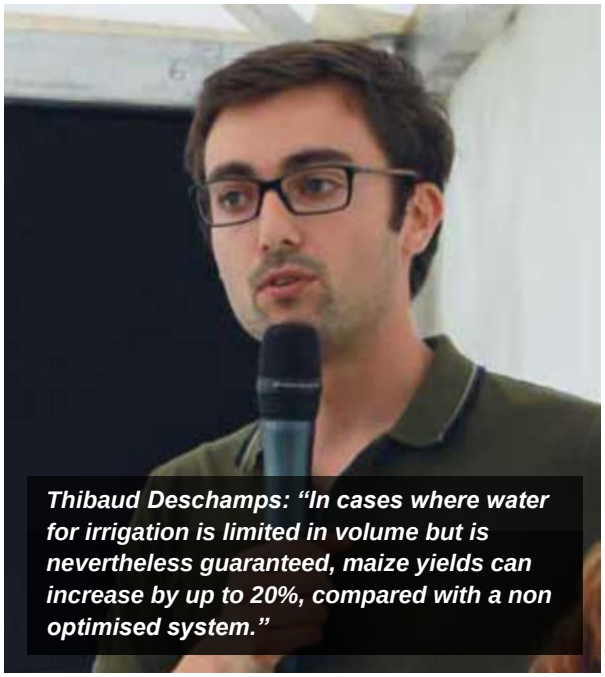
# HOW TO ADAPT
# to limited water resources?

## Thibaud Deschamps, agronomist at ARVALIS Institut du végétal gives his opinion



*Thibaud Deschamps: "In cases where water for irrigation is limited in volume but is nevertheless guaranteed, maize yields can increase by up to 20%, compared with a non optimised system."*

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**With a historically low winter recharge in several regions, irrigation management promises to be difficult this season. Thibaud Deschamps, an Arvalis scientist based central western France, gives an overview of the solutions that should be implemented. When water resources are limited, adopting a new approach could help to optimise results.**

***Perspectives Agricoles:*** **What guiding principles should be applied when there may be a shortage of water for irrigation?**
**Thibaud Deschamps:** Preparation for the irrigation campaign should start as soon as the preceding crop has been harvested, by preserving the soil structure as much as possible, and by adjusting cultural practices. A compacted soil will have reduced water retention capacity and will prevent plants from establishing deep roots. Factors that encourage surface run-off should also be avoided. If irrigation water is likely to be in short supply, the first action to consider is adjusting the rotation, with crops that require less water. During the season, the issue is how to manage a limited volume of water. We should remember that irrigation improves and regulates yields, and therefore helps to guarantee income.

***P. A.:*** **What are the methods available to ensure maximum optimisation of irrigation water?**
**T. D.:** One of the key principles is to irrigate when the plants can best utilise the water. In cases of water deficit, maize will start utilising irrigation water from the "10 leaf" stage, up until the grain has reached 45% moisture content. For wheat, water inputs are utilised between the second node stage until ear emergence + 15 to 25 days, depending on the nature of the soil. Management and decision support tools based partly on water balances or probes are also useful to help adjust inputs. It is estimated that those tools make it possible to reduce maize irrigation by two rounds per season. Likewise, for maize, choosing a variety belonging to the next earliness category can save an irrigation round of irrigation, but it also reduces yields by around 700 kg on average. Early sowing also helps to mitigate the risk of water shortages that often occur towards the end of the season. Finally, appropriate setting and regular monitoring of the equipment will avoid losses or overwatering.

***P. A.:*** **Can an irrigation strategy help when conditions are restrictive?**
**T. D.:** If the necessary volume of water to ensure normal crop development is not available, the usual choice is to reduce the cropped area. However, this is not always possible, depending on crop rotation constraints or available markets. Therefore, some producers irrigate with a potentially insufficient amount of water. This is why ARVALIS has been developing an irrigation management system that aims to improve input efficiency in that type of situation. One of the systems assessed yielded a better performance than the others. It is based on focussing water inputs in maize around flowering time, and on adjusting their volume and frequency in order to cover the period when the crop is most sensitive to stress induced by water deficiency. The yields obtained using this system are still lower than those reached when water resources are not limited. However, with the same limited amount of irrigation water available, yield gains of up to 20% were noted compared with a non optimised system. ARVALIS is continuing to work on integrating this type of system into management tools.

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