



Fostering Agriculture and Rural Development by Decision Support Systems

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Introduction

Stakeholders know about agricultural emissions in general, they know about the overall potential for climate change mitigation, but this is not known at farm or local level.

The decision is always a choice of many options, which should also include the option to do nothing. DSS performs many functions, so there are as many definitions as can be found articles and books on the subject. Decision support systems do not make decisions themselves, but help to make decisions, therefore their application requires specialists with certain qualifications. A DSS help in documenting the decision process that leads to the choice of a particular option thus contributes to its increasing transparency and fairness.

The terms Decision Support Tools or Decision Support Systems (DSS) refer to a wide range of computer-based tools (simulation models, and/or techniques and methods) developed to support decision analysis and participatory processes. A DSS consists of a database, different coupled hydrodynamic and socio-economic models and is provided with a dedicated interface in order to be directly and more easily accessible by non-specialists (e.g. policy and decision makers).

The aim of the study is to identify the target sectors and functions of agricultural and rural development decision support systems.

Methodology

In order to analyse the phenomenon of decision support systems (DSS) and its influence on the development of agriculture and rural development, the analysis, comparison and synthesis of scientific literature was carried out. From various databases, scientific publications on the DSS itself and its impact on the development of farms.

Results

DSS TARGETED SECTORS:

- Agriculture: CAP (land use monitoring, subsidies), FAS (smart farming), etc.
- Forestry: fragmentation, biomass, CO2 balance, timber production, regrowth, etc.
- Climate: hazards, trends, models, impacts
- Business: insurance, assessment, intelligence, marketing, AI applications
- Public: regional policy, nature protection, education & science.

● **DSS to support:** Increasing productivity; Allocating resources reasonably; Adapting to climate change; Avoiding food waste; Optimizing usage of nutrients, fertilizers, herbicides, and alike; Water management and irrigation strategies; Avoiding soil erosion and overfertilization; Optimizing usage of vehicles; Sustainable agricultural practices

● **DSS for** Mission planning; On-board decision-making; Route planning (on field); Irrigation management; Optimization of water supply; Integration of agricultural practice and adaptation to climate change; Participation of agricultural stakeholders; Food waste control; Quality sustainability control; Integration of economic and ecological aspects in agricultural practice; Usage of aerial imagery and geodata to optimize fertilization; Detecting vulnerable areas; Advising farmers concerning usage of herbicides, fungicides and other means, potentially harmful in various aspects; Supporting farm management; Supporting training and further education for farmers and agricultural managers.

Main conclusions

The database management system component allows the organisation, facilitates access to and the elaboration of time series of raw data.

DSS helps multidisciplinary team involved in the analysis of the development of agriculture and rural development problems to establish a *common language* and think in a structured way. Criteria, objectives and constraints about the problem become more explicit through the whole process of development and application of a decision support system.

