Improving Interaction between NGOs, Universities, and Science Shops: Experiences and Expectations

SPANISH CASE STUDIES REPORT

by
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January 2003

Supporting Science & Technology policies

A project funded by the European Commission/DG 12 under the Fifth RTD Framework Programme

Contract No. HPV1-CT-2001-60039

Title: The Spanish Case Studies Report
Authors: Inelia Ahumeda & Alain Labatut
Series: INTERACTS Report No. 2e
Pages: 96
Date: January 2003
ISBN: 87-90855-48-5

Publisher:
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When referring to this report please state the authors + title+ publisher + date
(European Commission financed project INTERACTS HPV1-CT-2001-60039)

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Acknowledgements

This investigation would not be achieved as such without the entire collaboration and commitment of the interviewees. After being informed by the Spanish INTERACTS co-ordinator on the Science Shop concept, the interviewees were able to start their own evaluation process regarding their case selected for the study. We believe that the case description made upon their testimony will match with their expectation. It has been a fruitful exchange of knowledge between the INTERACTS project and the organisations approached and we foresee this collaboration to continue in the next future. For all of this, we would thank the organisations and the people involved in the interviews.

Preface

Michael Strähle and Søsser Rasmussen

The objective of the INTERACTS project is: to draw out policy implications for future co-operation in Science, Technology and Innovation, in particular the co-operation of small and medium NGOs with universities through intermediaries such as Science Shops.

INTERACTS is a pioneer cross-national study by organisations and institutions from seven different countries – Austria, Denmark, Germany, the Netherlands, Romania, Spain, and the United Kingdom - collaborating across disciplines to identify necessary changes in structures and routines in the RTD system for improving future interaction between NGOs, researchers, and intermediaries like Science Shops. By bringing together the results from different countries, a broader picture emerges concerning past experience of the impact of Science Shops, future expectations and policy relevance. In this way, INTERACTS contributes to strengthening the interaction between research institutions and society, and gives more in-depth understanding of the processes and effects of knowledge production.

INTERACTS is an Accompanying Measure to ISSNET (Improving Science Shop Networking),
and financed by the European Commission, DG 12.

INTERACTS comprises five activities, which are interlinked. These National Case Studies Reports constitute the second activity in the INTERACTS project:
1. The State-of-the-Art Report provides an overview of the political and institutional conditions for co-operation between small to medium non-governmental organisations (NGOs), Science Shops, and universities in Austria, Denmark, Germany, Romania, Spain and the United Kingdom.
2. The **National Case Studies Reports** examine the practical experience and impact of interaction between NGOs, scientists, and Science Shops.
3. Participatory workshops in each of the partner countries form the next step, allowing discussion of future expectations and perspectives for co-operation with NGO representatives, researchers and policy makers. By giving voice to a broader range of stakeholders, INTERACTS contributes to the democratisation of science and technology policy.

4. The final report will identify potentials and barriers within the research and development system for improving conditions for future co-operation.
5. In a final step, the INTERACTS findings will be disseminated through national and international workshops and conferences.

Further information: http://members.chello.at/wilawien/interacts/main.html

Section 1: Introduction to INTERACTS Case Studies and Methods

Irene and David Hall

Experiences and Expectations of NGO / Science Shop Interaction

The European Commission has shown itself keen to build up the scientific work of research and technology development, but concerned that many studies of public attitudes show there is little interest in science, but a considerable amount of public distrust in science.

One of the functions envisaged by Europe in promoting a dialogue between science and society is to address this distrust through an 'early warning' system to alert the scientific community to citizens' concerns that are not being met by science as currently practised; the converse of this is to improve the public image of science, damaged by concerns over BSE, GM food etc., by greater communication to and respect for the public. As in the United States, there is also a concern in some circles, to democratise science by not leaving all the policy decisions to 'experts' but also to involve citizens and civil society (European Commission, 2002).

Regarding this dialogue, it has been argued that

> *"the relationship between science and society must become more two-way, involving scientific institutions listening to and learning to understand public concerns and values, and not merely educating them … there needs to be a long-term process of mutual learning between the public and science, which will necessarily involve new institutional relationships and forms."* (Fischer, Wallentin et al, 2002: 85)

The development of "new institutional relationships and forms" implies a new form of scientific governance. In Europe this development has included the emergence of intermediary organisations to link local groups with the sources of knowledge production (usually universities). It has been argued that these science shops have a vital role to play in the interface between science and civil society, because they can mediate between the concerns of citizens regarding their local conditions and environments and scientists who have access to the scientific and technical knowledge to meet those concerns (Irwin, 1995: 156).

Science shops consciously seek to “create equitable and supportive partnerships with civil society organisations”, where they make their services available on “an affordable basis, free of financial barriers.” As the research support is provided in response to community concerns, it differs from “the traditional hegemony of science.” (Mulder et al, 2001)

In the European ‘Science and Society Action Plan’ (European Commission, 2002) this role of the science shop is recognised. In relation to engaging in a dialogue between science and the citizen, science shops are mentioned as an example of actions where

> *“science is placed at the service of local communities and non-profit making associations. Hosted by universities or independent, their common feature is that they answer questions from the public, citizens’ associations or NGOs on a wide variety of scientific issues.”* (European Commission, 2002: 15)

A sub-project of SCIPAS[1] considered the other side of the equation – the impact of science shop activity not just on the community but on university teaching, learning and research. The report argued that

> *“besides assisting citizen groups, science shops can also contribute to the development of university curricula and research.” (Hende and Joergensen, 2001: 5)*

All these developments illustrate that access to knowledge has to be spread more evenly through society, and that within the universities, curriculum change is also required to produce scientists who are aware of their social responsibility. Science shops have a key role to play in mediating the relationship between the public and science and in forwarding new awareness. As science shops now have considerable experience in this activity, and have become diverse in response to local and national conditions, it is timely to review whether they have been able to deliver these ideals, and whether their further development should be promoted through the support of European policy. The INTERACTS research is designed to address these issues, by tracing and comparing the experiences of science shops and asking whether these experiences have brought about benefit to community groups through improved scientific knowledge and whether they have helped develop university teaching and learning strategies as well.

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[1] The SCIPAS network attempted to catalogue the variety of science shop activity and to investigate their different methods of operation. Important outcomes were a conference in Leuven, Belgium in January 2001, proposals for establishing a network of science shops with a newsletter and the Living Knowledge website (www.bio.uu.nl/living-knowledge).

Case Study Approach

The method of research chosen for this project is case study research, as this approach will provide detailed data on the varied experiences of the very different science shops in the member countries. Case studies are not merely descriptive, they are based on analytic categorisation and are designed to inform policy. According to key writers in this field:

> *"The research goal in a case history is to get the fullest possible story for its own sake. In contrast, the case study is based on analytic abstractions and constructions for purposes of description, or verification and/ or generation of theory. There is no attempt at obtaining the fullest possible story for its own sake." (Strauss and Glaser, 1977: 183)*

Criticisms of case study research usually relate to the idiosyncratic nature of a case, with the argument that case studies cannot deliver the kind of generalisable data that more positivistic, quantitative approaches can produce. Lincoln and Guba (1985) prefer to replace the concept generalisability with "transferability" as the latter term more accurately expresses how cases can be transferred from specific contexts to illustrate particular differences and similarities between cases. With INTERACTS, data is also being transferred to a wider policy context, through a method which involves comparison of cases.

For social policy researchers the case study has distinct advantages.

> *"All who wish to understand voluntary action will need to balance the parochialism of the case study approach against its attention to process and dynamics. Dense, located detail, critically analysed, is as important as thinner, if numerically significant outputs. This is a message for all who study voluntary organisations, whether as policy makers, practitioners, researchers or students". (Scott et al: 2000)*

The work of INTERACTS is intended to generate policy implications and recommendations by showing the empirical reality of science shop work "on the ground". If current policy does not connect with empirical experience then policy needs to be reviewed in the light of the evidence we produce.

As researchers we have collected information with a structured outcome as an objective, through gathering data via semi-structured interviewing using a standardised interview schedule, and using a common framework for analysis. The research has been designed to make the information accessible and coherent, so that both common

and unique features can emerge, along with explanatory discussion on the wider issues of impact and implication for policy (Hall & Hall: 2002).

Donmoyer (in Gomm et al, 2000: 61) notes a key advantage of the case study method when he states that “case studies can take us to places where most of us would not have an opportunity to go”. Similarly, Stake (1986) believes the role of the evaluator is to provide narrative accounts that provide vicarious experience. This report can therefore seen be considered as providing access to a variety of community experiences, a “window on the localities” of science shops in action. The account of unique situations and individuals provides models for action, while the “rich data” collected adds nuance and subtlety to overarching theoretical perspectives.

Interview Questionnaire

The case study is the means by which grounded experience can be developed into policy discussion. Each case is a study which has been conducted by a science shop, and is based on interviews with all the key participants on two levels – those who have been directly involved (Level 1) and those who have a view on the policy implications of the activity, such as university deans or organisational managers (Level 2). In this way it is hoped to represent the overlapping spheres of university, science shop and NGO activity, similar to the model of the Triple Helix of university-industry-government relations. (Leydesdorff, 2001)

A common methodology has been devised, with interview schedules (see Appendix) derived from the issues that partners have decided are central to the understanding of science shop work. Initial suggestions from partners of suitable questions were formulated into a pilot questionnaire, and feedback from the pilots was used to develop the final questionnaires to participants at level 1 and level 2.

So, for instance, the NGO respondent, researcher(s), supervisor and science shop were asked about the main research questions and methods, findings and recommendations and about the organisation of the project – how it was initiated, channels of communication, budget and timescales. The outcomes of the research were also investigated, in terms of usage and publication, long term benefit to the organisation, and relation to the wider objectives of the organisation.
These policy issues were also explored with level 2 respondents, although with the diversity of roles involved, it was more difficult to find questions which could be asked across all 6 countries, and some of the questions asked about science and society questions rather than about the specifics of the cases.

A major purpose of the study is not just to show whether negotiated applied community research can be effective – but to examine the case for the intermediary organisation in facilitating such research. So direct questions have been asked about the role of the science shop and about the advantages and disadvantages of the three way relationship between science shop, community group and researcher.

Open ended questions have been used to enable both the development of relevance to the particular case being studied and flexibility between cases (as national contexts are so different). The interviews had to be conducted according to ethical procedures and the following instruction was given by the designers of the methodology:
“Before any interview take place, it is important to gain the **consent** of the participants for this research to be used by INTERACTS and for possible future publication. Please enquire whether they wish themselves and/or their organisation to be anonymous – and a pseudonym to be used.”

Sample

It was agreed that partners would study cases of NGO-Science Shop interaction that were:
Complete (so that activity was finished and impact could be assessed)
Recent (so that those interviewed could recall fairly accurately what happened)
With Impact (so that cases contributed to knowledge or to usage)

It was also agreed that case studies would focus on the three main actors:
NGOs (with activities regarding the environment or social welfare and health)
Researchers (students and/or supervisors)
Science Shops

It was suggested that a minimum of 6 interviews per case would be required:
3 with those directly involved in the research, one each from NGO, Researcher, Science Shop (level 1)
3 with those involved in the research at a policy level, one each from NGO, Researcher, Science Shop. These might include NGO manager or regional network coordinator, University Dean with responsibility for curriculum and/or research profile, Science Shop manager (level 2)
In the event, it was difficult to interview three level 2 participants for each case, because the science shops were all at different stages of development – with the level 1 science shop co-ordinator often being the only science shop worker. Further, not all

the science shops were university based, and policy makers in academia, who would be willing to participate, were not easy to locate.

Finally, each partner agreed to complete three case studies, one of which would be from a science shop in their country, which was different from their own. It was felt that this would supply further comparative perspective to the study and increase the validity of the research – so that the findings would be less heavily biased to personal experience and justification of action. It is recognised that this will not provide "objective" or "value-neutral" research, as all researchers are, after all, committed to the ideals of science shop activity. Researcher involvement requires awareness of 'positionality' – of the positioning of the researcher within a wider structure which relates to how they have come to understand knowledge as well as how they have come to produce it (Rhoads, 1997: 17).

But the extension of the sample to other science shops would enable the inclusion of questions and issues which the INTERACTS members might not have encountered in their own science shops and might provide further insights into negative or difficult problems which can arise.

Link to Science and Society Policy, WP3 (State of the Art Report), WP5 (Scenario Workshops) and WP6 (the Final Report)

A first task for the INTERACTS research project has been for each national partner to contribute to a 'State of the Art' report, to set out the baseline with regard to science shops and science policy (Fischer, Wallentin et al, 2002). The case studies provide an opportunity to relate practice on the ground to the wider issues of policy at the national level of each partner through the conjunction of level 1 and level 2 interviews. The state of the art exercise sensitised the researchers to the policy environment of the cases and raised issues for questioning and analysis.
It is expected, in turn, the cases will provide the agenda for the scenario workshops which will further refine the issues introduced in the state of the art report, and worked through in the cases. Finally, WP6 will bring together the national findings into a comparative analysis for dissemination to NGOs, researchers, science shops and policy makers at national and European level.

Reflection and the Research

All partners were required to complete a pilot case, which became the basis of reflection on and development of the study through email and workshops. All partners were advised to keep a research diary to record their experiences of the pilot. “Reflection in action” is the process of thinking about what you are doing, as the work progresses and is distinct from “reflection on action” which is a *post hoc* activity – “stop and think” when the action is no longer current (Schõn, 1983). Such reflection in action, Schõn argues, provides a way of opening thought up to possibilities which might otherwise be blocked off. It helps produce flexibility in finding solutions when objectives are unclear or problematic and so produces improvisation which is thoughtful rather than reactive.

For the INTERACTS partners representing different cultures and experiences, reflection in action is crucial, if not always comfortable, to finding solutions which are creative and scientifically sound, and which represent the commonality and the diversity of the cases. The interview schedule, for instance, was modified after extensive consultation and reflection by partners, and the analytic framework was similarly revised. The case study research has thus been improved on the basis of both substantive and methodological considerations.

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Section 2: The Spanish National Case Studies

1 Executive Summary

The INTERACTS project has given an opportunity to launch an investigation in Spain on the Science Shop activities. In the following document, we have been looking at describing and analysing 3 good practices or case studies in order to show the type of activities carried out in Spain under the “label” Science Shop and their impact either on civil society or for scientific knowledge production.

In particular, the reasons for the selection of these cases has been approached as well as what important issues surfaced in the research and the methods used to do the research. These examples have helped to draw conclusions and policy recommendations framed within the Spanish reality of the new European IDT Framework Programme.

Science Shops and Spain

The Science Shop concept is not widely known in Spain, which is why this report focuses on “Science Shop like” entities and activities, how these entities reacted within the experience both of their scientific activity as well as within the research process for the Case Study Report during the learning process of what a Science Shop is and what it does.

With this in mind we have taken three cases which are unique from each other and also very representative of the work being carried out in Spain today covering a broad range of research as well as demographic and scientific areas. Two cases study were centred on Seville’s local concerns while the third case has been widely applied over the entire Spanish geography.

Case Study 1: Urban Ecology Strategy Design, Seville 2025

Firstly we look at group of “green organisations” who contacted with the science Shop to do an independent study on the ecological issues that were present in Seville society, possible future scenarios where their input and action would be called for as well as to create an Agenda 21 for Seville from the date of the study (1999) to the year 2025.
This particular case used an adaptation of the EASW (European Awareness Scenario Workshops) methodology for the research, that of supervised open brain storming workshops to create a debate within the organisation as well as other people who were also involved in, or interested in, green issues

Case Study 2: Architectural Study for Romany Community, “Los Perdigones”

This second project began and was carried out in the year 2000 when an NGO were informed that a Romany (Gypsy) shanty neighbourhood was being moved out from public / private land in order to make room for building contractors.
The methodology used in this particular case was also very innovative and inexpensive, a contest was designed to provide alternative solutions for housing adapted to Romany social requirements and, finding this solution, the expulsion of the community from the land could be prevented.

Case Study 3: Health and Environmental hazards at cement kilns waste incineration

Lastly, this case covers the issue of burning cattle meal at kilns. The Science Shop was asked for a research project both to find out the risks involved in this type of activity as well as ways in which this risk could be minimised.
The methodology was one of data gathering and analysis through investigating all research and scientific results from studies made into incineration, particularly that carried out in kilns and of incinerating animal meal.

Conclusions

Due to specific needs of each of the research projects outlined above, the civil society organisations involved were looking for a scientific assessment in order to go forward with their projects. In all these cases the Science Shop intervention has resulted crucial to allow further commitment of the actors involved in these particular processes. It has introduced coherency in the proposal of alternative solutions by including a scientific assessment on the cases

Beyond the specificity of the case studies selected, these are representative of Science Shops proceeding in Spain and unfortunately present the same type of limitation due to the anonymity regarding their actions. Financial constraint and non recognition of the practises for the student vitae are common aspects of the case studies, the Seville cases in particular.

Another common aspect of the Science Shops approached for this research, is in the will to cluster this type of action under the same banner, that of Science Shop, and achieve a higher recognition in the Scientific panorama.

Policy Evaluation and Recommendations

When comparing the sector areas and scientific technological areas tackled in the cases studied in this report with those targeted by the Spanish IDT policy principles and the Scientific technological areas in the National Plan 2000 – 2003, we find that social sustainability approach is missing in the scientific technological areas prioritised by the National Plan.

In the three cases selected for this study, the Science Shops involved have brought the scientific means needed to investigate concerns of the civil society, either at the local level as it was for the Seville's cases or at the national level as for the third case study presented. In all our cases, the investigation produced aimed to reinforce the civil society cohesion and its participation while this aspect is under represented in the objectives outlined in the IDT Spanish policy.

The Special Action subsection of the National Plan contemplates the disclosure of result and scientific and technological divulging, which is the signature of Science Shop activities. Consequently the Science Shop model could link with the National Plan and fit at this level. Since it is the ending period for this edition of the National Plan, it appears the right time to persuade on the usefulness of this model for the emancipation of science and society.

2 Introduction

The Science Shop concept is not widely known in Spain, which is why this report focuses on “Science Shop like” entities and activities, how these entities reacted within the experience both of their scientific activity as well as within the research process for this Case Study Report during the learning process of what a Science Shop is and does.

We feel we are in a unique position within the stage of the Science Shop development, as we can build this concept taking into account the experiences of countries where the concept is known and used.

With this in mind we have taken three cases which are unique from each other and also very representative of the work being carried out in Spain today within different areas of research as well as demographic and scientific areas.

2.1 Description of science shops in the three cases

Diversity in topic and technological fields, in applied procedure, in actors and in Science Shops has been our criteria to select the case studies as well as the Science Shops for the Spanish report. The fields concerned are the social science, architecture and industrial risk analysis.

2.1.1 Science Shop 1: Pax Mediterranea s.l.

PaxMed was founded in 1995 and has its offices in Seville, Spain. It works in research within the social arena of ecology, economical development and social cohesion strategy with environmentally and socially sustainable perspectives. It is actively involved in various European and local research and monitoring projects and observatories.
It has four full time employees and five collaborating professionals and various companies that are called upon to work on various projects according to their area of expertise.

2.1.2 Science Shop 2: ACS

A.C.S was founded in 1994, it is a University Association that is affiliated to the two mayor Architectural Schools in Seville[2]. The association is formed by students, professors, architects, technical architects and people from other professions that are joined by common concerns and objectives. Their main concerns are social instruction in the universities, the construction of a sustainable habitat in inner cities, equality on a global scale and the instruction of citizens who are aware rather than simple architects.

2.1.3 Science Shop 3: ISTAS

ISTAS[3] is a self-funded technical foundation promoted by the Spanish Trade Unions Confederation (CC.OO.) to support social activities for the improvement of working conditions and environmental protection in Spain. It has been founded to back trade unions' action in the field of occupational health and environmental protection.
Being a Trade Union foundation, the orientation, programming and management of ISTAS are under supervision of a Directorate. The majority of its members are trade unionists appointed by the Central Trade Unions Executive Commission. It has been created to serve all workers and maintains cooperation with similar organizations at European and international levels. Yet it is autonomous in character and economically self sufficient.
Part of ISTAS' work for CCOO is to observe environmental, scientific and social science issues which can have a detrimental effect on worker's lives. In this sense they act as an independent observatory for CCOO.

2.1.4 Choice of case studies, typicality and differences

Two cases study were centred on Seville's local concerns while the third case has been widely applied over Spanish geography. The later case raised interest by the configuration of actors and addressees within the frame of a Union's policy.

Due to specific needs, such as an ecological plan, electoral program and Agenda 21 for the first case, a process of expulsion of an entire community for the second and health risks for workers and neighbourhoods for the third, the civil society organisations involved were looking for a scientific assessment in order to go forward with their projects.

[2] "Arquitectura Superior" and "Arquitectura Técnica de Sevilla"
[3] Source: http://www.istas.net

The cases in Seville were unique events which formed part of larger projects. An electoral program and Agenda 21 in the first case and the ongoing defence of a local Romany community under an expulsion process in the second case. The third case presents a slightly different approach as it was part also directed to workers affiliated to the CCOO Union risk awareness policy. The necessity of the third case project arose as part of their ongoing work in dealing with risk analysis and sustainable industrial processes and was not a one off research case, although it did come about as a direct consequence of the unique circumstances of a large amount of animal meal being incinerated overnight due to the mad cow decease scare.

In all these cases the Science Shop intervention has resulted crucial to allow further commitment of the actors involved in these particular processes. It has introduced coherency in the proposal of alternative solutions by including a scientific assessment on the cases.

Each case is also representative of the scientific activities conducted by the Science Shop. It represents their scientific expertise without reducing the range of activities provided by the Science Shops.

2.1.5 Case Study 1: Urban Ecology Strategy Design, Seville 2025

A group of “green” organisations wanted to do an independent study on the ecological issues that were present in Seville society, possible future scenarios where their input and action would be called for, as well as to create an Agenda 21 for Seville from the date of the study (1999) to the year 2025.
The group contacted with the science Shop Pax Mediterranea, through Teresa Rojo, member of Ateneo Verde which also formed part of the group.

> This particular case used an adaptation of the EASW (European Awareness Scenario Workshops) methodology for the research, that of supervised open brain storming workshops to create a debate within the organisation as well as other people who were also involved in, or interested in, green issues. A methodology which is very innovative.

2.1.6 Case Study 2: Architectural Study for Romany Community, "Los Perdigones"

The project began and was carried out in the year 2000 when the NGO Asociación Pro Derechos Humanos de Andalucía (Human Rights of Andalusia), were informed that a Romany (Gypsy) shanty[4] neighbourhood was being moved out from public / private land in order to make room for building contractors.

The NGO contacted with the Science Shop Arquitectura y Compromiso Social (Architecture and Social Commitment).
The methodology used in this particular case was also very innovative and inexpensive, a contest was designed to provide alternative solutions for housing adapted to Romany social requirements and, finding this solution, the expulsion of the community from the land could be prevented. The design had to conform to the size of the land they had occupied while keeping within the legislation which regulated the land at the time, as well as following the very strict Administrative housing planning ruling Romany housing.

2.1.7 Case Study 3: Health and Environmental hazards at cement kilns waste incineration

In early 2001 the issue of burning cattle meal at kilns became a risk concern both for workers and for the environment. ISTAS made a recommendation to CCOO to study this issue with view to minimising worker environmental risk. CCOO accepted the proposal and ISTAS began the research project both to find out the risks involved in this type of activity as well as ways in which this risk could be minimised.

The methodology was one of data gathering and analysis through investigating all research and scientific results from studies made into incineration, particularly that carried out in kilns and of incinerating animal meal. The search was carried out with direct contact with scientists in the area of environmental risk as well as through internet and ISTAS' own contacts around the world.

[4] As in a neighbourhood with shacks constructed from various materials and no amenities.

2.2 Link to national issues in WP3

Beyond the specificity of the case studies selected, these are representative of Science Shops proceeding in Spain and unfortunately present the same type of limitation due to the anonymity regarding their actions. Financial constraint and non recognition of the practises for the student vitae are common aspects of the Seville's case studies in particular.

Another common aspect of the Science Shops approached for this research, is in the will to cluster this type of action under the same banner, that of Science Shop, and achieve a higher recognition in the Scientific panorama.

2.3 Methodology

2.3.1 Application of questionnaire

Case Study	Organisation	Name	Level
CASE STUDY 1 "Urban Ecology Strategy Design, Seville 2025"	Science Shop	Alain Labatut	1
	NGO	Ricardo Marques	1
		Manuel López Peña	2
	Scientist / University	Teresa Rojo	1
		Juan Maestre	2
CASE STUDY 2 "Architectural Study for Romany Community"	Science Shop	Ventura Galera	1
	NGO	Ignacio Mechon	1
		Antonio Pardo Silva	2
	Scientist	Jesús Rojo Carrero.	1
CASE STUDY 3 "Health and Environmental hazards at cement kilns waste incineration"	Science Shop	Estefanía Blount	1
		Miguel Crespo	1
	NGO	Carlos Martinez	2
		Juan Romero Agud	2
	Scientist	Fernando Pomares García	1

The original questionnaire template designed by Irene and David Hall was translated into Spanish and changed in accordance to our particular requirements, specially the last section on Science Shops. Furthermore, the questionnaire has been fully approved for the level 1 interviews while only part of it have been used for the level 2 interviews. However, the questionnaire was used as a guideline during interviews as a proactive approach was preferred while keeping to the main topics covered. A copy of both the Spanish and English questionnaires are available.

All the cases were written originally in English, some of the interviews were translated into English directly from the recordings.

2.3.2 Selection of interviewees

We were looking at the following profile for the level 1 interviewees:
Entity responsible (Science Shop & promoter (NGO))
Case study responsible (Science Shop & promoter (NGO))
Scientist responsible for case study

The interviewees could have at the same time some of these responsibilities. In the third case study, the promoter is a national union and not an NGO.

For the search of the level 2 interviewees, it has been considered the following:

Participant involved in the case study
Scientist or academic authority
Administration responsible

For the selection of interviewees, we were first asking about the key actors involved in the case study and through them, we were able start contacting with the potential interviewees

2.3.3 Preparation of the Interviews

The initial contact was done either via email or telephone. During this initial contact, the interviewees were informed of the goals of the project INTERACTS, of Pax Mediterranea and of the Science Shop concept.

Once the interview was arranged, a copy of the questionnaire was made available to the interviewee and the interview itself was conducted either by telephone or face to face at their offices or other locations. Most of the interviews were recorded, with prior

agreement by the interviewee. Only in two cases was the interview carried out via email, in the form of a specially adapted questionnaire. In one case the interview was not recorded due to the recorder not being available at the time.

All the interviews were carried out by Pax Mediterranea staff (Inelia Ahumada and Almudena Aparicio).

2.3.4 The interview procedure

The following were the steps of the interviews:
The interviews were informal within the questionnaire format agreed with the interviewee beforehand.
The interviewer introduced him or herself.
Permission was asked for tape record the interview.
The concept of Science Shops and Pax Mediterranea's role within Interacts was summarised once again.
The importance of the interviewee's project for our research was pointed out.
The interview was carried out.

2.3.5 Recording and transcription

Apart from two interviews which were conducted via email, all interviews were recorded and transcribed. The first two cases interviews, which were carried out by Almudena Aparicio, were first transcribed into Spanish and then translated by the Case Study author, the third case interviews were transcribed directly into English. In one instance (CS3) the interview was carried out in English.
As well as recording the interviews, full notes were taken during and after the interviews.

2.3.6 Reflections on the interviews

There were no overriding problems with the interviews, everyone interviewed agreed to be recorded, were very enthusiastic about speaking with us and of getting their work disseminated via the INTERACTS project.
On adapting the questionnaire to the Spanish reality we simplified the language used, deleting all technical and scientific terminology, as well structuring the questionnaire according to the case study layout and adding an explanatory section for the Science Shop concept.
For administrative level interviews the questionnaire was considerably shortened.

2.3.7 Reflective report on research practice

Science shop is a complementary approach to the Excellence program launch by the EU since it represents another way to get science to become alive and useful for society at large. It creates a model to allow civil society to access science assessment where it is needed and necessary.

In certain cases, the scientific community is proactive in matching this will of scientific assessment. This occurs mostly from the initiative of a reduced group of scientists as it was for ACS[5]. In this case, the seed has germinated onto the University and Social Compromise NGO, extending their working concepts to a larger range of specialities.

Being isolated initiatives, most Science Shops have no such identity at present time in Spain. The community of Science Shop is sparse in strength, action and the visibility expected. On the other side it grants freedom of speech.

In the three cases described in the Spanish report, Science has been applied to organise and propose alternatives for civil (forum) society representative organisation concerned (green party, Romany community and workers and neighbourhoods of the cement kilns). These were in need of scientific expertise to better understand their point of interest and to know how to act on these issues.

The scientific activities have been attractive for the people involved in researching these projects and also for those who participated in them. With regard the aspect of dissemination, this in particular has been master piece within general scientific procedure.

The scientific tools used were a scenario methodology for case 1, a competition for case 2 and a prevention assessment guide on industrial risk for case 3. The applications were complying with the guideline of Science Shop about scientific quality demand. The dissemination procedures, including publications, have enhanced the audience of these applied research activities and added a scientific contribution.

The nature of the people involved on the process or aware of the process and results has enlarged the traditional receptive circle commonly found in these research activities. This type of action guarantees certain sustainability between Science and Society.

[5] Case Study 2

2.3.8 Documentary evidence available

All the interviews that were recorded are available on tape, all in Spanish apart from one interview for case 3. There are also two email interviews. Correspondence records have been kept and the published works resulting from the cases are available to the public.

The sources used in each case have been added as footnotes and are also listed at the end of each Case Study, in a reference section.

3 Case Study 1: Urban Ecology Strategy Design, Seville 2025

3.1 Fact Sheet

Request: Made by NGO to Science Shop.

Duration: 3 months

Students: None

Costs: Costs met by NGO.

Outcomes:
Short summary of the findings which was used by Los Verdes as a political program and issued in a press release days before the elections.
Agenda 21 for Seville.
A book which used the findings in a comparative study and was also released in a formal launch a few months after the event.
Further work for the Science Shop and Scientist.

Working Methodology: The methodology used for this project was an adaptation of the EASW (European Awareness Scenario Workshops) method.

Interviews:

1 Scientist
1 University Chair
1 NGO representative
1 Science Shop manager
1 Participating research member

Follow up projects

None

3.2 Summary of the Project

"Los Verdes" (Green Party) and a representative from the green organisation "Ateneo Verde" wanted to do an independent study on the "green" issues that were present in Seville society, possible future scenarios where their input and action would be called for, as well as to create an Agenda 21[6] for Seville from the date of the study (1999) to the year 2025. Los Verdes were also interested in the information gathered to develop a long term political program as well as use as the basis for future actions and strategies which would reflect public expectations.

The main topics in the research were to identify problems, opportunities, criteria to follow as well as main actions the organisations and environmentalists could take with regard present and future environmental issues in Seville.

The methodology used in the research was an adaptation of the EASW (European Awareness Scenario Workshops) method, that of supervised open brain storming workshops to create a debate within the organisation as well as other people who were also involved in, or interested in, green issues.

The workshops, which were the basis of the participative methodology, were carried out in the space of four weeks during May 1999.

3.2.1 Participants

Science Shop: Pax Mediterranea SL (PaxMed)
NGO: Ateneo Verde and Los Verdes Party
Scientist/University: Dr. Teresa Rojo, Dept. Sociology Universidad de Sevilla.
Target Study Group: Various organisations and concerned individuals

3.3 Descriptions of Organisations involved

3.3.1 Science Shop: Pax Mediterranea SL (PaxMed)

Address: Plaza del Pelícano 4 – Local 27
41003 Sevilla, Spain
Telephone: 954541091

[6] Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment. It was adopted by more than 178 Governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, 3 to 14 June 1992. *Source: http://www.un.org/esa/sustdev/agenda21.htm*

Based in Seville, Spain, PaxMed was founded in 1995. PaxMed actively works in research within the social arena of ecology, economical development and social cohesion strategy with environmentally and socially sustainable perspectives. It is actively involved in various European and local research and monitoring projects.
It has four full time employees and five collaborating professionals and various companies that are called upon to work on various projects according to their area of expertise.

PaxMed has also published several studies and books related to the Social Sciences and Environmental Issues.
Interviews for Science Shop PaxMed: Alain Labatut

3.3.2 NGO: Ateneo Verde

Address: Cl Eustaquino Barrón 2
41003 Sevilla, Spain
Telephone: 954905650

Ateneo Verde is a cultural project site which was opened in order to defend ecology, peace, solidarity and human rights. It is worked by and founded by associates and collaborators as it does not receive any type of third party financial assistance.
There are six organisations which are affiliated to and have offices in Ateneo Verde.

The main organisation within Ateneo Verde which promoted this study were Los Verdes de Andalucía[7]

Los Verdes de Andalucía
Address: Cl. Imagen 6, 4ºB
41003 Sevilla, Spain
Telephone: 954214756

Los Verdes de Andalucía is a political party established over a decade ago and is part of the global Green Party movement. They are affiliated to the Green State Confederation, The Los Verdes-Izquierda Verde and the European Federation of Green Parties.
Interviewed for NGO: Ricardo Marques, Los Verdes.

[7] Which at the time were in a political coalition with Izquierda Andaluza. The Izquierda Andaluza is a political organisation which defines itself as Andalucian, leftist, transformers, critical, ecologist, feminist, pacifist, radical, democratic, self managed, liberating and non authoritarian.

3.3.3 Scientist (University)

The scientist involved was Doctor Teresa Rojo, she did the work as an independent volunteer as the University she works in does not have this type of service. However, the university did later fund the publication of a book with the results and analysis of the findings from this project.

We also interviewed Dr. Juan Maestre, who hold a chair in the Sociology Department at the University and is responsible for the link to the publication of the end results of this study.

3.3.4 Study Group Participant

It was felt that as this was a Social Science research project using a Participatory Methodology, the input from the workshop participants would also be useful in evaluating the research done.
The people who took part in the study met the basic criteria needed for an EASW study, including concerned individuals, governmental bodies, private enterprises, technical experts and ecological, political and other concerned groups.[8]

Interviewed as Study Group Participant: Dr. Manuel López Peña, Director for the Sociedad para el Desarrollo de Vega

3.4 Project Description

3.4.1 Objective

For the NGO the objective of the project was twofold, on the one hand Los Verdes wanted to evaluate and improve their Electoral Program for local elections at the time and, on the other hand, Los Verdes as well as other participating bodies in Ateneo Verde, wanted to elaborate an Agenda 21 for Seville.
The Electoral Program for Los Verdes had to identify what environmental issues were at large in Seville as well as what the public in general wanted achieved.
For the development for the Seville Agenda 21 key ecological issues had to be identified as well as possible future scenarios and strategic action plans for the Ecological movement in Sevilla. Agenda 21 had to take into account present ecological concerns, how to address them, and forecasting to the year 2025.

[8] For a full list of participant category please look at Figure 2, page 6.

For the Science Shop PaxMed apart from this project fitting in with their environmental work, the objective was to develop and refine a methodical tool for the study of Environmental Development issues as it was involved in a European study project into this methodology at the time.

For the Scientist Teresa Rojo this project provided a unique opportunity to do a comparative study of a methodology she had previously used with an ideologically different group, plus this research would have been difficult to implement without the NGOs tools of communication, physical space, access to the participating members and economic backing.

For the university, the project met with various requirements within their policy for publication and support.

The university has scientific development as its aim, this is something all universities have. In the case of the University of Seville, in its statutes it establishes that development is a specific aim and that it is a critical university. If we unite the aims of scientific character with particular character specific to the University of Seville as far as criticism is concerned, an analysis or a valuation of the city of Seville, must have a content of criticism. If we add all these things together, they enclose to very positively admit or to value studies of this category. Not only this but other similar studies would be very well received by the university." Juan Maestre, University.

3.4.2 Working Methodology

The methodology used for this project was an adaptation of the EASW (European Awareness Scenario Workshops) method[9]. The EASW method follows the following criteria:

The study has to be ecological in nature

Normally the study will be conducted by conducting brain storming workshops with relevant individuals over the period of two consecutive days. In this case it was conducted in five evening sessions spanning four weeks.

The following, or similar, questions have to be identified for discussion:

1. water supply and use; waste water;
2. solid waste management and recycling;
3. energy supply and use;
4. daily living and housing.

[9] Ibid. 2.

The following participants have to be present:

1. residents;
2. technological experts;
3. policy makers;
4. private-sector representatives.

A trained team has to be present to organise and direct the proceedings, in this case it was directed by the Science Shop PaxMed.

Written and or multimedia material has to be available to the participants explaining the aims of the study as well as the methodology being used.

The main structure of this particular project was adapted by Dr. Teresa Rojo to the following format:

Phase	Scientist	NGO	Science Shop
Objective Design	Responsible	Responsible	Responsible
Adapting Methodology	Responsible	Support	Support
Summoning the Workshops	Support	Responsible	Support
Monitoring the Workshops	---------	----------	Responsible
Physical Space for the Workshops	---------	Responsible	----------
Coordination of the Workshops	Responsible	Support	Support
Dissemination of Results	Responsible	Responsible	Responsible

Figure 1. Working format.

At the time of the workshops there were between 25 and 35 people actively taking part every day. They represented the participant criteria very accurately.

Category	Number of participants
Politicians	7
Private Sector	7
Resident	13
Technical Expert	8
Coordinator / Monitors	5

Total	40

Figure 2. Participant Category List

The workshops were coordinated by the scientist with the help of four monitors who were organised by the Science Shop and included some of their staff. All monitors were trained before the workshops by the scientist.
The methodology as well as the aims of the study were fully explained to all the participants on the workshop launch date.
A workshop booklet was made available to all the participants.

3.4.3 Project Initiation

The Urban Ecology Strategy Design project was first conceived by a representative of the NGO, when Dr Teresa Rojo visited him for feedback. She wanted to contrast her findings with the concerns of green organisations on the results of a previous research project she had carried out with Pax Mediterranea outside the Ecological activist environment. When this representative saw the study and the methodology she had used, he immediately showed an interest in carrying out a similar research project within the green movement. A formal request was made to the Science Shop (Pax Mediterranea) and these provided the NGO a proposal, which was accepted by them.

“It corresponds to a concrete measure taken by Los Verdes. PaxMed got in touch with them and made a proposal, they thought it was a well conceived idea that was superior to the traditional development of an Electoral Plan for Congress. It was partly a concrete necessity by Los Verdes and a PaxMed proposal.” Ricardo Marques, Los Verdes.

3.4.4 Duration

The normal duration of a workshop following the EASW methodology is of one or two days, but in the Urban Ecology Strategy Design case the workshops were held in five evening sessions. This was seen as more effective than the normal two day workshops as not all the participants were available for two full day workshops.

“The methodology was applied a little differently than usual [for an EASW (Ed)]. It was adapted for the necessities of the entities involved, they had to do this in several weeks as they could not do it in one or two days as is normally done. It was finally done in the course of four weeks.” Teresa Rojo, Scientist.

The workshops were carried out in Seville, the 13th, 19th, 20th, 26th, and 27th of May 1999.
This time frame did mean an extra communications effort on the part of the Science Shop and the NGO in order to keep people attending week after week.

3.4.5 Budget and Finance

The workshops and project communication was financed by the NGO, the original budget proposed by PaxMed was of 2.500 euros including structural support by Ateneo Verde.
The Science Shop PaxMed as well as the Scientist worked on this project voluntarily.

Scientist	NGO	Science Shop	University
The Scientist worked on a voluntary basis.	Financed all communication materials, workshop material, paid for the consultants needed to monitor the workshops and provided premises for the workshops.	The Science Shop personnel worked in this project on a voluntary basis. They also financed part of the publication of the final book.	Financed part of the publication of the final book.
	900 €	600 €	840 €

Figure 3. Finance

3.4.6 Main Research Questions[10]

The main topics questioned were: “Citizen Participation and Local Administration”, “Urbanism, Transport and Environmental Resources”, “Economy, Commerce and Employment” and “Housing, Family (youth /women) and Society”. These questions were to be looked at in a view of 25 years, from the year 1999 to the year 2025.

Changes or events the groups believed, wanted or feared could happen in Seville in the next few years.
Each participant evaluates the influence his social group can have over the different issues brought up.
Each participant evaluates the influence the “Los Verdes + Izquierda Andaluza” can have over future events.

[10] Source: Workshop Booklet.

A hierarchical list made with possible future changes according to relevancy and influence from Institutions and social groups.
The participants will debate over possible solutions and actions with regard the said events or changes.
A hierarchical list is made with possible actions to tackle the most pressing environmental questions facing the city.
Choosing the best ideas on what, how and whom should tackle the environmental questions facing the city and making a hierarchical list with the best results.

3.4.7 Documentation used during the Project

The participants were given a booklet at the start of the workshops. The booklet included a letter from Los Verdes and Ateneo Verde explaining what Agenda 21 is as well as their motives for carrying out the study. The introduction was followed by a five page introduction into societal changes and ecological concerns, then it went on to explain the main focus the study would take, explained the methodology and structure of the meetings. After that it had a full schedule for the five days, a list of participants and small introduction to each of monitors and the coordinator, explaining the role they would be undertaking within the study.[11]

3.4.8 Channels of Communication

The main means of communication between the NGO Science Shop and Scientist were telephone and email. There were meetings held regularly on the planning stage of the project as well, which became more regular the closer they came to the workshop dates.
Communication to the participants: the summoning to the workshop was done by the use of posters, mailing lists (both email and letter), a workshop dossier, telephone and word of mouth. The participant feedback before the workshops was via a registration form.
The existence of a large mailing list for Ateneo Verde supporters was fundamental in gathering all the workshop participants.

3.4.9 Key Findings and Recommendations[12]

There was a general agreement by the participants of the workshops that the trend to make Seville a tourist heaven should be avoided as they felt this led to an increase in unemployment and inequality.

[11] Ibid.
[12] Results booklet.

In order to avoid such a scenario the following key recommendations were made:

Reach energy sustenance by the use of bioclimatic, solar energy and housing criteria, in this way reduce electric consumption by houses which have solar energy and better insulation against heat and humidity.
Achieve an Administration which takes an active part as well as being more accessible to the public.
End drought with a cooperative management between technicians and the public. Use the existing resources with better technologies.
Make the city self-sufficient, with the active participation and responsibility of its citizens in protecting the city's resources and its ecosystem.
Control noise and pollution; make the city a Green City with bicycles and public transport, plazas and pleasant streets.
Improve the sharing of employment and wealth, lessening inequality.

Agenda 21
The following action plans were made from the above recommendations in accordance with Agenda 21:

Making each neighbourhood its own administrative and cultural centre.
Decentralising government offices.
Creating small market places at a neighbourhood level.
Making each neighbourhood a cultural and administrative centre and giving them their own local administration and access to cultural resources and spaces.
Improving public transport in Seville and Metropolitan area.
Extending the present interurban train lines to access local towns by renovating old train lines.
Constructing a metro system
Supplying tickets which can be used in all public transport.
Connecting the interurban trains with the local transport system
Studying possible public access to the old and historical part of the city [very narrow streets and difficult to access (ed.)]
Facilitating and encouraging the use of bicycles and walkways within the city.
Cutting down on the need to travel could be done via decentralising public administration, giving people access to public services in their own neighbourhoods or tele-centres.

Mobilising measures against unemployment.
Supporting the self-employed and businesses.
Employment creation through making the city ecologically sound.

Encouraging rehabilitation projects for marginalised neighbourhoods with the use of small businesses and craftspeople, giving these training on new technologies.
Discouraging black market, regulating unregistered labour so workers can have access to pensions.
Reducing the working day in some professions in order to encourage free time and better performance at work.

Advancing toward a self-sufficient city
Introducing clean industry into the city and reusing abandoned spaces.
Rehabilitation of run down and marginalised neighbourhoods.
Building a tram system.
Ecological rehabilitation of public housing.
Tele-centres from administration, banks and communications companies for public usage at neighbourhood level.

3.4.10 Political and Social Impact

Politically speaking, for the political parties which formed part of the NGO , Los Verdes and their coalition did not achieve the long term results they were after, or as Alain Labatut from the Science Shop puts it:

“At the time the political coalition that requested the study was disbanded, as Los Verdes did not get the votes they wanted in the elections, after this failure they joined the PSOE (Spanish Socialist Workers Party).”
The lack of extra votes meant they were not in a position to carry out the program that was designed with this project.

“At the time I was a member of the council and had planned to make an electoral program that would respond to the public’s needs, the plan was that Los Verdes would create a guide that would respond to their political actions, what happened is that they did not achieve representation and they couldn’t carry the plan out.” Ricardo Marques, NGO.

Although according to the scientist the fact that there was not an increase of votes was not related to the study in and of itself:

“This project was carried out at the last minute before the elections, if anything the participating political parties wanted to portray an image of civil participation to the electorate and this didn’t change the amount of votes they received. Los Verdes used it

on a press conference which was badly attended by the media." Dr. Teresa Rojo, Scientist.

The true impact of this study has proven to be quite significant, as Dr Teresa Rojo points out:

"On a larger scale this project is having a political impact as both the local government as well as the local Council have used the book as reference material for their Strategic Plan of Action for the City for Seville."

Socially speaking the results are also being used by the participants who took an active part in making the workshops effective. There were also publications made available after the project, such as Los Verdes electoral plan, the working out of Agenda 21, and an in-depth study of the EASW methodology which included this case, made by the scientist involved, Dr Teresa Rojo, which was published as a book by the University now available to the public and is the one being used by the local authorities as part of their plan of action.

3.4.11 The Results

Short summary of the findings which was used by Los Verdes as a political program and issued in a press release days before the elections.
A book which used the findings in a comparative study and was also released in a formal launch a few months after the event.

3.4.12 Use of the Results

3.4.12.1 Use of the results by the Organisations

Science Shop
Other projects:
"Some projects that are being launched by us at present are based on the recommendations which appear in the book, for example, elevating the educational level of the public with regard ecological concerns. The way in which to do this is based in the lines of action taken from the conclusions." Alain Labatut, PaxMed.

The Science Shop became known among many NGOs in Seville as well as Public Administration both through the study and through the publication of the findings in the form of a book.

Through this project they were also able to identify the public consensus with regard ecological self sufficiency, which is one of the areas of expertise for the company.

NGO
Publication of booklet outlining Los Verdes Electoral Program and Agenda 21.
Press Conference.
Both Los Verdes and Ateneo Verde as have used the results to make proposals in other contexts.

Scientist / University
Publication of a book: Sevilla 2010 Metrópoli Ecológica. Aplicación de la metodología participativa Europea EASW; Colección Técnicas y Perspectivas Sociológicas 2:, by Teresa Rojo. Published by Universidad de Sevilla.
The Scientist was invited by other collectives to explain the methodology used: Asociación Arquitectura y Compromiso Social as well as Mujeres Sururbanas.

3.4.12.2 Use of the results by the individuals interviewed

Teresa Rojo
She wrote the book which was published by the University
Has used the experienced and conclusions gained in subsequent projects.
She is presently looking into the possibility of setting up a group of experts from the university to act in further projects with the Science Shop.

The other individuals interviewed are not presently using the results personally.
3.4.12.3 Use of the results by the public

The public has access to the study via the book, which is on general sale.

3.5 Personal Result Evaluation by participating bodies.

Each of the interviewed participants evaluated the project and its methodology as highly motivating and workable.

3.5.1 Science Shop Evaluation

With regard the Science Shop experience this project was a complete success. The Science Shop was able to coordinate the scientist and various other consultants with the NGO, kept tags on all proceeding and achieve its objective.

“With this methodology we achieved the desired results.
The NGO were very happy with the workshops, at the level of the impact they had, we have to take into account that they are people who are fighting against a brick wall and they say changes are very slow.” Alain Labatut, Science Shop PaxMed.

The Science Shop PaxMed felt that this was a very good start with regard the Science Shop experience.

“Before starting Agenda 21 in Seville, there were no companies nor public organisms launching studies with this theme, the advantage of working as a Science Shop is that we can respond to the demand from entities which could not otherwise do this type of study.” Alain Labatut, Science Shop PaxMed.

Alain Labatut also felt the fact that this type of work (Science Shop model) was now producing information about questions that are not only in the interest of private companies or institutions, but that is also answering demands from associations was very important. Working with NGOs was confirmed to be feasible within the areas of consultancy and research.
He went on to say, “the ideas and plans are in contact with reality, it would be very advantageous to continue in this line.”

The only problem identified by the Science Shop was with regard the workshops being carried out in the course of four weeks as opposed to two consecutive days, as the methodology requests. This created an extra effort in communications in order to insure the continuous participation of all the people who had began the workshop sessions. Also the lack of funding was seen as a major setback, there were no funds to make the results known in a more in-depth format at the time, which would have guaranteed a better and quicker general impact.
Nor was there funding to continue the research on a long term basis.

3.5.2 Scientist Evaluation

The university valued the project very highly, which is the reason for their funding the publication of the results at a later date.

“I think it is a very positive work in two aspects, on the one hand it works with modern techniques, not widely known in Spain, and on the other the theme is a practical theme, such as Seville’s evolution.” Juan Maestre, University.

The scientist saw this project as an overwhelming success, the methodology used was taken very well by all parties involved in the workshops. The main aims of the projects, the formulation of an Agenda 21 and a Political Program, were achieved and there were no overriding problems with the planning, execution or final analysis of the exercise.

"… it was one of the first project I did with an NGO and the methodology used was new, specially seeing as it was carried out in the course of various weeks [as opposed to two days as is prescribed in the EASW methodology (ed.)]. It was a very valuable experience." Dr Teresa Rojo, Scientist.

Dr. Teresa Rojo felt that part of the positive results did not only come from the conclusions reached from the study, but also from the network of people and organisations which has been established as a direct result of the workshop sessions. The sessions allowed the participants to become aware of the problems, needs and the work each of them was had, which was very positive.

"Any political party that has this information and these proposals will be supported by the great majority of the population. From this data, all the participants can launch projects and activities." Dr Teresa Rojo, Scientist.

Personally speaking, her own objectives were met as this project provided a unique opportunity to carry out a comparative study of the methodology used in researching and designing an ecology strategic plan in Seville. She had already carried out this research with other entities in Seville which were ideologically at the opposite end of the political scale to the ecologists. The comparative study she was able to carry out found that the main conclusions and strategies both groups came up with met in various areas.

"Doing the comparative study within the ecologically minded community without the support of an active NGO would have been too expensive and difficult to coordinate as well as possibly impossible to motivate people to participate." Dr Teresa Rojo, Scientist.

3.5.3 The NGO Evaluation

The results of the actual workshops were very positive for the NGO as it had the expected results, that of making a viable ecological and social plan of action as well as designing an electoral plan for the party involved, based on what the public actually wanted done.

"The short term ones [objectives (ed.)], were achieved, but we didn't have the opportunity to carry out the long term ones." Ricardo Marques, Los Verdes."

It allowed Los Verdes to put their proposals into context with the public. With regard the study in itself they felt it was very interesting as it provided them with a series of conclusions which they were able to use in their electoral program.

"From my point of view yes [the methodology achieved its ends (ed.)], participatory processes were generated as well as lots of new ideas." Ricardo Marques, Los Verdes.

Ricardo Marques felt that many things were left without conclusion, many problems without solutions, but felt that what was important at the time was to identify the problems and in this sense it achieved its aim. He also felt the project run very smoothly, but thought this was because the participants were of a similar mind, if the same project was to be done with clients who have different political agendas then there could be conflicts.

3.5.4 Study Group Participant Evaluation

Dr Manuel Lopez Peña felt the workshop participation was important, the structure and methodology were well explained and he felt it was well conducted. He was particularly struck by the methodology of participation. He also feels that the incorporation of science and technology in societal themes were, among others, key for success. He has since moved on to other participatory projects within his professional capacity.
The participant wanted to take part in the elaboration of an Electoral Program, with this in mind he felt the results were positive.

3.6 Reflective Report

This report will take into account the following Interacts objectives:[13]

Client Perspective: the social context of the project.
The Cooperation process: summary of the project phase.
Afterward: summary of the project impact.

[13] Taken from Themes for Interacts Analisys, first draft 20 Oct 2002, by Michael Sogaard Jorgensen.

3.6.1 The client perspective: the social context of the project:

3.6.1.1 Why was the request initiated?

The concept of Science Shops is completely unknown in Spain, the cases being looked at, including this one, have not come about as a formal approach to a known Science Shop. In Spain things often work on word of mouth, acquaintance and small circle of people who are in the know how. A small network of people who know each other and move themselves in similar circles and projects. The Urban Ecology Strategy Design project is a typical example of this at work, the NGO were exposed to the possible solution to their dilemma when the scientist visited them for feedback on a previous project she had undertaken encompassing these issues. As there are no University policy of providing research facilities to the public at large, the scientist contacted with the Science Shop directly, this being facilitated by the fact that she has worked on many other projects with them.

3.6.1.2 What role did the client expect the science shop (project) to play.

The NGO expected the Science Shop to provide the expertise to find a new perspective for solving the issue of ecological planning to 2025, plus carry out all the expert and organisational tasks which the project entailed. The expectations on the Science Shop from the NGO and the scientist were met. Organisation wise, it provided the link between the scientist and the NGO, as well as providing organisational consultation and support for the workshops. It was also instrumental in providing the necessary staff to carry out the research. In the post research phase it was responsible for providing a summary of the results written (by the scientist) to the NGO so it could present it in a booklet and as an Electoral Program. Further more when the final book was published the Science Shop were also responsible for coordinating the different acting parties for the book launch.[14]

3.6.1.3 The co-operation process: summary of the project phase

How was the project designed and carried through, based on the request of the client group and the interest of the other actors getting involved: science shop, researchers, students etc. Why did each of the actors decide to be involved?

The Social Science project was requested by an ecologically active group, monitored by an environmental sociology scientist and organised by socio-environmental Science Shop.

[14] All publications mentioned are referenced in Section 6 of this case study.

The NGO is made up of six main organisations, one of which is a coalition of two political parties and the results of the research were in fact to be used in this coalition's political agenda.
However, the people who took part in the workshops[15] were in the majority not aligned to nor did they come as representatives of political parties, although they were socially active people and definitely ecologically aware. Their motivations were to define the ecological and environmental scenario for Seville 2025 and the design of a strategic plan of action.
Personal motivations by all individuals within the organisations who took part in this project were also ecologically orientated. In short, we cannot say this was a neutral science project although definitely an independent study as the conclusions were not predefined before the project start date and it was monitored by a Science Shop as well as a Scientist who were not aligned to the NGO in any way, except perhaps ideologically speaking.

3.6.1.4 What was the result of the project? What was the role of each of the involved actors in "producing" the results of the project

The results were a working Agenda 21 for Seville, as well as the information basis for a political program and the data for a comparative study of the methodology used.
The role of the NGO in producing these results were to give the structural, physical and participative means needed to carry out the research.
The role of the Science Shop was to provide the communications methods needed as well as the expert knowledge for carrying out the research, as well as to disseminate the results afterward.
The role of the scientist was to provide the methodology and experience in organising the workshops and analysing the results.

Afterwards: summaries the impact of the project:

- **What has been the impact of the project within each of the involved actors and how was the impact achieved.**

  On this particular project the impact can be measured in three actors:

  i) The NGO.
  With regard the NGO the main aim, that of developing an Agenda 21 for Seville, was achieved and the organisations within this NGO, as well as the individuals who participated in the research were influenced by the project as well as by the results.

[15] Classified as research assistants in the collection of information.

ii) The Science Shop

As well as being able to use the results in an ongoing study, they had great exposure to local organisations and NGOs, which has resulted in more projects being developed, although the expectations of future cooperation between this particular NGO and this Science Shop are not likely, the coalition which originally requested the study was disbanded.

iii) The Scientist

The Scientist involved in the research has used the experience in a comparative study which has since been published by the University and the Science Shop. She has also found the experience invaluable for her professional and teaching career. This project has meant a direct involvement from the university in a Science Shop project, which has opened the path to possible future involvement by the university in science projects from the beginning.

The university is actively participating in the formation of a Science Shop with European backing.

3.6.2 Scientific relevance and policy recommendations as seen from outside the involved actors

The concept of Science Shops is completely unknown in Spain, the cases being looked at, including this one, have not come about as a formal approach to a known Science Shop. As above mentioned, in Spain things often work on word of mouth, acquaintance and small circle of people who are in the know how. A small network of people who know each other and move themselves in similar circles and projects.

The scientist, on the other hand, is actively seeking to bring the Science Shop culture into the Spanish university arena. She has already made moves to implement a team of researches in her university which would be accessible through this and other Science Shops to the public at large.

The potential for brining the Science Shop culture into Spain is enormous, the reaction to this idea among the participating organisations and individuals was very positive.

Although the social impact this project had was seen to be minimal at the time, it was in fact much greater than can be measured by tangible means as most of the workshop participants left the sessions with a greater understanding of their own social roles and responsibilities in the ecological questions raised in the study. Not only were these people empowered by the experience but many of them have since, and independently, taken the initiative to implement some of the solutions found in their own neighbourhoods and organisations.

The lack of funding for the initial project crippled any active participation from the Science Shop or the Scientist in the further studying this case.
A recommendation for the Interacts research would be a follow up of the workshop participants as well as the coordinators who where contracted, in order to properly measure the societal and academic impact the Urban Ecology Strategy Design research project has generated in three main areas:

Acting on conclusions arrived at in the workshops.
Acting on the methodology used in the study.
Acting with the Science Shop method.

These are very interesting questions which are not covered in the scope of the initial Interacts research done on this particular project. Unlike research carried out on the natural sciences where the object being investigated, i.e. water, air or chemicals, the people taking part in the study is a vital and conscious component of the research, unlike water or air, these people can, and often do, walk out of the experience enriched and will often partake in the dissemination of the methodology used, the results reached at or will use or spread the knowledge of the Science Shop existence.

From what we can gather, in this project the gap between the available science and society was excellently bridged using the Science Shop method. Room for improvement has been identified in the following areas:

public funding for this method to become commonplace.
a greater awareness in the public mind as well as in the University arena of the existence of the Science Shop method should be raised.
greater funding for the dissemination of the knowledge acquired should be made available.

With regard scientific neutrality in this case we can see that political or ideological neutrality would be difficult to achieve. All the participants had ecological concerns, plus the initial criteria for the Interacts research is that the NGO not be a political party, in this case the NGO is made up of six main organisations, one of which is a coalition of two political parties and the results of the research were in fact to be used in this coalition's political agenda.
As is well known in Quantum Theory "the observer influences the results". However, if we were to take into account the previous work done with this methodology and to cover these questions by the scientist as well as the comparative study which was published in the final book, we can see that even when the groups and individuals

participating in this kind of study are not ecological activists, similar conclusions and solutions are reached.
It will be interesting to see at the end of the Interacts research phase whether the Science Shop experience with participatory research can ever be completely neutral.

The access of science to organisations which would otherwise not have it, via an intermediary, is obviously clear. This project has proven that this system can work and if funds were made available and a clear national policy was undertaken to make every University research facility accessible to the public the benefits to society would be without measure. As to policy building on ecological matters this project has generated a workable and realistic template for policy makers to use not only in Seville but throughout Spain.
The knowledge gained through the study of this project is invaluable for the Spanish experience, particularly the way in which we can compare this experience with the experiences of other participating countries.

3.7 Appendix for Case Study 1

3.7.1 Reference Material

Agenda 21: http://www.un.org/esa/sustdev/agenda21.htm
Methodology : Self Training Manual of the European Awareness Scenario Workshops (EASW), *Coordinated by* Francisco FERNANDEZ. Source: www.cordis.lu/easw
Information on Ateneo Verde : http://talika.fie.us.es/ateneoverde/
Information on Los Verdes : http://verdes.es/andalucia/quien.php.
Workshop Booklet : Jornadas Participativas y de Escenarios : El Futuro de Sevilla Horizonte 2025.
Workshop Results:
Técnicas y Perspectivas Sociológicas 2: Sevilla 2010 Metrópoli Ecológica. Aplicación de la metodología participativa Europea EASW, by Teresa Rojo. Published by Universidad de Sevilla.
Los Verdes + Izquierda Andaluza… Un buen tándem para Sevilla: Objetivos y acciones prioritarias para el futuro de Sevilla, horizonte 2025. Published by Los Verdes and Izquierda Andaluza.
Interacts objectives: Interacts STPA 2001-00011

4 Case Study 2: Architectural Study for Romany Community, “Los Perdigones”

4.1 Fact Sheet:

Request: The Science Shop (Arquitectura y Compromiso Social) was contacted by the NGO (Pro-Derechos Humanos) to see if they had any ideas on what they could do to keep the community in the land they had occupied since 1981, while chatting about the situation and doing some investigation the Science Shop came up with the idea of the contest. They had worked in other cases before, providing solutions for similar situations.

Duration: 1 ½ months

Students: various students and professional architects.

Costs: Minimal costs met by NGO and Science Shop.

Aim
The design of 38 houses a community hall and community storage with planning permission of 5.274 m², allowing a height of up to 5 floors in one plot and 4 flours in two smaller adjacent plots.
The designs had to comply as far as possible to the demands of the Romany community, keeping in mind their needs for a community hall and large areas where they could store their vehicles and working materials.

Outcomes:
There were twelve submissions of workable designs for the Romany Community housing project.

4.2 Summary of the Project

The project began and was carried out in the year 2000 when the NGO Asociación Pro Derechos Humanos de Andalucía (Human Rights of Andalusia), were informed that a Romany (Gypsy) shanty[16] neighbourhood was being moved out from public / private land in order to make room for building contractors. The NGO contacted with the Science Shop Arquitectura y Compromiso Social (Architecture and Social Commitment) who, as a methodology to find a tailor made building design solution, organised an open contest for Professional and Student teams that had at least one Architect in their ranks. The contest was designed to provide alternative solutions for housing adapted to Romany social requirements and, finding this solution, the expulsion of the community from the land could be prevented. The design had to conform to the size of the land they had occupied while keeping within the legislation which regulated the land at the time, as well as following the "Plan Andaluz de Rehabilitación de Núcleos Chabolistas" (Andalusia Plan for the Rehabilitation of Shack Nucleus)[17].

4.3 Participants

Science Shop: Arquitectura y Compromiso Social
NGO: Asociación Pro Derechos Humanos de Andalucía
Scientist/University: Durán Rojo Architects.

4.3.1 Science Shop: Arquitectura y Compromiso Social (A.C.S)[18]

A.C.S was founded in 1994, it is a University Association that is affiliated to the two mayor Architectural Schools in Seville[19]. The association is formed by students, professors, architects, technical architects and people from other professions that are joined by common concerns and objectives. Their main concerns are social instruction in the universities, the construction of a sustainable habitat in inner cities, equality on a global scale and the instruction of citizens who are aware rather than simple architects.

Address:
Dpto. Construcciones Arquitectónicas II
E.U. Arquitectura Técnica de Sevilla

[16] As in a neighbourhood with shacks constructed from various materials and no amenities.
[17] This plan is aimed at relocating suitable housing in the same place the shacks were originally located.
[18] Source: http://www.arquisocial.org/ACS.htm
[19] "Arquitectura Superior" and "Arquitectura Técnica de Sevilla"

Avda. Reina Mercedes, s/n
41012 Sevilla

Interviewed for Science Shop: Ventura Galera

4.3.2 NGO: Asociación Pro Derechos Humanos de Andalucía[20]

This Association's founding principles are those declared by the UN in 1948, the Universal Declaration of Human Rights. Although it's main affiliation if that of the Andalusia territory it is also involved in global concerns. Its main aims are to make present Human Rights as an instrument of transformation of consciousness in society itself. Apart from their educational activities and active participation in Human Rights concerns they provide support to victims of human rights violations in Andalusia, particularly those who have no resources, the marginalised sectors of society. They present activities range from social marginalisation, immigration, shanty towns, racism, xenophobia, minors, jails, peace and disarmament, education for peace and human rights and international solidarity.
They are involved and have organised several campaigns, as well as taking an active part in the Anti Globalisation Movement.

Address:
Blanco White, 5 Acc.A.
41018. Sevilla
Phone: 954 536 270 Fax: 954 534 086
Email: andalucia@apdha.org

Interviewed for NGO : Ignacio Mechon and Antonio Pardo Silva

4.3.3 Scientists / Experts: Durán-Rojo Architects

Durán Rojo Architects is an architectural company formed by Juan José Durán Oña and Jesús Rojo Carrero, who were students at the time of the study and won the architectural contest for the Romany housing design project.

Interviewed for Architects: Jesús Rojo Carrero.

[20] Source: http://www.apdha.org/

4.4 Project Description

4.4.1 Background

Los Perdigones were a group of plots, some belonging to the Council and some to private concerns such as the Spanish Railway company and various other small owners. Eighteen years previous to the project a Romany neighbourhood was expelled from public land in order to build Expo '92[21], the community which was not nomadic and had been living together for generations found somewhere else to settle, an old pellet factory and the disused land around it. Their housing was of shanty town construction, or shacks, and the land also accommodated their vehicles as well as large amounts of metal scrap with which the Romany worked with.

For as long as the land was unwanted the Council did nothing to help or accommodate these people, however, when a large building corporation bought adjoining land and began the construction of luxury apartments, the Council ordered a formalisation of the area, which would include housing, sports facilities and a green zone.

The problem arose when they realised no one had taken into account the 33 Romany families living in the land at the time.

Years went by and the Administration had not offered a viable solution for the Romany community. The proposals being put forward included moving the 33 families to a public housing estate on the other side of the city, which the families refused as it was too far. It was also proposed that the families be moved to privately rented apartments spread throughout the city, but there were no apartments available to them in the market. The Council then changed the last proposal to rent private houses rather than private apartments, but they could not be found. The last proposal was that the Council buy houses throughout Seville and other areas in Andalusia and house the families themselves. But no one proposed housing them in suitable accommodation within the land they were occupying at the time, where they had been living for nearly two decades and were they had become an accepted part of the local community until the Science Shop and NGO, who were working with the Romany community realised this could be a viable solution.

"This integration took years to achieve, the women would buy in the same shops until they [shop owners (ed.)] realised they were not going to steal nor damage anything, they were simply another customer. All the process of schooling the children, relations with the larger neighbourhood, our colleagues at Pro Derechos Humanos had

[21] EXPO'92 (Exposición Universal) took place in Sevilla from April, 20th to October 12th 1992, the construction of buildings, which was started in the early 80s on several acres of land. To build this show case thousands of millions pesetas of public money were spent, none of which went for the alleviation of the squalid living conditions the Romany community were subjected to.

managed to get the lads to form a football team which competed in the neighbourhood leagues, there were also cases of boys who had girlfriends in the settled community, the type of things that would be lost if Administration had its way." Ventura Galera, Science Shop.

"Los Perdigones were a one of the most consolidated and integrated settlements, plus it had a very particular problem as it had close links with the non Gypsy community and it was something which had developed since 1992, the year of Expo 92, in which they received a very marginal treatment because they were expelled from one of the exposition lots and they found this old pellet factory to settle down in. We have to understand that these were a group of families who were not nomadic, they had always lived together, had been born and were adults and lived there, and they had roots." Jesus Rojo, Architect.

4.4.2 Objective

The objective was based on the "Plan Andaluz de Rehabilitación de Núcleos Chabolistas" which promotes the re-housing of shanty town neighbourhoods into the same, or close by, land in suitable accommodation.
The housing had to accommodate 33 Romany families, their vehicles and their scrap metal and other materials they worked with; as well meeting Romany cultural needs such as living in houses rather than apartments.

"The idea of the contest comes up as an instrument inside a process of accompanying these families in being exposed to a hard action by the market who was trying to expel them from there. There was land and we decided to show that it was a viable solution [re-housing them in the same lot (ed.)]. We trusted that architecture was capable of providing solutions to resolve this problem." Ventura Galera, Science Shop.

The housing proposal had to be designed to a very professional high standard or otherwise it would be refused by the local Authority.
It was also necessary to work very quickly as the authorities as well as private concerns were closing in on the community very fast.

4.4.3 Working Methodology

A public contest was called for the study and design of suitable housing which would meet the criteria mentioned above.
The contest was open to architects, architect students and other multidisciplinary teams which counted with at least one architect. The teams could be of any nationality

and one of their members would be named coordinator, representing the team in its totality.
The proposals had to accommodate to the land available for housing as well as some of the other adjoining plots, full graphic designs and plans both for the layout and the houses had to be made available as well as financial estimations of the project.
The participants were given support in the form of working sessions, meetings with the Romany family representatives, other neighbours in the area and experts in the area of social cohesion and support. The participation at these meetings were considered vital for the development of realistic solutions to the project.
The projects presented were judged by a jury composed of:

Two Romany representatives
Two representatives from the associations which organised the contest
One representative from the Office of Public Defence of Andalusia
One representative from the Escuela Técnica Superior de Arquitectura de Sevilla[22]
One representative from Fidas[23]
One recognised professional of prestige in urbanism and architecture.

The contest had three main winners, first, second and third, plus various merit winners. The prizes were in the terms of honourable mentions, expositions and publications of the prized proposals.

“We summoned a very simple contestant base, very open, both students and professionals could participate, it wasn’t such a rigid contest as those called by the administration. However the contest had the same seriousness in its program, its objectives and the documentation that was given…. Not only architects could take part but also anthropologists, sociologists, anyone who would and could participate and because of lack of time we could not give it enough publicity outside of the school, that is why most contestants were linked to the school, there were some teams from outside Seville but the great majority were from Seville and in one way or another would come into the School…. The jury proposed was the most serious possible, so s the results would have category. Administration was called to be part of the jury but refused, but the School of Architects did and the office of Public Defence, the School of Architectural Design, a respected member or the profession, and there was also the people who organised it, us, and the Romany community spokesmen. Plus part of the

[22] Senior Technical Architectural School of Andalusia.
[23] Fundación para la Investigación y Difusión de la Architectura, Sevilla (Foundation for the Investigation and Dissemination of Architecture, Seville)

process was that the contestants spend time with the community." Ventura Galera, Science Shop.

"Architectura did all the design of the project and the concept, we gave them support with taking them to the shanty neighbourhood and showed them the shacks." Ignacio Menchón, NGO

4.4.4 Project Conception

The Science Shop (Arquitectura y Compromiso Social) was contacted by the NGO (Pro-Derechos Humanos) to see if they had any ideas on what they could do to keep the community in the land they had occupied since 1981, while chatting about the situation and doing some investigation the Science Shop came up with the idea of the contest. They had worked in other cases before, providing solutions for similar situations.

"We were working with the Chabolistas [shanty town dwellers (ed.)] and found out that the law says that a 10% of every plot destined for housing has to be given over to public housing. We went to the Administration and put forward this solution, but they told us there wasn't enough land, we showed them there was but they said Gypsies cannot live in vertical housing, they have to live at ground level… that's where the idea of the contest came up, we thought of it but Pro Derechos Humanos became involved as well." Ventura Galera, Science Shop

"A.C.S. proposed the idea of the contest and we thought it was great. The idea comes around when A.C.S. find out there is a plot of land there designated for public housing." Ignacio Menchón NGO

Pro Derechos Humanos had been working with this Romany neighbourhood for quite a few years; they had helped them get water, electricity and toilet facilities.

"Our colleagues and us explained to the Romany community that we could do this [the contest (ed.)] but only if they wanted to stay there, they said they wanted to, that they wanted to stay, that it was best for them to stay and were prepared to back us up in this initiative. We asked them for two things, on the one hand to keep this initiative as a priority, that they would not accept another solution, and on the other hand we asked them for collaboration in the contest itself, firstly in the information phase, in the contestant communication phase, where we would take them [contestants ed.] there to talk to them and secondly, once the proposals were presented, in choosing the work." Ventura Galera, Science Shop.

"Administration said the following: the land is for public housing but the Romany are incapable of adapting to 'normal' housing because they are attached to the ground and the space around the house is not compatible with the model of public housing. So A.C.S. [the Science Shop (ed.)] very cleverly said, 'lets see if this is true and lets call a contest of ideas so we can see if the architect can give a solution'" Jesus Rojo, Architect.

4.4.5 Time Frame

The idea was first conceived around the end of summer 1999, because of the mounting pressures from the different exterior bodies the NGOs involved in this case decided to act quickly in order to provide a viable solution before the community was moved out of Los Perdigones.

Between 2nd and 30th of October the Architects were required to register.
Between 17th October and 1st November, during the afternoon, reality meetings were carried out.[24]
The 10th of November at 14:00 hours was the deadline for project submissions.
On the 20th of November the winners were announced, with an exhibition of the work in the School and a press conference.

"It was very quick, before they were thrown out of there in a bad way. We had to quickly show that it was possible for them to stay there." Ventura Galera, Science Shop.

4.4.6 Budget and Finance

There is no data on finance or budgeting. All NGO members, as well as the contestants, worked on a voluntary basis. The costs included the posters made to advertise the contest, the presentation at the end of the contest and the price to the architects who won the contest, which was a packet of coffee.

"The contestants paid their own costs, the contest had minimal costs, it was all done in a voluntary basis, the prize was a packet of coffee and the contestants were very satisfied." Ventura Galera, Science Shop.

[24] The architects were required to visit the Romany community in order to get a real understanding of their needs.

4.4.7 Main Research Questions

The design of 38 houses a community hall and community storage with planning permission of 5.274 m², allowing a height of up to 5 floors in one plot and 4 flours in two smaller adjacent plots.
The designs had to comply as far as possible to the demands of the Romany community, keeping in mind their needs for a community hall and large areas where they could store their vehicles and working materials.

“The Gypsy shack has a very particular characteristic, that of being very linked to the ground, it is a place for shelter, sleeping and eating, but in reality all life is carried out outside, we began investigating in this line and many contest participants did the same, in the production of housing that had these characteristics, living inside and living outside in the community, this phenomenon [inability of the Romany to live in apartments] is known as vertical shacks, in that the apartments degrade due to lack of adaptation.” Jesus Rojo, Architect.

4.4.8 Documentation used during the Project

The architects were handed a small pack of information with the community’s needs, a study carried out by a foreign anthropologist was also used during the project. This anthropologist had lived with the community for two years.

4.5 Channels of Communication

The channels of communication toward the architects, announcing the contest was done via posters in the School of Architects and a notice in the School periodical.
The Architects then had to formally register via a form and 1000 pts (6 €).

“To announce the contest we used the means of communication offered by the School of Architects itself, the periodical, a poster in the School of Lecture and not much more because we didn’t have much time to spread the word on a city wide scale.” Ventura Galera, Science Shop.

The communication between the NGO and Science shop with the Romany community was done face to face.

“We explained the idea to the Romany Community, the families were mainly Gypsy, except for one family who were not, and they had a patriarchal structure which made it

easy for the spokesmen to communicate among themselves." Ventura Galera, Science Shop.

Communication between the NGO and Science Shop was done via meetings and telephone.

"Apart from the contest itself we were doing other things in parallel, we called a street party so that they would feel supported, with music, presentation of trees, a small bar, the kids organised themselves, it was supported by the neighbours of the areas, the schools, the church, we did them as a support and communication process for the contest." Ventura Galera, Science Shop.

Part of the communication process, in letting the contestants know what was needed in the design of the houses, was very innovative, they were called to "reality sessions":

"The contestants were required to, well it was greatly valued if they took part in a couple of sessions which were organised in the shanty neighbourhood so they could get to know, chat to and become familiar with the family structure, social structure, number of children and what a shack was like inside." Venture Galera, Science Shop.

4.6 Key Findings and Recommendations[25]

There were 12 submissions of working designs for the building of the houses by 11 teams of Architects, all of which met the specific requirements to build suitable housing in the available land.

4.6.1 Political and Social Impact

Politically speaking this research project has not had an effect as no new local policies have come about due to this particular case.

"The Socialist Party came over before the elections to say they would solve the problem, the Romany community was a formal part of the party but as soon as they were elected they forgot all about the community. We all voted for the PSOE[26] and nothing." Ignacio Menchón, NGO.

[25] Results booklet.

[26] Socialist Party of Spain.

However, socially speaking there has been a great impact both in the lives of the Architects involved in the contest, the NGOs and the end customers, the Romany Community. A community was formed to give support to another community that was in danger, the Romany neighbours. The Administration did not in the end build the houses which were designed with the contest but their hand was forced to supply a solution which was accepted by a majority of the Romany neighbours.

4.6.2 The Results

One of the outstanding aspects of the results was the speed at which everything was carried out and the quality of the submissions received in a very short time frame.
There were twelve submissions of workable designs for the Romany Community housing project, all twelve were of a very high standard, one acceptable to any Local Authority or professional body.
However the building company who had originally pressured the Administration for the expulsion of the Romany Families paid a sum of 6.000.000 pts (circa 36.000 €) per family in order for them to leave. Whether this was as a direct result of the contest or whether it had been planned beforehand is not clear.
Tangible results of the contest, such as publications are minimal.
The results as well as the contest structure and history was published in a small booklet which was presented at the prize giving ceremony which announced the winners.

“The panels were in exhibition in the School of Architecture as well as Pro Derechos Humanos. The School periodical published a small article about it, which they said they would expand in further issue, but they didn’t. There were interviews published in some of the local media. There was also some reaction from the neighbours who were against the contest.” Ventura Galera, Science Shop.

“It had big media coverage the day of the jury results, all the local media were there, radio and local televisions.” Jesus Rojo, Architect.

4.7 Use of the Results

4.7.1 Science Shop

The Science Shop has not used the results of the contest in other projects; however, they are involved in similar projects at other shanty towns across the city and feel that the experience gained in Los Perdigones has been invaluable.

"With the theme of shanty neighbourhoods we have worked before and will continue to do so, the team that worked on this project is also now working in other projects within this theme. We are improving things bit by bit… We are doing a follow up study of one of some of the families and we want to call other contests as solutions to other situations." Ventura Galera, Science Shop.

4.7.2 NGO

The NGO have not used the results as a model in subsequent projects but were unable to carry out the building of the winning designs.

"We have worked with A.C.S. with other projects." Ignacio Menchón NGO.

4.7.3 Scientist / University

At the time of the interview, the Architect had not used this project in his career or studio; in fact he felt that having taken part in this project was more of a stigma in professional circles than a bonus. He is however proud of having taken part and would do it all over again if need be.

Use of the results by the individuals interviewed

None of the interviewed individuals is presently using the results in their curriculum or professional lives.

4.8 Personal Result Evaluation by participating bodies.

4.8.1 Science Shop Evaluation

The contest is seen by the Science Shop as having been an overriding success. They were in fact very surprised at the high level of professionalism in all the entries. However, they would have liked to have seen the houses built. The fact that the Community was moved out by a "bribe" is seen as a negative result of the exercise.

"The contest in itself wasn't the aim of the project, the contest was an instrument for the end we wanted to achieve, which was the housing of the Romany in the place where they were integrated. The contest as far as an immediate objective was a success because it resulted in work of very high quality and it also advanced the study of what is the capacity of society itself being able to absorb and carry out these types of

commissions. Placing these type of families in vertical housing was not easy, they began to see the submissions and realised they would not be able to have ground level houses, it was hard for them to accept this, but at least they could stay there, where they were integrated.
They were given 36.000 € per family that was supposed to help them in acquiring them a new house, but with that amount they were only able to buy land far from the city, or flats in rundown neighbourhoods, where the neighbours opposed their integration.
In reality it was a failure." Ventura Galera, Science Shop.

4.8.2 Scientist Evaluation

The project meant quite a lot for the Architect, he felt involved in making Seville a multicultural city.
As with regard the evaluation of what he felt were the results he comments:

"The results were that about 20 or 30 architects gave proposals of a very high standard, like any which would have had lucrative ends. In other words, the level of possible solutions was very positive, but in practice the problem was not resolved, in fact it was corrupted because they gave the people who lived there money which they accepted and the unity for which they had fought so hard was lost. I guess in one word my view is 'no' the objective was not successful." Jesus Rojo, Architect.

As to the concept he felt the contest was very healthy as it was involved in the type of problems which are very compatible with public contests, on the one hand it generates debate for all parties involved and on the other it involves the professional in the type of social commitment which he would not other wise be involved with in his professional career, offering an opportunity to work outside professional conditioning.

"I recommend this type of activity where society and people with a specific education participate, as any scientific-academic knowledge combined with citizen participation can give a constructive solution." Jesus Rojo, Architect.

4.8.3 The NGO Evaluation

The NGO believes the exercise was a success as the contest brought together many people but also brought about a satisfactory solution which was to provide decent housing to the people in the shanty neighbourhood.

"Some people wanted to accept the money and others didn't but the building contractor representative said, ' if some go then you all have to go', or there is no money for

anyone. It was a conflicting situation, we were fighting for them to stay there. As to the contest itself there were some really interesting designs proposed, very interesting. Some were more workable than others. The objective for them to stay was not achieved, but the objective to house them has been achieved as one of the objectives of the contest was to get them housing. This for me was fundamental. Mind you not any housing, but good quality housing, which I think was achieved. I was a bit disappointed that after all the fighting they took the money, but this is just my opinion." Ignacio Menchón, NGO

Mr Ignacio Menchón also felt that the money that was offered to the Romany families was as a direct result of the contest. Although we cannot really say his view is reflected in by the Romany families, at least one family was not happy with the money arrangement, according to Mr. Antonio Pardo Silva, one of the Perdigones residents, he felt pressured in accepting the money when he would have preferred to live in one of the new houses specially designed for him.

"When they [the building contractor (ed.)] saw that there was a big possibility of the Romany community staying due to our fight, that several designs had been presented, it became viable that they would stay there, they thought no way are they going to stay there, we'll give them money so they leave now!" Ignacio Menchón, NGO.

4.9 Reflective Report

This report will take into account the following Interacts objectives:[27]

Client Perspective: the social context of the project.
The Cooperation process: summary of the project phase.
Afterward: summary of the project impact.

4.9.1 The client perspective: the social context of the project:

4.9.1.1 Why was the request initiated?

In this case the way in which the Science Shop and the NGO organised the research project came about through close working contact within the Romany Community. In fact the Science Shop interviewee lived near the Romany community and his son went to school with one of the Romany girls. Again, small networks of people who move in similar circles were the ones to organise this event.

[27] Taken from Themes for Ineracts Analisys, first draft 20 Oct 2002, by Michael Sogaard Jorgensen.

In this case it was the NGO which made the initial contact to the Science Shop who came up with the idea of the contest. The Science Shop asked for the NGO support as well as the support of the Romany community in carrying out the project. All expectation by the Science Shop and the NGO were met, the contest was seen as a success as it provided designs for suitable housing.

4.9.1.2 What role did the client expect the science shop (project) to play

The NGO expected the Science Shop to provide free yet highly professional architectural plans for housing suitable for the Romany community and acceptable to the Administration. These expectations were met by the Science Shop in a very innovative way. By their position within the university, the architectural professional body within Seville and the student body, the science shop was able to attract several highly capable scientists (architects) who submitted plans which were suitable as a viable solution for the housing problem.

4.9.1.3 The co-operation process: summary of the project phase

How was the project designed and carried through, based on the request of the client group and the interest of the other actors getting involved: science shop, researchers, students etc. Why did each of the actors decide to be involved?

The project was requested by an NGO which has worked with the Romany, and other marginalised communities, for decades and who find themselves in a very particular position for identifying problems faced by these communities as well as finding those professional who can provide solutions to these problems.

The Science Shop has worked with this NGO in finding housing solutions for marginalised communities in the past and has continued to work with it since this project was carried out. Their main interest in getting involved with these types of project is twofold, on the one hand it is that of providing highly professional architectural solutions to people who would otherwise not have it and on the other to provide architects and architectural students a “real life” view of architectural design. In other words an educational role toward the professionals themselves, taking them out of placing the design as the priority and brining them to view the occupant, the person who will live and use that building, as the main priority.

The personal motivation by the actors involved in this project were of a humanitarian nature. Everyone interviewed expressed a concern for the Romany community and their plight. All the work was done on a voluntary basis as there was no financial compensation involved.

4.9.1.4 What was the result of the project? What was the role of each of the involved actors in "producing" the results of the project

There were 12 submissions of working architectural designs for the building of the houses, all of which met the specific requirements to build suitable housing in the available land demanded by the Administration.

The role of the NGO in producing these results were to provide full access to the Romany community.

The role of the Science Shop was to provide access to expert knowledge for carrying out the architectural designs.

The role of the scientists (team of architects) was to provide suitable solutions for the problem at hand.

Afterwards: summaries the impact of the project:

- **What has been the impact of the project within each of the involved actors and how was the impact achieved.**

iv) The NGO.

The NGO were faced with a problem for which the Science Shop provided an answer. Even though the architectural proposals were not used in the end, the NGO feels the exercise was a success as the Administration and private concerns involved in trying to evacuate the Romany community were forced to make this community a better offer then they had previously made. The NGO has been also influenced in that they now work more closely with the Science Shop in other projects.

v) The Science Shop

The Science shop felt their objectives were met and the impact was measured in the effect this project had in budding as well as professional architects in "humanising" them to the reality of housing for people rather than housing design for design's sake.

vi) The Scientist

The architect interviewed felt the experience to be highly enriching, particularly the "in situ" research, where the architects were required to spend living time with the Romany families. He took part in this project because of his humanitarian concerns and feels he would do it again, even though within the elite architectural society in Seville, this project was looked down upon as it went against the establishment.

Scientific relevance and policy recommendations as seen from outside the involved actors

This is a particularly interesting case as the methodology used to find a viable solution to a social problem was very innovative and inexpensive.

Again this case proves that when NGOs or the public at large has access to science great solutions can be arrived at.
With regard policy changes, this case clearly illustrates the need for legislation on the human and cultural rights of minority communities such as the Romany Community featured in this study.
The overwhelming feeling this researcher has found while analysing the data provided was that Spanish society at large feels that the living conditions the Romany community is subjected to and the way they are treated by the government is normal and that improving these conditions is the job of NGOs.
Legislation to provide suitable housing as well as basic amenities for the Romany Community within the city limits is of prime importance.

With regard this particular project, the Romany community felt empowered and integrated in deciding their future. They took an active part in the design process as well as being the final word with regard the winning designs. The bridging between Science and the Community in this case was particularly effective. The fact that they were consulted on the design process of the houses is very unusual and unique for Spain.
This was, in my view, the most positive and innovative aspect of the project. It is the first time in the NGOs and the Science Shop's experience that the Romany Community was fully integrated in the decision making with regard their living conditions.
As to the Interacts experience this case, like it has been already mentioned, proves to be very innovative. The idea of a contest made the design of suitable housing accessible to the customers who would not otherwise have been able to afford it, in this case the NGO and the Romany Community.
These two organisations continue to work together after this project in similar Romany shanty neighbourhoods and have used the contest idea in at least one other case.

The social impact this project had on the organisers themselves was very positive, even though they were unable to take it to its happy conclusion of building the houses which were designed for the Romany Community.
This case received a fair amount of media coverage at the time of, and previous to, the contest, although the contest itself did not result in new legislation nor political backing, the overall marginalised community case seems to have been positively affected by the contest. Many people stood up for the community and the contest and many people made their voices heard who were against the whole idea of the Romany community staying in this land, particularly the new neighbours who had recently acquired luxury apartments overlooking Los Perdigones.
This case is documented in legal proceedings as well as media archives.

It would also be interesting to investigate what happened to the Romany Community after they were thrown out of the land. By doing this we would have a clear idea if the research that was carried out by the contest was indeed the best solution, as the organisers and community thought, or the solution (monetary compensation) that was finally given was in fact the better option. This would prove or disprove the expert conclusion that keeping the families in Los Perdigones, in the specially designed housing, was the best option and in this way we could judge whether the Science Shop results in this case would have been the best way to go.

To do this further research would have to be done in the following areas:

Did all the families manage to acquire suitable housing with the money they received?
Did they settle in into the communities they moved into?
Where they able to continue with their social structure and culture?
Did their living conditions improve or worsen after leaving their community?

In this Interacts Case Study, Architectural Study for Romany Community, even though the NGO does identify the Romany to have a different living culture and tries to provide housing which will not destroy that culture or community, the Local Administration priority is to expel the community in order to provide a beautiful green area and recreational grounds for the new dwellers of the luxury apartment blocks. In other words it does not officially recognise the Romany community as a cultural nucleus worth saving. On the contrary, it uses the fact that this community has special living needs as a weapon against them.
The Romany in Spain are continuously being forced to live in derelict ground, with no sanitary services or suitable shelter due to them being expelled from one place after another and thus disintegrating social ties and extended family culture, as well as being rejected by the local community of the areas in which they move into. The cases of Romany communities having received suitable housing within the area they had previously occupied are very few indeed, and these cases have been driven by NGOs, not the local Administration.
We should also note that the majority of the Romany community members at Los Perdigones chose an important amount of cash over defending their right to live as a community in a place where they had established roots and good living relations with the “normal” settled community.
Pointing out the fact that the Romany community opted for an alternative solution to that provided by the NGO in no way means to actively criticise the work done by the NGO or the Science Shop in this case, but does aim at opening up discussion on the merits of integration and Pioneer style help based on “Scientific expert advice” versus acceptance and cooperation with different cultural minorities. In fact this particular

Interacts Study case points to a possible working basis for cooperative projects between ethnic minorities and scientists in the future.
It would be interesting to find out in all Interact cases where a similar situation of minority group are involved whether the NGOs scientific, or expert, solutions found through Science Shop did in fact improve or worsen the minority group's situation, particularly in the case of Romany communities.

Another recommendation for the Interacts research would be to investigate cases with this type of innovative and inexpensive research solutions, after all, the main stumbling block most NGOs find in trying to access scientists is the economic limitations of their condition.

Like the other cases in the Spanish Interacts research none of the organisations involved saw nor classified this case as a Science Shop experience. When told about the Science Shop concept, the interviewed participants felt very encouraged that this concept be brought to Spain.
The experience gained not only by the Science Shop members but by the other professionals who rallied in this case, both for the design and the judging of the designs, is priceless, particularly in the way in which the Shanty Town dwellers were "humanised". One of the main Science Shop objectives is to make citizens who are architects and not simple architects; in this case they have accomplished it. The Science Shop felt the fact that student and established architects went over to the shanty neighbourhood to spend time with the Romany community was very positive, it taught these present and future architects that houses are primarily for the people who will live in them and not important in themselves.
As this case is quite unique in its approach the view from the scientist, in this case the architect, on this theme focuses on an important part of linking scientists with society using the Science Shop or other methods.

"The university, if it does not assume the responsibility of not only forming a scientist but also a citizen, is not achieving it's objective, it is in fact generating an anti-citizen because it is forming a tool which is capable of solving a problem but thinks very little and does not link him or herself to the problems as a person.
The world would be a different place if graduates came out of universities with an ethical capacity as well as a technical one, a capacity that would allow them to understand themselves as part of a collective and thus their input could be and would from part of their lives from the very start of their professional studies" Jesus Rojo, Architect.

4.10 Appendix for Case Study 2

4.10.1 Reference Material

Information on A.C.S. (Science Shop): http://www.arquisocial.org/ACS.htm
Information on Pro Derechos Humanos de Analucía (NGO): http://www.apdha.org/
Contest Information and Results: Contest Presentation Booklet.
Comparative information on Traveller Community in Ireland: http://www.ucc.ie/ucc/units/equality/pubs/Minority/oconnell.htm
Information on Expo ’92 http://perso.club-internet.fr/eb92/

5 Case Study 3: Health and Environmental Hazards at Cement Kilns Waste Incineration

5.1 Fact Sheet

Request: Made by CCOO

Duration: 1 ½, 2 years

Students: none

Costs: Human resources, one full time technician for nearly a whole year

Outcomes:
Booklet
National Press conference
Various local press conferences
Verbal presentations to cement kiln workers throughout Spain
Partake in round tables within various forums
International distribution of findings via web page and individual requests.
Use of the results by the Scientific Commission at the European union level.

Working Methodology:
Literary review of existing data and scientific studies around the world.
Compilation of data from workers and manufactures at cement kilns plant level.

Interviews:
2 Science Shop: ISTAS director and main technician in charge of the project.
2 NGO: CCOO director of environmental risks and lawyer representing association at one of the plants.
1 Scientist: Scientist who's work was used to design final proposal.

Follow up projects
This project is an ongoing concern, particularly its dissemination process.
Dissemination in Spain of Declaration of Scientists on dioxin release in waste incineration.

5.2 Summary of the Project

Part of ISTAS' (the Science Shop) work is to observe environmental, scientific and social science issues which can have a detrimental effect on worker's lives. In this sense they act as an independent observatory for CCOO. In early 2001 the issue of burning cattle meal at kilns became a risk concern both for workers and for the environment.
ISTAS made a recommendation to CCOO to study this issue with view to minimising worker environmental risk. CCOO accepted the proposal and ISTAS began the research project both to find out the risks involved in this type of activity as well as ways in which this risk could be minimised.
The methodology was one of investigating all research and scientific results from studies made into incineration, particularly that carried out in kilns and of incinerating animal meal. The search was carried out with direct contact with scientists in the area of environmental risk as well as through internet and ISTAS' own contacts around the world.

5.3 Participants

Science Shop: ISTAS
NGO: CCOO, Cement Kiln workers.
Scientist/University:

5.3.1 Science Shop: ISTAS

Address: C/ General Cabrera, 21
E-28020 Madrid
Tel. (+34)914 491 040
Fax. (+34)915 711 016

ISTAS[28] is a self-funded technical foundation promoted by the Spanish Trade Unions Confederation (CC.OO.) to support social activities for the improvement of working conditions and environmental protection in Spain. It has been founded to back trade unions' action in the field of occupational health and environmental protection.

ISTAS activities are ruled by the principles of autonomy and scientific accuracy, key aspects in technical advisory, as well as non-interference in trade union's decision process.

[28] Source: http://www.istas.net

Being a Trade Union foundation, the orientation, programming and management of ISTAS are under supervision of a Directorate. The majority of its members are trade unionists appointed by the Central Trade Unions Executive Commission. It has been created to serve all workers and maintains cooperation with similar organizations at European and international levels.

Interviewed for Science Shop: Estefanía Bount, Miguel Crespo.

5.3.2 NGO: Spanish Trade Unions Confederation (CC.OO.)

Address: C/Fernández de la Hoz, 12
28010 - Madrid
Email: ccoo@ccoo.es
Teléf.: 91 702 80 00
Fax: 91 310 48 04

CCOO[29] is a democratic Union organisation and umbrella body for State Federations, National Confederations and Regional Unions. It defends the professional, economic, political and social interests of workers in all areas, particularly places of work. Its main objective is the end of all type of oppression, discrimination and capitalist oppression.
Although CCOO was the main founder of ISTAS, the latter work as an independent consultant in issues of scientific investigation and advice.

Interviewed for NGO: Carlos Martinez (CCOO), Juan Romero Agud (representing anonymous NGO)

5.3.3 Scientist (University): Instituto Valenciano de Investigaciones Agrarias (IVIA).

[30]The origin of the IVIA goes back to the first Practical Farm-School of Agriculture of Valencia created in 1881 and to the stations of Fitopatología (1924) and Naranjera de Burjassot (1931). These stations next to the one of Horticultura de Benicalap and Arrocera de Sueca later formed in 1970 CRIDA 07 and in 1984 the present Valencian Institute of Agrarian Investigations. IVIA, is an Independent organism of the Valencian Generalitat, assigned to the Conselleria de Agricultura, Fishing and Food, created in 1991 by Law 4/1991 of the Valencian Generalitat. Its aims are to impel the scientific research and technological development in the Valencian agro-alimentary sector.

[29] Source: http://www.ccoo.es/pdfs/estatutos.pdf
[30] Source: http://www.ivia.es

Address: Instituto Valenciano de Investigaciones Agrarias.
Dirección: Carretera de Moncada-Naquera, km 5.
46113 Moncada (Valencia)
Spain
Tel. 96-3424000
Fax. 96-3424001

Interviewed as scientist: Fernando Pomares García (Team Leader for Fertilisation and Soil Conservation)

5.4 Project Description

For this project we identified the Union as a pseudo NGO, as it is the kind of association that look after workers' rights and health. The reason it was the Union of CCOO which we took as the "customer" in this case is that the official request for further research of the case came from them, but many other people also requested this study albeit not in an official capacity.

"In the theme of the animal meal, of which this interview is about, we have worked as advisors to UGT as well as CCOO. In this case UGT came to us like other organisations did and we resolve the question." Miguel Crespo, Science Shop.

The work ISTAS took on has three main areas of work within this project.

"Theoretically, although with leeway, there are three areas of work which would be training, where there are also external collaborators. Then there's the area of work health, in which the main type of work would be that of research and would be the flag of the institution, and then an area of environment in which we work on research, information adaptation at a scientific, technical level for its use at a Union level." Miguel Crespo, Science Shop.

For CCOO (the main NGO in this case) this project fits in with their working relationship and responsibilities as full time collaborators in health and risk issues.
"Within what is the normal work carried out by ISTAS, they took charge of making a report about the environmental repercusions and labour health of the use of dangerous residuals in cement kilos. As well as the report they have been advising us, the environmental federal department as well as the construction federation FECOMA, which is the federation which carries the cement kiln companies." Carlos Martinez, NGO

For the association (secondary NGO) the aim was more specific.

"… our request was to Miguel Crespo to prepare a petition report in the concrete case that we had in which we were working." Juan Romero Agud, Lawyer for second NGO

5.4.1 Objective

The first objective of this project both for the Science Shop, ISTAS, and for the NGO, CCOO, was to find out what, if any, risks there were in the incineration of cattle meal in kilns. Secondly there was, and still is, the objective of disseminating the results from this research to all people , NGOs and organisations, through training, meetings and publications particularly for workers involved in this type of work and the citizens who live near the kilns which were (and are) carrying out this activity. Thirdly, and linked with the first, was to provide an alternative solution for waste management. Fourthly there is the ongoing objective of changing waste management policy at national, regional, local and industrial levels.

"The problem started years before because of the national plan to manage hazardous waste in Spain ,but there are no places to take this waste so they are taking them to cement kilns and are trying to eliminate them there…. Our objective was first to give information to workers of environmental and health risks, first of all we give information to workers so they could make decisions." Estefanía Blount, Science Shop

It is also worthwhile mentioning the reason why cement kilns were so keen in burning animal meal.

"It is a complicated subject to move ahead with because the cement kiln companies have a great interest to use these dangerous waste products as fuel. They use many mechanisms to deal with and convince the workers, the administration or the city councils and the neighbours of the areas where they are located." Carlos Marinez, NGO

One of the NGO objectives is to effectively influence decision making at a national, regional and local levels with regard policies on incineration for waste disposal in order to minimise the risks to health to workers and the environment.

"…the union has the position against incineration because we feel it is not the most sustainable way to manage waste. This also creates a new problem with the workers in the cement kilns because they have to manufacturing cement to become waste

managers and exposed to new problems because they have to manipulate hazardous waste." Estefanía Blount, Science Shop

5.4.2 Working Methodology

The main method during the research stage was Data Gathering.

"Gathering information, tried to make some contacts with the ministry of the environment …because they were doing the inventory of dioxins and tried to get information through them, we made contact with employers, the manufacturers association, tried to get information through them and especially abroad, information from other organisations and the US, we have data on kilns and dioxins for example, in Europe there is a lot of experience on burning waste and what happens after that. So it was reviewing literature, trying to make direct contact with some institutions for the initial part of the research." Estefanía Blount, Science Shop

The other stages of the project, those of training and dissemination, were often combined with the first. ISTAS, sometime acting independently or as CCOOs official scientific branch, would visit kilns as soon as they had the first conclusive evidence of the risks involved in the incineration process for animal meal.

"There have been multiple meetings with union delegations in these companies to which the ISTAS people who carried out this report have come to and this has allowed to clear points of views and circumstances of this case." Carlos Martinez, NGO

Miguel Crespo, the main technician involved in the research, went on to the describe the actual stages of research and how these led from health risk information to a possible working alternative model for residual management. Providing a viable solution was of course part of the initial objectives.

"The first search was carried out via internet, at the same time we contacted a person, a researcher of agrarian activities who works in IVIA (Instituto Valenciano de Investigaciones Agrarias), is a man who has been working many years now in biodegrading residuals via composting. We contacted him to see if he had done a similar work or if it could be considered [for animal meals, ed.]. We also contacted with a vetenary from Madrid who had written a report about the inconvenience of incineration, this path did not prosper although we did have success with the other contact, Fernando Pomares, who carried out the research work. In fact he proposed a program and began a program of agricultural use of the animal meals." Miguel Crespo, Science Shop

5.4.3 Project Initiation

One of the main roles ISTAS plays for CCOO is that of worker health risk watchdog, when possible risks have been identified they are reported to CCOO which then decides whether they want the issue researched further or not. In this case the problem escalated at a very fast rate due to the media coverage and government decisions at the time.

"… one of our functions that we have with regard the Union, is to launch initiatives that we understand are convenient for the Union. So there was an initial discussion between Estefanía and myself as we were in charge of environment at the time. We evaluated what was on the table and the convenience of launching taking into account that the objective for us was not so specifically the animal meals but that there emerged a sensitising in the street against incineration. We made an initial proposal to the Union and from the Confederation Secretariat a mandate was launched." Miguel Crespo, Science Shop.

"This [incinerating waste in cement kilns, ed.] went on for years, but then in the last couple of years the problem toped up when the mad cow decease came about and also they could not commercialise the animal meal anymore and what to do with this waste, there was tons of waste and what are we going to do with it? So, cement manufacturers reached an agreement with the government where they would burn them in their plants, so we said, 'okay, hold on a second, are there no other alternatives? Lets study lets study other alternatives because incineration is not sustainable and how are we going to do this, this is biologically contaminated waste, we don't want our workers exposed to that waste lets sit down and do this right'. That's when CCOO talked to ISTAS and asked them for technical advice, work the problem about, the dimensions, what are the risks for health, that are the risks for the environment and what criteria should the union have to counteract this problem." Estefanía Blount, Science Shop.

5.4.4 Duration

The research work began at the end of 2000 and continued with one full time technician (Miguel Crespo) for over a year. After the initial stage, the research, training, dissemination and policy changing activities for alternative waste management were carried out in parallel.

"The initial phase was to do a literature review and find out information, what alternatives are there, what will happen when we burn this waste, what will the

emission be, review all the legislation, find out what's the maximum dioxins limits on emissions [for example], what does legislation say about classification and labelling of the waste and so on. Kind of find out the whole scenario and then review information on occupational exposure and environmental risks as well" Estefanía Blount, Science Shop

"14 months in total. The extension was not voluntary. In the summer of 2001 we thought to close the project because we understood that we had accomplished a part of our objectives. What happened is that in a way success killed us. We had generated so many expectations that from September 2001 to March 2002 we have had an incredible job outside as well as inside the Union. There have been some territories that from then, like in Castilla y Leon, we even had contact with the administration to create an autonomous proposal of management for this type of residues. Elaborated a small document to work this theme, but also street level divulging information… we couldn't stop the process and it went on 14 months." Miguel Crespo, Science Shop.

5.4.5 Budget and Finance

ISTAS is a financially independent entity, as a foundation it is however administrated by a board of governors, most of who belong to the upper hierarchy of CCOO, which was the entity that originally founded ISTAS. Therefore the decisions of what work to carry out or not carry out will often have Union criteria or interests behind them. CCOO did not pay for this project, although they did later publish a Union Guide with the results.

"The activities that ISTAS does is not financed by the union. We usually live from projects that we do, from the European Union or the Government or different types of projects, so within those large projects we have incorporated this type of work.
That's where we pay our salaries and we do all these projects, a lot of what we do is included in say a project on occupational health. The hours we put into it were not financed, we didn't have money, it was an extra effort we did, we are not a profit organisation, but this project did not have a budget allocated, but we did allocate one technician practically full time for a almost year on this project. It came from different funds. So the biggest effort was dedicating human resources for all this time. It came out of the general budget, allocated priorities." Estefanía Blount, Science Shop

5.4.6 Main Research Questions

The research aspect of this project had two main questions, that of the treatment received by the animal meal in its production processing and the second involved the suitability of incineration as waste management for the contaminated animal meal.

"To begin with, there was a first consideration which we proposed, that the information available pointed toward the fact that the process of denaturalisation of the animal meals was not as rigorous as it should be. Not according to regulations and less so with technical criteria. There were, and still are, only commercial criteria so in practice the processes are deficient.
In any case, from our point of view the truth is that there was no justification that this process be inadequate in order to propose incineration. Therefore one line of work was that public opinion was formally presented as only an urgency to treat the residuals as though legislation only permitted incineration and as though only this was the problem. We understood that this was only a way to cover up and understood that there was a public health problem previous to this but the only thing that was spoken about was that the animal meals had to be burned. "Look here, but there is a whole range of explanations to give that you are not giving," The second issue is that they are falsifying reality as the norms, in practice, say that the only legal option for the animal meals treatment are fertilising and putting them in a rubbish dump, that only optionally these can be incinerated. So it is not true that legislation says it can only be burned. And the third proposal was, from my experience in residual management I could see there were similarities between the animal meal with other flows that already existed… basically organic residuals, a presence of organic matter of about 60% - 70%, an important fat content, a product with in practice was perfectly biodegradable. So what we proposed was 'look here, associate the new residual or animal meal to the flows already in existence and apply technology which already exists.'" Miguel Crespo, Science Shop.

5.4.7 Documentation used during the Project

One of the first things I detected in the first stage of reviewing the documentation, there were many reports on ….but really, if you went to the references of these documents you could see that there were only half a dozen or so which are the ones we approached. The report by the Word Health Organisation, later on a couple of vetenary reports by the Interantional Organisation of Animal Health. A first report which was mainly overlooked, but for us was very important as they were one of the first to react, that was from the Association of Haemophiliacs, they are a very sensitive

collective. It was one of the first and detected that there could be a contamination… Later on there is a report by Carlos III and that's it, the rest are based on these.
There was a lot of noise, you could see lots of documents but when you searched the references they were all the same. This was one of the things we divulged, the sources were few, concrete and all placed the sterilisation process in doubt. In fact in one it accepted that incineration was not the only way forward." Miguel Crespo, Science Shop.

The reference material used during the research by ISTAS is the following[31]:

WHO Infection Control Guidelines for Transmissible Spongiform Encephalopathies 23-26 March 1999.

La enfermedad Creutzfeldt-jakob y la hemofilia: evaluación del riesgo Bruce Evatt, M.D.

Enfermedad de Creutzfeldt-Jakob Paul Climent. Federación Mundial de Hemofília: http://www.wfh.org/Spanish/SpanishPublications/cjd_sp.htm

Encefalopatias espongiformes transmisibles (TSE) Dr. Hugo Villegas de Olazával

Encefalopatía espongiforme bovina. Ficha de enfermedades de la Organización Mundial de sanidad animal. : http://www.oie.int

Danish Food Ministry."Calculated costs for different scenarios for changing the rules for manufacturing and use of meat and animal meal". 21 de febrero 2000.

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00/418/CE Decisión de la Comisión por la que se reglamentan el uso de los materiales de riesgo en relación con las EET y que modifica la Decisión 94/474/CE.

5.5 Channels of Communication

The channels of communication very much depended on the people being contacted.

"Internet yes for information, plus if we had to contact someone email is a good way to contact them, specially if you don't know them, scientists or governments, some people we have called, if we wanted a meeting with government representatives we've called, working with the workers, most of them don't have email, this was also a challenge, usually we have to have direct meetings with them, face to face meetings. The union usually through phone or email I will contact the person in the union and then they call the people, [for example] the people from Andalusia, or if we had a national meeting or they call people from each of the factories and they would come and we could talk to them directly. We also did a lot of visiting all of the plants on a one to one basis, specially myself, we would go to the cement kilns, there we would visit the plant, we would have a meeting with the director, the technical people and with the workers and we would also inform them and we would gather information. That phase was more face to face and direct meetings." Estefanía Blount, Science Shop

5.6 Key Findings and Recommendations

The findings and recommendations have been threefold, firstly the production processing of the animal meal was questioned and recommendations were made with regard this process, secondly risks were found to be too high when incineration was used as waste management and thirdly an alternative waste management procedure of investigated and proposed as a viable solution for the second problem.

With regard the production of animal meals the following were key findings:

"…the information available pointed toward the fact that the process of denaturalisation of the animal meals was not as rigorous as it should be. Not according to regulations and less so with technical criteria. There were, and still are, only commercial criteria so in practice the processes are deficient. In any case, from our point of view the truth is that there was no justification that this process be inadequate in order to propose incineration.
Therefore one line of work was that public opinion was formally presented as only an urgency to treat the residuals as though legislation only permitted incineration and as though only this was the problem. We understood that this was only a way to cover up and understood that there was a public health problem previous to this but the only thing that was spoken about was that the animal meals had to be burned. 'Look here,

but there is a whole range of explanations to give that you are not giving'. " Miguel Crespo, Science Shop

With regard, and as mentioned before, ISTAS had been working based on the fact that incineration is not an advisable type of waste management, more so if it is carried in inappropriate industrial plants.

"We do find that there are environmental risks to incinerating waste, regardless of the type of waste, in cement kilns because we don't think they are prepared, they are not comparable to incinerators because they can only reach certain temperatures, there is no fast cooling and so dioxins can be released and other pollutants escape the filters that cement kilns usually have, like very, very fine particles for example a lot of heavy metals are volatile and so usually escape the filters as well. They are not even prepared.
So we found there could be environmental risks and occupational health threats and public health threats. A lot of these cement kilns in Spain are built within the town, wall to wall with a houses, you can see there is this white powder covering the streets, the cars, the houses and everything which is the regular activity, all these particles escape the filters and we are talking more toxic pollutants, that will also escape.
You do see that a lot of the cement kilns are very old, they have very old technology, they are surrounded by houses, it is not a good idea to burn the waste, there are technological and scientific questions everywhere and so we don't agree with burning waste to manage the waste." Estefanía Blount, Science Shop.

With regard the third point, an alternative waste management for the animal meal was proposed.

"…from my experience in residual management I could see there were similarities between the animal meal with other flows that already existed… basically organic residuals, a presence of organic matter of about 60% - 70%, an important fat content, a product with in practice was perfectly biodegradable. So what we proposed was "look here, associate the new residual or animal meal to the flows already in existence and apply technology which already exists."
What we proposed was on the one hand to examine the previous treatment of processing, guarantee the denaturalisation and then go to a process of fermentation. The advantages of fermentation is that gives an energetic benefit through the production of methane… and the final product is a very stable product at a biochemical level and is not likely to present any problems.

In this case in fact we proposed that we continue to apply the present technology and the final residue can be composted and can be used in agriculture." Miguel Crespo, Science Shop.

5.6.1 Political and Social Impact

The political and social impact can be measured at a national, regional, industrial and local level. Taking this into account the results were highly positive as in many places concrete measures were taken by policy makers at different levels with regard incineration and waste management for the animal meal.

"What we were trying here was to make a policy change… trying to reach the high political level to stop incinerating.
We were hoping to talk to the government and demand to not incinerate all the animal meal, lets talk of the national plan to find other ways to do this. In Castilla Leon we did almost reached that agreement. In fact they haven't started burning because we were there with UGT to try and find alternatives treat this waste.
There are so many different experiences.
Nationally the government reached an agreement with the cement manufacturers to do this, but then it is up to each community because they have the competence to treat waste, so each community is deciding what they are doing with them, for example yesterday I found out, in the Pais Valenciano they are trying to promote a … experience to compost the meal, so first they contacted us to help them. In different places they area making different decisions.
… once they are burning waste then what we are doing, in a few plants in Andalusia for example, there our position is different. It doesn't make sense to say "no, no, no," they are doing it already, there what we are doing is demanding information. And say, by law you have to assess the risk to workers, because this is a new risk you have introduced, and by law you have to classify the waste, and by law you have measure what comes out of the chimneys and we want that data. What we were able to do within Andalusia is there is a new European directive for the incineration of waste which applies to cement kilns that want to burn waste, so that is not going to enter into force until 2005, so what we pushed for was to push that date forward so by 2003 the cement kilns in Andalusia have agreed to comply with that new more restrictive limits for incineration.
We have obliged manufacturers and government to do things right and talk with us and insure participation with workers and citizens and try and do it better." Estefanía Blount, Science Shop.

5.6.2 The Results

If we divide the results by the objectives outlined at the start of this report, the following can be identified:

To find out what, if any, risks there were in the incineration of cattle meal in kilns.

"We do find that there are environmental risks to incinerating waste, regardless of the type of waste, in cement kilns because we don't think they are prepared, they are not comparable to incinerators because they can only reach certain temperatures, there is no fast cooling and so dioxins can be released and other pollutants escape the filters that cement kilns usually have, like very, very fine particles for example a lot of heavy metals are volatile and so usually escape the filters as well. They are not even prepared.
So we found there could be environmental risks and occupational health threats and public health threats. A lot of these cement kilns in Spain are built within the town, wall to wall with a houses, you can see there is this white powder covering the streets, the cars, the houses and everything which is the regular activity, all these particles escape the filters and we are talking more toxic pollutants, that will also escape.
You do see that a lot of the cement kilns are very old, they have very old technology, they are surrounded by houses, it is not a good idea to burn the waste, there are technological and scientific questions everywhere and so we don't agree with burning waste to manage the waste." Estefanía Blount, Science Shop.

Secondly there was, and still is, the objective of disseminating the results from this research to all people:

"We've done press releases, press conferences to present this report, and especially in the different locations where we visited these plants we have a lot of media and press conferences there. Local press.
We have also been invited to a lot of conferences with industry, manufacturers, who take us to debate, so different forums sometimes in technical forums, sometimes more political forums, sometimes with industry on a round table and express our opinions there.
Book released January 2002[32]… it is free for anyone who wants it. We don't have resources for this so that is why we didn't do broad distribution, we did short number to

[32] *Guía Sindical para el seguimiento y prevención de riesgos derivados de la coincineración en cementeras.* (Union Guide for the follow up and prevention of risks derived from the incineration at cement kilos.) Publisher by CC.OO and CC.OO-Fecoma.

insured all workers who wanted it could have it but lots of other organisations or citizens have called us and asked for a copy.
It's on the internet, anyone can access it." Estefanía Blount, Science Shop.

Thirdly to provide an alternative solution for waste management.

"…we had worked on models of organic residual flow management and this we used for the animal meal case and is what we have here to answer some of the problems that we still have. It was a tool, criteria, which we had already been elaborating and that we applied in this case." Miguel Crespo, Science Shop.

Fourthly there is the ongoing objective of changing waste management policy at national, regional, local and industrial levels, which were covered in the previous section on political and social impact.

5.6.3 Use of the Results

5.6.3.1 Science Shop
Other projects: The report generated by this study, as well as the publication by CCOO, have been used in various other cases.

5.6.3.2 NGO
Publication of a Union Guide, multiple forums and conferences.

5.6.3.3 Scientist / University
The study is an ongoing concern.

5.6.3.4 Use of the results by the public
The findings are freely available in the internet as well as through ISTAS and CCOO.

5.7 Personal Result Evaluation by participating bodies.

5.7.1 Science Shop Evaluation

The Science Shop has evaluated the results both overall as well as in certain cases where this study was used in particular.

"We have very ambitious goals, I am happy with the work we've done because with the resources we had which were very few, the difficulties we had because for a long time

we were the only group that was lobbing against this, Greenpeace were not involved, consumers, citizens were not, they would support, they would follow along but we were taking the lead. That's a lot of pressure for an organisation like ours, we don't have a lot of resources and it is very difficult to tell workers to tell them to take the lead on environmental issues, we are talking about their job. Although they usually agree and understand this, but sometimes they are… we can only push up to here, we cannot do any more, they are inside the company, and sometimes we need support from outside.
With the resources we have and the circumstances which are very special for a trade union to take on such a strong issue and make technical debate, it wasn't just ideas, it was hard data, we were debating, articulating for the workers from all the plants all over Spain. I am very happy with those results, because sometimes it is hard to reach workers, we did a lot of work visiting all of the plants, talking to them, I am happy with what we did.
Now, the results in some places I am very, very happy because thanks to our work we stopped a lot of these projects, which is beneficial for society and the environment, in others we didn't and others we are working on it. In no case I can say it was terrible." Estefania Blount, Science Shop.

5.7.2 Scientist Evaluation

The scientist evaluated the case by the content of the conclusions arrived at.

"Recycling the content of organic residues which can be used in agriculture is, from an environmental and health point of view, a much better option than the use of cement kilos for their elimination. " Fernando Pomares, Scientist.

5.7.3 The NGO Evaluation

The NGO evaluation centred not only on the project at hand but also on ISTAS.

"The truth is they support our work in a very efficient way in these themes. Both when we speak of advice to the union structures themselves as in the organisation of courses, meetings and in publishing specific themes in the areas of work health and environment. We work very closely together, very integrated with frequent meetings to combine planning and establish work rules. The evaluation is very positive, that ISTAS exists and can give this technical and organisational support.
…I think this report and the campaign we have carried out, against this usage of hazardous waste, and controlling what is done with guarantees, demanding information, demanding certain environmental conditions, I think it has contributed quite a lot to slow down the use of hazardous waste in cement kilns." Carlos Martinez, NGO

5.8 Reflective Report

This report will take into consideration the following Interacts objectives:[33]

Client Perspective: the social context of the project.
The Cooperation process: summary of the project phase.
Afterward: summary of the project impact.

5.8.1 The client perspective: the social context of the project:

5.8.1.1 Why was the request initiated?
This study has been requested by CCOO, the Union organisation which founded the Science Shop like entity, ISTAS, as the primary "customer" for ISTAS' work. Besides the official client, there were many potential users for the study such as for the cement kilns neighbourhoods or for public departments in charge of health risk.

As ISTAS also functions as watchdog for this Union with regard health risks to workers, they initially suggested an indepth investigation into the case of the cement kilns as well as to provide an alternative organic waste management solution for the animal meal.

Cement kilns were presented as a good solution for removing animal meal, a view welcome by these plants as it provides them with cheap highly combustible fuel, because of the huge media coverage of the animal meal problem at the time, the Union decided to go ahead and make a formal request for this study.
At the same time as this research was being carried out, another entity requested a study on risks to workers. This entity is presently staying anonymous due to the fact that legal proceedings are still pending, but it also represents the same "customer", but in the case of a particular cement kiln which was incinerating animal meal.

5.8.1.2 What role did the client expect the science shop (project) to play
CCOO expected ISTAS to make an in-depth investigation into the risks involved when incinerating animal meal in cement kilns. Particularly the cement kilns found in Spain. At the same time, this study had to outline workers' requirement in form of guideline. The client also expected ISTAS to be an integral part of the results dissemination process.

After risk to workers was scientifically proven, the client expected ISTAS to provide

[33] Source: Themes for Interacts Analysis, first draft 20th Oct 2002, by Michael Sogaard Jorgensen.

ways in which this risk could be minimised according to meet legislative regulations and also to provide technical advice for alternative waste management processes in those cases where incineration had not yet began.

5.8.1.3 The co-operation process: summary of the project phase

How was the project designed and carried through, based on the request of the client group and the interest of the other actors getting involved: science shop, researchers, students etc. Why did each of the actors decide to be involved?

The research was primarily requested by CCOO in the frame of its policy against incineration. Keeping this in mind, the process of incineration carried out at cement kilns, most of which are old and unsuitable, meant a possible health risk for the workers whom CCOO represent.

The work was a direct result of ISTAS role as a health watchdog with regard health risks to workers, as well as part of the Union policy against all incineration. ISTAS has a direct interest in profiting from its scientific competence in providing a study on health risk associated to cement kilns activities. Due to the absence of reference on the matter, it was considered a scientific challenge to investigate the relation between organic incineration and health risks.

The first task was to establish if indeed there was a risk to health through incinerating animal meal in cement kilns. A process of data gathering began to find studies done with regard this issue.

After it was established that indeed there was a risk involved in this process, the project moved on to accomplish the different goals established by the Union, that is to disseminate the results among workers, neighbours, industrialists and other entities, make sure that present legislation was rigorously met in cases the incineration had already began and at a wider level, to change national, regional and local policy with regard incineration at cement kilns.

The other aspect, which was the case in the particular kiln where this study was used, was to use the scientific material for the defence of a collective which had already been detrimentally affected by this industrial process.

In all cases the actors decided to get involved in this project because of a conscientious awareness of the risks involved in incineration and are all working in organisations which defend people's rights.

What was the result of the project? What was the role of each of the involved actors in "producing" the results of the project

It has been scientifically established that there were health risks associated in the process of incineration at cement kilns. The results that followed are concrete reports and a book published, as well as taking concrete measures to try to avoid this type of waste management for animal meal in places which had not yet began incineration, providing an alternative model of waste management.

To make sure legislation was met in places where incineration had already began and to lobby national, regional and local government to change waste management policy.

In the case of the legal proceedings we still don't know what the results are as the proceedings are still pending.

The Science shop designed the methodology for the study and assumed the co-ordination and the collaboration with the scientific and local sectors.

CCOO provided the funding for the publication of the results as well as providing its national network of affiliated worker organisms to carry out into specific cases as well as providing a large platform of result dissemination.

Afterwards: summaries the impact of the project:

- **What has been the impact of the project within each of the involved actors and how was the impact achieved.**
  On this particular project, impacts can be supposed for the following actors:

  vii) *NGO*.
  For CCOO, the first impact was to be leader in an issue no one had taken on at the time and this is relevant for lobbying at the political level and to prepare actions at the workers level. The case became a much larger concern than had originally been envisaged.
  They are happy with the amount of positive results in certain national regions and would like to have had more impact in others. With regard the particular cement kiln collective the impact from this study is yet to be established.

  viii) Science Shop
  The Science Shop had to legitimatise its scientific authority and defend itself as a reference entity for health risk analysis. One of the results have been to establish themselves as an independent authority in this

issue both within and outside the Union. ISTAS is therefore expanding its legislative assessment expertise to involve scientific research.

5.8.1.4 Scientific relevance and policy recommendations as seen from outside the involved actors

The scientific relevance should not be separated from the whole result of the study which has been the combination of scientific research, health risk prevention and scientific dissemination with social target.

The diffusion of results has supposed a great success for this case study since the client has continued the process by editing and distributing most of the outcomes. It has allowed the capacity to reach a social group in need of scientific assessment and this should be valorised scientifically speaking.

The primary reason for choosing this case was the specific model of Science Shop work which ISTAS carries out, particularly seeing as they are very visible and easily reached nationally as well as internationally by anyone who needs scientific information with regard the issues they cover.

The case of the cement kilns is of particular interest as it covers the wide range of roles which ISTAS, as a Science Shop like entity, takes on. We have these roles as the following:

Watchdog: for environmental issues, health risk issues to workers and neighbourhoods.
An established a methodology which clearly defines itself as bringing science to the people (e.g. workers). In various occasions those interviewed mentioned the fact that scientific works and papers had to be translated, not only into Spanish but into a language which could be easily understood by a non scientific community.
It is highly visible, it makes itself easily available for those people who might need scientific advice, they are easily reached via their webpage as well as through more traditional methods.
Takes an active part in disseminating the results of scientific studies.

The impact of this work by the Science Shop has had nationwide repercussions, but at the end of the day even if this work had been able to improve the lot of only one community, it can be seen as a complete success.
In making science available to entities which would not otherwise have it, ISTAS has established as a clear intermediary between science and the public.

What we have to question is what is the infrastructure which has allowed ISTAS to be able to do this type of work at such a wide scale. By analysing this structure we could use it as a base for a working model for Science Shops in Spain.

In this case, the main customer was a national Union and has provided its national network as well as it representation within national politics to set a platform for ISTAS to work with, which has had a direct correlation to the social and political impact.

However, and as with several other Science Shop cases in Spain, there was no funding for this study and ISTAS had to provide its own funding for the research. This points to an interesting pattern in that often in Spain the funding arrives at the dissemination stage while the research itself has no real funding.

As with the other Spanish cases, the concept of Science Shop was enthusiastically greeted by the actors involved:

"The Science Shop concept seems very interesting to me, as it can permit the implication of researchers or independent and impartial scientific personnel in the resolution to society's pressing problems through the direct agreement between social organisations and groups of scientists. It seems very interesting that science, or its agents (scientists) implicate themselves decisively in society's problems, both social aspects as well as economic and environmental.
…For many scientists it can be much more gratifying to contribute in the resolution of a social problem than generating a new technology in a productive process, with beneficiaries who are, primarily, private and reduced." Fernando Pomares, Scientist.

5.9 Appendix

5.9.1 Reference Material

Information on ISTAS : http://www.istas.net
Information on CCOO: http://www.ccoo.es/pdfs/estatutos.pdf
Information on Scientist : http://www.ivia.es
Union Guide : *Guía Sindical para el seguimiento y prevención de riesgos derivados de la coincineración en cementeras.* (Union Guide for the follow up and prevention of risks derived from the incineration at cement kilos.) Published by CC.OO and CC.OO-Fecoma. 2002
Scientists for the Elimination of Toxic Pollutants: http://www.istas.net/decops.htm

Stockholm Agreement on Persistent Organic Polluting Agents: An international instrument for a global problem. By Estefanía Blount. (http://irptc.unep.ch/pops/)

6 Policy Evaluation of the Spanish Research

The policy evaluation outlined below describes first the Spanish IDT policy principles and the Scientific technological areas targeted in the National Plan 2000 – 2003. This preliminary explanation allows in a second phase to place in this scientific map the investigation achieved in the 3 cases selected in this study.

Spain came into scientific policy a little late in Europe, as the first science law was edited on 1986: the Law 13/1986[34], of Promotion and General Co-ordination of Scientific and Technical Research established the National Plan for Scientific Research and Technological Development. It launched the National Plan and the management office (CICYT-Comisión Interministerial de Ciencia y Tecnología).

The National Plan was conceived as a mechanism designed to integrate several different elements, and which had to determine the principal objective in R&D for multi-annual periods and to organise the research activities into programmes to be carried out by those ministerial departments with responsibilities in the relevant areas.

First National Plan is from 1988. Since then, different plans have succeeded to "improve notably the Spanish Science-Technology-Enterprise System, increasing the capacity of the public R&D system and opening it up to the productive sectors".

The last plan issued is the **"National Plan for Scientific Research, Technological Development and Innovation 2000-2003**". It has finally centralised all the research capacities and programmes, being issued by the newly created Ministry of Technology. A brief outline of the policy objectives and plan structure is given below:

6.1 Spanish IDT policy principles[35]

Direct relationship between the innovative capacity of a country and its competitiveness
Contribute to the development of public sector policies (Education, Health, Environment, etc.)
Improve the welfare and quality of life of the citizens

[34] Source : http://www.ocenf.org/educa/legisla/ley13_86.htm
[35] Source : http://www.mcyt.es/sepct/PLAN_I+D/pnididocu.htm

Reinforce basic research, which is a fundamental element in the generation of knowledge and the basis for all long term development
Encourage enterprises to become fully involved in the culture of technological innovation with the aim of increasing their competitiveness
Improve the co-ordination of the scientific and technological tasks between the public and private sector, not only the quality of the research but also the value of its applications.

Scientific technological areas targeted in the National Plan 2000 – 2003:

“Scientific technological areas” are defined as domains of priority activities linked to the development of knowledge specific to a technology or a scientific discipline:

Biomedicine
Biotechnology
Information and Communication Technology
Material Science
Chemical Processes and Products
Industrial Design and Production
Natural Resources
“Agrofood” recourses and Technologies
Socio-Economic Research

Sector areas

Sector areas are defined as a set of R&D&I activities geared by the entrepreneurial and social demands and focused on the solution of problems in a specific strategic socio-economic sector.

Aeronautics
Food
Automotive
Civil construction and Preservation of Cultural and Historical Heritage
Defence
Energy
Space
Environment
Socio Sanitary
Information Society
Transport and Land Planning

Tourism, Leisure and Sport

New issues stressed: the European Paradox

The "fact that the Spanish Science-Technology-Enterprise system, as in the whole of Europe, suffers from a lack of practical applications, generated from the knowledge obtained through research. This phenomenon is known as the "European paradox". It is therefore essential for our productive sectors to take maximum advantage of the efforts made in applied research". The above mentioned issue legitimates a more applied research effort in this new National Plan 2000-2003.

The European paradox, mentioned as a Spanish problem, is somehow due to multiple factors, especially to a non research oriented educational system prevailing in Europe and to the gap between science and society. Science shops have an interface role to solve the mentioned gap. As far as expected, any Applied Science could eventually match with scientific requirements coming from the society side, where there are such unsatisfied or newly created needs. However if there is an interface actor in the referred science/society relation, then we are speaking about applied research generated from the knowledge obtained through Science Shop.

6.2 Conclusion

When comparing the sector areas and scientific technological areas tackled in the cases studied in this report with those targeted by the Spanish National Plan, we find that social sustainability approach is missing in the scientific technological areas prioritised by the National Plan. The technological areas where our cases can be classified in a more social sustainable approach.

Table of Science Shop case studies characterised by sector areas and scientific technological areas in relation to the Spanish National IDT Plan 2000-2003 (NP)

Science Shop Case studies	IDT - NP Sector area covered	Scientific technological areas tackled (*not prioritised in NP*).
CASE STUDY 1 "Urban Ecology Strategy Design, Seville 2025"	Information society (Advance public services)	Socio-economic research
CASE STUDY 2	Transport and land planning	Sustainable building

"Architectural Study for Romany Community"	(land planning and sustainable development)	technologies
CASE STUDY 3 "Health and Environmental hazards at cement kilns waste incineration"	Environment (management technology and the treatment of refuse)	Waste incineration process

Source: PaxMed elaboration based on the IDT National Plan and INTERACTS case studies.

A search through the National Plan looking for references to "the civil society", "cohesion", "participation" or alike gave us the following results:

One of the stated objectives of the scientific policy is to improve the welfare and quality of life of citizens
Scientific and technological cohesion is aimed at in the Plan via "allowing any Spanish R&D group the access to high quality research facilities and equipment" understood as a contribution to lessen S&T isolation and the training of less favoured regions human resources.
Participation is concrete postulate missing in the National Plan since the Modality of Participation section only refers to financial participation to the R&D effort. Direct participation shall be the way to diffuse science if conceived as part of the research undertaken and not let aside as it may occurs. By accessing science, one can better touch to it decision.

The applied science should first consider how the result of a scientific research can be developed and integrated by the larger range of social groups. This postulate has been the basis for the EASW methodology development which has been produced as a research project conceived around the participation ("of EASW expert") and aiming to be widely diffused for the benefit of the users.

In the 3 cases selected for this study, the Science Shops involved have brought the scientific means needed to investigate concerns of the civil society, either at the local level as it was for the Seville's cases or at the national level as for the third case study presented. In all our cases, the investigation produced aimed to reinforce the civil society cohesion and its participation while this aspect is under represented in the objectives outlined in the IDT Spanish policy.

6.3 Recommendations to the new Spanish IDT national Plan

The Special Action subsection of the National Plan contemplates the disclosure of result and scientific and technological divulging, which is the signature of Science Shop activities. In this way, the Science Shop model could link with the National Plan and fit at this level. Since it is the ending period for this edition of the National Plan, it appears the right time to persuade on the usefulness of this model for the emancipation of science and society.

Considering the recent launching of the new European IDT Framework Programme, it can be expected that the Spanish National Plan ending in 2003 shall renew its principles and approach more to the new European science and society approach.

In the above, reference has not been made to the Regional Science and Technology Plans. In Spain there are 18 Regions and almost all of them have a Plan.