



# ROW-BASED ARABLE FARMING – A SYSTEM FOR PRACTICE?

Economic yield optimisation and biodiversity: how can these two apparently competing goals be reconciled? This is where the agro-ecological arable farming system „Controlled Row Farming“ comes in.

In arable farming, it is no longer just a question of maximising yields from the area. Against the backdrop of the political and social discussions of recent years, one thing has become clear: Sustainability is also playing an increasingly important role in conventional arable farming. This includes reducing the use of pesticides and fertilisers while at the same time increasing biodiversity. With „Controlled Row Farming“ (CRF), Amazone-Werke has developed a new cultivation method in collaboration with Agravis AG, Deutsche Saatveredelung AG (DSV) and its own subsidiary Schmotzer Hacktechnik, which is intended to enable more biodiversity with constant yields through row-based cultivation.

## Optimised for rows

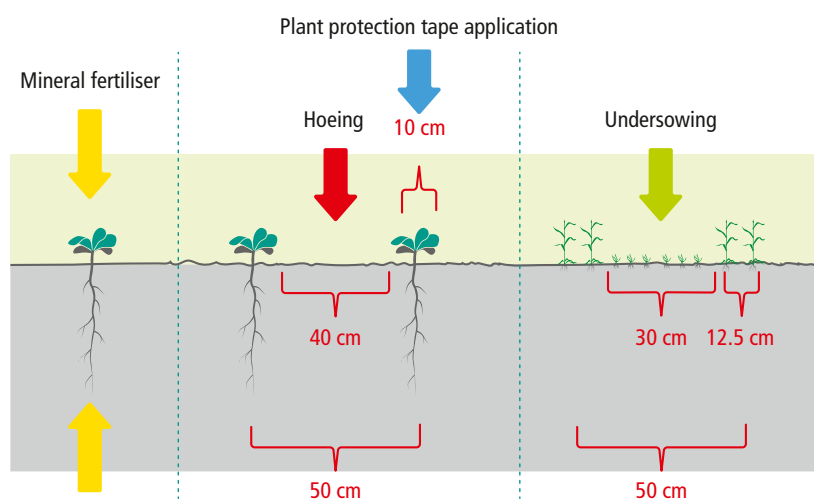
In the CRF, crops are grown in rows 50 cm apart; cereals are grown in double rows. Depending on the crop rotation, the seedbed

can be offset by 25 cm in order to utilise the preceding crop value of an undersown crop, for example.

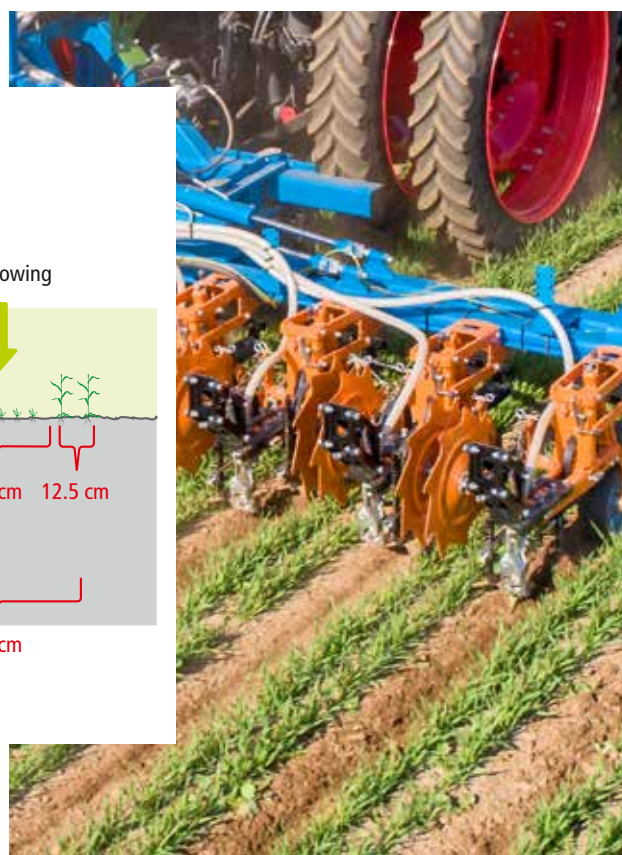
All operations are aligned with the rows, as illustrated in Fig. 1. Thanks to the fixed row width, the crop no longer needs to be spread or sprayed over a wide area. Instead, the sensitive inputs of fertiliser and crop protection can be precisely placed and thus used as efficiently as possible. Exact scientific trials (as part of final theses) are being carried out to verify these assumptions.

Mechanical weed control plays a decisive role. Accordingly, the hoe is a key machine and an important part of the CRF system. As all crop types are designed for a row width of 50 cm, this technique

FIG. 1: ILLUSTRATION OF CRF SYSTEM OPERATIONS



A row spacing of 50 cm is used in the CRF system. All operations (fertilisation, hoeing, plant protection or establishment of undersown crops) are aligned with this.



## **i** CONTROLLED ROW FARMING – MORE THAN A VISION

- Row-based arable farming with maximised efficiency of farm inputs
- Strengthening the value of the agroecosystem by including diverse companion crops
- Stabilisation of yields despite reduced use of fertilisers and pesticides

can be used for all crops. In combination with the band application of plant protection products, the weed pressure in the row can be kept at a low level. In addition, undersowing can be established with the hoe or when sowing the crops, which can suppress weeds.

### More biodiversity through undersown crops

Between the rows, undersown crops such as various types of clover, linseed, ribwort-plantain or wild herb mixtures can be sown. Flower strips, which are usually only sown at the edge of fields, can also be planted here. The companion crops have no contact with fertilisers or plant protection thanks to the exclusively row-based working measures. Therefore, they ensure more biodiversity in the field, increase soil fertility and contribute to the phytosanitary support of the main crop.

### A system for farmers

The trials are focussed on practical suitability. It is therefore important that the system can be integrated into conventional arable farming without significant yield losses. „We don't want to develop anything fundamentally new that first has to be established at great expense with the help of subsidies or other support measures,“ emphasises Maximilian Wilp, head of the Amazone research farm Wambergen in Hasbergen-Gaste. This is where the CRF trials are carried out. So far, Wilp is satisfied with the results: „We have been able to maintain yields and increase biodiversity at the same time.“

### And the costs?

Nevertheless, the switch to row-based arable farming first requires investment. In order to estimate the relationship between the increased financial expenditure on technology, labour and time and the savings, especially in fertiliser and pesticides, Amazone, in collaboration with students from Osnabrück University of Applied Sciences, calculated various scenarios using a model farm. The model calculation was based on an arable farm with 350 ha, which grows winter cereals, oats, sugar beet and grain maize.

All in all, the costs in the calculations were at the same level of the classic cultivation method. One challenge for many farms will be the increased need for labour. The increasing automation of work processes in cultivation equipment and the use of autonomous field robots could play a decisive role here.



Controlled Row Farming (CRF): a system that allows better establishment of companion crops.

### And in the future?

The focus for the future is on maintaining yields. „We are currently working a lot with companion and undersown crops to find out which ones work well. We see it as a task to find out which mixtures and varieties are suitable for the CRF system,“ reports Wilp. In the medium term, Controlled Row Farming is to be implemented on other farms in order to test whether the system also shows the good results in wider practice.

### Conclusion

Controlled Row Farming shows alternative solutions for meeting social demands in arable farming without neglecting the economic side. After all, the ecologisation of conventional agriculture can only be successful if yields are kept at a constant level.

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