

# SATELLITE IMAGERY IN AGRICULTURE: Commercialisation and Sustainability in Germany

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## ABSTRACT

Satellite imagery has been used since the 1960s to monitor agricultural activities at a national and international level. It is only now that the image quality and cost feasibility have made satellite imagery available to individual farmers in application to crop quality analysis and other measures relating to precision farming. The underlying reasoning for the propulsion forward of this technology to the level of individual producers has been out of the argument that it provides economic and environmental benefits while increasing yields. However, when looking at the goals of EU Common Agricultural Policy at large, the use of satellite imagery by individual farmers has the potential to contribute greatly to some, while detracting from important goals such as maintaining small farms and rural infrastructure, as well as encouraging agrobiodiversity and alternative methods of farming. This is a study of the actors that have enabled satellite imagery to be available to German farmers, as well as an analysis of areas in potential need of attention and improvement by the public sector. The format is a technological assessment with an output of policy recommendations for an inclusive and sustainable progression of the use of satellite imagery use in agriculture.

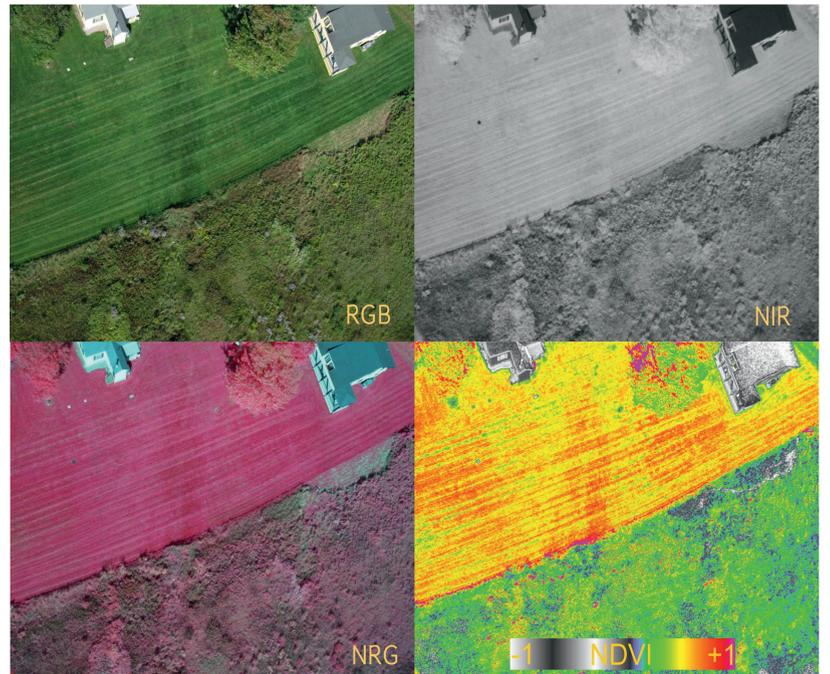
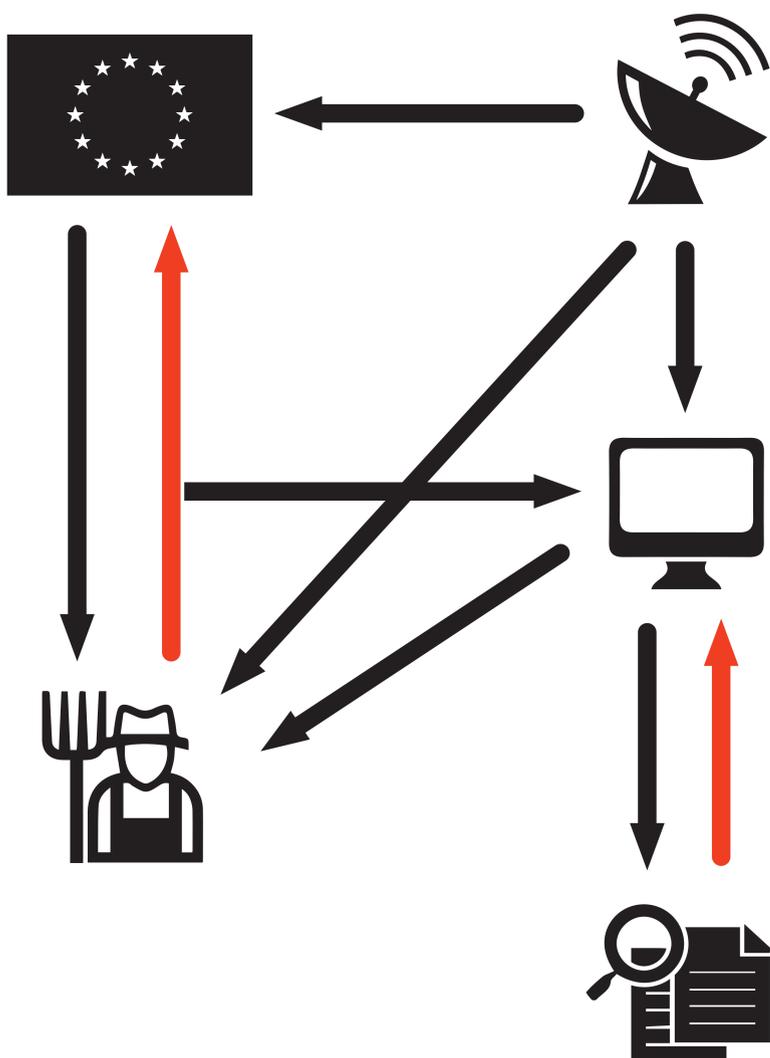
## HYPOTHESIS

- 1) Satellite imagery is marketed and used more on large farms and little consideration or accessibility for small farmers.
- 2) Agrobiodiversity measures are not available in the currently offered Precision Agriculture software, although the technology is clearly available and utilised in research.
- 3) Satellite imagery is being used to continue the use and application of synthetic fertilisers and pesticides, and the bridge to transition or connect users to organic field inputs is not being made.

## METHODOLOGY

Interviews were conducted with PA and farm management software providers utilising satellite imagery through their services that are either offered in Germany at the present time, or are planning to offer their services in Germany in the near future. These companies were found through a combination of Internet searches, the German *Handelsregister*, and listed attendants to the 2015 Agritechnica conference, the worlds largest trade fair for agricultural machinery and equipment. Interviews were conducted with a preference for face-to-face interviews, however, the majority of the interviewees were located at distances that did not allow for this. Thus, some phone interviews were conducted and emails with question lists were sent for response.

Through these short interviews based on 12 core questions (see QR code), the goal was to evaluate, both the current offerings and intentions of the software companies with regard to EU-CAP sustainability measures including agrobiodiversity, small farms, and related features, as well as the barriers to implementation where policy intervention could play a role in creating incentives.



## FINDINGS

**Small Farms:** 20% of the software companies evaluated specifically targeted small farmers, as defined by 50-500ha farms. 60% said that they did not discriminate, and that there were no barriers to entry for any size farm besides small technology features that might be more important to small farmers such as higher resolution imagery. 20% said there was a cut-off size for which it would be profitable, for example, greater than 200 hectares.

There still remains to be a technology lag wherein satellite imagery capabilities through the offered software are limited to the equivalent of Bing or Google Maps, and are not yet utilising the availability of recent true-colour or infrared imagery which would provide more information that would be more subject to scale factors.



**Agrobiodiversity:** Of the interviewed companies 20% were using technological capabilities that would enable agrobiodiversity measurement by satellite. All provided the opportunity for farmers to list which crops they were growing so as to compare different seasons and offered the planning option of crop rotation, however, only 20% of interviewed companies stated satellite data was not planned to be included as an analysis tool for measuring agrobiodiversity both on fields and in the surrounding area.



**Organic Farms:** The results of the interviews were that 80% stated, (paraphrased) 'yes, theoretically an organic farmer could use the software, but we do not cater to their needs specifically.' The other two respondents said that one could restrict their capabilities, so as to not be able to spray chemicals, and the other respondent said that his next step was to contact organic associations to discuss these possibilities. All interviewees stated that it would be too complicated to use satellite imagery for certification purposes.



**Affiliation Results:** Out of the ten companies interviewed, five had strong affiliations with different field input companies which were integrated into their software. The five that did not expressed the importance to the farmers they were serving, to remain independent and impartial when providing the farm management software. **Connected to this are issues of data protection, where farmers don't want their data shared with more companies than necessary.** The companies interviewed that did have affiliations with seed, fertiliser, and equipment companies, responded with (paraphrased), 'yes, but it is only to offer more convenience to the farmer should s/he choose to use them. There is no obligation to use those exact ones.'

