in Dhaka. Due to ISSOWAMA, the concept of ISWM has been included in the SWM program. In addition to technological and environmental issues, the social and financial issues are also taken into account in the implementation of this SWM program. The 3Rs (Reduce, Reuse and Recycling) strategy has been formulated and gradually implemented.

The general public participation in waste segregation has been emphasised, and public activities are taken to build up people awareness. The private sector participation in waste collection has started, which is to be considered a huge impact in a city of the size of Dhaka (metropolitan area: more than 14 Mio. inhabitants). ISWM facilities such as composting and sanitary landfill are being implemented. Policy and investment programs are being taken together for comprehensive improvement in waste management service, taking into account the results obtained in the project.

On the academic level, partner KUET mentioned the fact that it is evident that ISSOWAMA will provide a clear state-of-the-art of SWM in Asian developing countries, mainly to the practitioners, researchers, policy makers and the concerned stakeholders. Along with this they also can

understand how SWM is influenced by the prevailing social, economic, institutional, legal, technical and environmental conditions, and points out the negative impacts of deficient SWM on environment, public health and economic development. As the project incorporates different countries of diversified economic and social status, exchange of views, practical activities and on-going research will be possible, so that a new integrated and improved concept of SWM can be developed. The project is also helpful to the policy makers to produce the best policies in their own context for the SWM. The local Ward Commissioners, the City Corporation Mayors, the Conservation Department and the National level contributors will be assisted by the project outputs. Moreover, the project will be useful if its findings are taken into consideration for policy making in the developing countries.

Cambodia

At the level of DoEPP, ISSOWAMA has been useful firstly to learn about the mobilisation of resources necessary for such kind of project. This has proven to be a valuable experience, as it has opened further possibilities for cooperation in research projects. The work in ISSOWAMA, the collection of information needed, consultation with other organisations, etc., has been a decisive factor in setting up of a network at national level with other organisations working in the field. The frequent need to establish contact with them, ask for consultation, further information, etc. has brought together a sector that was scattered. The immediate result of the participation in an international network has also had an important impact on DoEPP in terms of knowledge and experience exchange.

The most important result achieved has been the possibility to mobilise staff from the government and NGOs for the first workshop held in Cambodia at this level on SWM. This was the first time these issues were discussed at national level, among a group of people that included not only practitioners, but also decision-makers and end-users. The event, together with the Simplified Guide created in the project (which is the first document on the topic translated into Khmer so far), have created interest at different institutional levels: from the City Governor (Phnom Penh) to the Senior Minister of Environment, interest has been expressed on further research, on the celebration of more workshops like the ISSOWAMA event and on bringing the solutions proposed by the project into practice.

This institutional interest has materialized itself in the provision of funds by the City Governor for building a biogas plant in the city's landfill for wastes generated in slaughterhouses. The City Governor has expressed to DoEPP his interest on the Simplified Guide, as well as for the overall outcome obtained in the project: sharing technical knowledge on SWM.

As a result, Phnom Penh city has changed the way waste is handled, separating it in two categories: wet and dry. Wet waste as organic waste is segregated at source whenever possible, for example in public markets. It is then transported separately and disposed at the site for composting and biogas production. The dry fraction, smaller, can be often sold and reused (plastic, paper, etc.). In addition, stronger enforcement of the existing regulations is applied to keep public areas clean.

At ministry level, the Minister has expressed his interest on the results of ISSOWAMA, and has urged the different groups to continue organising a yearly workshop to discuss the waste problems in the country. Moreover, the translated Simplified Guide has been warmly received and the researchers and environmental institutions have been encouraged to continue the work initiated in the project.

China

THU, as the leading decision-making supporting institution for environmental protection in China, undertakes many important research projects on SWM granted by the central government of China. The concept of ISSOWAMA was adopted in implementing new research projects, such as *Research and Demonstration of MSW Sustainable Landfilling Technology, Development and Application of Common Technology for Circular Economy Promotion in Suzhou City, Research and Demonstration of Combined Recycling of Township Solid Wastes.*

The workshop organised as part of the project received excellent feedback from the participants from different stakeholders including industries, universities, research institutions, associations and media. The workshop was reported by the largest Chinese professional web for solid waste, China Solid Waste Web (www.solidwaste.com.cn).

SWM in China is very complicated, since the economic development level and natural-social conditions vary from urban areas to rural areas, from coastal regions to inner regions. The best and the worst technologies for SWM co-exist in China. The cases and experiences of other European and Asian ISSOWAMA partners do provide some insights for the country, although the scale and complexity in China makes it very difficult to reach the same impact degree as in other countries. For example, China has many unsuccessful experiences on composting of MSW; however, it was successfully applied in India and Bangladesh. The information exchanged in the project with regards to lowering costs, quality control and market development was, for example, an interesting outcome on a concrete, applied topic that can be easily replicated.

India

ISSOWAMA has played an important role disseminating information on the techniques and technologies involved in SWM among the decision makers in government and industry, apart from spreading awareness among general public. However, it is yet to be seen if these recommendations and the results indeed are translated to the framing of effective policies in the medium and long term.

The set of qualitative sustainability criteria and the quantitative impact indicators which have been developed as a part of the performance assessment system will help in assessing waste management practices vis-à-vis their environmental impacts, economic considerations and the social situation of the target region. These are to be verified in different cities of Asia and the results can help in the further development of cost-effective technologies and practices in Asia. ISSOWAMA has already provided a framework for that by effectively linking waste treatment with the environmental, economic, financial, technological, legal and institutional aspects.

Apart from this, the greatest achievement of ISSOWAMA lies in bringing together stakeholders and experts in SWM from Europe and the development countries of South Asia. This common forum of academic institutions, NGO's, local municipalities, policy makers and the government will promote greater cooperation and hence, greater sharing of knowledge and the exchange of information and technologies between different regions. The case studies which were analysed as part of the ISSOWAMA project were focussing on the use of locally available and cost-effective strategies, and these can be adapted in other regions as well. By identifying gaps in technical knowledge and policy barriers, the ISSOWAMA network can guide further implementation and future research in SWM. Projects like this have a longer gestation period in the sense that the direct impacts are seen only after a period of time. However, a few other areas in which ISSOWAMA's subtle impacts can be felt are:

- WII is currently developing a CDM project regarding energy efficient cook-stoves that use biomass based briquettes prepared out of organic waste. The organisation involved, Sneha Biotech from Chennai, was also taking part in the ISSOWAMA workshop organised by WII.
- Exploring the potential for CDM revenues for an organisation called SRM Bio Conversion that converts waste material from the mango processing industry to useful products and bio-fuel briquettes
- Dissemination of information regarding environmental and health impact of e-waste in the adjoining areas and suburbs of Delhi.
- Interaction with officials from the municipalities, government and State pollution control board of Assam and highlighting to them some best practices in waste management. In this regard, the Government of Assam has prepared a DPR to commission its first 6 MW waste-to-energy project in Guwahati.

- Demonstration of effective handling and management of biomedical waste in a few prominent private hospitals in the city of Guwahati. This has led to increasing awareness among the hospital staff regarding biomedical waste and they are also considering the use of GPS-based Solid Waste Transport Management System
- Raising awareness about use of biotechnology in increasing population. In this regard, the innovative biobin composting process in which organic waste (food and green waste) is decomposed was highlighted by Dr. R. Jagannathan of VNS Enviro Biotech and this was regarded as an attractive waste-disposal mechanism by a number of private business concerns during the ISSOWAMA workshop.

If the recommendations of the project and the best practices in SWM from different countries in the South Asian region are incorporated in developing an ISWM, it will certainly result in a sustainable urban environment in Asia with effective inputs in economic, environmental and social aspects with adequate institutional arrangements. In this regard, some of the areas where future co-operation is envisaged are:

- Waste to energy programs in municipalities of different cities and transfer of clean technology.
- Generation of compost and locating effective marketing channels.
- Capacity building programs to organise the informal sector involved in waste collection.
- Explore further possibilities of bringing together private business concerns and the public sector in effective PPP's (Public Private Partnerships).
- Assessing environmental and health impacts of the activities in the Along-Sosiya ship breaking and recycling yard and exploring scientific ways for effective waste disposal (a case study in this regard was developed as part of ISSOWAMA).

Indonesia

ISSOWAMA has been the first project in Indonesia of its kind that has structured SWM projects from technological, social and economic point of view. The selected and analysed SWM case studies provide detailed insight and indicators to measure and benchmark the performance of the selected projects – not only in Indonesia but also with projects from the other participating countries. ISSOWAMA has set the standards from which the countries could continue to improve and to extend their activities in SWM.

The outcome of ISSOWAMA should be considered as a source, which will be used for further research in the participating countries individually or in the network. In Indonesia the outcome of the project will be brought on the one hand to the Centre of Good Governance (CGG) and to the Technology Transfer Centre at the State Islamic University Jakarta (UIN). These organisations have been advisors of ISSOWAMA during the project implementation and are the most appropriate for disseminating its outcomes throughout Indonesia. The CGG cooperates with the provincial governments throughout Indonesia and the UIN in Jakarta is considered as the resource university among other 5 State Islamic Universities in Indonesia.

In summary, ISSOWAMA represents the starting point for further conceptual work and research. Now, having the best practices and knowing the sources of SWM sector, best practices could be disseminated, especially among the provincial governments and politicians.

Philippines

From the point of view of academia, UP-PLANADES is convinced that ISSOWAMA will indirectly improve/change waste management practices in Asia and, particularly, in the Philippines. This is possible when the good practices projects are assessed with the tool created by the ISSOWAMA Team, the Case Study Assessment Tool. As such, it is comprehensive in looking into the good practices on SWM and has provided a dynamic venue in promoting participatory urban management, as well as a way of understanding and integrating solid waste with other urban development issues.

ISSOWAMA has significant impacts for research because it looked into the triangulation methodology for case study analysis such as primary, secondary and walk-thru/observation methods of data collection. It is comprehensive to reveal good practices in each case studied and analysed. The recommendations and lessons learned from the case studies will be the inputs for policy-making both national and local, i.e., the municipality and/or city governments. However, many of these good practices ISWM remain remote from the larger arena, thus hindering them from being recognised and from becoming models of ISWM. The challenge is how to locate and make these practices known to others so as to extend their outreach and impact.

The Philippine cluster in the consortium included as well a NGO and a SME, which find the outputs very useful for research and policy making since they can be used for data analysis of best practices and technologies. The ISSOWAMA assessment tool is also positively evaluated by them, as it allows proponents to review proposed and on-going projects thoroughly covering critical points other than technological aspects, such as environmental, financial, socio-economic, legal and policy-making. The assessment tools can be helpful if used as international standards for incoming ISWM projects. The detailed assessment questions, if taken seriously, will guide the stakeholders towards a unified direction and well-thought decisions.

Most SWM projects in Asia focus primarily on technologies, whether appropriate or not for their conditions and impacts to people, culture and environment. The tool will be a good guide for project proponents and undertakers to take a more holistic approach towards sustainability that should include the aspects as identified by ISSOWAMA. Technology should be appropriate, locally available, affordable and environmentally sustainable.

For policy makers, the ISSOWAMA guide can direct the focus on SWM processes and therefore provide more realistic targets to the local governments as well as other SWM practitioners.

To summarise the ISSOWAMA consortium was a very heterogeneous group of actors from research, academia, NGOs and governmental authorities from 7 different Asian countries and 4 European countries. The organisational network analysis in the first stages of the project clearly showed that such inter-Asian links and networks are not fully developed, nor active in many cases. What the project has fully achieved has been to create a new strong network among key actors in the SWM sector which continue to be strong and effective in the future. In addition, the work conducted by the project on “novel assessment tools” has been able to provide a strong basis for future work on “best practices” and “sustainability factors” in SWM projects. Although the work itself did not directly improve the conditions in the countries of concern, as it did not involve direct implementation on-site, it nevertheless achieved to develop knowledge and to build capacity among a wide range of stakeholders, and it can be assumed that the benefits will be visible in improved planning and implementation of projects in the near future.

Potential impact

ISSOWAMA was conceived as an European-Asian initiative expected to be a SWM expertise network to coordinate, assess and guide suitable further research and, moreover, to promote strategic activities with the aim of identifying aspects like cost-effective treatment and sorting technologies, environmental impacts, gaps in technical knowledge and socio-economic policy barriers for further execution.

The network was also intended to propose directions for future research on SWM and for local implementation. The main aim of this work was the creation of a European-Asian Solid Waste Research and Dissemination platform able to establish synergies amongst organizations, promoting therefore International Cooperation in the field of SWM amongst researchers, social and governmental stakeholders, professionals of the sector, etc. This inclusive and holistic approach was vital to understand more deeply the specific surrounding conditions and potential consequences of the already existing and the new waste treatment technologies. Thus, ISSOWAMA was intended to be an important pathway towards Asian SWM sustainability through:

- Establishment of a permanent cooperation strategy among the Asian and European stakeholders on SWM through coordination of current research.
- Inclusion of Life Cycle Thinking in the implementation of ISWM Strategies, thus decoupling economic growth from environmental damage in fast growing countries.
- Identification of the existing and the potential socio-economic barriers for the implementation of the new proposed technologies and proposal of the best socio-economic strategies for implementing them.
- Identification of the main constraints in Asia for implementing new concepts on municipal and industrial SWM (from waste collection to treatment) through the data compilation on waste generation and treatment in Asian developing countries and also evaluation of common and urgent problems throughout the continent.
- Investigation of the most suitable and feasible solutions through the study of the most appropriate adapted technologies on SWM for each specific problem / case study in Asia. This would provide a better knowledge of the state of the art, with a significant advance with regards to efficiency, cost-effectiveness, operation and control. This would facilitate the design of the integrated and sustainable waste treatment systems, thus adjusting the final decision to technical and economic feasibility, according to the outcomes of the relevant potential impacts and methodologies for environmental impacts assessment related to SWM Asian developing countries.
- Improvement of the know-how and best management practices to relevant Asian stakeholders (municipalities and industries) on solid waste treatment and on waste minimisation procedures.
- Promotion of ISWM in Asian developing countries, and improvement of urban health, life quality and economy level.
- Dissemination of the results obtained, increasing awareness on the need to improve SWM in Asia. This compiled and disseminated knowledge in ISSOWAMA network would improve the waste treatment process, reduce the environmental impact and therefore enhance the Asian waste sector to reach the goal of sustainable development.

Thus, the establishment of ISSOWAMA networked important stakeholders involved in waste management and developed a variety of innovative, adaptable and replicable approaches to a more efficient management, stimulating the interchange of knowledge and improvements amongst the Asian industries, research centres, NGOs, etc. contributing to future research and local implementation strategies. This work contributed to:

- Strengthening formal and informal networks on waste management existing in the Asian countries included in the consortium.

- Integration of new actors in these networks.
- Better understanding of the specific surrounding conditions (environmental, economic and social) and potential consequences of the waste treatment technologies use.

In order to achieve this, the project beneficiaries gave priority to dissemination and promotion activities focus on stakeholders' participation in order to raise their awareness not only on technical issues, but on other aspects related to the organisation and management of relationships between all of the key actors or stakeholders, for the planning and implementation of ISWM.

It was crucial for planning the dissemination and promotion strategy to include all involved stakeholders groups for securing real improvements in waste management practices. Waste management involves a wide range of stakeholders (local producers, members of the private sector of waste treatment – what comprises the formal and the informal sector (individuals, families, groups and small companies) – , processors, regulators, households, waste pickers associations, municipalities, etc.), each with their own professional backgrounds and priorities. NGOs also play a crucial role in reaching the communities helping to create awareness about the environmental impacts and health problems associated with the disposal of wastes.

The first step of this strategy was the creation of a project webpage, in which all items produced within the ISSOWAMA project are available for the visitors, as well as relevant information regarding SWM, the events organised during the project duration, the project structure, etc. The impact of this important tool could be considered quite important taking into account the number of visits and the amount of materials downloaded during the project timeframe; by the end of the of the project, and counting since July 8th, 2009, which was the day in which the project website launched, more than 22.200 visits have been registered, being the beneficiaries' profiles, the events section and the workplan description the sections more visited by the public checking the webpage. Regarding downloads, around 3.000 downloads of the available materials were registered, being the most significant document the report on mapping and evaluation of SWM case studies (D2.2), followed by the simplified guide on SWM in Asian developing countries (D5.5) and the report on relevant potential impacts and methodologies for EIA related to WWM in Asian developing countries (D3.1) according to the downloads registered.

The production of adapted dissemination tools was another important point for this dissemination and promotion strategy. Besides electronic dissemination through the webpage, it was necessary to emphasise the role of printed material as it was clear that not all stakeholders would have access to internet, so basic and relevant information had to be provided to them by other means. This helped to communicate the results of the project to all sectors of relevant stakeholders. Therefore, a set of dissemination tools (simplified guide, leaflet, poster and publications) based on the project reports and conclusions have been prepared:

- Simplified guide: the contents of deliverable D5.5, one of the main project outcome, were adapted and summarised in order to create a useful guide for those aiming to learn regarding SWM possibilities. This guide was translated into Thai, Bahasa, Khmer, Chinese, Bengali, Hindi and Vietnamese languages in order to make them accessible and understandable for local stakeholders.
- Project leaflet: a project leaflet was designed and produced in English, containing relevant information on ISWM and the basics of the ISSOWAMA project. It was afterwards translated into Thai, Bahasa, Filipino, Khmer, Chinese, Bengali, Hindi and Vietnamese languages in order to facilitate its understanding by local stakeholders. It was used by the project beneficiaries with dissemination purposes, being distributed in all events organised within the project, as well as in those events to which the beneficiaries attended to promote the ISSOWAMA project.
- Project poster: as the leaflet, it was designed and produced in English, and it contained also the basics of the ISSOWAMA project and relevant information on ISWM. As in the previous cases, it was produced in English and further translated into Thai, Bahasa,

Filipino, Khmer, Chinese, Bengali, Hindi and Vietnamese languages to make it understandable by local stakeholders. It was showed by the project beneficiaries in all events organised within the project, as well as in those events to which the beneficiaries attended to promote the ISSOWAMA project.

- Project publications: five publications were foreseen concerning the identified relevant potential impacts of SWM in Asian developing countries, the revised methodologies for environmental impact assessment methods related to SWM in Asian developing countries and the results of case studies assessment. This would intensify the dissemination of the project results in the research and academic organisms as well, as dissemination was needed in all sectors. However, the beneficiaries decided that it would be worth to increase the number of articles to be produced, so finally eight articles were prepared. The articles foreseen in the project were the following:
 - 1st publishable scientific article on the set of impact categories: ‘Application of Integrated Solid Waste Management in the Tourist Resort of Boracay Island, Philippines’.
 - 2nd publishable scientific article on the extended methodology for environmental technology assessment method: two articles, namely ‘Extended methodology for environmental technology assessment method’ and ‘Evaluation of various Environmental Technology Assessment tool for waste Management to evolve a comprehensive assessment tool suitable for Asian Countries’.
 - 3rd publishable scientific article on the results of case studies assessment: ‘Integrated Sustainability Assessment of Solid Waste Management in Asia: Case Study of Nonthaburi in Thailand’.
 - 4th publishable scientific article on the results of case studies assessment: three articles, namely ‘Determinants of sustainability in Solid Waste Management – the case of Gianyar waste recovery project, Indonesia’, ‘National Level Sound Material-cycle Society (SMS): Recognizing Role of Private Recycling Business Sector in Thailand’ and ‘Higher education needs for capacity building at local level for solid waste management through 3R in Asian developing countries’.
 - 5th publishable scientific article on the results of case studies assessment: ‘From Tragedy to Opportunity: Analysis of the Case Study Assessment on the Controlled Disposal Facility in Payatas, Quezon City, Philippines’.

An overview of all articles can be found on page 29 and the following pages. The most important components of the dissemination and promotion strategy were the events organised within the project timeframe. There were two kinds of events, concretely the Thematic Panel Discussions and the regional workshops. The Thematic Panel Discussions (TPD) had the aim of presenting and discussing the project results and milestones with researchers, scientists, government officers, companies and other relevant stakeholders in the waste sector, while the Regional Workshops were organised for municipalities, SMEs, industries and stakeholders for the informal sector (CBM organizations, waste pickers associations, etc.). The objectives of the TPDs were to present the relevant methodologies designed to assess the sustainability of SWM systems and identify issues or additional parameters / aspects that were lacking in the current methodology and should therefore be included. All participants to these TPDs were expected to contribute to the discussions and provide information enabling to improve the mentioned methodology. On the other hand, the workshops had the objective of the dissemination in a broad level, serving also to introduce new relevant actors like local waste processors and regulators to the existent networks, as well as to raise awareness and promote good practices and environmental sound technologies.

- Panel discussions

The first TPD was focused on the topic ‘Relevant potential impacts of Solid Waste Management in Asian developing countries’, being organised by SWAPP. It was held in Manila, Philippines within the SWAPP Congress as a parallel session. This way, the project TPD could attract more attendees due to the fact that it was framed within a bigger and relevant event. The SWAPP Congress was held on November 23rd – 26th, 2010. This 4-days event consisted on a 2-days conference (November 23rd – 24th, 2010) and 2-days simultaneous coaching workshops on disposal management (November 25th – 26th, 2010) based on the theme ‘Promoting sustainable Solid Waste Management practices in Asia’. The First ISSOWAMA TPD took place concretely on 24 November 24th, 2010. There were three major topics discussed at the TPD: 1) Municipal Waste, 2) Healthcare Waste, and 3) Industrial waste. UP-PLANADES with the support of SWAPP was in charge of inviting relevant stakeholders that were involved in the selected case studies and others considered of relevance, e.g. stakeholders from associations, waste pickers, CBM organisations, municipal/private solid waste services providers, NGOs, environmental organisations, independent local consultants, public environmental and health agencies, research centres and municipalities.

A total of more than 200 participants coming from the research and academic institutions, non-government organisations (NGOs), national government agencies (NGAs), local government officers / staff, industry associations, private sector, and ISSOWAMA consortium members attended the SWAPP Congress and the ISSOWAMA First Thematic Panel Discussion.

The second TPD was focused on the topic ‘Revision of methodologies for environmental impact assessment methods related to SWM in Asian developing countries’. The event organised by JGSEE was called ‘Methodologies for Environmental Impact Assessment Methods of Solid Waste Management in Asia’, and took place in Bangkok, Thailand on April 22nd, 2011. The objectives of this TPD were to present the relevant methodologies designed to assess the sustainability of SWM systems and to identify issues or additional parameters/aspects that are lacking in the current methodology and should therefore be included. All participants to this TPD were expected to contribute to the discussions and provide information enabling to improve the mentioned methodologies.

There were 25 participants registered to the panel discussion but 27 persons attended the event. The participants were all stakeholders from the waste management sector belonging to academic, governmental, public and private organisations. Most of the participants were concerned with environmental issues associated to SWM.

The third and final session, based on the ‘Asian Guidelines of assessment methods of different solid waste streams’, was organised in Delhi, India on June 8th – 9th, 2011, being organised by TERI. The topics discussed were: 1) Presentation on the Asian Guidelines for assessment methods of different solid waste streams, 2) Discussion on finalisation of Asian Guidelines, 3) Network enlargement activities and solidification strategies, 4) Waste assessment guidelines for construction and demolition waste, 5) Remediation of municipal landfill, 6) Role of informal sector in waste management, 7) E-waste management for Bhutan. The program also included a site visit to Ghazipur dumpsite, East Delhi. TERI, supported by AU, invited relevant stakeholders to attend the third TPD that were involved in the selected case studies, as well as others considered of relevance, e.g. stakeholders from academic and governmental research institutions, association of industries, local representatives of international cooperation agencies, public environmental and health agencies and municipalities. Nearly all ISSOWAMA consortium members were represented in this TPD, since the project Final Meeting was also held in India at the facilities of TERI at the same time. EAWAG presented the Asian Guidelines for assessment methods of different solid waste streams within this event.

A total of 35 persons attended the event. This included 22 persons from ISSOWAMA team and representatives from Ministry of Environment and Forests, Government of India, faculties and students from Jamia Millia Islamia, Delhi College of Engineering, TERI University, University and TERI, local consultancy organisations and corporate sector representatives.

The number of attendees to all these events (262 participants in total) gives an idea of the public reached and the opportunities this offer for further collaborations.

- Regional workshops

Although 8 workshops were scheduled, in the end 9 workshops were carried out in India, China, Bangladesh, Thailand, Vietnam, Cambodia, Indonesia (2) and Philippines. Special efforts were made in order to include local producers and the private sector of waste treatment technologies (e.g. developers and vendors) in the dialogue. Therefore, the consortium members were able to share with them the results of the case studies on SWM practices and to develop recommendations and possible options on how to apply the most suitable treatment technologies in different specific conditions. The workshops organised were the following:

- 'Integrated Sustainable Solid Waste Management in Asia', Beijing, China, July 17th 2010. There are 48 participants (40 male and 8 female) from different organisations, cities and stakeholders in China:
 - Government (Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Construction)
 - International organisation (Basel Convention Coordination Centre for Asia and the Pacific)
 - Networks (China Association of Urban Environmental Sanitation; China Solid Waste Web www.solidwaste.com.cn)
 - Industries (3 state-owned and private companies in China)
 - Universities and research institutes (18 universities and research institutes, including Tsinghua University, Peking University, Macao University, Pakistan Mehran University, and China Research Academy of Environmental Sciences, China Research Academy of Urban Construction, etc.)
- 'Waste treatment technologies and services – India case study', Chennai, India, July 23rd, 2010. There were 52 participants (41 male and 11 female), including representatives of the Chennai Municipal Corporation and other government bodies, industry, academia and Non-Governmental Organisations.
- 'Integrated Solid Waste Management', Dhaka, Bangladesh, September 9th, 2010. There were 40 participants (40 male, 2 female) in the workshop, being policy makers, practitioners, NGOs and CBOs as well as representatives from private sector.
- 'Sustainability of Solid Waste Management in Thailand', Bangkok, Thailand, October 11th 2010. There were 73 participants registered to the workshop, out of which 60 persons attended the event (39 female and 41 male), being researchers, scientists, government officers, companies and other relevant stakeholders in the waste sector.
- 'Dissemination of Waste – to energy biogas technologies from Integrated Sustainable Solid Waste Management systems', Phnom Penh, Cambodia, December 15th, 2010. there were 58 participants (5 female and 53 male) including local government agencies from the Department of Environment, the Municipality, private sectors and community-based organisations work in waste sectors. They shared their experiences with the workshop platform and used exchange information for future waste management in Cambodia.
- '8th regional ISSOWAMA workshop on Technology and Business forum for waste management', January 26th 2011, Manila, Philippines. A total of 71 participants (37 male and 34 females) attended the workshop. They represented multi-sectoral groups, namely from research and academic institutions, NGOs, National Government Agencies (NGAs), local government officers/staff, industry associations, private sector, and ISSOWAMA consortium members.

- 'Waste refinery and ISSOWAMA Indonesia workshop', Yogyakarta, Indonesia, February 11th, 2011. There were 38 participants (22 female and 16 male) including researchers, lecturers and scientists (20), students (7) and national and international government officers (11).
- 'Evaluation the decision support tool for MSW treatment technology in Hi Chi Minh City', Ho Chi Minh City, Vietnam, March 4th, 2011. There were 37 participants (17 female and 20 male), including representatives of: People Committee of Ho Chi Minh City; Department of Science and Technology; Hochiminh City Environmental protection Agency (HEPA); Institute of Natural Resources and Environment; University of technology; Ho Chi Minh City Waste Recycling fund; CENTEMA Centre; ETM Centre; Wageningen University; CITENCO; Public Service Company; Vietnam Waste Solution Company; Tam Sinh Nghia Company; Tasco Company; DONRE.
- 'University of Indonesia ISSOWAMA workshop', Depok, Indonesia, March 23rd, 2011. There were 67 participants (32 female and 18 male) including researchers, lecturers and scientists (10), students (53), government officers (2), companies (2) and other relevant stakeholders in the solid waste sector.

The number of attendees to all these events (484 participants in total) gives an idea of the success of the events and the public reached from a wide range of sectors.

Taking into account the results of all these activities, the consortium was convinced on the interest of the stakeholders in ISWM strategies. Potential roads for future collaboration have been investigated and discussed, and included in the recommendations of the consortium for future research and cooperation report.

This report summarises the most important research and knowledge gaps in the Asian context and identifies the main deficiencies and lacks in research in general terms. It further suggests what specific topics or thematic fields need more research, giving examples of research gaps for specific countries. The subchapter also suggested what typology of research is required and how research projects should be planned to best enhance that research outputs are taken up and implemented by policy makers, local authorities, private sector and practitioners in general. There were also recommendations for future technology development, dissemination of knowledge and cooperation.

The consortium therefore developed strategies for network solidification including future joint research activities. The scope of these possible new networks may be different from this CA but they should aim to continue the work of ISSOWAMA, coordinating research and encouraging collaboration between stakeholders of different sectors.

Project public website:www.issowama.net**Coordinator contact details:***Dr. Gerhard Schories*Verein zur Förderung des Technologietransfers an der Hochschule Bremerhaven e.V – TTZ
Bremerhaven

Umweltinstitut

An der Karlstadt 10, 27568 Bremerhaven, Germany

Phone: +49 (0) 471 94 48 702

Fax: +49 (0) 471 9448 722

E-mail: gschories@ttz-bremerhaven.de**List of beneficiaries:***Table 3: List of ISSOWAMA project beneficiaries*

| Beneficiary number | Beneficiary name | Beneficiary short name | Country |
|--------------------|---|------------------------|-------------|
| 1 (coordinator) | Verein zur Förderung des Technologietransfers an der Hochschule Bremerhaven e.V. | TTZ | Germany |
| 2 | Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz | EAWAG | Switzerland |
| 3 | Wageningen University Sub-department of Environmental Technology | WU | Netherlands |
| 4 | Stichting WASTE | WASTE | Netherlands |
| 5 | BIOAZUL S.L. | BIOAZUL | Spain |
| 6 | Winrock International India | WII | India |
| 7 | The Energy and Resources Institute | TERI | India |
| 10 | Khulna University of Engineering & Technology | KUET | Bangladesh |
| 11 | Dhaka City Corporation | DCC | Bangladesh |
| 12 | Tsinghua University- Department of Environmental Science and Engineering | THU | China |
| 14 | Joint Graduate School of Energy and Environment at King Mongkut's University of Technology Thonburi | JGSEE | Thailand |
| 15 | Asian Institute of Technology | AIT | Thailand |
| 17 | Department of Environment Phnom Penh Municipality | DoEPP | Cambodia |
| 18 | Royal University of Phnom Penh | RUPP | Cambodia |
| 19 | Universitas Indonesia | UI | Indonesia |
| 20 | Solid Waste Management Association of the Philippines | SWAPP | Philippines |

| | | | |
|----|--|-----------------|-------------|
| 21 | School of Urban and Regional Planning University of the Philippines | UP- PLANADES | Philippines |
| 22 | International Solid Waste Association | ISWA | Denmark |
| 24 | ZKK Foundation, Inc | ZKKF | Philippines |
| 25 | Anna University Chennai | AU | India |
| 26 | Centre for Environmental Technology and Management, VLU University | VLU | Vietnam |
| 27 | IPM Construction and Development Corporation | IPM | Philippines |

USE AND DISSEMINATION OF FOREGROUND

ISSOWAMA project was a response to the FP7 call for a 'Networking and preparatory action in view of developing cost-effective, environmentally-safe waste treatment technologies and services adapted to the needs of developing countries, within a targeted life cycle approach'. Taking this into account, it was conceived with the aim of transferring and adapting knowledge regarding ISWM, techniques and methodologies that have proven their effectiveness for improving SWM in different locations. The consortium focus was therefore the adaptation and dissemination of appropriate and cost-effective technologies and services, and the identification of the next steps for the development of improved waste management systems appropriate to the local needs and circumstances.

Thus, dissemination of results was one of the main activities carried out during the project lifetime. In this sense, a whole Work Package (WP5) was designed, and it is also foreseen to continue disseminating ISSOWAMA's results even after the project ends. Different activities were taken into account when designing this WP, concretely:

1. Web page establishment and management.
2. Definition of future joint activities for network enlargement and solidification.
3. Production of adapted dissemination tools (brochure, poster, simplified guide, publishable articles).
4. Organisation of thematic panel discussions.
5. Organisation of regional workshops.

All these activities were carried out as reported in the first and the second periodic reports. Nevertheless, the most important one regarding the use and dissemination of foreground was the one devoted to the definition of future joint activities for network enlargement and solidification.

On the one hand, this task was intended to propose recommendations for future research, technology development and cooperation strategies. The mapping of associations, organisations, initiatives and methodologies gave an opportunity to set strategies for cooperation and cross-fertilisation of ideas. Therefore, potential roads for future collaboration among the organisations mapped and the methodologies assessed within the project were investigated and discussed. After summarising the most important research and knowledge gaps in the Asian context and the main deficiencies and lacks in research in general terms, the consortium suggested what specific topics or thematic fields need more research, giving examples of research gaps for specific countries and suggesting the typology of research and how research projects should be planned to best enhance that research outputs are taken up and implemented by policy makers, local authorities, private sector and practitioners in general. Recommendations regarding future technology development, dissemination of knowledge and cooperation were also given.

On the other hand, and based on the results obtained in the activities of ISSOWAMA, the consortium developed and discussed strategies for network solidification, what included future joint research activities in the frame of funding projects, applications for grants in international organisations, exchanges of personnel, etc., aiming the coordination of research and the encouragement of collaboration between stakeholders of different sectors. The beneficiaries detailed the contacts made outside the consortium and the exchanges of information focused on ISSOWAMA, the papers co-authored by project beneficiaries and external experts on topics dealt with in ISSOWAMA, the partners included in new proposals dealing with ISSOWAMA topics, the contacts made during conferences and other dissemination events, the press releases and articles produced dealing with ISSOWAMA, the events attended by the project beneficiaries in which ISSOWAMA was presented, the project proposals written and / or to be written jointly by several project beneficiaries, the joint research activities planned, the exchanges of personnel made / to be made and the contacts made to donor agencies.

The activities mentioned are organised in the following tables. Table A1 contains a list of publications related to the foreground of the project, while table A2 includes a list of all dissemination activities (conferences, workshops and other dissemination events attended, websites / applications, press releases, presentations, exhibitions, etc.) carried out and planned by the project beneficiaries.

It is worth to mention that it is possible to plan further dissemination of the project results because they are property of all beneficiaries as stated in Annex I (bearing in mind the provisions laid down in Annex II of the Grant Agreement and in the Consortium Agreement). Access rights for the further exploitation or further research of ISSOWAMA results is royalty-free if a beneficiary needs them.

| TEMPLATE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES | | | | | | | | | | |
|---|---|--|---|---------------------------|----------------------|----------------------|---------------------|----------------|---|--|
| NO. | Title | Main author | Title of the periodical or the series | Number, date or frequency | Publisher | Place of publication | Year of publication | Relevant pages | Permanent identifiers ¹ (if available) | Is / Will open access ² provided to this publication? |
| 1 | Budget sheets and Buy in: Financing Community-based Solid waste management in Siem Reap, Cambodia | Kate Parizeau | Environment and Urbanization | Vol.20 (2), Oct 2008 | Sage Publication | Office in UK | 2008 | pp. 445-463 | n.a | YES |
| 2 | Higher education needs for capacity building at local level for solid waste management through 3R in Asian developing countries | Prof. C. Visvanathan | Article submitted to "International Journal of Educational Development | | Elsevier | | June 2011 | n.a | n.a | YES |
| 3 | Extended methodology for environmental technology assessment method | José Potting, Shabbir H Gheewala, Sébastien Bonnet | To be published in a book entitled: Life Cycle Assessment: A Guide for Environmentally Sustainable Products | n.a | Scrivener Publishing | US | 2011 | n.a | n.a | NO |

¹ A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view) or to the final manuscript accepted for publication (link to article in repository).

² Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

| TEMPLATE A2: LIST OF DISSEMINATION ACTIVITIES | | | | | | | | |
|---|--|-------------|--|-------------------------------------|--------------------|---|--|---------------------|
| NO. | Type of activities ³ | Main leader | Title | Date | Place | Type of audience ⁴ | Size of audience | Countries addressed |
| 1 | Knowledge management through, Training course, Word press blog, Website and leaning workshop | RUPP | Urban Environmental Management Application in Southeast-Asia (SEA-UEMA project) | 2009-2010 | Cambodia | National | >120 institutional and individual networks | Cambodia |
| 2 | Research Project | RUPP-ICM | Willingness to pay for Community-based Solid Waste Colluection in Steung Hav District, Sihanouk province | 2008 | Cambodia | Community | 103 respondent s | Cambodia |
| 3 | Presentation | Gfrerer, M. | Waste Refinery Network | February 18-19 th , 2009 | Yogyakarta | Public servants, academics | 85 | Indonesia |
| 4 | Briefing | Gfrerer, M. | Presentation of ISSOWAMA and search for case studies in Indonesia | March 5 th , 2009 | Jakarta | Staff of Ministry of Public Works, Ministry of Research & Technology and Unilever Indonesia | 10 | Indonesia |
| 5 | Sandec News Nr. 10 | Y. Vögeli | Integrated Sustainable Solid Waste Management in Asia | July 2009 | Eawag, Switzerland | Scientific community, | 3500 copies | International |

³ A drop down list allows choosing the dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.

⁴ A drop down list allows choosing the type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias ('multiple choices' is possible).

| | | | | | | | | |
|----|-------------------------------------|--|---|-------------------------------|----------------------------|---|-----------|---------|
| | | | | | | policy makers | | |
| 6 | E-Waste Forum | VLU University | E-Waste Management in Ho Chi Minh City | 2010-2011 | Ho Chi Minh City, Vietnam | Environmental managers, authorities and scientists | | |
| 7 | Conference | Ministry of Trade and Industry and Ministry of Planning and Investment | Waste to Energy | March 19 th , 2010 | Ha Noi, Vietnam | Environmental managers, authorities and scientists | 60 | Vietnam |
| 8 | Conference | Nguyen Trung Viet | Evaluation of Quantity and Composition of Industrial and Hazardous Waste in Ho Chi Minh City, Da Nang and Ha Noi - Proceeding of the conference on Waste Combustion Technology to Energy Recovery and Possibility to Apply in Vietnam | March 19 th , 2010 | Ha Noi, Vietnam | Environmental managers, authorities and scientists | 60 | Vietnam |
| 9 | Website/Internet site Press Release | Prof. Rosario Jimenez/Dr. Mario Delos Reyes/Kristine Aspiras | UP-SURP Website - Article on Integrated Sustainable Solid Waste Management for Asia | June 2010 | Quezon City | Academe | Thousands | |
| 10 | Workshop | WII | Waste treatment technologies and services – India case study | July 23 rd , 2010 | Chennai, Tamil Nadu, India | Professionals from Municipal Corporations, other government bodies, industry, academia as | 35 | India |

| | | | | | | | | |
|----|--|--|---|--------------------------------------|---|---|---|----------------------------------|
| | | | | | | well as NGO's | | |
| 11 | Email-conference on biogas | Y. Vögeli | Anaerobic Digestion of Organic Solid Waste in Asia - Potentials and Challenges | August 2-13 th , 2010 | Email-conference | Scientific community, policy makers, industry | 53 | International with focus on Asia |
| 12 | Conference | | The 7th Expert Conference on Solid Waste Management in Asia and Pacific Island | September 15-17 th , 2010 | The GIS NTU Convention Center, Taipei, Taiwan | Scientific Community | | |
| 13 | Workshop | JGSEE | Sustainability of Solid Waste Management in Thailand | October 11 th , 2010 | Bangkok, Thailand | Stakeholders in the waste management sector including academics | 60 | Thailand |
| 14 | ISWA World Congress (under ISSOWAMA project) | | ISWA World Congress | November 15-17 th , 2010 | Hamburg, Germany | Professionals and researchers from the waste sector | ISSOWAM A event 15-25, whole congress >1000 | Worldwide |
| 15 | ISWA Congress 2011 | Le Thi Kim Oanh | Combined anaerobic and aerobic digestion of municipal solid waste & pig manure in Ho Chi Minh City | November 15-17 th , 2010 | Hamburg, Germany | Professionals and researchers from the waste sector | ISSOWAM A event 15-25, whole congress >1000 | Worldwide |
| 16 | ISWA Congress 2011 | Ms. Bárbara De Mena Pardo, Dr. Gerhard Schories, Mr. Nikoloz Tokhvadze | Gaps and barriers for appropriate waste management in Asian developing countries: Insufficient access to know-how | November 15-17 th , 2010 | Hamburg, Germany | Professionals and researchers from the waste sector | ISSOWAM A event 15-25, whole congress >1000 | Worldwide |

| | | | | | | | | |
|----|---|--|---|-------------------------------------|----------------------------|--|--|-----------|
| 17 | ISSOWAMA session in the frame of the ISWA World Congress 2010 | TTZ | ISSOWAMA Session | November 16th, 2010 | Hamburg, Germany | Professionals and researchers from the waste sector | ISSOWAMA event 15-25, whole congress >1000 | Worldwide |
| 18 | ISWA Congress 2011 | Y. Vögeli | Decentralised anaerobic treatment of market waste | November 16 th , 2010 | Hamburg, Germany | Professionals and researchers from the waste sector | ISSOWAMA event 15-25, whole congress >1000 | Worldwide |
| 19 | Flyers/Brochures/Posters | Prof. Rosario Jimenez/Dr. Mario Delos Reyes/Kristine Aspiras | ISSOWAMA Flyer in Filipino Pinagsamasama Pangangasiwa ng Basura sa Asya; ISSOWAMA Flyer in English Integrated Sustainable Solid Waste Management in Asia | November 23-26 th , 2010 | Bayview Park Hotel, Manila | Local government units, NGAs, NGOs, Private Sectors | 200 | Asia |
| 20 | Presentations/Workshop - First Thematic Panel Discussion | Prof. Rosario Jimenez/Dr. Mario Delos Reyes/Kristine Aspiras | Relevant Potential Impacts of Solid Waste Management in Asian Developing Countries | November 24 th , 2010 | Bayview Park Hotel, Manila | Local government units, NGAs, NGOs, Private Sectors | 200 | Asia |
| 21 | Workshop | Senior Minister of Environment | Waste-to-Energy | December 15 th , 2010 | Phnom Penh | related to SWM: Private sector, NGOs, Academic, Public sector, Province admin, Newspaper | 63 | Cambodia |

| | | | | | | | | |
|----|---|--|---|-------------------------------------|---|--|-----------|--|
| 22 | Regional ISSOWAMA workshop in the Philippines | C. Zurbrügg | presentation on the ISSOWAMA assessment tool | January 25 th , 2011 | Manila, Philippines | Scientific community, policy makers, industry | | Philippines |
| 23 | Invited members of the Solid Waste Contractors Association and employees of IPM to attend the 8 th Regional ISSOWAMA Workshop; sponsored the field visit of Mr. Chris Zurburgg, EAWAG partner to various SWM sites in Manila | SWAPP | 8 th Regional ISSOWAMA Workshop: Technology and Business Forum on Waste Management | January 26 th , 2011 | Development Academy of the Philippines, Pasig City, Philippines | Industry, Civil Society, Policy makers, Media, Local Government Units, Academy, Technology Providers | 76 | Philippines, Malaysia, Switzerland |
| 24 | Workshop Distribution of ISSOWAMA brochures Presentation & test application of ISSOWAMA Assessment Tool | SWAPP ZKKF UP PLANADES IPM | 8th ISSOWAMA Regional Workshop: Technology and Business Forum on Waste Management | January 26 th , 2011 | Development Academy of the Philippines, Pasig City, Philippines | Industry Civil Society Policy-makers Media LGUs Academe Technology Providers | 76 | Philippines Malaysia Switzerland |
| 25 | Workshop | Gfrerer, M.; Syamsiah, S. | ISSOWAMA -Waste Refinery Network | February 10 th , 2011 | Yogyakarta | Public servants, academics | 38 | Indonesia |
| 26 | Briefing | Gfrerer, M. | Cooperation Possibility | February 10 th , 2011 | Yogyakarta | International experts | 8 | Indonesia |
| 27 | Conference | Organised by partner KUET | WasteSafe2011 | February 13-15 th , 2011 | Khulna, Bangladesh | Researcher, practitioners, donor agencies | 200 – 300 | International |

| | | | | | | | | |
|----|---|--|---|--------------------------------------|--------------------|---|-----------|---------------|
| 28 | Proceedings of the WasteSafe 2011 Conference | Zurbrügg, C. WasteSafe 2001 | Determinants of Sustainability in Solid Waste Management - The Case of Gianyar Waste Recovery Project, Indonesia | February 13-15 th , 2011 | Khulna, Bangladesh | Researcher, practitioners, donor agencies | 200 – 300 | International |
| 29 | Proceedings of the WasteSafe 2011 Conference | Bárbara De Mena Pardo, Dr. Gerhard Schories, Laney Williams, WasteSafe 2001 | Situation Review: An analysis of SWM procedures in Southeast Asian emerging and developing nations, ISBN: 978-984-33-2705-5 | February 13-15 th , 2011 | Khulna, Bangladesh | Researcher, practitioners, donor agencies | 200 – 300 | International |
| 30 | Proceedings of the WasteSafe 2011 Conference | Bárbara De Mena Pardo, Dr. Gerhard Schories, Prof. Muhammed Alamgir, Kristina Krasteva | Sustainable Solid Waste Management and knowledge exchange in Asian developing countries, ISBN: 978-984-33-2705-5 | February 13-15 th , 2011 | Khulna, Bangladesh | Researcher, practitioners, donor agencies | 200 – 300 | International |
| 31 | Conference | | CSD Intersessional Conference on Building Partnerships for Moving Towards Zero Waste | February 16-18 th , 2011 | Tokyo, Japan | Scientific Community | | |
| 32 | Briefing | Gfrerer, M. | Cooperation possibilities | February 21 st 2011 | Jakarta | Staff of ISWA | 3 | Indonesia |
| 33 | 8th Expert Meeting of Society of Solid Waste Management Experts in Asia and Pacific Islands (SWAPI) | Dr Tariq Bin Yousuf | Waste recycling in Dhaka city : role of waste pickers in informal economy | February 21- 23 rd , 2011 | Tokyo, Japan | Waste Management experts | 30 | Bangladesh |
| 34 | Conference | | The 8th Expert Meeting on Solid Waste Management in Asia and Pacific Islands | February 21- 23 rd , 2011 | Tokyo, Japan | Scientific Community | | |

| | | | | | | | | |
|----|--|----------------|--|-------------------------------|-------------------------------|---|-----------------|--|
| 35 | Workshop | VLU University | Decision support tool for municipal solid waste treatment technology in Ho Chi Minh City | March 4 th , 2011 | Ho Chi Minh, Vietnam | Environmental managers, authorities and scientists | 40 | Vietnam |
| 36 | Workshop | Gfrerer, M.; | University of Indonesia ISSOWAMA Workshop | March 23 rd , 2011 | Jakarta | Public servants, academics, students | 67 | Indonesia |
| 37 | Briefing | Gfrerer, M. | Cooperation possibilities | April 14 th , 2011 | Jakarta | Waste Experts from | 5 | Indonesia |
| 38 | Workshop, ISSOWAMA brochure, Presentation on the ISSOWAMA Environmental Assessment Tools | JGSEE | 2 nd Thematic Panel Discussion: Methodologies for Environmental Impact Assessment of Solid Waste Management in Asia | April 22 nd , 2011 | Asia Hotel, Bangkok, Thailand | Local Governments, NGOs, Academe | 20 | Philippines, Thailand, Netherlands |
| 39 | Panel | JGSEE | Methodologies for Environmental Impact Assessment of Solid Waste Management in Asia | April 28 th , 2011 | Bangkok, Thailand | Stakeholders in the waste management sector including academics | 30 participants | Thailand, Netherland and The Philippines |
| 40 | Conference | AIT | International Conference on Solid Waste 2011: Moving Towards Sustainable Resource Management | May 3-5 th , 2011 | Hong Kong | Scientific Community | | |
| 41 | Article | AIT | National Level Sound Material-cycle Society (SMS): Recognizing Role of Private Recycling Business Sector in Thailand | April 2011 | Thailand | Scientific Community | n.a. | Thailand |

| | | | | | | | | |
|----|---|---|--|-------------------------------|--|---|----------|--|
| 42 | ISSOWAMA Brochures | Hong Kong Baptist University and Sino Forest Applied Research for Pearl River Delta Environment | International Conference of Solid Waste 2011; Moving Towards Sustainable Resource Management | May 3-5 th , 2011 | Hong Kong Convention and Exhibition Centre | Academe, Media, Civil Society, Industry, Government, NGOs | 400 | Hong Kong, Philippines, China, Bangladesh, Thailand, Japan, USA, Germany, etc. |
| 43 | Press Releases | Prof. Rosario Jimenez/Dr. Mario Delos Reyes/Kristine Aspiras | Integrated Sustainable Solid Waste Management for Asia | June 2-3 rd , 2011 | Quezon City | Print Media – Philippine Daily Inquirer, The Philippine Star, Manila Standard Today | Millions | Philippines |
| 44 | ISSOWAMA Thematic panel discussion in India | C. Zurbrügg | Asian Guidelines for assessment methods of different solid waste streams | June 8 th , 2011 | Delhi, India | Scientific community, policy makers, industry | | India |
| 45 | ISSOWAMA press kit and press release | ttz | Asian and European Experts Join Hands to Address Solid Waste Burden in Asia | May 20 th 2011 | Bremerhaven, Germany | General public | 500+ | Germany |

| | | | | | | | | |
|----|---|---------------------------|--|---------------------------------|---|--|-------|---|
| 46 | Workshop, ISSOWAMA brochure, CDs of the 1 st Thematic Panel Workshop and the 8 th Regional ISSOWAMA Workshop, Presentations of the ISSOWAMA Asian Guidelines for Assessment Methods of Different Solid Waste Streams, Presentations on ISSOWAMA Network Enlargement Activities and Solidification | TERI | 3 rd Thematic Panel Discussion: Integrated Sustainable Solid Waste Management in Asia | June 8-9 th , 2011 | India Habitat Centre, New Delhi | Academe, NGOs, Media | 40 | Philippines, India, Switzerland, Germany, Spain, Thailand, Vietnam, Cambodia, Bangladesh, Indonesia |
| 47 | ISSOWAMA brochures | Partnership for Clean Air | Clean Air 10+2 Annual Forum | June 10-11 th , 2011 | Quezon City, Philippines | Industry, Civil Society, Policy makers, Media, Local Government Units, Academe, Technology Providers | 100 + | Philippines |
| 48 | Presentation | Adisasmito, W. | 7 th Framework Programme at UI | June 15 th , 2011 | Jakarta | Public servants | 20 | Indonesia |
| 49 | Conference | | The Fifth Asia-Pacific Urban Forum | June 22-24 th , 2011 | United Nations Conference Center, Bangkok, Thailand | Scientific Community | | |

| | | | | | | | | |
|----|---|--|---|-----------------------------------|---------------------------|---|-----------|-------------|
| 50 | Conference | Centre for Natural Resource and Environmental Studies, VNACONEX and Life Science Online Publishing | Waste Combustion Technology to Energy Recovery and Possibility to Apply in Vietnam | June 30 th , 2011 | Ha Noi, Vietnam | Environmental managers, authorities and scientists | 150 | Vietnam |
| 51 | Workshop | Vietnam Environmental Protection Agency | Status of Solid Waste Management in Vietnam | July 7 th , 2011 | Ho Chi Minh City, Vietnam | Environmental managers, authorities and scientists | 60 | Vietnam |
| 52 | Forum | Ministry of Education and Training | International Forum on Green-Tech and Management | July 28-29 th , 2011 | Da Nang, Vietnam | Environmental managers, authorities and scientists | 60 | Vietnam |
| 53 | Proceedings of the International Forum on Green-Tech and Management | Nguyen Trung Viet | Municipal Solid Management System in Ho Chi Minh City: Waste generation, Characteristics and Treatment Technologies | July 28-29 th , 2011 | Da Nang, Vietnam | Environmental managers, authorities and scientists | 60 | Vietnam |
| 54 | Dissemination | Prof. Rosario Jimenez/Dr. Mario Delos Reyes/Kristine Aspiras | Simplified Guidelines for ISSOWAMA | July 2011 | Quezon City | Local government units, NGAs, NGOs, Private Sectors | Thousands | Philippines |
| 55 | International Workshop on Climate Change | Dr Tariq Bin Yousuf | Case study on Improvement of Solid Waste Management through a low carbon society | August 25-27 th , 2010 | Phuket, Thailand | Local government | 40 | Bangladesh |

| | | | | | | | | |
|----|---|---|--|-------------------------------------|------------------------------------|--|------------------|--|
| 56 | Sandec News Nr. 12 | Y. Vögeli | New ISSOWAMA assessment tool for case studies | August 2011 | Eawag, Switzerland | Scientific community, policy makers | 3500 copies | International |
| 57 | Conference | JGSEE and WASTE | International Conference on Sustainable Energy and Environment (SEE 2011) | November 23-25 th , 2011 | Bangkok, Thailand | Academics | 300 participants | Several countries from Asia, Europe, Middle-east, Africa and America |
| 58 | Proceedings of International Conference on Sustainable Energy and Environment (SEE 2011) | Shabbir H Gheewala, Sébastien Bonnet, S.N.M Menikpura, Lilliana Abarca and Bharati Chaturvedi | Sustainability Assessment of Solid Waste Management in Asia: Case Study of Nonthaburi in Thailand | November 23-25 th , 2011 | Bangkok, Thailand | Academics | 300 participants | Several countries from Asia, Europe, Middle-east, Africa and America |
| 59 | Invited members of the Solid Waste Contractors Association and employees of IPM to attend the 1 st Thematic Panel Discussion | SWAPP | SWAPPCON 2010: Promoting Sustainable Solid Waste Management Practices in Asia | November 23-26 th , 2011 | Bayview Hotel, Manila, Philippines | Industry, Civil Society, Policy makers, Media, Local Government Units, Academe, Technology Providers | 180 participants | Philippines, India, Japan, USA, Thailand |
| 60 | Conference, ISSOWAMA brochures, poster, presentation on ISSOWAMA case studies | SWAPP | SWAPPCON 2010: Promoting Sustainable Solid Waste Management Practices in Asia | November 23-26 th , 2011 | Bayview Hotel, Manila, Philippines | Industry, Civil Society, Policymakers Media, Local Government Units, Academe, Technology Providers | 180 participants | Philippines, India, Japan, USA, Thailand |

| | | | | | | | | |
|----|---|---|--|--------------------------------|------------------------------------|--|------------------|--|
| 61 | Thematic Panel Discussion SWM Conference Distribution of ISSOWAMA brochures and posters Presentation of selected ISSOWAMA case studies | SWAPP UP PLANADES ZKKF IPM | SWAPPCON 2010: Promoting Sustainable Solid Waste Management Practices in Asia | Nov 23-26 th , 2011 | Bayview Hotel, Manila, Philippines | Industry Civil Society Policy-makers Media LGUs Academe Technology Providers | 180 participants | Philippines India Japan USA Thailand |
| 62 | Solid Waste Management Research, The Journal of International Solid Waste and Public Cleansing Association, ISWA | Seng Bunrith, et al, | Municipal Solid Waste Management in Phnom Penh, Capital City of Phnom Penh, Vol 29, Issue 5, 2011, PubMed | 2011 | US national library | Industry, Civil Society, Policy makers, Media, Local Government Units, Academe, Technology Providers | n.a. | Cambodia, USA and other countries |
| 63 | Article for submission to Waste Management and Research | Mario R. Delos Reyes, Rosario Jimenez, Kristine Aspiras | From Tragedy to Opportunity: Analysis of the Case Study Assessment on the Controlled Disposal Facility at Payatas, Quezon City, Philippines, International Solid Waste Association | 2011-2012 | Luxembourg | Industry, Civil Society, Policy makers, Media, Local Government Units, Academe, Technology Providers | n.a. | International |

| | | | | | | | | |
|----|---|--|---|--------------|--------------------------|--|----------------|---------------------------------|
| 64 | Article submitted to Waste Management and Research, publication pending. Submission ID: WMR-11-0291 | Schories, Gerhard Millora, Judea Ciudad, Diosell De Mena, Barbara | Application of Integrated Solid Waste Management in the Tourist Resort of Boracay Island, Philippines, Scholar One manuscripts | 2011-2012 | Luxembourg | Industry, Civil Society, Policy makers, Media, Local Government Units, Academe, Technology Providers | n.a. | International |
| 65 | Article | WII | Evaluation of various Environmental Technology Assessment tools for waste management to evolve a comprehensive assessment tool suitable for Asian countries | | | | | |
| 66 | Website (linking ISSOWAMA website to SWAPP website) | SWAPP | SWAPP website www.swapp.org.ph | Continuously | Makati City, Philippines | Industry, Civil Society, Policy makers, Media, Local Government Units, Academe, Technology Providers | More than 1000 | Philippines and other countries |

Section B (Confidential or public: confidential information to be marked clearly)

NOT APPLICABLE

1. REPORT ON SOCIETAL IMPLICATIONS

A General Information *(completed automatically when Grant Agreement number is entered)*

| | |
|---------------------------------------|--|
| Grant Agreement Number: | 211873 (ISSOWAMA) CSA-CA |
| Title of Project: | ISSOWAMA |
| Name and Title of Coordinator: | Dr.-Ing. Gerhard Schories - Technical Director TTZ Bremerhaven (Water, Energy and Landscape Management) |

| B Ethics | |
|--|----|
| 1. Did your project undergo an Ethics Review (and/or Screening)? <ul style="list-style-type: none"> If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 'Work Progress and Achievements' | NO |
| 2. Please indicate whether your project involved any of the following issues (tick box): | |
| RESEARCH ON HUMANS | |
| • Did the project involve children? | NO |
| • Did the project involve patients? | NO |
| • Did the project involve persons not able to give consent? | NO |
| • Did the project involve adult healthy volunteers? | NO |
| • Did the project involve Human genetic material? | NO |
| • Did the project involve Human biological samples? | NO |
| • Did the project involve Human data collection? | NO |
| RESEARCH ON HUMAN EMBRYO/FOETUS | |
| • Did the project involve Human Embryos? | NO |
| • Did the project involve Human Foetal Tissue / Cells? | NO |
| • Did the project involve Human Embryonic Stem Cells (hESCs)? | NO |
| • Did the project on human Embryonic Stem Cells involve cells in culture? | NO |
| • Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos? | NO |
| PRIVACY | |
| • Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)? | NO |
| • Did the project involve tracking the location or observation of people? | NO |
| RESEARCH ON ANIMALS | |
| • Did the project involve research on animals? | NO |
| • Were those animals transgenic small laboratory animals? | NO |
| • Were those animals transgenic farm animals? | NO |
| • Were those animals cloned farm animals? | NO |
| • Were those animals non-human primates? | NO |

| RESEARCH INVOLVING DEVELOPING COUNTRIES | | |
|--|-----------------|---------------|
| • Did the project involve the use of local resources (genetic, animal, plant etc)? | | NO |
| • Was the project of benefit to local community (capacity building, access to healthcare, education etc)? | | NO |
| DUAL USE | | |
| • Research having direct military use | | NO |
| • Research having the potential for terrorist abuse | | NO |
| C Workforce Statistics | | |
| 3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis) | | |
| Type of Position | Number of Women | Number of Men |
| Scientific Coordinator | 9 | 12 |
| Work package leaders | 5 | 6 |
| Experienced researchers (i.e. PhD holders) | 8 | 13 |
| PhD Students | 4 | |
| Other | 9 | 8 |
| 4. How many additional researchers (in companies and universities) were recruited specifically for this project? | | 3 |
| Of which, indicate the number of men: | | 2 |

| D Gender Aspects | | |
|---|-------------------------------------|--|
| 5. Did you carry out specific Gender Equality Actions under the project? | <input type="radio"/> | Yes |
| | <input checked="" type="checkbox"/> | No |
| 6. Which of the following actions did you carry out and how effective were they? | | |
| | Not at all effective | Very effective |
| <input type="checkbox"/> Design and implement an equal opportunity policy | ○ ○ ○ ○ ○ | |
| <input type="checkbox"/> Set targets to achieve a gender balance in the workforce | ○ ○ ○ ○ ○ | |
| <input type="checkbox"/> Organise conferences and workshops on gender | ○ ○ ○ ○ ○ | |
| <input type="checkbox"/> Actions to improve work-life balance | ○ ○ ○ ○ ○ | |
| <input type="radio"/> Other: <input style="width: 100%;" type="text"/> | | |
| 7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed? | | |
| <input type="radio"/> Yes- please specify <input style="width: 100%;" type="text"/> | | |
| <input checked="" type="checkbox"/> No | | |
| E Synergies with Science Education | | |
| 8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)? | | |
| <input type="radio"/> Yes- please specify <input style="width: 100%;" type="text"/> | | |
| <input checked="" type="checkbox"/> No | | |
| 9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)? | | |
| <input type="radio"/> Yes- please specify <input style="width: 100%;" type="text"/> | | |
| <input checked="" type="checkbox"/> No | | |
| F Interdisciplinarity | | |
| 10. Which disciplines (see list below) are involved in your project? | | |
| <input checked="" type="checkbox"/> Main discipline ⁵ : Waste Management | | |
| <input checked="" type="checkbox"/> Associated discipline ⁵ : Engineering, Policy Sciences | <input type="radio"/> | Associated discipline ⁵ : <input style="width: 100%;" type="text"/> |
| G Engaging with Civil society and policy makers | | |

⁵ Insert number from list below (Frascati Manual).

| | | | |
|--|--------------------------------|-------------------------------------|-----|
| 11a Did your project engage with societal actors beyond the research community? <i>(if 'No', go to Question 14)</i> | | <input checked="" type="checkbox"/> | Yes |
| | | <input type="checkbox"/> | No |
| 11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)? | | | |
| <input type="radio"/> No <input checked="" type="checkbox"/> Yes- in determining what research should be performed <input type="radio"/> Yes - in implementing the research <input checked="" type="checkbox"/> Yes, in communicating /disseminating / using the results of the project | | | |
| 11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)? | | <input type="radio"/> | Yes |
| | | <input checked="" type="checkbox"/> | No |
| 12. Did you engage with government / public bodies or policy makers (including international organisations) | | | |
| <input type="radio"/> No <input type="radio"/> Yes- in framing the research agenda <input type="radio"/> Yes - in implementing the research agenda <input checked="" type="checkbox"/> Yes, in communicating /disseminating / using the results of the project | | | |
| 13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers? | | | |
| <input checked="" type="checkbox"/> Yes – as a primary objective (please indicate areas below- multiple answers possible) <input type="radio"/> Yes – as a secondary objective (please indicate areas below - multiple answer possible) <input type="radio"/> No | | | |
| 13b If Yes, in which fields? | | | |
| Agriculture | Energy | Human rights | |
| Audiovisual and Media | Enlargement | Information Society | |
| Budget | Enterprise | Institutional affairs | |
| Competition | Environment | Internal Market | |
| Consumers | External Relations | Justice, freedom and security | |
| Culture | External Trade | Public Health | |
| Customs | Fisheries and Maritime Affairs | Regional Policy | |
| Development Economic and Monetary Affairs | Food Safety | Research and Innovation | |
| Education, Training, Youth | Foreign and Security Policy | Space | |
| Employment and Social Affairs | Fraud | Taxation | |
| | Humanitarian aid | Transport | |
| 13c If Yes, at which level? | | | |
| <input checked="" type="checkbox"/> Local / regional levels <input checked="" type="checkbox"/> National level <input type="radio"/> European level <input type="radio"/> International level | | | |
| H Use and dissemination | | | |

| | | |
|--|---|--|
| 14. How many Articles were published / accepted for publication in peer-reviewed journals? | 17 submitted, 6 approved, 11 approval pending | |
| To how many of these is open access⁶ provided? | Not concreted for all cases; to the closing date of this report, it is known that 4 articles have open access, while 2 do not have open access | |
| How many of these are published in open access journals? | Up to now, it is known that 2 articles are published in open access journals | |
| How many of these are published in open repositories? | | |
| To how many of these is open access not provided? | Up to now, it is known that 2 articles do not have open access | |
| Please check all applicable reasons for not providing open access: | | |
| <input type="checkbox"/> publisher's licensing agreement would not permit publishing in a repository <input type="checkbox"/> no suitable repository available <input type="checkbox"/> no suitable open access journal available <input type="checkbox"/> no funds available to publish in an open access journal <input type="checkbox"/> lack of time and resources <input type="checkbox"/> lack of information on open access <input type="checkbox"/> other ⁷ : | | |
| 15. How many new patent applications ('priority filings') have been made? <i>("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</i> | 0 | |
| 16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box) | Trademark | |
| | Registered design | |
| | Other | |
| 17. How many spin-off companies were created / are planned as a direct result of the project? | 0 | |
| Indicate the approximate number of additional jobs in these companies: | | |
| 18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project: | | |
| <input type="checkbox"/> Increase in employment, or <input type="checkbox"/> Safeguard employment, or <input type="checkbox"/> Decrease in employment, <input checked="" type="checkbox"/> Difficult to estimate / not possible to quantify | <input type="checkbox"/> In small & medium-sized enterprises <input type="checkbox"/> In large companies <input type="checkbox"/> None of the above / not relevant to the project | |

⁶ Open Access is defined as free of charge access for anyone via Internet.

⁷ For instance: classification for security project.

