



Program: FP7 Cooperation

Deliverable 5.8

Best practices document

Project acronym:	EUROSHELL
Project title:	Bridging the gap between science and producers to support the European marine mollusc production sector
Project coordinator:	Comité National de la Conchyliculture (CNC)
Grant agreement number:	312025 – FP7 KBBE 2012.1.2-11
Funding scheme:	Coordination Support Action
Deliverable number 5.8:	Best practices document

BEST PRACTICES FOR KNOWLEDGE MANAGEMENT IN THE SHELLFISH SECTOR

Recommendations on how stakeholders (Producers' organisations, RTD institutes, local and regional government or policy advisors) can ensure that transfer is incorporated as part of communication between stakeholders in the sector.

Through the discussion on extension that were held during the first stakeholders meeting and the 7 regional workshops, a number of ideas and suggestions came out to improve knowledge transfer between science and industry. Several questions were asked to launch the discussion in small groups so as to facilitate the participation of everyone.

THE PROBLEMS

One of the major problems identified is the system by which the careers of scientists are measured – notably their peer-reviewed publications, their administration and their teaching. **Researchers are not recognised professionally for transfer** and it may also be that in an environment of high competitiveness to access diminishing research funding, universities and public research institutes might actually **keep back knowledge** from peers and end users to be more competitive in certain fields of expertise.

Education and interest levels are also different in SMEs, especially small family companies that do not have the capacity to access information or implement knowledge in their daily operations.

In terms of actually sourcing and 'packaging' research knowledge for transfer there are often **limitations on time and resources** to do this, and especially concerning translation of the research findings and the assessment of their credibility. This problem may be compounded by the fact that some research has **no direct, short term impact** and it is not clear in many cases how to actually use the research outputs.

A final summary point raised here is the existence of a north/south divide in Europe that may operate on all the levels mentioned above. An example was provided for shellfish culture in Greece where the sector remains under-developed as it is not considered to be of strategic, political and socio-economic importance and hence **resources are not directed towards its development**.

In all shellfish producing countries – irrespective of their development status – there is a **real need to strengthen connections and bridges between the structures, the tools and the regions**.

THE SOLUTIONS

- A matter of will and attitude

To strengthen cooperation between scientists and producers, the most important is to want it and to agree to make some effort to improve the relationships.

Professionals must become more involved: in governance, decision-making regarding the industry and its organization, the demand for information and its dissemination between all stakeholders of the sector, including among professionals themselves, in collective actions (cooperative ...) ... and not just in times of crisis!

Scientists should show interest towards shellfish farmers and their empirical knowledge and get closer to them.

- Have common needs and priorities for all stakeholders involved in the network

The profession must continue to organize to have a **common vision / direction**, to formulate a clear message to decision-making bodies.

This common vision must be assorted to **clear objectives to be communicated to scientists** so that science can be oriented towards the search for solutions to the problems that the sector encounters.

This work can only be done through consultation meetings. Many stakeholders who participated in Euroshell regional workshops said that this kind of meetings to share views and ideas should be organized more often.

In the Netherlands, for the different sectors in the industry there are specific knowledge groups such as for oyster culture, and these groups discuss about main knowledge gaps and priorities for solutions.

- Encourage direct dialogue

Public meetings should be organized more regularly. For example, three meetings could be set every year, regardless of the current situation, regardless of the progress of projects.

Annual conferences can also be organized where **short presentations** are made, followed by **open floor discussions**.

In the Netherlands, the shellfish industry organizes annual seminars (<http://www.wageningenur.nl/en/Expertise-Services/Research-Institutes/imares/Projects/PRODUS-Sustainable-shellfish-culture.htm>) and biannual symposia (www.schelpdierconferenties.nl).

In France, the IFREMER organizes open house days every year in every coastal region to present scientific and technological activities.

These meetings can be organized by the national or regional organizations representing producers or by research centers or technical centers, or jointly. It is important to have **physical meetings to**

discuss projects that are completed, ongoing and future, to discuss about progress and difficulties, **in a transparent manner**.

Each party must **understand the work of the other**. Professionals must understand that researchers cannot provide immediate nor generalizable solutions. The study results are sometimes only valid at a given time and place.

Scientists must, for their part, understand that professionals need practical and immediately applicable solutions. They must therefore explain their approach, hazards, setbacks, etc.

In Italy, a new society (SIRAM: www.siram-molluschi.it) was setup that organizes meetings where scientists and representatives of producers and some producers meet. The meetings are paid by sponsors. Outputs of conference are public proceedings.

- Strengthen participation of the industry in RTD projects
 - Involve industry in RTD **right from the inception of the programme(s)**:

Professionals should be involved in studies, from their formulation to their results. There is a strong **need for consultation**. These studies must be punctuated with steps during which stakeholders meet to report on the progress of the project, agree on the solutions and on any adjustments.

- **Simplify the administrative procedures** for their participation in RTD.

In the Netherlands, the industry participates in research and funds various PhD projects and a chair on sustainable shellfish culture at Wageningen University.

There are also PHDs co-funded by universities and industry in France and in the UK.

- Provide courses for producers and incentives for participation

In France there are various secondary schools - Lycée de la mer (25 throughout France) – that provide training for aquaculture and fisheries. Producers have the obligation to follow courses/get diplomas at these schools to receive permits.

It is also important to provide **life-long learning courses**.

In Ireland, there are funds for farmers to attend workshops and conferences abroad. The BIM offers also training courses.

The training services should not be totally free. In agriculture, it was found that when farmers had financed a training service, the results were better than when they had just attended a training entirely financed and designed by others.

- Focus on demonstration and learning from each other

Demonstration by giving examples is a good way to popularize. It is generally easier to understand a phenomenon when observed oneself, even better, when experienced. Experiments are essential not only to advance the research, but also to understand various phenomena.

Technical centers are good platforms to demonstrate and experiment with producers and scientists.

There are **4 technical centers in France**: CREAA (Centre Régional d'Expérimentation et d'Application Aquacole) in Poitou-Charentes, SMIDAP (Syndicat mixte pour le développement de l'aquaculture et de la pêche en Pays de la Loire), CEPRALMAR (Centre d'Etude et de PRomotion des Activités Lagunaires et MARitimes en Languedoc-Roussillon), and SMEL (Station Méditerranéenne de l'Environnement Littoral). Science/industry cooperation could be strengthened through these centers.

Meetings in the form of farm visits, lab visits, forums bringing stakeholders together, workshops, exchanges between professionals and scientists should be held regularly.

Exchanges between different countries can also be organized.

There are exchanges between Irish and French farmers for example.

Of course, informal meetings can also take place ad hoc.

Discussion groups could be set up either by producers, or by local organizations, but the will/decision has to come from local producers. A group of about 10 producers can decide to work together. They organize regular meetings where they discuss about specific problems and try to find solutions together by experimentations. They can invite specialist, scientists, to bring some advice.

Dairy discussion groups in Ireland

- A forum for sharing ideas between members; a place to openly discuss farming issues; and to keep up to-date with new technology.
- Offer support to farmers through the provision of a social network.
- The primary purpose is to provide a forum suitable for learning to take place.

Benefits: gaining technical information; solving problems; support in trying out new ideas; positive attitude; new friendships; personal development.

Groupements de Vulgarisation Agricole in France

In France in the sector of agriculture, many farming extension groups called *Centres d'études techniques agricoles (CETA)* have been created to listen to the concerns of farmers members ; establish a program of work to address these concerns; study the problems using the most appropriate methods; provide its members with solutions that could be applied in their operations; facilitate the implementation of adopted solutions in their farms.

- 10 to 20 farmers who decide to meet regularly to discuss their farming problems and to work together to find solutions
- a democratically elected president and a competent technician and good facilitator
- a serious program of work in response to priority issues of participants
- a significant contribution, reflecting the commitment of each member
- experiments and surveys on the farms of members
- visits and study tours elsewhere in France and / or abroad
- training sessions and training for elected officials and technicians

This has been tried in the sector of shellfish farming in Southern Brittany but it failed after a few years simply because the facilitator left. Although it was very useful, the will was not strong enough to provide **time and effort** to carry on.

Fisheries Knowledge Groups in The Netherlands

These groups are nationally organised partnerships between fishermen, fish farmers and scientists. These research institutes help the fisheries in adding value to fish products, reducing their environmental impact and lowering production costs by facilitating communication and cooperation between fishermen, fish farmers, scientists, experts inside and outside of the fisheries chain and NGO's and by carrying out research.

- Include a phase of knowledge transfer in all research projects

Knowledge transfer should become part of each research project. It should be evaluated and become **a condition for the final payment**. The rules for transfer within the evaluation of projects should be re-assessed.

The projects should be **kept alive** after the funded phase.

In the United Kingdom, there are projects where PhD/Master's students are asked to answer specific problems that producers have. They learn to apply their knowledge, and teach the producers how to approach a problem scientifically.

- Develop communication tools

Communication is the key for good relation and partnerships. **Information must circulate** more. It does not necessarily mean to multiply letters, emails, and other messages but relevant information

must be transferred. For example, it is important to **send newsletters regularly**, from producers' organisations to producers and scientists, from scientists and/or technical centers to professionals.

Scientists or technical centers should write **data sheets or synthetic information to be disseminated** towards professionals. Again, it is important that the transmission of information is **regular**.

This task can also be fulfilled by producers organisations.

For example, the *Comité Régional de la Conchyliculture (CRC) de Bretagne Sud*, regularly writes scientific factsheets of one to four pages about a concept/word that it sends to its members.

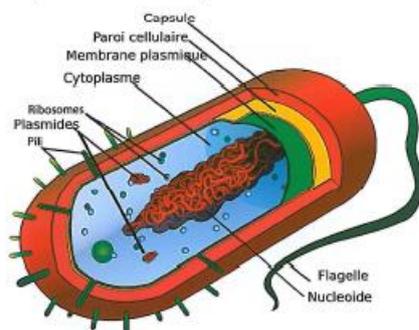
vulgarisation

Une bactérie

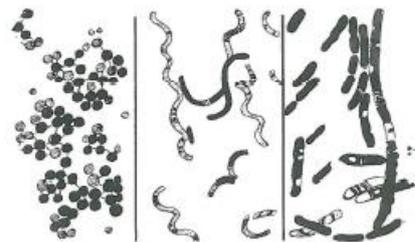
C'est quoi ?

Une bactérie est un organisme vivant unicellulaire de quelques micromètres de long, sans noyau et possédant le plus souvent 1 chromosome (filament d'ADN).

Elle peut posséder des flagelles.
Elle peut être entourée d'une « capsule »



Elles ne sont pas toutes pathogènes.
Elles ont des formes différentes.



Ça se reproduit comment ?

La bactérie se reproduit par simple division. Une cellule donne donc deux cellules identiques comme on peut le voir sur la photo ci-contre.

Division de streptococcus pneumoniae
(D Feneil, AM Di Guilmi - 2007)
<http://www.ibs.fr/>



Ça sert à quoi ?

On peut classer les bactéries comme l'a fait Elisabeth Gauthier dans un article sur les antibiotiques, paru en 1993 dans le magazine L'Agora à savoir les « Bonnes », les « Brutes » et les « Truandes » ©

Les « **Bonnes** » bactéries ou celles utiles pour l'homme : Lactobacilles du yaourt, bactéries intervenant dans le traitement des eaux usées, bactéries intestinales utiles à la digestion

Les « **Brutes** » : On pourrait y classer *E. coli* lorsqu'elle est retrouvée dans le milieu marin. Elle est indicatrice de pollution fécale et peut entraîner des déclassements de zones conchylicoles.

Les « **Truandes** » : On peut y classer de nombreuses bactéries au nom évocateur telles que *Mycobacterium tuberculosis*, *Mycobacterium leprae*, *Vibrio cholerae*, *Staphylococcus aureus* mais aussi *Salmonella*.



La bactérie sera plus ou moins virulente en fonction des conditions environnementales, du nombre de bactéries présentes, ...

On les trouve où ?

Elles sont PARTOUT (dans l'océan, dans les intestins, dans la bouche, sur les mains, dans les yaourts, dans le fromage, ...)

Certaines peuvent vivre en milieu aérobie (avec oxygène O₂), d'autres en milieu anaérobie (sans O₂) ...

Bactérie et conchyliculture

La bactérie la plus « connue » en conchyliculture est l'indicateur *E. Coli* qui permet de classer les zones de production conchylicoles.

E. Coli est une entérobactérie (elle fait partie de la flore intestinale qui dégrade les résidus alimentaires). On la retrouve donc dans le milieu (c'est un indicateur de contamination fécale).



■ Pour en savoir plus :
<http://www.afssa.fr/Documents/MIC-FI-Ecoli.pdf>



Le saviez-vous ?

→ *Quand sont apparues les bactéries ?*
Il y a environ 4 600 millions d'années.

→ *Combien y a-t-il de bactéries dans votre bouche ?*
Il y en a environ 10¹¹ milliards.

A **website** to exchange information, views, suggestions from various stakeholders is also very useful.

In France, an independent scientist in ecology initiated a **blog** <http://www.ostrea.org/> in 2002 that provides popularized scientific information on oyster farming (biology, ecology, history, oysters...), as well as a forum where farmers can ask questions, tell about the situation in their own region, etc.

Euroshell project website provides also a knowledge database that gathers research projects from France, Italy, Spain, Ireland, United Kingdom and the Netherlands. A map of the sector with the main shellfish stakeholders of these countries is also available on the website.

Social media can be used to disseminate information.

Short messages services (SMS) can also be used for urgent and important information.

Fun and attractive professional magazines may be edited.

It is important to **diversify communication tools**. Some producers do not have access to the Internet so it is necessary to send them information by **mail-post**.

- Popularize knowledge

Popularize means to transmit knowledge in a **pedagogical** manner. This involves **adapting the speech** to the public, using **clear and understandable language**. Scientific language has to be translated into plain language.

The information to be transmitted should be **simplified without being distorted**.

Its context must be well explained as it may not be transferred from one place to another, from one period to another. The words must not be generalized.

Extension must be done in different directions, not only from scientists to professionals, but also from professionals to scientists. Fore knowledge and skills that are developed by those who are on the field are as important as those provided by research. Scientists need this empirical knowledge. This empirical knowledge should be centralized in order to make it available for the technico-scientific world.

Scientific knowledge and empirical knowledge are complementary.

In addition, **knowledge is co-constructed**, everyone can contribute with expertise, discovery, criticism, etc. underpinning knowledge. There is not on one side those who know and on the other side those who know nothing.

- Have an industry and a research 'champion',

A focal point could coordinate extension activities and serve as a **reference**, a contact point for communication.

- Define the mandate and boundaries of the extension network, set the 'plan' and deliver it (see paragraph 2 "extension network embryo")

It is necessary that the network is **well organized** and that the links are **effective and constant**. Each member of the network must have clearly defined functions and competences to avoid confusion, duplication and gaps.

If positions of aquaculture consultants are created, it is necessary that these advisers are networked.

Efficient coordination is the key. Researchers must better coordinate in order to avoid duplication of work. Producers can also benefit from a good coordination, helping them to solve problems in their companies (production, administration, etc.). And of course, science and industry must coordinate their action so that they can work together efficiently.

Netherlands: networks such as the Fisheries Innovation Platform, the Fisheries Knowledge Groups, Blueports and FLAGs have been set up to drive innovation in the fisheries and aquaculture, involving scientists and producers.

- Rely on competent "extension workers"

Disseminate knowledge requires special skills. First, the extension worker must have **strong knowledge on the area**, enjoy teaching, be a **pedagogue**, and have **interpersonal skills**. He/she may be neither scientific nor professional, which also allows him/her to be **neutral**. He/she must **establish trust** with his/her interlocutors and maintain a **balanced relationship**.

Positions of **aquaculture consultants or advisers** could be created, as agricultural advisors. They could ensure a **scientific and administrative watch** to collect, sort, verify, gather, cross-check, synthesize and disseminate information. They could play a role of **matchmaker between scientists and professionals**.

Without intermediary, if scientists want and can transmit information directly, it is essential that they have the qualities mentioned above. Scientific or the person that has knowledge should be **humble**, should not behave like the only one who knows in front of an ignorant audience. He must **explain the difficulties** encountered, why it takes time, why it does not work.

Meanwhile, the audience or those receiving the information must be **indulgent, patient and respectful** with regard to the person who gives its knowledge.

The person transferring knowledge must be able to **translate the information from scientific language to plain language**.

Some professional organizations, like in Spain, employ scientists to deal with specific problems (veterinary issues). Thus, the link is direct and constant with the industry and the transfer of knowledge is easier.

- Maintain a contingency 'fund' for individual or groups of SMEs to buy specific services for punctual needs.

In the UK, there is incidental funding for consultancy by scientists.

It is obvious that at a national, regional or local level there is not one ideal set up or structure that fits all the needs and structures present at these levels.

The key drivers for the successful implementation of an extension network are trust and facilitation.

These drivers may be enacted through national producer or trade associations and they could focus on the big issues, notably coordination and administration of extension activities. In many cases, it is necessary to **broaden the mandate of Producer Organisations (POs), technical centres, or other extension 'units'** as the link/interface with local groups and **funded by regional authorities**. These transfer structures need to have a 'collective memory' of needs and previous research or other projects and initiatives.

Finally, while these local groups could lead on communicating science and transferring knowledge, they may also need another activity to **incentivize participation by SMEs**. This could take the form of benchmarking production performance on indicators developed by the participants; by rotating the regular meetings on participants' farms and by organizing visits to other farms in other regions or in other countries.