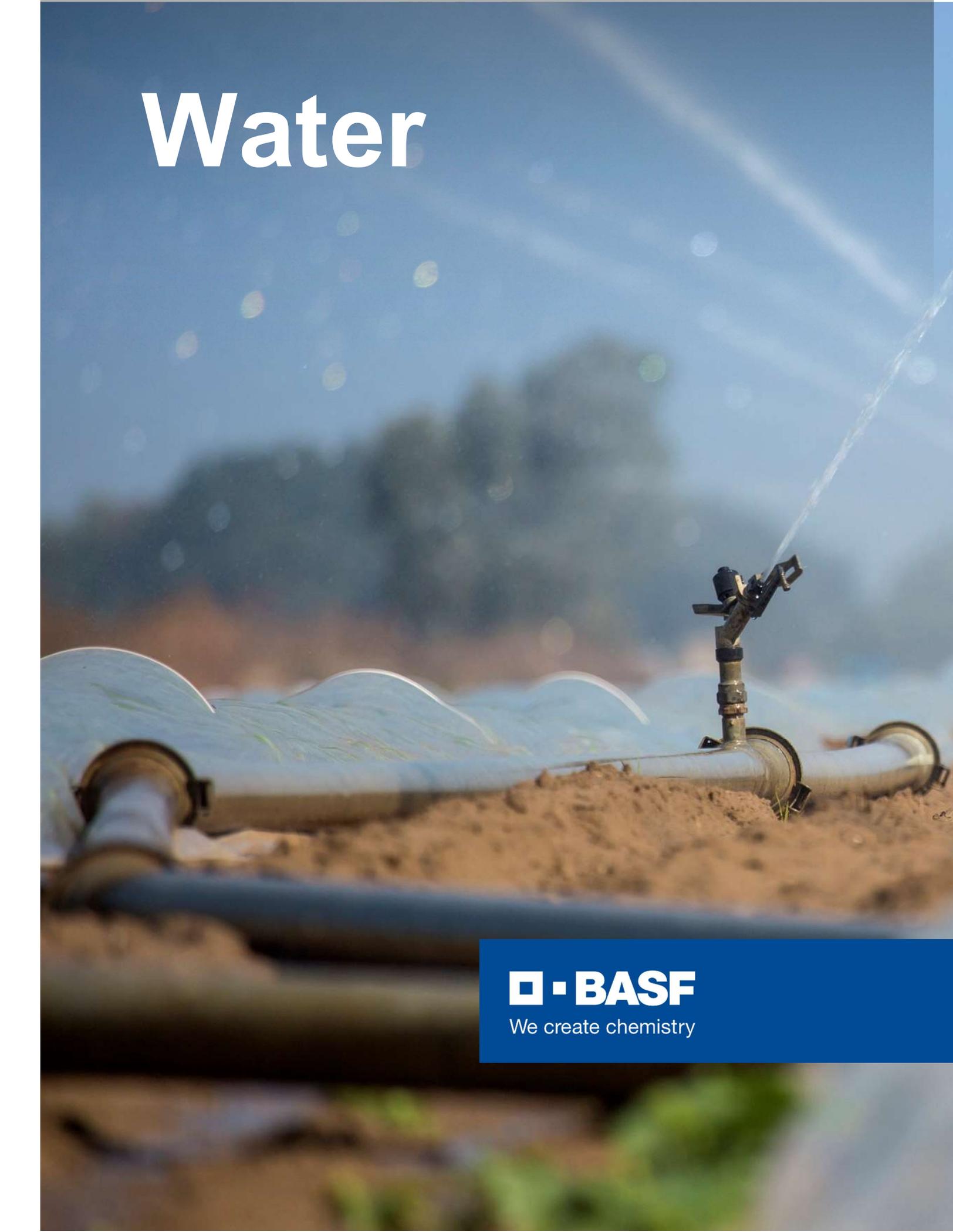


Water



 **BASF**

We create chemistry

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Water input for the agricultural product can originate from natural precipitation and also, if applied, from artificial irrigation. Moreover, water input is necessary for the dilution of crop protection agents.

1. Precipitation

It is assumed, that the total precipitation during the cultivation period is available for the crop and is modeled as rainwater input. Regional data on monthly precipitation from January to December have to be entered in the model. In case protective materials against rain and hail are used, the values on precipitation are adjusted accordingly.

1.1 Nitrogen input from precipitation

The nitrogen content of rainwater is considered in the AgBalance®. Average values for the deposition of nitrogen are available for 63 countries, based on literature data gathered from (Bala, Devaraju, Chaturvedi, Caldeira, & Nemani, 2013), (National Atmospheric Deposition Program, 2016), (Galy-Lacaux, et al., 2016), (Lü & Tian, 2007), (Godoy, Paulino, Oyarzún, & Boeckx, 2003), (Bobbink, et al., 2010) and (European Monitoring and Evaluation Programme, 2015).

2. Irrigation

Depending on the crop requirements and environmental and climate conditions, irrigation can be necessary for cultivation. The consumption of water can be a critical aspect for the sustainability analysis depending on the regional water availability. In the AgBalance® Model, the water consumption for possible irrigation operations can be specified. Often, the water used for irrigation stems from nearby rivers, lakes, groundwater and rainwater collection. In the model, the water used for irrigation is differentiated depending on its source and specific country water flow, which include water scarcity and deprivation factors. If primary data on water consumption for irrigation purposes is not available, it can be calculated with the FAO CROPWAT model (Food and Agriculture Organization of the United Nations, 2018), based on soil, climate and crop data. In case a pump is required for irrigation, the energy consumption is modeled as described in the electricity chapter.

2.1 Nitrogen input from irrigation

Surface and groundwater used for irrigation contains nitrogen in the form of nitrate and is considered in the nutrient balance (see Seeds & Crops). An average content of 10 mg NO₃-N per liter of water (WHO, 2016) (BMUB, BMEL, 2017) is assumed.

3. Dilution of crop protection agent

Water used for the dilution of crop protection agents is also considered. The water is assumed to be taken from tap water with its corresponding scarcity and deprivation factor. If primary data on the amount of dilution water is not available, an average amount of 200 liters per hectare and application is assumed as an approximation.

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