Role of contractors for adoption of new technologies

Supervision: Anna Massfeller

Background:

New weeding technologies such as autonomous weeding robots or tractor-mounted camera-steered tools allow reducing herbicide usage through site-specific weed management. Farmers start to make use of these technologies in their fields and their adoption behavior is currently being studied. However, it has been found that these new technologies are often not bought by the farmers themselves, but rather used via contractor services (Spykman et al., 2021). The role of contractors, therefore, seems as an important driver of broad-scale adoption but has so far not been exhaustively investigated.

Thesis ideas

Several theses (BA/ MA) with different focuses and methodologies are possible:

Literature search

- Status quo of contractor services in Germany: where are they located, what services do they offer, what services are demanded? + Compilation of a data base
- Status quo on research on factors driving farmers' decision to make use of contractor services

Options for **empirical work**

1) Existing data set from online survey with around 300 German sugar beet farmers in early 2022 containing data on technologies used for weed management and ownership status (own machinery, shared, contractor service), farm and farmer characteristics, spatially explicit field locations and shapes. Possible research topics include:
    - Which factors drive the decision to use machinery via contractor services? E.g. Is it rather farm and farmer characteristics (farm size, field size, age, etc.) or production-related factors (soil quality, etc.) or spatial factors (distance to the contractor, distance between own fields, distance between fields and farm) or regional differences (east Germany vs. west Germany? Farm-demographic structures, etc.)
    - Which type of technology is currently used via contractor services in sugar beet weeding? How can users of contractual service for mechanical weeding be classified?

2) Collecting own data
    - Survey with farmers on which contractor service they use out of what reason or why they don't use it e.g. change the "farmer job" towards administration while actual tasks are outsourced, (fear of) loss of "fun to drive the tractor"
    - Role of risk: all farmers might need the same service at the same time, would that lead some tasks to be not outsourced? How does that influence farmers' decision-making?

3) Use of secondary data (?)
    - Trends in contractor services used, e.g. how did the costs for contractor service usage develop over time? For what reasons?

Own ideas in any of the directions are welcome. These are no fixed research questions but rather ideas/ starting points that can be further developed/ combined.

Starting Literature

SPYKMAN, O., GABRIEL, A., PTACEK, M., GANDORFER, M., 2021. Farmers' perspectives on field crop robots – Evidence from Bavaria, Germany. *Comput. Electron. Agric. 186, 106176.*

WANG, Y., HUBER, R., FINGER, R., 2022. The role of contractors in the uptake of precision farming—A spatial economic analysis. *Q Open 2, qoac003.*

Notes

German skills might be needed (e.g. websites on German contractor services, contact to contractors, farmers etc.).

Continuous supervision is intended to give students the opportunity to develop further skills and methods of scientific work and to deepen their content-related knowledge. The results of the work make a valuable contribution to an actual research project and may result in co-authorship of a publication as part of the project. Master theses must be written in English, Bachelor theses could be written in German, however English is preferred.

If you are interested or have further questions, please send a short email to anna.massfeller@ilr.uni-bonn.de (please mention study program, planned time frame for writing the thesis, topic idea/ preference).

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