How to support decision making processes in agribusiness through the GRUS system

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Facilitate and Support Group Decision

• Group Decision Support System developed for:
  • Supporting a group engaged in a decision making process
  • Facilitating the problem solving
  • Avoiding conflict

• One paradigm:
  • MCDA
  • MCDM
Group Decision Support Systems

• “... mix of devices, software, persons, processes, allowing collaboration among group of persons.” (Sprague and Carlson, 1982)

• ...mix of computers, communications, technologies of decision working together to support problems identification, formulating and generating solutions during work meetings.” (DeSanctis and Gallupe, 1987)
GDSS Advantages

• Improve groups efficiency

• Tangible
  • Time reduction
  • Increasing the number of good ideas

• Intangible (difficult to quantify)
  • Improve group cohesion
  • Improve problem definition
  • Good group commitment
Kinds of GDSS
Facilitation - Definitions

• Important impact on the group outputs and productivity

• “...activities done, before, during and after a collective decision meeting to support the group to reach their objectives defined during the decision process.” (Bostrom, Anson and Clawson, 1993)

• “... defined as a process through which an external person of the group, non concerned by the decision, officially recognized and accepted by the group, is employed to support a group engaged in a decision making process.” (Adla, 2010)
Kinds of Facilitation

• Technical
  • Assist stakeholders with the technology use

• Process
  • Moderate the stakeholders and their interactions in the tasks achievement in order to make arising the meeting objectives, and to guide the participants

• Content
  • Imply to directly deal with the problem to solve
Tools for Facilitation

• Content oriented
  • Dynamical Text Guide in a Multi-Criteria GDSS (*Limayen, De Sanctis, 2000*)
  • Cooperative Knowledge Based System (*Adla, 2011*)
  • Automatic ideas clustering (*Yuan, 2008*)

• Process oriented
  • Agent Based System (*Nunamaker at al., 2002*)
  • Group activity analysis (indicators analysis) (*Nunamaker et al., 2002; Vivacqua et al., 2011*)
  • Facilitation Process (*Adla, 2010*)
  ‣ Difficulties to agree on common criteria used for Decision Making
# Facilitation Process

## GROUP FACILITATION PROCESS

<table>
<thead>
<tr>
<th>PRE MEETING</th>
<th>DURING MEETING</th>
<th>POST MEETING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating Agenda</td>
<td>Selecting participants</td>
<td>Generating alternatives</td>
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<td></td>
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<td>Organizing alternatives</td>
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<td>Evaluating alternatives</td>
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<td>Choosing solution</td>
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<td>Presenting solution</td>
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<td>Reporting</td>
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</tbody>
</table>

**Fig. 1:** Group facilitation process

(Adla, 2010)
MCDM Group Decision Making

• Macharis et al. (2018)
  • GDSS: Promethee
  • Decision Makers
    • Individual Preferences
      • Private Criteria
      • One performance matrix by Decision Maker
  • Global aggregation for the group \(\rightarrow\) Weighted Sum

• MAMCA

• Advantage: Sensitive Analysis among Stakeholders

• Limit: No Collaboration, No Co-Decision, No Common Share
GRoUp System (GRUS)

» Web Application : ToolBox

» Based on Grails web application framework
  > Open Source Framework

» GRUS is a fully open source system : available upon request
GRUS Features 1/2

» Can be used in several situations

- Same Time
  - Same Place
    (Synchronous and collocated)
- Different Time
  - Same Place
    (Asynchronous and collocated)

- Indifferent to Time
- Indifferent to Place

- Same Time
  - Different Place
    (Synchronous and distributed)
- Different Time
  - Different Place
    (Asynchronous and distributed)

» In GDSS, 2 roles of user
  - One facilitator (meeting manager)
  - Several Participants (meeting contributors)
GRUS Features 2/2

» 2 kinds of meetings are available
  > Public meetings
    + All registered users in GRUS system can participate
  > Private meetings
    + Only invited users can participate to a private meeting

» Some collaborative tools are available
  > Electronic Brainstorming
  > Categorizer
  > Vote
  > Agenda
  > Report...

» User with the role of facilitator can for her/his meeting
  > Define the meeting type
    + Group process (sequence of collaborative tools)
  > Invite users
  > Manage the group process (stop, add, delete,...) tools
GRUS Objectives

» Open System for
  > Sharing collaborative tools
  > Sharing group processes

» Promote the use of GDSS in organizations

» Improve the efficiency of group work
GRUS as a Tool-Box

- Several tools
- Combine them
- Flexible process
GRUS: Process oriented

- **Process**
  - Several steps
  - Several tools

<table>
<thead>
<tr>
<th>step3</th>
<th>parameters ➤ criteriaAlternativesGeneration ➤ criteriaReduction ➤ alternativesReduction ➤ multicriteriaClusterEvaluation ➤ directChoiceCluster ➤ reportingCluster</th>
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<tbody>
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<td>parameters ➤ retour</td>
</tr>
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<td>parameters ➤ brainstorming ➤ vote</td>
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<tr>
<td>Vote - Etape 1 - ER</td>
<td>consensusB</td>
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Criteria

- Suitability Function
  - Scoring Scale
  - Indifference Score
  - Reject Score
  - Shape of Interpolation
  - Shapley Indice (Bi-Capacity)

(a) linear improvement of the suitability
(b) sigmoide improvement of the suitability
(c) plateau improvement of the suitability
Vote Processes

- Parameters
  - Facilitator
  - Stakeholders
  - Weight
- Brainstorming
  - All
  - Alternatives
  - Definition
- Individual Preferences
  - All
  - Ranked
  - Alternatives
- Consensus
  - Facilitator
  - Display
  - Results
- Decision
  - Facilitator
  - Decision
- Report
  - Facilitator
  - File report

Borda
Condorcet

EURO 2018

19

June 21st – 22nd 2018, Valencia, Spain
Experiments

- Synchronous / Distributed
- 15 Experiments
  - Non Academics / Academics
- Process
  - Parameters
  - Brainstorming
  - MultiCriteria Evaluation
  - Discussion
  - Report

Simplify

AINIA - UPV

UT1C, France – UNLP, Argentina – 06/04/2018
Conclusions

• Scenarios have been defined
  • Tomata production:
    • How to increase production?
    • How many stems do we keep in greenhouses?

• Experimentations allow to:
  • Test usability of the system
  • Improve software requirement step of designing the GDSS
Perspectives

• Simplify use of the system
  • Hide some parts during some steps

• Test other processes
  • Vote
Thank you !!!

Questions !!!!