O.30 - Consequences of integrated weed management on labour organisation at the farm level

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Integrated weed management (IWM) in arable cropping systems (CSs) is based on the combination of a range of techniques to disturb the demography of weed populations. The evaluation of the feasibility at the farm scale is one significant criterion to consider for the evaluation of innovative crop protection strategies. A long term experiment has been underway since 2000 in France. The results over the first 6 years demonstrated that IWM-based CSs reduced the use of herbicides while containing weeds satisfactorily. The feasibility of the tested CS prototypes was studied by creating virtual farms and simulating the working organisation at the farm scale over the year, using the farm simulator Equip'Agro. The labour distribution was compared to the time available for the farmer in each decade, (which depended on the number of days favourable for field operations), a consideration of soil type, the inter-annual variability of rain and the soil humidity requirements of each equipment. According to the simulations, working hours were more evenly distributed over the year in IWM-based CSs because of more diversified crops. Both the mechanical weeding operations and the shallow cultivations for the stale seed bed technique were achieved in decades with sufficient working time availability. However, the late sowing of winter cereals (necessary for preventing the emergence of harmful weeds) was apparently difficult to achieve in the less favourable years, because the number of days favourable for sowing decreases at the end of October. The simulations at the farm scale made it possible to estimate the machinery costs and to assess the economic performance of the virtual farms. The results provided significant information about the trade-off between the environmental quality and the economical performance of CSs.