Content

SPARD

Spatial Analysis of Rural Development Measures
Contract No. 244944

Work Package 6

Month 16 year 2011

D6.1

Prototype development and requirement analysis

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COOPERATION

1 Overview of work package

Work package number	**6**		**Start date or starting event:**		1				
Work package title	**End-User Involvement and SPARD-Decision Support System**								
Activity Type [1]	RTD								
Participant number	1	2	3	4	5	6	7	8	9
Participant short name	ZALF	LEI	UniBo	AIT	VUA	INRA	UEdin	UL	**IPTS**
Person-months per participant:	8	2	6	4	0	0	0	0	**3**

Objective
To develop the stand-alone modelling tool SPARD-DSS incl. a Graphical User Interface (GUI) that allows end users to conduct ex-post evaluations and ex-ante assessments to demonstrate CMEF indicators at different spatial scales, causal relationships at horizontal cross-country and vertical in-depth level

Specific objectives
(1) Process design and requirement analysis of the interactive SPARD-DSS using software-prototyping and methods of participative end user involvements.
(2) Developing a conceptual approach of the SPARD-DSS Tool based on requirement analysis on (a) analytical objectives, (b) functionality, (c) graphical design (incl. 'look and feel'), compatibility (e.g. interfaces) that result in a tailored domain structure of the software architecture
(3) Programming of the SPARD-DSS based on the process-oriented outcome of the requirement analysis. Compatibility testing to technical setting of data management system (work package 2).

Description of work (leader IPTS) (possibly broken down into task), and role of participants
Task 6.1: Software Prototyping and EC Stakeholder (end user) process design
(by IPTS and UniBo, supported by ZALF)
To successfully discuss and survey end user requirements, a prototype of the SPARD-DSS as an adequate mean is indispensable. Coding of simplistic functions (software prototyping) and graphical illustrations support the stakeholder design process respectively. End user requirements will be surveyed with regard to (1) spatial, time and thematic integration, (2) technical performance, (3) quality criteria on reliability information and (4) type and quality of institutional linkages; both in iteratively adjusted group discussions and through individual semi-qualitative interviews. Early involvement with a stable end user group will be key factor for a successful end user participation process. The requirements will be described in a detailed report.
Task 6.2: Development of the Conceptual Approach of the SPARD DSS (by IPTS, UniBo and AIT)
In order to develop the SPARD-DSS efficiently within given capacities, the conceptual design has to be planned and allocated carefully among necessary components. Based on the requirement analysis, the resources will be allocated according to the end user feedbacks; among the major components of analytical objectives, functionalities of the SPARD-DSS, the graphical design, compatibility for efficient tool advancements. Subsequent the conceptual approach is to be

[1] Please indicate one activity per work package: RTD = Research and technological development; DEM = Demonstration; MGT = Management of the consortium; OTHER = Other specific activities, if applicable (including any activities to prepare for the dissemination and/or exploitation of project results, and coordination activities).

described in detail. Estimates on the use of resources related to the intended software architecture and applications will be translated into adequate applied techniques and corresponding programming tasks.

Task 6.3: Internal Interface Definition of WP 2 and External Interfaces (by IPTS and AIT)
To provide technical linkages with the data management system, a compatibility test on jointly used software is needed. Direct use of gathered data of the data management system will be provided through individually defined interfaces through action protocols that allow direct data use, data retrieval and easy up-date functionalities. External interfaces to other Impact Assessment Tools will be considered on potential system compatibility and / or data compatibility (e.g. EU ip projects SENSOR (SIAT Sustainability Impact Assessment Tool), Seamless etc.)

Task 6.4: Programming the SPARD DSS (by IPTS, AIT, ZALF)
Programming of the SPARD DSS based on tasks 6.1 to 6.3. Software languages will be carefully discussed and selected. Property rights will be defined before the software coding begins. Follow up and adjustments during the programming process according to estimates and resource use. Common coding of interfaces with IT-group of work package 2.

Task 6.5: Testing the SPARD DSS (by IPTS, UniBo, ZALF, AIT)
Demonstrating the functionalities of the SPARD DSS and testing results on reliability, plausibility and consistency in collaboration with the end user group and adapting final tool requirements according to group discussion results.

Milestones

M6.1 Two workshops and a number of single interviews with potential end user to discuss the major requirements (requirement analysis) (month 6, 15)

M6.2 One meeting with software engineers of WP2 to discuss the conceptual approach of SPARD DSS (software architecture) with related internal and external interfaces (month 18)

M6.3 One workshop on the final draft including all interfaces of the elaborated conceptual approach of SPARD DSS with participating researcher of WP2 and potential end user on the (month 24)

M6.4 Internal workshop on the presentation of all stand-alone software components of SPARD DSS (month 34)

M6.5 Three group discussions on the test results towards quality criteria such as reliability, plausibility and consistency (month 27, 30, 33)

Deliverables

D6.1 Prototype development and requirement analysis on (1) Spatial, time and thematic integration, (2) technical performance, (3) quality criteria on reliability information and (4) type and quality of institutional linkages (report; month 16)

D6.2 Prototype SPARD DSS conceptual approach including the attributes of analytical objectives, functionalities of the SPARD-DSS, the graphical design, compatibility for efficient tool advancements (final report; month 26)

D6.3 Documentation of the interfaces to the data management system (documentation, month 33)

D6.4 CD on SPARD DSS as a stand-alone software package with self-explaining install instructions (software, month 34)

D6.5 Accompanying summary on test results including end user reactions (report; month 36)

Structure

2 Prototype development and requirement analysis

The deliverable D6.1 is defined as prototype development and requirement analysis on (1) Spatial, time and thematic integration, (2) technical performance, (3) quality criteria on reliability information and (4) type and quality of institutional linkages (report; month 16). Particular the outcome of the requirement analysis is the deliverable D6.2, which is also partly described at the end of 6.1 as a first prototype SPARD DSS of a conceptual approach including the attributes of analytical objectives, functionalities of the SPARD-DSS.

2.1 Requirement analysis

2.1.1. Objective and Problem

General objective of the requirement analysis is to define the balanced design between demand of the Commission and research advancements of the supply provided by the SPARD project. Requirements analyses in systems engineering and software engineering consist of tasks that determine the needs or conditions to meet for a new product, taking account of the conflicting requirements of various stakeholders such as end user of the SPARD decision support system (DSS). In this regard a short analysis on methods on Requirment Analysis with regard to DSSs and Impact Assessment Tools (IATs) introduces the subject defines subsequently against this background the adequate methods for the SPARD project:

In this regard Funtowicz and Ravetz (1990) have argued that an integrative approach to generating knowledge is required when the evidence-base is uncertain whilst the risks resulting from poor policy choices are high, as is typically the case in issues relating to sustainability. Whilst it is clear that DSSs only play a part within integrative policy assessment processes, and that the impact of such tools and more broadly, evidence, on policy and decision-makers can be relatively subtle and nuanced (Owens, 2005; Shulock, 1999), it is also clear that a wide range of different tools exist and are used to support policy impact assessments in Europe (Renda, 2006). Further, the use of policy assessment, and therefore DSSs, looks likely to continue to grow (Nilsson et al. 2008).

Variation exists between countries in the complexity of DSSs employed, from simple (e.g. checklists and impact tables) through formal to advanced tools (e.g. integrated land-use and energy simulation and optimisation models) (Nilsson et al. 2008). Advanced Impact Assessment Tools (IATs) employed often simulate potential impacts of policy options in order to support decision making (Harris, 2002; Van Ittersum et al., 2008) and have been identified as being appropriate for providing support to complex decision processes in the field of sustainable development (Brouwer and Van Ek, 2004; Wilkinson et al., 2004).

To facilitate the adoption and enhance the usability of IATs and DSSs by policy organisations, there is a widely recognised need for tool functionalities and interfaces to be aligned to user needs, captured somehow during the development process (Diez and McIntosh, 2009, 2010; Hinkel, 2009; Jakeman et al. 2006; McIntosh et al. 2005; McIntosh et al., 2008; Norse and Tschirley, 2000; Reeve and Petch, 1999; Santhanam et al., 2000; Scholten et al. 2007; van Delden et al. 2007, 2010). Adoption and use failures have been attributed to failures in capturing user requirements (Lubars et al. 1993 cited in Lindgaard et

al. 2006), to a lack of general agreement on development project goals, insufficient platform experience and to weak project management (Ewusi-Mensah, 1997). Such failures have also been attributed to their being excessive IAT data acquisition and maintenance costs, excessive system training costs, insufficiently user centred interface and functionality design, and a lack of trust between users and developers (Diez and McIntosh, 2010).

A wide range of methods for acquiring and then using information on user needs exists, from the informal to more structured, including established approaches from software engineering and socio-technical information systems design such as SSADM and ETHICS (see Reeves and Petch, 1999 for a review), through a range of approaches developed by environmental model and software developers (e.g. Jakeman et al. 2006, Scholten et al. 2007, van Delden et al. 2010) to more recent approaches representing current information systems and design thinking such as User Centred Systems Design (Gullikson et al. 2003) and Goal Directed Design (Cooper et al. 2007). Each method varies in terms of the number and sequence of steps or tasks involved, or what we will term 'structural' characteristics. They also vary in terms of the way in which those tasks are carried out, or what we will term 'process' characteristics, including the specific methodologies employed. Finally, each method varies in terms of the roles distinguished within the development team and the kinds of users targeted / distinguished.

In the frame of SPARD – against this above describe background – we summarize that way of conducting requirements analyses is crucial to the success of the final product. In this light we emphasize that during the development time gathered requirements should be well documented, accessible, transparent and traceable in order to first identify the needs and at later stage to justify the model / tool features in the way of having maximised the probability for model success tailored for operational policy advice, if required. The characteristics of requirements can be really broad as the span software-architectural, behavioural, functional, and non-functional elements. But they all have in common that the major conceptual components are the following types of activities:

1. Elicitation of requirements such as communication with customers and end users to determine the requirements.
2. Analysis of requirements such a critical review of the requirements, which determine whether the stated requirements are unclear, incomplete, ambiguous, or contradictory.
3. Recording requirements means here a proper documentation in various forms (documents, cases, storylines, and processes).

We have applied a systematic requirement analysis, which is part of the requirement engineering and includes several processes in a formal way, which we outline in the following:

(a) Basic requirements evaluation

Based on the project design, the basic requirements, capacity settings and deliverables are surveyed. The project specifications for the technical model design allowed for unrestricted decisions in the way of fulfilling contract objectives. Iterative feedback through discussions with the contracting body on the model design has been undertaken as an effective measure for priority-setting and maintaining continuous communication.

(b) In-house efficiency review

Reviewing and benchmarking previous in-house endeavours and expertise within the development team helped to increase cost-efficiency through the use of existing software components and to minimise the risk of redundancies. The process leaded to the potential re-use of existing software components such as the map viewer and server-based data bases or just well-proofed concepts of previous projects.

(c) Prototype development

The prototypes provided a way of structuring group discussions. The first concept was a PowerPoint prototype to demonstrate demonstrated functionality (Houde and Hill, 1997). The second hands-on prototype contains a Graphical User Interface (GUI) with an exemplary implemented model simulation. The final version integrates all system and content components with additionally requested reliability information on simulation results.

(d) Prototype-based group discussions with end-users

Mixed groups will take place; consisting of software engineers, natural scientists and policy experts as potential end-users to capture the diversity of IA needs. Demonstrating the prototypes in a standardised way helped to structure the discussions. Relevant requirements are discussed by showing content-management proposals such as an example to comply with requirements on transparency, or functionalities such as the simulation solving procedure and visualisation tools.

Specifically, the EC Research Directorate General, the Institute for Prospective Technological Studies (IPTS) and DR-Agri and related officer in data service untits acted as potential end-users (see meeting Bled, Slovenia in chapter 2.1.3).

(e) Organisational analysis using semi-structured interviews

Along with group discussions, semi-structured interviews on organisational requirements are also conducted as complementary research. The needs from the organisational perspective as a whole compared to single user perspectives are considered equal important. Single interviews, either face-to-face or phone interview, provide a valuable method of bypassing in tendency stronger strategic feedback in group discussions, since bilateral discussions tend to survey rather single options of individuals.

(f) Final contractor negotiations regarding capacities

The divergence between originally allocated budget resources for SIAT developers to comply with promised outputs, and requested user requirements arising from the requirement analysis create a need to adjust the actual model design. This last step includes normally discussions on prioritising of desired design features.

2.1.2 SPARD Activities

In order to fulfil the objective of developing adequately the stand-alone modelling tool SPARD-DSS incl. a Graphical User Interface (GUI), the following different activities in the form of (1) presentations of objectives and intended methods to be applied in order to create awareness, (2) bilateral face-to-face unstructured and structured interviews, and (3) by phone respectively have been conducted. (4) Group discussions on general directions of prototype development and strategies on the use of different types of tools took place in two end-user meetings. Following sequence of interactions between SPARD researchers and EU Commissioners have been undertaken:

2.1.2.1 Kick-Off Meeting: June 14 - 15, 2010 Berlin, Germany

Kick-off SPARD workshop: The first meeting took place in Berlin. Major objective was to build awareness and to demonstrate different design options of decision support tools developed in different projects. Specifically,

- A general understanding of the tasks of the work package has been formed.
- Questions with regard to the SPARD-DSS have been clarified.
- Capacities of software development to develop the SPARD-DSS have communicated.
- Expectations related to possible design options of the software product have been discussed.

2.1.2.2 Bilateral unstructured interviews: June 14 - 15, 2010 Berlin, Germany

Bilateral unstructured interviews on the perspective of the Commission took place. Major objective was to understand the general expectation and perspective of Peter Werheim, the attendee of the Kick-Off SPARD meeting and – at this time the responsible officer of the project. The outline of the talk to understand the general perspectives encompassed questions on “what should be improved via the DSS”, “Will be an actual implementation for operational policy advice possible?” and “What is the expected added value of a consolidated data base of the SPARD-DSS?”.

As result of the unstructured interviews in the form of expert talks could reveal the following major challenges:

- The content and improvement of indicators and less software-add-ons on the DSS itself are major requirements of the Commission. Integrated add-ons such as mapping tools, spider-diagrams etc. in the DSS software system are generally rarely directly used, unless it is not proved over longer period.
- SPARD is a research project and it will be questionable, whether the DSS can be implemented directly for use in the frame of DG Agri-Services.
- The possibility to use a consolidated data base with regard to new findings of the CMEF indicators and the future evaluation of Rural Development Programmes on causal and spatial relationships with special attention to the validation in case studies areas seem to be promising.

- The emphasis to build a Graphical User Interface should lay on the physical link to the SPARD Knowledge - and Data Base, where results will be consolidated. The challenge seem to be how to build logic functionalities of fetching results in which kind of dimensions and how to aggregate / disaggregate them with consistent units at different spatial scales.

2.1.2.3 First End-user Workshop in Brussels, Belgium, December 2010

The end user workshop in Brussels comprised the two activities of (1) presenting the intended work for the attending end users and to (2) conduct at the end of the workshop bilateral structured face-to-face interviews in order to capture the institutional structure of the EU Commission and specifically of DG-Agri.

Researcher from SPARD consortium attended the meeting in order to build awareness of the SPARD project and to interact and conduct interviews subsequent to the meeting. The following officers at the EU Commission were interviewed in a time slot of approx. 15 to max. 20 minutes.

- Chiara Dellapasqua DG Agri
- Jean Michel Terres DG Agri LOI 130
- Macie Krzysztofowicz
- Imma Garcia DG Agri
- Florian Diettrich DG Agri
- Hans-Jörg Lutzeyer (had to leave earlier)

Presenting methods of prototyping
In order to create awareness and to build trust the planned work on the prototyping was presented and a general discussion on understanding the goals of the SPARD project took place. Desired commitments for the bilateral structured interviews but also for longer-process involvement of willing Stakeholders were achieved.

Face-to-Face structured interviews
At the end user workshop seven interviews with potential end users of the Commission have been conducted according to the milestone number M6.1: Two workshops and a number of single interviews with potential end user to discuss the major requirements. The interviewees were considered as potential end users of the SPARD DSS. The outline of the structured interviews was conducted as follows:

Questionnaire: Tool to demonstrate CMEF indicators at different spatial scales, causal relationships at horizontal cross-country and vertical in-depth level / SPARD-DSS

1. Stand-alone vs. client tool (server-based)?

a. **Stand-alone tool**:
- local installation
- local database
- no internet connection needed
- opportunity of database update requires database maintenance, creation of an updated database file and hosting of that updated file (extra costs)

b. **Client tool** (server based):
- no local installation
- internet connection necessary
- data retrieval from a server
- database server and its maintenance is necessary (extra costs)
- opportunity of database update requires check and update of database (extra costs)

c. How important is for you the current **compatibility with existing data base of CMEF indicators** and how would you like to accomplish the consistency / integration of new results?

2. Raw data or processed data? Please describe your view on importance

a. If you are interested in **indicators result presentation**:
- table with aggregates (only numbers + units) or
- charts or
- maps or
- other (?)

b. If you are interested in processed data only:
- what would be interesting for you? e.g. export as xls- or csv-file

3. Traceability and / or transparency? Please describe your view on importance

a. Data source indicated, and if, how?
b. Data traced from aggregates
c. Fact and information sheets

4. Reliability estimation? Would you prefer that researcher estimate the quality / reliability of SPARD results?

a. Categories such as self-calculated… official
b. Data traced from aggregates
c. Fact and information sheets

5. Functionality of the tool

a. Limited access (by registration of user)
b. Retrieval of data in compatible tools (eg. Excel, Access, Word…)
c. Upload of own-created / changed data
d. Download of data for public (we guess not), and if, in coded / aggregated form.
e. Print function of all results
f. Aggregates among regions / indicators
- regions: up-scaling of indicators among regions of different scales (aggregates): Should this be integrated or better processed in commonly used tools;
- other indicators: all indicators with same units via individual aggregation rules

6. Property rights: your view on sensitivity of data

a. Exclusive **SPARD consortium + DG Agri**
b. **Only DG Agri** (due to sensitivity of data)
c. Property rights only affected **when original data visible**
d. **Software**: source codes (open source according GPL, LGPL., EUPL..? Which license type?)

As major results of the interviews as major findings:

- In general, the options of the six end users were relatively divers. Although the objectives are clear formulated, it the SPARD DSS seemed very open in the way of implementation.

- An end user group exists, but the nature of the EU Commission and DG-Agri respectively seems to be very service-oriented that might complicate the actual implementation to use the tool by commissioners.

- The knowledge on software development and functionalities is limited as often in-house services process the required information thus some questions could not been answered. Practice is that the EU Commission asks their in-house services for data and / or processing design element (e.g. charts, mapping etc.).

- For EU-Commission purposes, in SPARD-DSS integrated visualisation tools seems to be redundant. Only numeric formats seem to be interesting. Ideally these numeric information can be generated in a generic way to generate the results in different dimensions, such as scales and to aggregate / disaggregate them accordingly in a consistent way.

- As generating and processing results is service-oriented, it seems to be important to connect to these services, which are commonly used by the EU commission / DG-Agri. Two ways seem to be a promising way: In-house department service (CMEF indicator department, graphical design unit) or service-orientd Joint Research Centre (IPTS iMap project on integrated modelling platform)

- In detail following main directions for developing the SPARD DSS can be drawn (compare to questionnaire outlined above):

    - Question 1 (a+b): Several interviewees mentioned that the use of SPARD-DSS seem to be more relevant for the JRC than for DG AGRI. Both, a stand-alone or client tool is possible, but a hybrid software solution seems promising. A CD-ROM is needed to install the DSS, but the data will be fetched from a central server data based, which is online available. As hindering fact, in general permission at EI Commission level would be needed to install “own” software. The server-data base has to be installed in-house, if data are highly relevant, although a possible option seems as well that the EU Commission contracts a third party for maintenance of an external service (but generally unusual). The i-map project of IPTS was mentioned several times as hosting project / institution. The cost coverage for maintaining the data base is a major decision to be made soon.

    - Question 1 (c): The CMEF indicators are highly relevant, but generally the maintenance and the data base itself are outsourced. The officer ask generally, if the corresponding unit / department needs generated and processed information on the indicators. It was nearly not possible to answer the question on operational feasibility how to set up the link to the official CMEF indicators and how to achieve compatibility between the SPARD data base of the DSS and the CMEF data base.

- Question 2 (a): In general it was revealed that the numeric data are the relevant dimension. Precise units and aggregation methods across scales are highly relevant. Additional visualisations such as bar charts and maps are of less importance as this service is provided in-house. Only mapping of results might be an option, which was mentioned by two interviewees.

- Question 2 (b): All interviewees claimed for expert functionalities as xls or CSV-file formats. CSV-file formats were prioritised.

- Question 3 (a+b+c): The traceability and transparency as assessed as highly important. Data sources should be indicated and data should be traceable, if possible, if processed data are aggregated. The Fact and information sheets were assessed as not highly relevant given the use of capacities of software developers and involved researchers. Intervals, timely updates and calculation methods were mentioned as assets that should be considered.

- Question 4 (a+b+c): Highly important seem to be the categories such as the indication whether results are self-calculated or stem from officially elaborated methods (e.g. Eurostat etc.). Data should be traceable, but fact sheets might be only an option, if a handbook would be elaborated. A handbook was seen as an asset, if capacities to develop this are available.

2.1.2.4 Second End-user Workshop in Bled, Slovenia, September 2011

At the end user workshop in Bled the SPARD consortium discussed in a structured way with the end-users Inmaculada Garcia de Fernando Sonseca and Rudolf Genbrugge from the EU Commission thematically clustered methods and tools to be used in the SPARD project. Each team presented in a short presentation of 15 to 20 min the current state of work and the essential findings towards the use of Tools and applied methods. In feedback-rounds the different presentations were commented. This second end-user workshop was part of the milestone M6.1: Two workshops and a number of single interviews with potential end user to discuss the major requirements. The guided discussion followed the agenda below:

I Objective / Problem
11:00 – 11:15 Annette Piorr: Brief introduction and aim of this meeting
11:15 – 11:30 Wolfgang Loibl: AIT: Relations between data, measures, indicators a. spatial coverage
11:30 – 12:00 *Discussion: 30 min*
II Methods
12:00 – 12:15 Wietse Dol, LEI: Metabase as a possibility to link SPARD data viewer to other data sources (census), to automize data harmonization and to visualize in GIS
12:15 – 12:30 Martijn Smit, VUA: What can we learn from spatial econometrics?
12:30 – 13:00 *Discussion: 30 min*
14:00 – 14:15 Jan Peters-Anders, AIT: Concept of the SPARD data viewer as a data retrieval tool
14:15 – 14:30 Stefan Sieber, ZALF: Concept for the SPARD end user tool and GUI
14:30 – 15:00 *Discussion: 30 min*
III Discussion / Conclusion
15:00 – 16:00 *Discussion: SPARD- supply and the demand in the light of EU-Commission`s view*

The following issues have been discussed in the way of the structure presentation:

- Annette Piorr (scientific coordinator) gave the message that the EU demand will help the SPARD consortium to streamline the objectives. Major issues to be decided comprise the data organisation within SPARD, the data retrieval tool and the role of the DSS as evaluation tool for Rural Development Programmes.

- Wolfgang Loibl discussed the problem of pan-European data availability and the action on combining of measures from the CATS database with specific attention to EU-wide cause-effect explorations should be emphasised. There is partly a low coverage of measures related to NUTS regions and many small measures of the axis 3 target the same effects. The regional and thematic coverage of data was discussion, in particular since the by the Commission delivered data do not show individual separation on single measures. There exist divergences due to the increasing data base over time, due to different country reporting and harmonisation problems among countries. The database started in the year 2000. There exist moreover an overlap of objectives of measures and in general it is difficult to evaluate and improve the quality and the regional coverage of data in post-processing. As a major result it was stated that the combination of measures is necessary to prevent an isolation of available NUTS3 regions. In order to prevent biases, it was agreed to identify types of measures and to build groups with identical behaviour on cause-effects.

- Wietse Dol presented the Tool MetaBase, which can be seen as a statistical database and a scientific database with additional options to create additional knowledge. Users have to share their knowledge and a training for MetaBase for advance use is one major requirement. The MetaBase will be used for integration and processing of data and the use of MetaBase beyond lifetime was discussed. A major advantage of MetaBase is additionally the dissemination of results across involved institutions of SPARD and to the outside scientific world. Quality check of data is always needed and the question to use MetaBase as a standard program couldn´t be answered. At the institute LEI many projects (e.g. SCENAR 2020) worked with MetaBase. The nature of MetaBase is open access and that might be a hindering reason with regard to the CATS database. But different data-areas can be restricted, which would be necessary in terms of data policy of the EU Commission with regard to the CATS data base.

- Martijn Smit presented the work on spatial econometrics within SPARD. As a major result the importance of the results have been revealed. It was noted that in general the yearly data are not enough and longer time periods beyond 10 years are appropriate to find significant effects on investigated measures. The quality of data in the light of using methods on econometric modelling have been discussed and detailed problems on spent budget per measure were discussed with regard to the reference unit (absolute numbers, spent budget per employee) and the nature of data on the elasticities and content-related issues on the flexibility of labour productivity was demonstrated and discussed.

- Jan Peter Anders demonstrated the first prototype of the Data Viewer and related sub-tools on potential Map Visualisation. The issues of the necessary compatibility with in-house services at DG-AGRI were raised and questions on the adequate integration and the

link of the Data Viewer with the previously demonstrated tool MetaBase was discussed. Software compatibility allow presumably only JAVA applications since restrictions of the EU Commission policy will not allow installation of additional software. With JAVA this problem can be solved.

- Stefan Sieber moderated the workshop and summarised the results in a synthesis. He mentioned problems related to data quality and missing plausibility check of data, while the EU Commission normally focuses only the financial approval of budgets. The involved end users stated that the audit unit checks the support measures on budgets according to the regulation. The issue was raised that member states have to deliver the data at the basis of NUTS3. Generally Mr. R. Genbrugge is prepared to support the validation of data to improve the quality of data. The audit unit collects the CATS data tables at member state-level and beyond data gathering, the check of quality and availability of data, the cleaning of data and running scripts are additional activities to be accomplished. The quality of data is very divers, since there exists a large variability of paying authorities (approx. 80). Generally it will be possible to measure "families" of different types of beneficiaries and Mr. R. Genbrugge was willing to support Wolfgang Loibl with regard to the aggregation questions. It was stated that there do exist general problems on certain measures, which address intermediate beneficiaries. Divergences between financial years and calendar years exist additionally.

  With regard to the potential use of the SPARD DSS it was stated that DG Agri has its own GIS unit and services and building in-house awareness is certainly necessary to increase the probability of potential use of SPARD DSS by DG-AGRI. In general a web-based SPARD-DSS was preferred for data retrieval, because data retrieval via additional needed software installing might be restricted by the in-house IT department of the EU Commission. More detailed functionalities of the SPARD DSS itself will be discussed once an advanced prototype is available. Although no clear steps and promises could be given with regard to a SPARD DSS adoption by DR-AGRI at this stage, the end users were prepared to organize mid of next year 2012 a workshop in Brussels once the prototypes of SPARD are advanced and the functionality can be demonstrated. A core group of potentially interested officer of DG-AGRI and representatives of the SPARD consortium will be invited.

2.2 Prototype Design Options

The objective of the D6.2 is to develop a Prototype SPARD DSS conceptual approach including the attributes of analytical objectives, functionalities of the SPARD-DSS, the graphical design, compatibility for efficient tool advancements (final report; month 26). The D6.2 is the outcome of this deliverable 6.1, but the first results of the discussion within the consortium of SPARD and the requirement analysis will be outlined here and transformed into D6.2 at later stage of the project.

Important is the process character to develop the design of the first prototype. Thus, the IT experts of the SPARD consortium try to picture the step-wise advancements of the prototype

design. In the light of the first year the prototype deals with data processing, which might be widened by new add-ons (e.g. mapping) in the second year.

2.2.1 The SPARD-DSS Prototype (after 20 months)

Based on the requirement analysis a first potential prototype using evolutionary prototyping has been developed. Screenshots will be used to demonstrate the "look and feel of the Graphical User Interface (GUI)". The process of developing the first functioning prototype SPARD-DSS incl. a Graphical User Interface (GUI) is a continuous process and based on the feedback given on the second workshop, the GUI will be adapted and further developed.

Design options as major outcome of the conducted requirement analysis are outlined in section 2.1. Important features of the SPARD DSS are the (1) spatial, time and thematic integration, (2) technical performance, (3) quality criteria on reliability information and (4) type and quality of institutional linkages. The design is a major joint process with researcher of workpackage 2.

As major result of the activities of workpackage 2 a range of data-relevant GUI design options have been elaborated. The objective of work package 2 is to provide an information infrastructure for RDP performance evaluation containing CMEF indicators and additional ones from national RD management authorities:

1. Development and maintenance of an information infrastructure providing user friendly remote data access for RDP performance evaluation indicators
2. Data delivery: support, harmonization and storage for RDP performance evaluation (Partners: AIT with support of ZALF, LEI)

As a summary the following design options have been elaborated as data processing and the major product of a data viewer.

Data Pre-processing

Original Table Structure

	A	B	C	CO	CQ	CS	CU
1	cmefid			C191a	C191b	C191c	C192a
2	Indicator			**Context 19 - Structure of the Economy**	**Context 19 - Structure of the Economy**	**Context 19 - Structure of the Economy**	**Change in Structure of the Economy**
3	Subindicator						
4	Measurement			% GVA by branch	% GVA by branch	% GVA by branch	% GVA by branch
5	Source			Eurostat	Eurostat	Eurostat	Eurostat
6	Source2			Economic Accounts	Economic Accounts	Economic Accounts	Economic Accounts
7	Year			2007	2007	2007	2002-2007
8							
9	Unit			%	%	%	%
10							
11	Calculation			DG AGRI -L2	DG AGRI -L2	DG AGRI -L2	DG AGRI -L2
12	NUTS code	label	NUTS level	% GVA in Primary sector	% GVA in Secondary sector	% GVA in Tertiary sector	% GVA in Prima
878	FR824	Bouches-du-Rhône	NUTS3	1,2	19,8	79,0	
879	FR825	Var	NUTS3	2,7	13,5	83,8	
880	FR826	Vaucluse	NUTS3	4,1	18,5	77,4	
881	**FR83**	**Corse**	**NUTS2**	**1,7**	**15,7**	**82,6**	-
882	FR831	Corse-du-Sud	NUTS3	0,9	15,7	83,4	
883	FR832	Haute-Corse	NUTS3	2,6	15,7	81,8	
884	**FR91**	**Guadeloupe**	**NUTS2**	**3,0**	**13,7**	**83,3**	-
885	FR910	Guadeloupe	NUTS3	3,0	13,7	83,3	

"Human readable" RDP Report Table

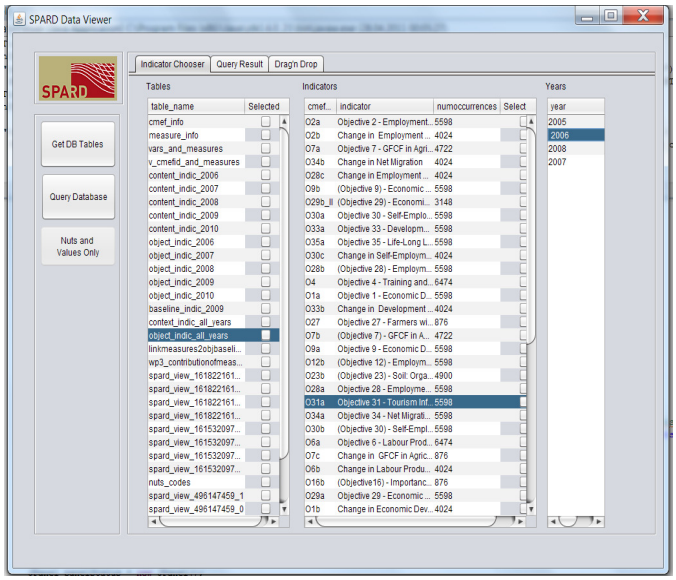
baseline_indic_2009 @spard.public (localhost) - Table

File Edit View Window Help

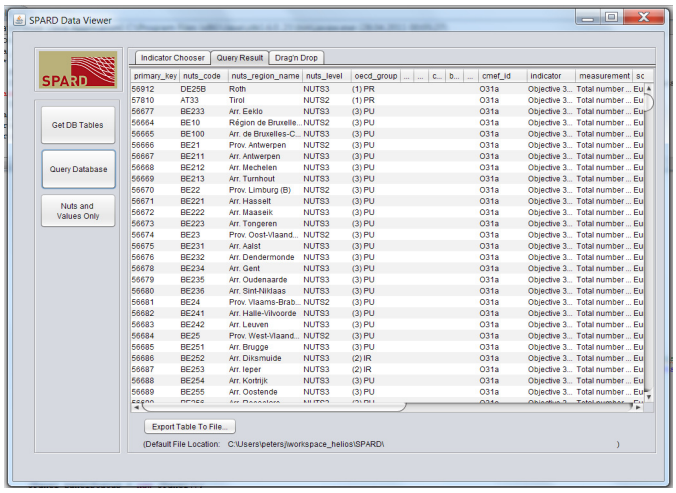
Import Wizard Export Wizard Filter Wizard Grid View Form View Memo Hex Image Sort Ascending Sort Descending Remove Sort Custom Sort

prima	nuts_co	nuts_region_name	nuts_leve	oecd_gr	oecd_gi	countr	country	base	cmef_su	cmef_id	indicator	measurement	source	source2	year	unit	calculation	indicator_value
109	AT11	Burgenland (A)	NUTS2	(1) PR	predon	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	0
110	AT12	Niederösterreich	NUTS2	(1) PR	predon	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	0,3
111	AT13	Wien	NUTS2	(3) PU	predon	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	-3
112	AT21	Kärnten	NUTS2	(1) PR	predon	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	3,1
113	AT22	Steiermark	NUTS2	(1) PR	predon	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	1,8
114	AT31	Oberösterreich	NUTS2	(2) IR	interme	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	0
115	AT32	Salzburg	NUTS2	(2) IR	interme	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	1,7
116	AT33	Tirol	NUTS2	(1) PR	predon	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	-5,1
117	AT34	Vorarlberg	NUTS2	(2) IR	interme	AT	Austria	13	O7	O7c	Change in GFCF in Ag	Average annual growt	Eurostat	Agricul	2000-20	% pei	DG AGRI - L2	0
118	AT11	Burgenland (A)	NUTS2	(1) PR	predon	AT	Austria	88	C18	C182a	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-1,56
119	AT11	Burgenland (A)	NUTS2	(1) PR	predon	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-0,45
122	AT12	Niederösterreich	NUTS2	(1) PR	predon	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-0,48
123	AT12	Niederösterreich	NUTS2	(1) PR	predon	AT	Austria	90	C18	C182c	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	2,01
124	AT13	Wien	NUTS2	(3) PU	predon	AT	Austria	88	C18	C182a	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-0,25
125	AT13	Wien	NUTS2	(3) PU	predon	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	0,28
126	AT13	Wien	NUTS2	(3) PU	predon	AT	Austria	90	C18	C182c	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-0,02
127	AT21	Kärnten	NUTS2	(1) PR	predon	AT	Austria	88	C18	C182a	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-2,08
128	AT21	Kärnten	NUTS2	(1) PR	predon	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-0,19
129	AT21	Kärnten	NUTS2	(1) PR	predon	AT	Austria	90	C18	C182c	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	2,26
130	AT22	Steiermark	NUTS2	(1) PR	predon	AT	Austria	88	C18	C182a	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-1,91
131	AT22	Steiermark	NUTS2	(1) PR	predon	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	0,11
132	AT22	Steiermark	NUTS2	(1) PR	predon	AT	Austria	90	C18	C182c	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	1,8
133	AT31	Oberösterreich	NUTS2	(2) IR	interme	AT	Austria	88	C18	C182a	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-1,97
134	AT31	Oberösterreich	NUTS2	(2) IR	interme	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	0,14
135	AT31	Oberösterreich	NUTS2	(2) IR	interme	AT	Austria	90	C18	C182c	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	1,83
136	AT32	Salzburg	NUTS2	(2) IR	interme	AT	Austria	88	C18	C182a	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-1,9
137	AT32	Salzburg	NUTS2	(2) IR	interme	AT	Austria	89	C18	C182b	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	-0,1
138	AT32	Salzburg	NUTS2	(2) IR	interme	AT	Austria	90	C18	C182c	Change in Age Structu	% people by age class	Eurostat		2000 - 2	%	DG AGRI -L2	2

Derived Database Table



SPARD Data Viewer – Indicator Selection



SPARD Data Viewer – Query Result

The SPARD Data Viewer (major component)

The SPARD Data Viewer consists of a Web Start Client and a web-based database which contains all CMEF indicators of the RDP reports of 2006-2009. Working features are a fully functional remote access and batch procedures for data extraction, whereas the latter feature is still under development.

Since the RDP reports' CMEF indicator tables proofed to be very weak in terms of data availability future plans are to integrate data from the CATS database and to make use of MetaBase data and functionalities to improve the overall data availability for the SPARD RDP performance evaluation.

One important point here will be how to deal with the data gaps that showed up during the data evaluation (this is planned to be handled by MetaBase functionalities). A second point is the handling of multiple entries per indicator and how to handle their combinations and the possibility to select them in the GUI. Lastly, future development might also include Web Processing Services (WPS) to perform statistical analyses remotely on the server.

2.2.3 Conclusions (after 20 months)

To define the bigger picture and taking the nature of the EU Commission into account, it seems adequate to develop the SPARD-DSS in the way that the two options (1) the potential implementation at EU Commission and (2) a SPARD-DSS targeted for the research community should be envisaged. This allows a maximum flexibility in terms of the use of SPARD-DSS beyond project lifetime.

The EU Commission has internal services to post-process data records and the current discussion revealed limited need for additional tools provided by FP7 projects. As a major outcome of internal experience and discussion within the frame of SPARD one can summarise that the FP7-products are rarely used by the EU Commission. Therefore, the requirement analysis has to be focused partly on the SPARD consortium by complementary requirement analysis of stakeholders at the EU Commission.

The following tools specifications are under discussion and will be considered as highly important:

- Software architecture: As current state of the art tools are not complete server-based due to a streamlined maintenance and system control as well as because of limited outreach to potential end users. Moreover, a complete server-based software solution might cause high costs for maintenance and can be instable, if the right measures are not undertaken. A hybrid solution seems to be most adequate, since on the one hand parts of the software can be installed on the computer, but necessary data can be retrieved from only one data base. This data base can be efficiently updated.

- The graphical use interface: The functional GUI is not defined yet in detail, although SPARD DSS as a data retrieval tool exist and the general functionality is evident. Emphasis will be given to the data retrieval and the numeric results and fewer capacities will be used to develop additional visualisation tools beyond traditionally available ones. The data retrieval tool seems to be two or three dimensional targeted for triggering the data in different aggregates. The numeric data processing with up- and downscaling functions seems to be most important for the EU-Commission. The subsequent visualisation will be usually elaborated by Commission`s in-house services. Nevertheless, a simple mapping component might be adequate. No additional graphical visualisation sub-tools seem to be needed and neither desired.

- Browser-based end user interface: A browser-based end user interface seems most adequate as it allows for direct use at EU-Commission level without the need of additional permissions to execute software programmes. Generally one should avoid stand-alone programmes, which have to be executed on the personal computers at the commission.

- Server-based data base: The data base should undergo with a directly connected server-based data base using. The server-based data base has the advantage to easy update data and to steer and control the content to be provided to potential end users. Pure stand-alone solutions seem to be risky since high number of different versions might be produced.

- Quality criteria: Quality criteria are highly appreciated at the level of the Commission, in particular in case of own calculations quality criteria should be developed. Transparency and traceability should be always guarantied as part of the quality management. Reliability information of results should be indicated at all data record levels by specific reliability quality criteria assessed by SPARD. This is very important for most end users.

- Compatibility: The compatibility between SPARD-DSS and CMEF indicators is in most cases not clear and end users doubt the consistency. So far there is no real perceived concept / option on how to ensure compatibility.

- Traceability and transparency: Data sources and calculations should be always traceable and transparent, especially when own calculations are applied. If official data is used, data sources should be indicated and at all stages along the calculation chain traceable from result aggregates. Fact and information sheets are an asset but not compulsory and should be elaborated, if the added value is clearly visible.

- Functionality of SPARD-DSS: Functions should contain: a) registration / user to limit access, b) upload of self-generated data not relevant, but download yes, c) retrieval / import of data in compatible tools e.g. excel very important, d) print function an asset.

- Maintenance of the Tool: DG-Agri has generally service contracts for maintenance, but it seems not likely that DG-Agri will adopt the tool due to FP7 project. In any case the costs for maintenance beyond project lifetime are most important decision criteria for the SPARD-DSS specification.

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