

Economic consequences of abandoning the use of chemical plant protection products

Expert opinion commissioned by the German Farmers' Association

- Abstract (May 2023) -

With the draft regulation on the sustainable use of plant protection products (SUR - Sustainable Use Regulation), the EU Commission is planning a total ban on the use of chemical plant protection products in so-called sensitive areas. According to calculations by the Leibnitz Institute for Ecological Spatial Research, 31% of arable land and 36% of orchards and vineyards in Germany are affected. The effects of abandoning chemical plant protection have been calculated for arable, forage and vegetable farms. For fodder production, the focus is on dairy farms with a high proportion of grassland. Vegetable farms represent the cultivation of the most important vegetable species in Germany. Arable farms have been calculated for sites with a high yield potential and for sites with a low yield potential. On the weak site, larger structured farms have been assumed. The economic effects have been calculated on the basis of the performance measure of direct and labour cost-free output (DAL), which includes the variable and fixed special costs.

In arable farming, the average yield losses for winter cereals amount to approx. 30%, for potatoes and winter rape to approx. 40%. Summer cereals, the grain legumes field bean and field pea as well as maize are associated with significantly lower yield losses when cultivated without chemical plant protection. The yield reductions on grassland are calculated at 5 % and 10 %. In the case of the vegetables studied, there are high yield reductions of at least 30 % up to total failure. The cultivation risk without chemical plant protection is high.

On [arable land with high yield potential](#) (e.g. Soester Börde), the income reductions due to the abandonment of chemical plant protection are very high for the economically strong crops winter wheat, winter rape and sugar beet. The cultivation of winter rape and sugar beet is then also associated with a high cultivation risk. As a result of not using fungicides, potato cultivation in particular loses its economic attractiveness. Table potatoes are then no longer economically viable to grow. Without chemical crop protection, the cultivation risk increases considerably, so that potato cultivation would be abandoned in many cases. The losses amount to € 427 for winter rape, € 360 for winter wheat and € 345 for sugar beet.

Maize gains in relative competitiveness compared to the other fruits, so that its cultivation is expanded. In the model farm with typical crops on very good arable land, the income reductions amount to 449 €/ha.

Overview: Loss of income of typical farms as a result of not using chemical crop protection products

Model farm		Variant	Loss of income in €/ha
Arable farming	good agricultural land	high yield level	448,79 €
	Weak arable land	low yield level	not economical
		low yield level (+20%) (5-member FF.*)	not economical
		low yield level (+20%) (3-limbed FF*.)	308,92 €
Fodder production	scarce area (80 ha)	High PSM intensity	305,18 €
		Average PSM intensity	204,97 €
	Area not scarce (100 ha)	High PSM intensity	135,64 €
		Average PSM intensity	109,29 €
Vegetable gardening			6.905,49 €

* FF: Crop rotation

On the [arable land with a low yield potential](#), the farms only achieve a comparatively low DAL (direct and labour cost free output). Without a single farm payment, profitable arable farming is hardly possible. Doing without chemical crop protection is not economically viable if the initial profit level on a site is already low. For the location, a monetary **yield increase of 20%** (due to higher prices or yields) has been calculated as the second variant. In the model farm, dispensing with chemical crop protection results in a reduction in income of 309 €/ha. This is based on the assumption that a three-tier crop rotation can be established without chemical crop protection. In the medium term, this is hardly possible due to increasing crop rotation problems, so that on sites with low yield potential, arable farming without chemical crop protection is not economically viable at given producer prices.

For the conceptual design of the [model farm for fodder production](#), the focus was placed on a dairy farm in a low mountain region. It is assumed that the model farm's agricultural land is characterised by a high proportion of permanent grassland (75 % of the land).

In many practical farms, the abandonment of herbicides leads to reduced yields (fresh mass yield and quality) on grassland. If this leads to a shortage of basic fodder, which the farm cannot fully compensate for internally, this leads to a reduction in the number of dairy cattle. The consequence of this is comparatively high income reductions of 305 €/ha in the fodder farming business with

a high plant protection intensity and in the amount of 205 €/ha in the forage farm with a medium plant protection intensity.

If the yield reductions in silage maize and grassland can be compensated for internally because the farms have sufficient land, dairy farming does not have to be restricted. There are only yield reductions and cost increases on grassland and arable land. The income reductions are then relatively moderate. Farms with optimal process management manage to cultivate grassland without chemical plant protection. For these forage farms, only comparatively low income reductions result from the cultivation of silage maize.

The selection of the [outdoor vegetables](#) studied was based on their cultivation importance in Germany. In vegetable cultivation, compliance with the quality parameters for marketing plays a central role. If the quality parameters are not met, the produce cannot be marketed. Forgoing chemical plant protection can therefore quickly lead to total failure. Especially harmful fungi and pests are often difficult to control without chemical plant protection, as alternative methods of regulation are hardly available. The risks of cultivation, depending on the weather, increase considerably when fungicides and insecticides are not used.

Herbicides can be replaced by alternative methods to varying degrees depending on the crop. If herbicides are not used, manual hand hoeing and weeding play the central role in the economic effects. Extensive hand hoeing and weeding leads to high costs.

The vegetable cultivation of the most important crop groups has been mapped on a model farm. In the model farm, the cultivation of asparagus, onions and iceberg lettuce was abandoned as a result of the abandonment of chemical plant protection, since the cultivation is no longer economically viable. Field lettuce, sugar beet and winter wheat were then included in the crop rotation. The abandonment of chemical plant protection resulted in profit reductions of 6,900 € per ha in the model farm.

Overall, it can be assumed that if chemical plant protection is abandoned, many farms will give up growing vegetables, or at least certain types of vegetables, because cultivation is no longer economically viable.

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