ERA-NET ICT-AGRI
Coordination of European research within information and communication technology (ICT) and robotics in agriculture and related environmental Issues

Impact model with evaluation objectives and list of indicators

Deliverable 5.1.

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1. Introduction

The ERA-NET scheme is one of the EU's programmes to support innovation and technological development throughout Europe. It aims at developing and strengthening the European Research Area by facilitating practical initiatives to coordinate regional, national and European research programmes in specific fields. Under the ERA-NET scheme, national and regional authorities identify research programmes they wish to coordinate or open up mutually.

The ERA-NET project ICT-AGRI-1 initially started in the EU's Framework Programme 7 in 2009, the follow-up project ICT-AGRI-2 was launched in 2014 and is scheduled until 2017. The ICT-AGRI project coordinates itself research projects with the aim of enabling precision farming by means of information and communication technologies and robotics. As these projects receive funding, an evaluation is required in order to assess the value they generate. This evaluation task is described in Work Package 5 "Impact assessment and evaluation of ERA-NET effectiveness", one of the Work Packages which every ERA-NET project consortium has to manage. The impact model presented hereafter has been elaborated in order to accomplish this Work Package. It serves as a basis for setting up questionnaires to collect data on the impacts and the effectiveness of the ICT-AGRI research projects.

First of all, the difference between such an evaluation and simple monitoring needs to be clarified. The evaluation through the impact model presented hereafter aims at giving information which is appropriate to rate the achievements of the funded projects and of the funding initiative itself. The gathering of information only takes place after the projects have been finished.

In contrast to this kind of evaluation, monitoring consists of the on-going practice of checking activities and their contexts, processes and results in order to improve them. Monitoring is not only an important task of the project coordinator but also of the ERA-NET scheme. Within ICT-AGRI, project monitoring activities are performed by the Danish Agency for Science, Technology and Innovation (DASTI) as a part of Work Package 2.

1.1. Overall objectives

The impact assessment and evaluation includes the funding of ICT-AGRI research projects as well as the ICT-AGRI internet platform "Meta Knowledge Base" (MKB) developed for networking activities. The impact model therefore not only aims at optimising the profitability and effectivity of the funds granted but also at strengthening the benefits of the ICT-AGRI network. The question is in particular, how effective the ICT-AGRI grants were in attracting other financial means and in promoting research and networking between researchers in the targeted research and development areas. Thus, it is important to know, with what resources the projects were launched and which role the ICT-AGRI network played at the beginning of the project development.

Another important objective of the evaluation is to assess the added value brought by particular characteristics of the ERA-NET scheme, namely the joint and transnational aspects of the projects.

Finally, the success of the ERA-NET ICT-AGRI is assessed by summarizing results, outcomes and impacts of all projects.

1.2. Assumptions and hypotheses

The assumption is, that the ICT-AGRI support for collaborative research projects produces numerous downstream effects, which can be classified as either specific outputs, outcomes for the research institutions or impacts on any stakeholder who might be affected. Different success factors may influence these downstream effects.

Furthermore, an overall relationship between input and output variables is expected and proportionality between the resources invested and the value created should be given.

1.3. Overall methodological approach and limitations

In order to conduct an evaluation, it is crucial to have a global, inclusive view of the research projects. There are needs, objectives and maybe incentives that lead to the launch of a project, and the project then produces effects at different levels, on different populations and at different times. The goal is therefore to distinguish these levels where effects can be expected. The main levels are knowledge, cooperation, agriculture in practice and economical aspects. In turn, the actors mostly concerned by these effects will probably be the direct users of the technology developed – primarily farmers– other researchers, the research organization itself and through economic, social or ecological improvements also the society.

However, taking into account the effects at all these different levels and on all different populations would require reaching all the stakeholders who are possibly involved, which is not feasible. This impact assessment model therefore suggests to focus on the collection of information from the project partners of the different ICT-AGRI projects. The effects on other levels and stakeholders may primarily be evaluated through them.

Further limitations associated with impact assessments arise through the issues of *time lag* and *causality*. In the context of this impact model, *time lag* refers to the presumption that a project may take effects at (very) different times. It is therefore important to estimate properly the time necessary for an effect to take place, so that there are no unrealistic expectations towards the projects. *Causality* refers to the assumption that there is a logical connection between the activities conducted and the effects observed. However, not all the effects may be attributable only to the project considered. In fact, several other parameters are likely to affect the chosen indicators as well. These other parameters therefore need to be taken into consideration in the evaluation process.

1.4. Reference examples

For the development of the impact model presented here, several evaluation approaches have been studied. In the following, two of them are briefly presented and the suitability of their elements for an adoption in this model is discussed.

1.4.1. FACCE-JPI evaluation framework

As this evaluation framework was made for a Joint Programming Initiative, the approach seems to correspond well with the aims and structures of ERA-NETs. In particular, the idea of a “logical framework analysis” (LFA) provides a good base for the impact model. The LFA assumes that the different steps going from the setting of a project and its objectives to the wide societal impacts are causally linked. Furthermore, the framework offers a listing of elements that are worth evaluating at

project level which is useful. Nevertheless, FACCE assessed the targets through the three dimensions "structure, process and outcome", whereas this impact model focuses more on the "outcome" part. On the whole, the FACCE model contains a large part about the organization of the network and the alignment of the national and European research programs, which is not considered to be a priority of the impact model presented here. Finally, there are few questions directly intended for the researchers in the surveys planned.

1.4.2. IST impact study

Even if the IST impact study is about another field (microelectronics, healthcare, mobile communications), it seems to suit well as a basis for the impact model for several reasons. Firstly, it mainly addresses project participants. Secondly, indicators are precisely categorised into inputs, outputs, outcomes and impacts, which guarantees a good structure for the questionnaire addressing the researchers. Finally, there are some relevant additional indicators (see chapter 3) that allow to better assess the achievement of the objectives. The impact model is therefore highly inspired of the IST impact study.

2. ICT-AGRI impact model

The impact model serves to compile a complete set of questions which allows a concluding evaluation of the project achievements. Did the calls and the funded research fulfil the expectation of the ICT-AGRI partners and stakeholders? What were the main outputs of the funded projects? How were the funds used? What effects did the project produce, directly and in the long term? How effective was the support of the Meta Knowledge Base for networking? These are examples of questions the impact assessment and evaluation is intended to answer.

2.1. Target groups for the evaluation and impact assessment

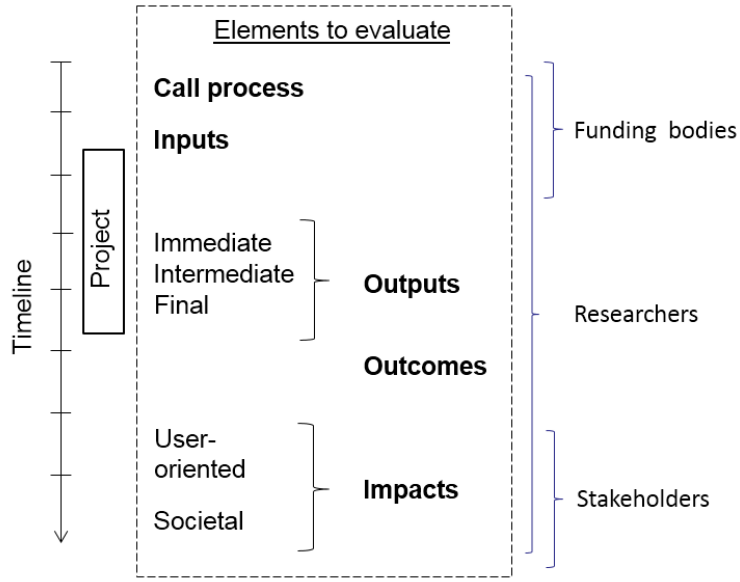


Figure 1: Project timeline and evaluation through different target groups

As Figure 1 illustrates, the impact assessment and effectiveness evaluation involves different parts. The first part is an evaluation of the call process and the inputs by the funding bodies. This has been

conducted earlier in ICT-AGRI-1, deliverable 3.4. As mentioned above, the greatest part however represents the collection of data from project partners, meaning from the researchers themselves. This part of the impact model aims at researchers who had successfully applied for an ICT-AGRI project. Reaching those who were interested in participating in ICT-AGRI projects but did not apply for would go beyond the scope of the model. Those who submitted a project but did not succeed could be asked questions about the consortium formation and call process. However, it is likely that they would not be willing to provide answers since they were refused the support and there is no benefit for them. Nevertheless, the group of unsuccessful applicants needs to be taken into account when it comes to the optimization of the call process. For the part which aims at a further assessment of the project impacts, the users of the outputs may be addressed directly.

Considering the collection of data from researchers, one has to be aware of the position the person providing the information holds within the organisation structure of the project. The questions have to be phrased accordingly so that repeated answers referring to the achievements of the whole consortium can be avoided or at least identified.

Questions therefore need to address consortium partners (refer to Figure 2) who are supposed to give information about their own part of the project and their own partner team. For some questions regarding the outputs and the impacts, only the coordinator may be asked, who should provide answers on the consortium level.

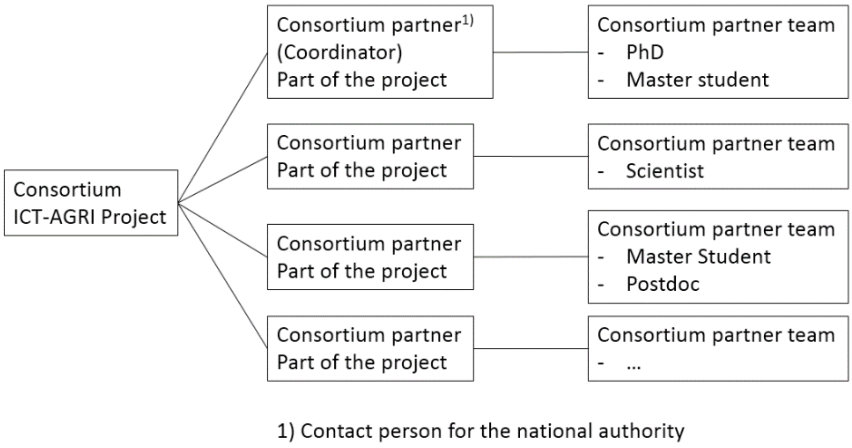


Figure 2: ICT-AGRI project organisation structure

In order to have a common understanding of the terms used in Figure 2, they are defined as follows:

Consortium: For each ICT-AGRI project, a consortium is formed consisting of partners from a minimum of three ICT-AGRI partner countries providing funding.

Consortium partners: Partners who work together on the same ICT-AGRI project. Each partner is responsible for his part of the project.

Consortium partner team: The consortium partner team is a group of researchers headed by the consortium partner or may consist of only the consortium partner himself.

2.2. Collection of data

For the collection of data from researchers different approaches are possible. One approach would be to extract information from the proposals and especially the final reports. In order to have much of the information required available within these documents, the corresponding templates may need to be adjusted and improved for the future on the basis of the impact model presented here. Precise information on funding sources, staff employed or standardized data about publications could for example be easily collected within the final reports. An important advantage of this approach is that an impact assessment is also possible for projects which have been completed some time ago.

However, not all kinds of information might be suitable to gather through the reports. Further data, especially information of a rather subjective character, may need to be collected through additional surveys. Yet efforts would be required for extracting the data from the final reports and for merging it with the answers of the surveys. Furthermore, it might be a challenge that the two sets of data gained are complementary and one does not ask twice for the same information.

Another option would therefore be to provide a questionnaire together with the template for the final report. Partners could be asked to fill in a part of the questionnaire when handing in the final report. Considering the issue of *time lag*, the rest of the questionnaire which focuses more on outcomes and impacts could be filled in around half a year later. This way, one would not have to merge the information from the final reports and the questionnaire. All the necessary data could directly be collected in the questionnaire file and the same information would not be requested twice from the responders. Generally, consortium partners would need to be informed that filling in the evaluation and impact assessment questionnaire is a mandatory task of participating in an ERA-NET project and would need to know about this evaluation procedure.

A survey with the consortium partners as mentioned above would best be conducted in form of a free filing questionnaire implemented on the MKB where they can log on to answer it. Partners who are involved in several projects will need to fill in a questionnaire for each one. As researchers are confronted with many surveys, the survey questionnaire will need to be straightforward with ready-made answers.

The advantages of collecting the information through a questionnaire are quite simple: the researchers are best informed about their activities and it would be much too costly to let an external person evaluate every project. An online survey is very cost-effective and the consortium partners can complete the survey whenever they find time. Furthermore, the analysis of a survey is much easier than that of interviews. Nevertheless, interviews bear the great advantage of getting more precise and detailed answers. Thus, interviews are not a priori ruled out. For smaller countries, it could be seen as an additional tool for the evaluation.

2.3. Relevant elements to evaluate

In order to take into account the whole process of the ICT-AGRI projects, the model is structured according to the different stages: call process, inputs, outputs, outcomes and impacts. The first two consider aspects that can be evaluated before or at the beginning of the project, whereas the three others consider aspects that can be measured when the projects have been finished.

The questions for each stage are subdivided into different categories according to the target or the kind of effects (e.g. immediate, intermediate, final outputs), and each category (e.g. immediate outputs) contains several indicators (e.g. publications, trainings, contacts with stakeholders, conferences). This is visualised in the model (Figure 4) and will be roughly described hereafter.

2.3.1. Call process

As part of the questionnaire, the call process comprises questions regarding for example the quality of the call documents, the clarity of the call procedure as well as the given time frame and the available tools to find partners and build a consortium, respectively. The questions aim at identifying the potential for improvement of future calls. Thus, asking the project participants about their experiences with the call procedures will allow to better design them.

2.3.2. Inputs

Analysing the inputs will give an idea of the funding sources and amounts entering the projects. An important question is whether the funding of ICT-AGRI stimulated other funding sources. But inputs not only include financial means but also human resources, equipment, knowledge and ideas.

2.3.3. Outputs

Outputs represent the direct results of the activities realized. Questions regarding the outputs are separated into immediate (publications, public events, etc.), intermediate (patent applications, new methods or tools etc.) and final results (new products or services).

2.3.4. Outcomes

Outcomes are the effects of the outputs on the research teams themselves and their organisations or on the SME, respectively. High outputs may significantly improve the situation of the project participants by an enhanced reputation and prestige as well as by an improved competitive position in the scientific community and in the case of SMEs in the commercial market.

Questions about the outcomes allow to assess how ICT-AGRI helps researchers, research institutions and SMEs to progress. They serve as a basis for assessing the benefit of their participation in the project in terms of increased knowledge, improved networking and cooperation skills and access to new markets.

2.3.5. Impacts

Impacts are the wider effects of the research projects. According to Figure 3, impacts are defined as the benefits for the immediate target audience and users of the outputs. The project benefits for the society at large are called relative impacts.

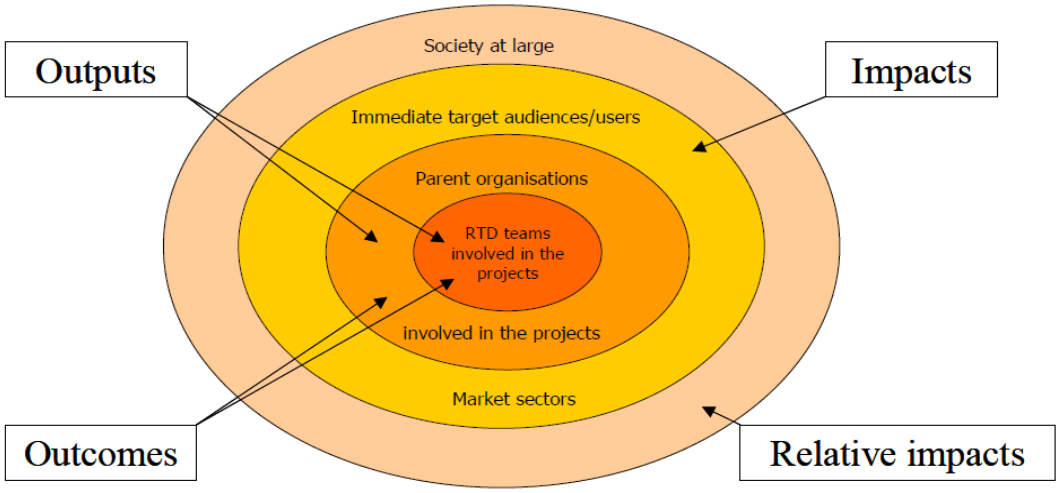


Figure 3: Outputs, outcomes, impacts and relative impacts on the according target group (Source: IST Impact Study, 2004)

This differentiation between impacts and relative impacts is not made in the impact model. The impact model simply specifies different stakeholder groups who might experience impacts, namely the research community, the industry/service sector, the farmers and other end-users as well as the society at large (Figure 4). The main focus of interest is however also on the project benefits for the users of the outputs and for the society as a whole.

For the evaluation of impacts on end-users, the impact model suggests two approaches (refer to Figure 1). On the one hand, the consortium partners can be asked about their opinion and experiences concerning the benefits of their outputs for end-users. On the other hand, end-users may be asked directly. The latter approach is much more sophisticated because firstly, end-users need to be identified. Secondly, project outputs might be well intermingled with achievements form other activities, which makes it difficult to separate cause and effect.

Moreover, a real challenge is the determination of the possible impacts on the society at large. First of all, the ICT-AGRI projects are rather small. Thus, economical, ecological and societal impacts might be rather insignificant. Furthermore, there might be quite a large period of time until impacts on the society can be measured. Thus, in the case of ICT-AGRI projects the measurement of impacts on the society at large is not really feasible. Nevertheless, these measurements are also presented in the impact model in order to complete it. Finally, combining the survey results of all ICT-AGRI projects might still give a hint on the benefits of the ICT-AGRI research promotion.

The model (Figure 4) shows, that there is not only a chronological order between the different stages, which is the vertical axis, but also a causal link along the horizontal line.

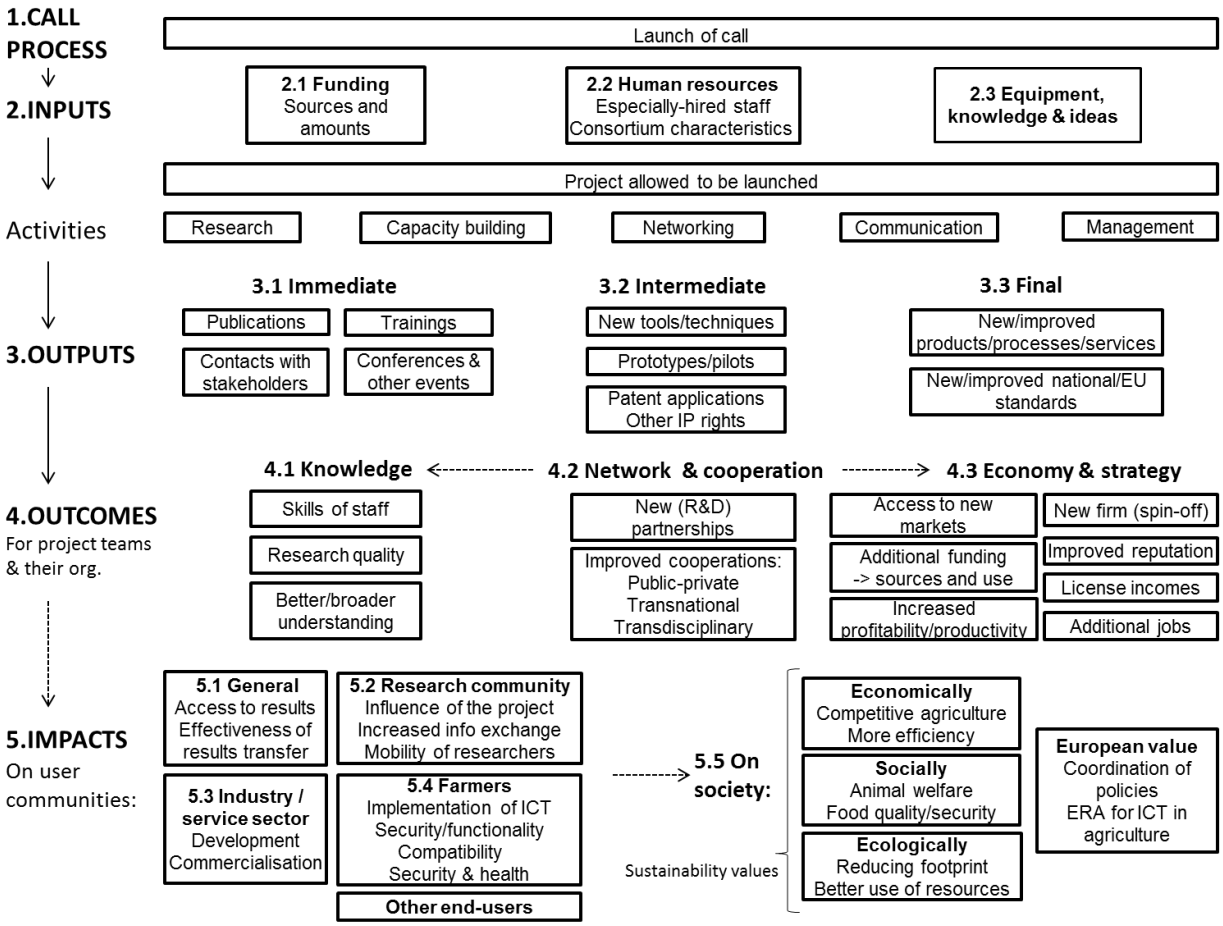


Figure 4: Impact Model Scheme

2.4. Parameters and levels of measurement

Gaining reliable and comparable measurement and evaluation results for each indicator poses a major challenge. In order to anticipate a sound interpretation of the data collected, the survey participants are asked to rate different parameters, depending on the type of question.

Objective performance: When available, objective measurable answers will be requested, such as numbers (e.g. of publications) or amounts (e.g. of funding).

In addition to that, the two following subjective parameters need to be rated for most indicators. The answers can be given on an ordinal scale from 0 to 5 (nothing – very high). These subjective parameters are required in order to evaluate the relative achievements:

Subjective performance: The subjective performance describes the achievements compared to the expectation. The participants are asked to rate their degree of satisfaction about their success regarding a certain indicator. This will allow to assess indicators that can hardly be evaluated with an objective measure as well as those where it is possible, but difficult to find a benchmark.

Importance: The participants will be asked to rate the personal importance they attach to a certain indicator (e.g. the importance of a new method, tool or technique as an output of the research project). As researchers are in the best position to judge whether an indicator is more or less important in the

context of their research, a rating of the importance of a specific question will help to put the results into perspective.

Another parameter to be rated is the success factor:

Success factor: The participants are asked about the activities/factors, which were the most important ones for the success of the project outcomes. A list of propositions for success factors is given and the participants either have to select the most relevant ones or may indicate own factors that were most crucial. Examples for success factors are active networking, strategic approaches, internal or external communication etc.

3. Evaluation issues

As not all questions ask for the same type of information or can provide the same kind of objectivity or certainty, different question groups are defined. These question groups aim at facilitating the analysis of the data collected through the questionnaires. The participants of the survey will not be confronted with this differentiation.

There are questions regarding the efficiency, others regarding the added value the ICT-AGRI initiative provided to the consortium partners and again others regarding the effectiveness as well as further ungrouped questions.

Efficiency questions: The efficiency questions are needed for calculations regarding the return of investment of the whole project, for both the project participants (ratio between outputs and costs, e.g. number of papers/million euro project costs) and the EU network (leverage effect of funding = ratio between ICT-AGRI funding and total investments made).

Additionality questions: The additionality questions ask, what would have happened without ICT-AGRI funding. These questions can be input-oriented (What would the project have looked like without ICT-AGRI funding?) or output-oriented (if the project had been carried out without ICT-AGRI funding, what would the estimated differences in the outputs be?). The answers to these questions will allow to isolate the opportunities brought about by the participation in ICT-AGRI in particular.

Effectiveness questions: The effectiveness questions evaluate the perceived importance of the goal and the achievements (subjective and/or objective performance) compared with the expectations.

4. Sources

IST impact study, Microelectronics & Microsystems, Healthcare, Mobile communications; Databank Consulting; 2004

FACCE JPI Evaluation framework, *framework for monitoring and evaluation of FACCE-JPI and its joint actions*; DASTI, BLE, INRA, BMLFUW, BBSRC; 2013

Impact assessment of health research projects supported by DG Research and Innovation 2002-2010; European Commission; 2011

Evaluation of research outcomes in water for development, *Guidance Notes for Research Programme Design;* Julie Fisher; 2010

Annex 1: Compilation of Questions

Contents

I. Introduction

a. Legend

Each of the questions addresses a certain group of indicators with appropriate colour codes:

Green	Efficiency questions	Orange	Effectiveness questions
Yellow	Additionality questions	White	Ungrouped questions

Efficiency questions: The efficiency questions are needed for calculations regarding the return of investment of the whole project, for both the project participants (ratio between outputs and costs, e.g. number of papers/million euro project costs) and the EU network (leverage effect of funding = ratio between ICT-AGRI funding and total investments made).

Additionality questions: The additionality questions ask, what would have happened without ICT-AGRI funding. These questions can be input-oriented (What would the project have looked like without ICT-AGRI funding?) or output-oriented (if the project had been carried out without ICT-AGRI funding, what would the estimated differences in the outputs be?). The answers to these questions will allow to isolate the opportunities brought about by the participation in ICT-AGRI in particular.

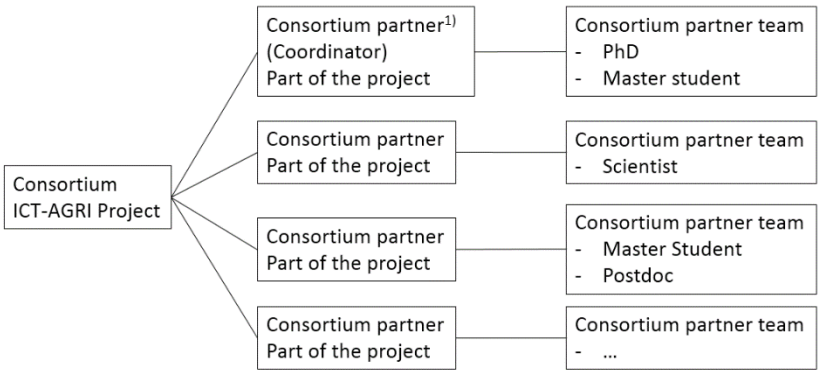
Effectiveness questions: The effectiveness questions evaluate the perceived importance of the goal and the achievements (subjective and/or objective performance) comparted to expectations.

b. Evaluation

Each of the questions with an ordinal value scale may have the following values:

Nil/Nothing/ not applicable	Very low/very few/ very bad	Low/few/bad	Moderate	High/much/good	Very high/Very much/very good
0	1	2	3	4	5

c. Explanation of terms



1) Contact person for the national authority

Consortium: For each ICT-AGRI project a consortium is formed consisting of partners from a minimum of three ICT-AGRI partner countries providing funding.

Consortium partners: Partners who work together on the same ICT-AGRI project. Each partner is responsible for his part of the project.

Consortium partner team: The consortium partner team is a group of researchers headed by the consortium partner or may consist of only the consortium partner himself.

d. Comments

Underlined questions ask for information that is already given in the proposal or in the final report.

Questions in italic ask for information that should be added in future templates for final reports.

0 General questions

Question	Value range	Indicator group
Name	Free entry	
Organisation	Free entry	
Country	Free entry	
What ICT-AGRI project are you involved in? (If you are involved in several projects, please fill in a questionnaire for each one)	Choices:	
Please select the type of organisation you represent	Choices: University/ Public research centre/ Private research centre/ Company/ Other	
Are you the coordinator of the project consortium?	YES / NO	
Do you have experience in transnational cooperative research projects?	YES / NO	
Is this your first participation in an ERA-NET project?	YES / NO	

1 Call process

Question	Value range	Indicator group
How did you learn about the ICT-AGRI call?	Choices: ICT-AGRI website (Meta Knowledge Base) / Netwatch website/ National website/ ICT-AGRI newsletter/ /Other	
How do you judge the quality of the ICT-AGRI Call Announcements regarding the ICT-AGRI calls?	Ordinal	
How do you judge the quality of the Guidelines for Applicants for Pre-Proposal regarding the ICT-AGRI calls?	Ordinal	
How do you judge the quality of the Guidelines for Applicants for Full-Proposal regarding the ICT-AGRI calls?	Ordinal	
According to your experience, how effective was the call process for		
Defining proper themes to launch your project?	Ordinal	
Allowing to build your consortium?	Ordinal	
How do you judge the ICT-AGRI call procedure regarding clarity and transparency?	Ordinal	
How do you judge the given period of time for the preparation of the:		
Pre-proposal	Ordinal	
Proposal	Ordinal	
How do you judge the drafting and negotiation of the contract with your national authority?	Ordinal	
How do you judge the drafting and negotiation of the consortium agreement?	Ordinal	
How do you consider the benefits of your participation in ICT-AGRI compared to the overall effort and expenses (administration, application, time etc.)?	Ordinal	

2 Inputs

2.1 Funding

Question	Value range	Indicator group
To finance your part of the project, what amount (in euros) was funded by:		
ICT-AGRI	Number	
Other external public funds	Number	
External private funds	Number	
Your own funds	Number	
How were they used:		
Salary	Number	
Equipment	Number	
Travelling/ Meeting	Number	
Other expenditures	Number	
If your part of the project had not received ICT-AGRI funding, would you have undertaken it anyway?	YES / NO	
If yes, how large would your budget have been compared to the ICT-AGRI funding?	Choices: same/ smaller /bigger	
If yes, how would your part of the project have been funded?	Choices: With own funds/ with external (public or private) funds/ with both	

2.2 Human resources

Question	Value range	Indicator group
How did you find your consortium partners?	ICT-Agri website (MKB)/ other internet platform/ research partner/ other contact	
How effective do you consider the MKB in enabling networking?	Ordinal	
How effective do you consider the MKB to introduce yourself to the research community?	Ordinal	
To what extent do you agree with the following statements:		
The project was transnational	Ordinal	
Number of nations represented	Number	
Public-Private cooperation corresponded to your expectations	Ordinal	
The consortium composition corresponded to your expectations	Ordinal	
Most of the consortium partners were new to each other	Ordinal	
The consortium partners are still cooperating	Ordinal	

Question	Value range	Indicator group
How many people were in your partner team?	Number	
How many employees of the following positions did you hire especially for your part of the project:		

	Researchers with PhD more than 3 years / experienced scientists	Number	
	Researchers PhD post-docs / young scientists	Number	
	PhD students	Number	
	Master students	Number	
	Support or technical staff	Number	
	Other	Number	
What disciplines were represented in your partner team?		Choices: ICT, robotics, sensor technology, electronics, modelling, agronomy, animal physiology, grassland management, other (please indicate)	
Without ICT-AGRI funding (if your part of the project undertaken), would you have had:			
	Fewer partners	YES / NO	
	Less European partners	YES / NO	
	Less partners from other disciplines	YES / NO	
	Less private-public exchanges	YES / NO	

2.3 Equipment, knowledge and ideas

Question		Value range	Indicator group
Was your part of the project based upon work conducted in an earlier project?		YES / NO	
In gathering the necessary ideas for your part of the project, how valuable was the consortium for you?		Ordinal	
To what extent do you agree with the following statements:			
	End users / farmers were involved in the design of your project part	YES/NO	
	Other stakeholders were involved in the design of your project part	YES/NO	
	If yes, which ones?	Free entry	

3 Outputs - direct results of the activities realised within the project

For each output category, you are asked to rate the following parameters:
- The **importance** you attribute to this output, in the context of your part of the project or - for the questions to the coordinator - for the project as a whole (scale 0-5)
- The **objective** performance, in the requested terms
- The **subjective** performance: achievement compared with your expectation (scale 0-5)

3.1 Immediate outputs of the consortium partner team

Category	Importance of output (Ordinal)	Objective performance	Number	Subjective performance (Ordinal)	Indicator group
Publications		Number of published documents with you or your team members as contact person:			
		Scientific papers in peer-reviewed journals, proceedings and books			
		Not peer-reviewed scientific publications			

		Non-Scientific publications			
		Press releases, Interviews, TV show-ups			
		From them:			
		Available in OPEN access databases			
		Available in Thomson Reuters Web of science			
		Available in SCOPUS			

Category	Importance of output (Ordinal)	Objective performance	Number	Subjective performance (Ordinal)	Indicator group
Public events		Total number of:			
		Public scientific events which you or your team members attended			
		Non-scientific events with open / invitation-based participation which you or your team members attended			
		Within those, what was the number of:			
		Attendees (approx. total of all events			
		Events, where you were in the organizing committee?			

Category	Importance of output (Ordinal)	Objective performance	Number	Subjective performance (Ordinal)	Indicator group
Contacts with stakeholders		Number of meetings which you or your team members attended with:			
		Service providers			
		Industry, SME			
		Advisors			
		Others			
Trainings conducted		Number of trainings which you or your team members conducted			
		Number of attendees (approx. total)			

3.2 Intermediate results of the consortium (to be answered only by the coordinator)

Category	Importance of output (Ordinal)	Objective performance	Number	Subjective performance (Ordinal)	Indicator group
New methods, tools & techniques		Regarding the outputs of the whole consortium, please indicate total number of:			
		New methods			
		Tools developed			
		Techniques proposed			
Patent applications		Total number			

Prototypes, pilots		Total number			
Other IP: copyrights, trademarks, designs		Total number			

3.3 Final results of the consortium (to be answered only by the coordinator)

Category	Importance of output (Ordinal)	Objective performance	YES/NO	Subjective performance (Ordinal)	Indicator group
New products or services		Did the consortium reach a marketable product/service?			
Standards		Did the consortium obtain at least 1 new European level standard?			
		Did the consortium obtain at least 1 new national level standard?			

3.4 General questions

Question	Value range	Indicator group
Without ICT-AGRI funding, what % of your results (outputs) would have been achieved?	Ordinal	
Globally, what is your level of satisfaction concerning the outputs/results you and the consortium achieved?	Ordinal	

4 Outcomes – effects of the project on your partner team and institution

For each outcome category, you are asked to answer for the same parameters as for the outputs. Only one parameter has been added:

- The success factors: which activities/factors were the most important for the success of the project outcomes regarding your part of the project and your institution, respectively? For each outcome, please select the one or two most relevant propositions given in the following list.

  1. Networking: networking activities like events, conferences, meetings were the key to success;

  2. Consortium: the fact of having a consortium of partners with different expertise and skills was the key to success;

  3. Strategy: a key to success were the well-defined research questions and aims of the project;

  4. Internal communication: the extensive communication among the consortium partners was the key to success;

  5. External communication: the extensive communication with funders, stakeholders, European and national authorities was the key to success;

  6. Trainings or other forms of education were the key to success;

  7. Quality of results: the high quality of the developed product/services were the key to success

  8. Research approach: the innovative methods/tools/techniques used were the key to success

  9. Exogenous factors: legal environment, market conditions, coincidence etc. were the key to success

  Note: When asked for the success factor please write the number(s) corresponding to the propositions 1 to 9 or add your own factors.

Note: for the questions of change in any parameter, the comparison has to be made between the beginning of your part of the project and now.

4.1 Knowledge

Question	Value range	Indicator group
To what extent did the skills of your staff increase?	Ordinal	
To what extent did you get a broader understanding of the concerned research field(s) and stakeholder expectations?	Ordinal	
To what extent do you agree that your understanding of end users's/farmers' needs increased since your part of the project began?	Ordinal	
To what extent do you agree that your understanding of your consortium partners' expertise and competencies increased?	Ordinal	
How much did the research quality increase as a consequence of increased skills and understanding?	Ordinal	

Question	Value range	Indicator group
How many people completed any of the following qualifications through their work on the ICT-AGRI funded project and/or using funding from the ICT-AGRI project?		
PhD	Number	
MSc, MEng	Number	

4.2 Network and cooperation

Question	Value range	Indicator group
To what extent did your part of the project contribute to the formation of new R&D partnerships (during or after the project implementation)?	Ordinal	
If you experience the formation of new R&D partnerships:		
Are/Were they mainly international (meaning all collaborations outside your country)?	YES / NO	
Are they still continuing?	YES / NO	
Did you achieve any results which would not have been possible without the consortium?	YES / NO	

Please characterise the evolvement of the cooperation since the beginning of your part of the project:

Category	Importance of outcome (Ordinal)	Objective performance	Value range	Subjective performance (Ordinal)	Success factor	Indicator group
Improved public-private cooperation		Frequency of contacts	Choices: Less, equal, more, much more			
Improved transnational cooperation		Frequency of contacts	Choices: Less, equal, more, much more			
Improved transdisciplinary cooperation		Frequency of contacts	Choices: Less, equal, more, much more			
Access to complementary expertise						

4.3 Economy and strategy

Question	Value range	Indicator group
Did your project achievements lead to additional funding during or after the completion of your part of the ICT-AGRI project?	YES / NO	
If Yes:		
What is the indicative number of new projects linked to the ICT-AGRI funded project?	Number	
Where does the funding for this/these project(s) come from? (several answers possible)		
EU Framework Programmes / Horizon 2020	Number	
Other EU funds	Number	
National funds	Number	
Other public funds	Number	
Private funds	Number	
Own funds	Number	
How were they used:		
Salary	Number	
Equipment	Number	
Travelling/ Meeting	Number	
Other purposes	Number	

	Are or will partners of the ICT-AGRI funded project consortium participate?	**Choices:** All, None, Some	
	Which approach is or will be considered?	**Choices:** R&D, Implementation, Commercialization	

The following questions are primarily addressed to enterprises. However, research institutions are very welcome to answer them as well. Did your involvement in the ICT-AGRI-funded project lead to:

Category	Importance of outcome (Ordinal)	Objective performance	Value range	Subjective performance (Ordinal)	Success factor	Indicator group
Increased employment levels		Number of additional places	Number			
License incomes		Amount	Number			
Increased profitability		Percentage of increase in margins	Number			
Enhanced productivity		Percentage of increase	Number			
Enhanced competitiveness						
Access to new markets			YES/NO			
Creation of a (spin-off) company			YES/NO			
Improved reputation						
Reduced commercial risks						

Question	Value range	Indicator group
In general, to what extent can the current performance of your unit/organization be attributed to your participation in ICT-AGRI?	Ordinal	

5 Impacts – effects of the project on users and society at large

5.1 General questions

Question	Value range	Indicator group
To what extent did you provide open access to the results of your part of the project?	Ordinal	
How effective do you judge the information transfer of your results among the user communities?	Ordinal	
To what extent did your results reach the desired circles?	Ordinal	

5.2 Impacts on the research community

Category	Importance of impact (Ordinal)	Objective performance	Value range	Subjective performance (Ordinal)	Success factor	Indicator group
Launch of projects from others based on your results		Enumerate the projects you know of	Free entry			
		Percentage of those addressing agriculture	Number			

Question	Value range	Indicator group
For students/staff who have worked on your project (only if staff members were hired especially for the project, no permanent staff members), please indicate their first career destination after finishing their involvement with the project		
Employment: private sector research	Number	
Employment: private sector non-research	Number	
Employment: public sector research	Number	
Employment: public sector non-research	Number	
Further study	Number	
Seeking Employment	Number	

Since the beginning of your part of the project, to what extent did you observe in your research environment the following changes (they do not need to be direct results of the project):

Question	Value range	Indicator group
An increased mobility of researchers?	Ordinal	
Increased research activities between ICT and agriculture?	Ordinal	
Improved information exchange themes?	Ordinal	

5.3 Impact on industry/ service sector

Category	Importance of impact (Ordinal)	Objective performance	Value range	Subjective performance (Ordinal)	Success factor	Indicator group
End users / companies interested to use your results		Enumerate the requests received	Free entry			

Question	Value range	Indicator group
Are your results further developed by the industry?	YES / NO	
If yes, indicate by whom	Free entry	
Are your results commercialized by the industry?	YES / NO	
If yes, indicate by whom	Free entry	

5.4 Impact on farmers

Category	Importance of impact (Ordinal)	Objective performance	Value range	Subjective performance (Ordinal)	Success factor	Indicator group
Implementation of your solution by farmers		Particular examples known	Number			

Question	Importance of impact (Ordinal)	Subjective performance (Ordinal)	Indicator group
As far as you have received feedback about it (and if not, please give your own opinion), how did the implementation of your solution improve the situation of the farmers, in terms of:			
Security, health			
Compatibility of technology			
Functionality, user-friendliness			

Productivity			
Profitability			

5.5 Impact on society at large

Question	Importance of impact (Ordinal)	Subjective performance (Ordinal)	Indicator group
To what extent does your project contribute to the following effects?			
Increase productivity			
Reduce waste in the food chain			
Increase energy efficiency			
Optimize fertilizer and pesticide use			
Optimize water management			
Maintain soil quality			
Promote biodiversity			
Decrease air pollution			
Reduce greenhouse gas emissions			
Ensure food quality and safety			
Increase animal welfare and health			
Improve farmers' working conditions			
Promote cohesion in the European research area			