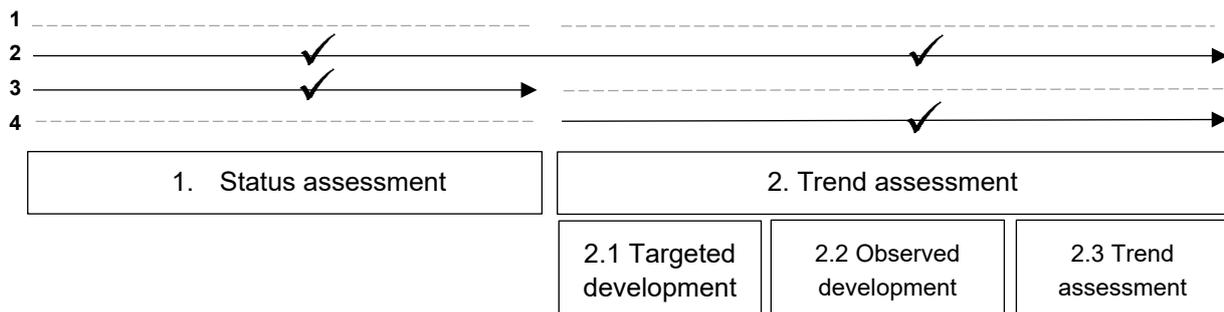




# Indicator assessment method

Environmental monitoring indicators provide information on the status and development of the environment based on available data. Depending on the nature of the indicator, not all indicators can be assessed in terms of status and/or trend (see Figure 1). Future developments are not discussed.



**Fig. 1:** Four scenarios for assessing status and/or trend. 1) Status and trend cannot be assessed. 2) Status and trend can be assessed. 3) Status can be assessed and trend cannot be assessed. 4) Status cannot be assessed and trend can be assessed.

Where legally binding targets (target values, limit values) exist, they are used as the basis for the assessment. If this is not the case, the assessment is based on a comparison between the targeted development (section 2.1) and the observed development (section 2.2). At the end of this process, the indicators are assigned to one of the categories for status and/or trend (section 2.3):

**Table 1:** Categories used in assessments

Status	Trend
<p><b>Good</b> <i>No negative impact on the environment, health or infrastructure. Complies with limit values.</i></p>	<p><b>Positive</b> <i>Indicators without a time-bound target: The observed development is moving towards the targeted development.</i> <i>Indicators with a time-bound target: The target may be reached or exceeded by the deadline if the observed development continues.</i></p>
<p><b>Average</b> <i>The impacts on the environment, health or infrastructure are manageable. The status is close to the limit values.</i></p>	<p><b>Unsatisfactory</b> <i>Indicators without a time-bound target: The observed development is stable, but an increase or decrease is desired.</i> <i>Indicators with a time-bound target: The development is moving in the right direction but is insufficient to reach the target by the deadline.</i></p>
<p><b>Poor</b> <i>Negative impacts on the environment, health or infrastructure. Does not comply with limit values.</i></p>	<p><b>Negative</b> <i>The observed development is moving away from the targeted development.</i></p>
<p><b>X Not assessable</b></p>	<p><b>X Not assessable</b></p>

## 1. Status assessment

The assessment of the status takes stock of the current situation. It seeks to contextualise the previous year's obtained values in terms of the overall situation, the limit or target values defined in legislation or the targeted development.

The status is assessed by members of staff at the FOEN, who provide an expert opinion. The arguments justifying the assessment are explained in the comments on the indicator.

## 2. Trend assessment

The assessment of the trend describes the trajectory over a given period: it reports on what is changing. The trend is assessed according to the method used by the Federal Statistical Office (FSO) for MONET 2030 monitoring.<sup>1</sup> This method consists in comparing the targeted development to the observed development, which is calculated based on available data.

The trend assessment method has three steps:

- 2.1. Determine **the targeted development**
- 2.2. Calculate **the observed development** based on the available data
- 2.3. **Assess the trend**: compare the observed development with the targeted development.

### 2.1. Targeted development

In order to assess the trend, a targeted development must be defined, showing the direction to be achieved in the medium to long term.

**Table 2:** Determining the targeted development

Indicators without a quantified and time-bound target	Indicators with a quantified and time-bound target
<p>An expert determines the targeted development for the parameter under observation, i.e.:</p> <ul style="list-style-type: none"> <li>• an increase </li> <li>• a decrease </li> <li>• a stabilisation </li> </ul> <p>The desired development can be defined either with or without a set timeframe.</p>	<p>The targeted development is shown in the targeted trajectory that must be followed in order to reach the target within the set time.</p>

In some cases, the indicator is not assessed because the targeted development cannot be defined.

### 2.2. Observed development

The observed development is calculated on the basis of available data for one or more parameters of the same indicator. Three types of calculations are performed depending on whether there is a quantified and time-bound target (see sections 2.2.2 and 2.2.4) and on the frequency and length of the time series (see section 2.2.2). The FSO formula has been supplemented with a function that takes the absolute value of a number in the denominator (abbreviation: ABS). This allows negative numbers to be bypassed when necessary.

<sup>1</sup> [Summary of indicators – 2019 | Publication](#)

### 2.2.1. Determining the date of the first survey $t_0$

When calculating the observed development, the date of the first data collection  $t_0$  is set to the year 2000 as standard. This standard date is applied uniformly to all monitoring indicators, unless otherwise specified. In some cases, this date may need to be changed due to a change in the data acquisition method or the application of an international convention defining a different date for the first data collection.

### 2.2.2. Indicators without a quantified and time-bound target

In cases where there is no quantified and time-bound target, the observed development corresponds to the change in % calculated during the period analysed. To reduce the influence of particular values on the initial  $x(t_0)$  and final  $x(t_1)$  years, we use the average values of the last three available years and the average values of the first three years of the period concerned.

$$\text{Change in \%} = \left( \frac{\left( \left( \frac{(x(t_{1-2}) + x(t_{1-1}) + x(t_1))}{3} \right) - \left( \frac{(x(t_1) + x(t_{0+1}) + x(t_{0+2}))}{3} \right) \right)}{\text{ABS} \left( \frac{(x(t_1) + x(t_{0+1}) + x(t_{0+2}))}{3} \right)} \right) \times 100$$

Where  $t_0$  = date of the first value collected in the period considered for the assessment,  $t_1$  = date of the last value collected, and ABS = absolute value.

#### Insufficient time series

When the indicator has a data update frequency of more than one year or when the time series includes fewer than six measurements, the observed development corresponds to the percentage change between the last value  $x(t_1)$  at time  $t_1$  and the first available value  $x(t_0)$  at time  $t_0$  for the indicator.

$$\text{Change in \%} = \frac{(x(t_1) - x(t_0))}{\text{ABS}(x(t_0))}$$

Where  $t_0$  = date of the first value collected in the period considered for the assessment,  $t_1$  = date of the last value collected, and ABS = absolute value.

### 2.2.3. Indicators with a quantified and time-bound target

The observed development is the ratio between the observed average annual change of the indicator between a final value  $x(t_1)$  at time  $t_1$  and an initial value  $x(t_0)$  at time  $t_0$ , and the theoretical average annual change to reach the target  $x(t_z)$  at the set date  $t_z$  (also called the theoretical path). The observed development corresponds to the deviation from the theoretical path (in %).

$$\text{Deviation from the theoretical path in \%} = \left( \frac{(x(t_1) - x(t_0))}{(t_1 - t_0)} \right) \div \left( \frac{(x(t_z) - \text{ABS}(x(t_0)))}{(t_z - t_0)} \right) \times 100$$

Where  $t_0$  = date of the first value collected in the period considered for the assessment,  $t_1$  = date of the last value collected,  $t_z$  = date by which the target must be reached, and ABS = absolute value.

## 2.3. Trend assessment

The assessment of the trend is used to compare the observed development with the targeted development. At the end of this process, an assessment result is provided for each assessable indicator using the categories in Table 1.

### 2.3.1. Indicators without a quantified and time-bound target

The percentage variation obtained in section 2.2.2 allows the observed development to be classified into one of three categories:

- Growth ↗ if the change is > 3%
- Decrease ↘ if the change is < -3%
- Stabilisation → if the change is **between -3% and 3%**

**Table 2:** Trend assessment for indicators without a quantified and time-bound target

Targeted development	Observed development	Assessment result	
		<b>Positive</b>	The observed development is moving in the same direction as the targeted development.
		<b>Positive</b>	
		<b>Positive</b>	
		<b>Unsatisfactory</b>	The observed development is stable, but an increase or decrease is desired.
		<b>Unsatisfactory</b>	
		<b>Negative</b>	The observed development is moving away from the targeted development.
		<b>Negative</b>	
		<b>Negative</b>	
		<b>Negative</b>	

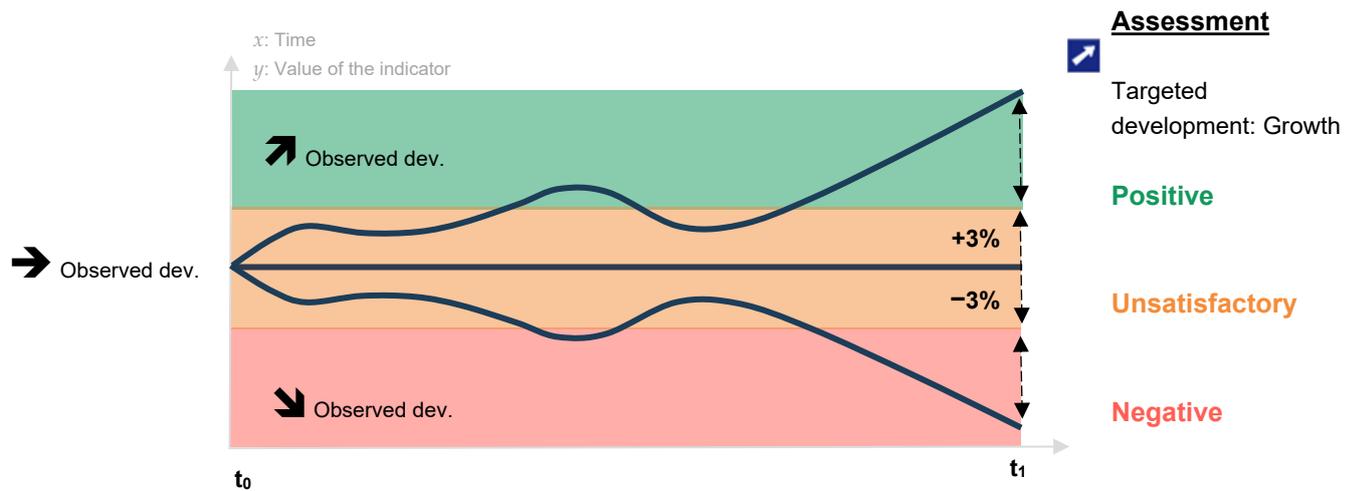


Fig. 1: Assessment of an indicator without a quantified and time-bound target

### 2.3.2. Indicators with a quantified and time-bound target

Trend assessment involves comparing the observed development (actual trajectory) with the targeted development (theoretical trajectory:<sup>2</sup> the path required in order to meet or exceed the target by the required date within the allotted time).

Table 3: Trend assessment for indicators that have a quantified and time-bound target

Targeted development / theoretical trajectory	Observed development / actual trajectory	Assessment result
Limit value or target value	$\geq 97\%$ of the theoretical trajectory	<b>Positive</b>
	$\geq 0 \leq 97\%$	<b>Unsatisfactory</b>
	$\leq 0\%$	<b>Negative</b>

The observed development is moving towards the theoretical trajectory and will allow the target to be reached or exceeded by the deadline.

The observed development is moving towards the theoretical trajectory but is insufficient to reach the target by the deadline.

The observed development is not moving towards the theoretical trajectory.

<sup>2</sup> Theoretical path or theoretical trajectory: mathematical modelling of the trajectory required in order to move from the current status to the targeted development.

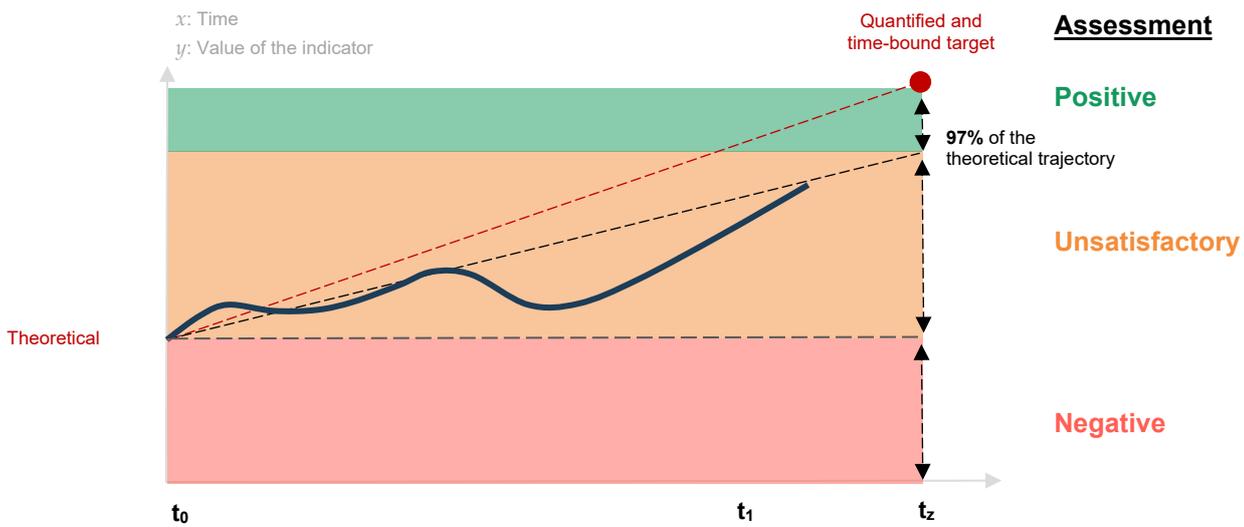


Fig. 2: Assessment of an indicator with a quantified and time-bound target

This method provides a framework for assessing indicators, but should not be applied uncritically. For environmental monitoring indicators, the assessments obtained in this way are subject to critical review. The assessment may be modified as a last resort if it is not relevant and other factors need to be taken into consideration. The choice to modify it should be explained in the indicator commentary.

## 2.4. Special cases

### 2.4.1. Indicators with several parameters

When the indicator comprises multiple parameters within the same data set or from different data sets, each parameter is assessed separately according to the scenarios mentioned above. A positive assessment gives a result of +1, a negative assessment a result of -1, and an unsatisfactory assessment a result of 0. If the sum of the results is > 0, the development is assessed as 'positive'; if the sum is = 0, the development is assessed as 'unsatisfactory'; and if the sum is < 0, the development is assessed as 'negative'.

### 2.4.2. Significant variations in the data series

The method used to assess the development only takes into account the first and last values in the data series. Data located between two points are not considered in the calculation of the observed development. This method is therefore not appropriate for assessing a data series that shows significant annual variations. In such cases, experts decide whether the development can be assessed based on other criteria or if it cannot be assessed. If the development is assessable, modifications to the method in section 2.2 may be made for the indicators concerned.