

Analyzing Design and Potential of Pesticide Application Services in Austrian Farming

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Abstract:

The use of plant-protecting chemicals in agricultural production is controversial because of their proven or suspected risks to human health and the environment. The EU has therefore claimed that concrete measures and instruments must be introduced to achieve a more sustainable use of pesticides. The Inter-University Research Centre (IFZ) and the Institute of Innovation and Environmental Management of the Karl Franzens University are undertaking research projects to determine if plant protection measures include an eco-efficient benefit and how they can be created and offered as a service. One of the core questions is to determine whether farmers in the Styrian winegrowing area would assign to a contractor the task of protecting their crop with chemicals. In an earlier project INNOVAZID, it was found that this is a well-known practice, but one that is often regarded as mutual aid with little economic benefit for the contractor. Despite this, a few examples were found where this practice could be characterised as a service. This suggests that – if core questions such as the insurance of the service and the design of the contract are solved – such a service can be developed, thereby achieving more sustainable and quality-assured chemical plant protection.

Keywords: plant protection, eco-efficiency, service, sustainable use of pesticides.

I. EUROPEAN PLANT PROTECTION POLICY

In its Communication No. 349 (2002) the European Commission put forward a proposal for a thematic strategy on the sustainable use of pesticides [1]. It is expected that a decrease in pesticide use will reduce the risk to human health and the environment. Among others it is therein recommended to: Improve control about use and distribution of pesticides, create a system of mandatory education, awareness, training and certification for pesticide users, substitute most dangerous substances with safer (including no chemical) alternatives.

Initiatives of the member states specify measures to converge to these goals, notable programs are known from Denmark [2] and Germany [3]. Proposed measures are: Increased advice to farmers, establishment of demonstration farms and info-groups, increased use of decision support and warning systems, supplementary training to farmers and consultants, development and use of pesticide indicators (assessing quantity and quality of pesticide use).

II. NOVEL DEVELOPMENTS IN PLANT PROTECTION

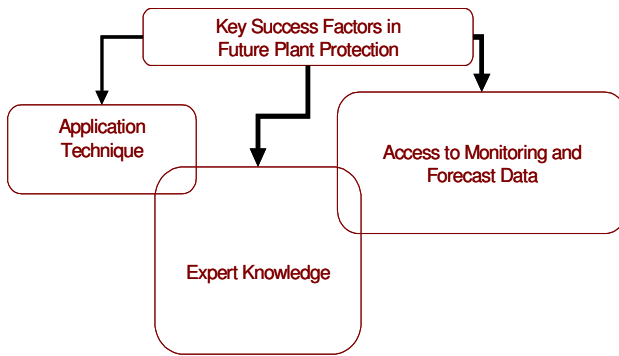
Precision farming techniques has an increased impact on agriculture throughout the world. Precision farming is understood to be a approach to optimize crop yields via systematic gathering and handling of information about crop and field [4]. Every single field (site specific) is analysed using modern technology such as GPS (Global Positioning System), remote sensing as well as traditional land surveys and administrative management tools such as yield statistics. It is demonstrated in experiments that site specific weed control has a significant potential for reducing herbicide use taking into account that the spatial distribution of weed populations is heterogeneous. Internet based self service portals provide farmers with information to help deploy fewer crop protection pesticides [5]. Users can enter their individual cultivation data which can be integrated with the information available. The results can be called up and help in the decision making process. The system warns users affected by events such as pest infestation automatically per text message.

III. EXPECTING BENEFITS FROM A PLANT PROTECTION SERVICE

Considering that plant protection will be increasingly

- Charged with control and prevention measures
- Associated with consulting and knowledge
- Implemented with high tech equipment

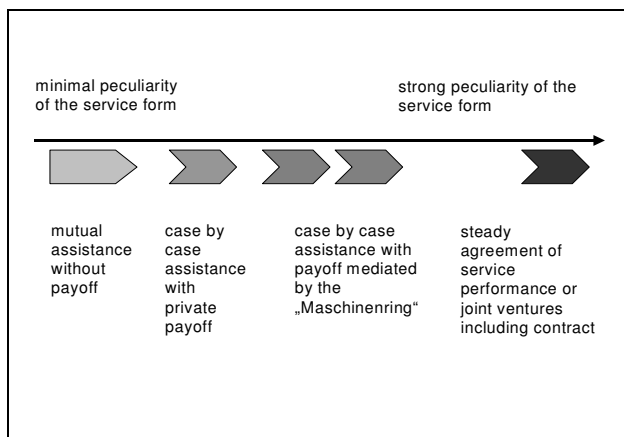
The question arises if plant protection measures can be created and provided as a service system and whether this would include an eco-efficient benefit. In brief, eco-efficient service systems aim at reduced resource consumption, preserving benefit to the client. Benefit can be assumed in an efficient use of equipment (reduced machinery), application of modern equipment, enhanced occupational safety and documentation of the service measures as a quality control measure during application. Outsourcing plant protection to a service provider discharges the farmer and hence he may focus on his core competences or generally gather improvement of his life quality.



These facts, trends and assumptions constitute the starting point of several finished and current projects funded by the Styrian Future Fond *Zukunftsfonds Steiermark* and the Austrian Program on Technologies for Sustainable Development *NachhaltigWirtschaften (Fabrik der Zukunft)*. Therefore a steady cooperation between the *Inter-University Research Centre (IFZ)* and the *Institute of Innovation and Environmental Management of the Karl Franzens University* was established integrating stakeholders as required. The overall aim is to find out if - in Styria as well as in Austria - plant protection measures are offered to the farmers or requested by them as a service, and how a market could be developed for such a service. Therefore, farmers in agriculture, wine- and fruit growing were surveyed, along with consultants and representatives of the farmers association.

IV. PLANT PROTECTION SERVICES IN STYRIA – STATE OF THE ART (INNOVAZID)

Focusing on Styrian farming, the project INNOVAZID collected how plant protection services are implemented [6]. Farmers in agriculture, wine- and fruit growing were surveyed, along with consultants and representatives of the farmer association. As a result, it was determined that plant protection is occasionally offered and performed as a service, but as a general rule the clients still retain their own machinery, and the suppliers – in most cases also farmers – are not able to earn a significant amount of their income from this service. The survey also revealed a few case studies of practice where the character of the service was more distinct.



To illustrate character and scope of a “strong peculiarity of the service” one case study - located in the federal state *Burgenland* - is drafted here:

The plant protection service was founded in the early Nineties aiming at task sharing between two farmers. Later on the service was broadened to others and actually contracts with ten clients are maintained. The stewarded area comprises 500 hectare, the performance is weed and pest control in agriculture (mostly cereals). According to the service supplier the foremost motivation always was cost saving. This is achieved by jointly purchasing the pesticides and efficient administration including modern technique application. The machinery for example is equipped with charcoal filters and circulating air condition thus enhancing occupational health safety. Expert knowledge enables the service supplier to choose the optimal date for application, appropriate documentation certifies the client to be in the compliance with legal requirements. Contract based agreement over several years enables or at least facilitates planning and calculation of investments.

In the interview the service supplier proposed to enhance similar joint ventures coordinated by the *Maschinenring* - a big agricultural service supplier association - as well as appropriate training courses. It was his position to provide such a service with a certificate on a legal basis.

V. IMPLEMENTING PLANT PROTECTION SERVICES IN STYRIAN WINEGROWING (SER-VINO)

In the project SER-VINO, farmers in the Styrian winegrowing areas were surveyed on how they perform plant protection and on whether they are willing to assign to a contractor the task of protecting their crops with pesticides [7].

Model calculations and case studies are being undertaken and will be provided to the target group to demonstrate the economic benefit. Due to a first appraisal contract based plant protection service – including fungicide and herbicide application with machinery owned by the supplier - would cause costs of about 1.800 to 2.600 € per year and hectare vineyard. The range arise from differences between the contract models: Beside the classical client - supplier model a model consisting of a joint venture of farmers is feasible. While the machinery is in the property of the consortium, a (part time) operator is hired and drives the machinery.

VI. DEVELOPING A CONCEPT FOR A PLANT PROTECTION SERVICE (SERPLANT- PRO)

When developing the plant protection service, core questions such as insurance, assurance of quality and contract design have to be solved, since quality and safety are prerequisites when establishing pioneer applications. In the project SERPLANT-PRO – sponsored by the *Austrian Program on Technologies for Sustainable Development NachhaltigWirtschaften* – the participants aim to analyze and demonstrate how the service system “plant protection” can be implemented, to identify barriers, and to determine which stakeholders are interested in the concept. The provincial focus of

INNOVAZID is also being broadened to include the whole of Austria. Key research questions are: Who are the important stakeholders, including promoters and opponents? How can information channels be designed? How can issues of liability and insurance be resolved? Who can be pioneers?

VII. REFERENCES

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