

## Codebook

### Codebook for Secondary Data

A Collection of Variables from Publicly Available and Free-to-access Sources

<b>Dataset name:</b>	secondary_data_blinded
<b>Dataset size:</b>	1 Mb
<b>Column count:</b>	48
<b>Row count:</b>	2,728
<b>Updated date:</b>	2025-06-04

#### Description:

As a supplement to the data that we collected ourselves via the InBestSoil farm survey, we also extracted additional variables from publicly available sources to supplement the primary data. All data we present herewith has been reduced in granularity via a rounding procedure in order to protect the anonymity of the farmers who answered the survey as per our data protection agreement. For certain very large farms we set the maximum land area to 100 hectares to further protect the identity of these farmers as farms of such scale are rare in Switzerland.

The data can be linked to the full survey data set and the subset of data covering wheat production via the 'surveyid' variable. We include general farm structural information regarding cropped areas and the percentages of crop categories grown in rotation by a given farm. For the farms that grew milling wheat in the 2022/2023 production season we also include more detailed information relevant for wheat production aggregated across wheat plots including the average soil characteristics, geomorphology and meteorology. As all data presented within this document is secondary data that we did not collect ourselves we direct you to the original sources - which are outlined by variable below - for specific details. In using this data we also ask that you to respect and abide by the data usage regulations of the original sources.

For the variables extracted from geodienste.ch we would like to cite and thank the following cantonal administrations who have made the data publicly available via this webservice: Aargau (AG), Appenzell Ausserrhoden (AR), Appenzell Innerrhoden (AI), Bern (BE), Basel-Landschaft (BL), Basel-Stadt (BS), Fribourg (FR), Genève (GE), Glarus (GL), Graubünden (GR), Jura (JU), Luzern (LU), Neuchâtel (NE), Nidwalden (NW), Obwalden (OW), St. Gallen (SG), Schaffhausen (SH), Solothurn (SO), Schwyz (SZ), Thurgau (TG), Ticino (TI), Uri (UR), Vaud (VD), Valais (VS), Zug (ZG) and Zürich (ZH). Please consult the included README file for the contact information for each cantonal geographic information system administration involved in providing the geodata via geodienste.ch.

#### Column Attributes:

1	<b>Column name:</b>	survey_id
	Column description:	Individual survey ID

Source information:	InBestSoil farm survey			
Column type:	Character			
Data type:	Numeric			
Unique non-missing value count:	2,728			
Missing value count:	0			
Min	Mean	Median	Max	SD
42.00	1817.55	1804.50	3601.00	1017.08

<b>2</b>	<b>Column name:</b>	<b>agricultural_zone_farm_site</b>
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Column description:	Agricultural zone of farm [Factor]		
Source information:	Extracted variable from the boundaries of agricultural zones in Switzerland map provided by the Federal Office for Agriculture (FOAG)		
Data type:	Factor		
Unique non-missing value count:	3		
Missing value count:	0		
Categories	Frequency	Cumulative Frequency	Percent
Valley	2,160	2,160	79.18
Hill	400	2,560	14.66
Mountain	168	2,728	6.16

<b>3</b>	<b>Column name:</b>	<b>total_land_area</b>
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Column description:	Total land registered to farm [ha]			
Source information:	Extracted variable from the nutzungsflächen map (2023) provided by geodienste.ch			
Data type:	Numeric			
Unique non-missing value count:	19			
Missing value count:	0			
Min	Mean	Median	Max	SD
10.00	36.80	35.00	100.00	19.18

<b>4</b>	<b>Column name:</b>	<b>total_arable_area</b>
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Column description:	Total arable land registered to farm [ha]
Source information:	Extracted variable from the nutzungsflächen map (2023) provided by geodienste.ch
Data type:	Numeric
Unique non-missing value count:	18
Missing value count:	0

Min	Mean	Median	Max	SD
5.00	26.08	20.00	100.00	16.85

<b>5</b>	<b>Column name:</b>	<b>total_perm_grass_area</b>
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Column description:	Total permanent grassland registered to farm [ha]
Source information:	Extracted variable from the nutzungsflächen map (2023) provided by geodienste.ch
Data type:	Numeric
Unique non-missing value count:	14
Missing value count:	0

Min	Mean	Median	Max	SD
0.00	13.61	10.00	100.00	14.72

<b>6</b>	<b>Column name:</b>	<b>perc_arable_beets</b>
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Column description:	Share of arable land producing beets [%]
Source information:	Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch
Data type:	Numeric
Unique non-missing value count:	10
Missing value count:	0

Min	Mean	Median	Max	SD
0.00	4.61	0.00	50.00	7.63

<b>7</b>	<b>Column name:</b>	<b>perc_arable_potatoes</b>
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Column description:	Share of arable land producing potatoes [%]
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Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		12		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	2.52	0.00	65.00	6.41

8	Column name:	perc_arable_maize
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Column description:		Share of arable land producing maize [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		14		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	15.02	15.00	75.00	11.39

9	Column name:	perc_arable_temp_grass
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Column description:		Share of arable land under temporary grass [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		21		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	25.78	20.00	100.00	22.65

10	Column name:	perc_arable_bff
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Column description:		Share of arable land under biodiversity protection [%]		
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Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		7		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	0.81	0.00	30.00	2.58

11	Column name:	perc_arable_barley		
Column description:		Share of arable land producing barley [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		11		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	7.32	5.00	50.00	8.29

12	Column name:	perc_arable_wheat		
Column description:		Share of arable land producing wheat [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		15		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	22.11	20.00	80.00	11.52

13	Column name:	perc_arable_other_cereals		
Column description:		Share of arable land producing other cereals [%]		

Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		14		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	6.51	0.00	80.00	9.57

<b>14</b>	<b>Column name:</b>	<b>perc_arable_osr</b>
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Column description:		Share of arable land producing oilseed rape [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		11		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	7.14	0.00	60.00	8.61

<b>15</b>	<b>Column name:</b>	<b>perc_arable_other_oilseeds</b>
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Column description:		Share of arable land producing other oilseeds [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		8		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	1.96	0.00	35.00	4.71

<b>16</b>	<b>Column name:</b>	<b>perc_arable_legumes</b>
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Column description:		Share of arable land producing legumes [%]		
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Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		10		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	2.23	0.00	65.00	5.42

17	Column name:	perc_arable_veg_fruits		
Column description:		Share of arable land producing field veg/berries [%]		
Source information:		Calculated variable derived from information extracted from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Numeric		
Unique non-missing value count:		16		
Missing value count:		0		
Min	Mean	Median	Max	SD
0.00	2.05	0.00	90.00	7.09

18	Column name:	number_wheat_plots_total		
Column description:		Number of milling wheat plots registered to farm [No.]		
Source information:		Extracted variable from the nutzungsflächen map (2023) provided by geodienste.ch		
Data type:		Integer		
Unique non-missing value count:		27		
Missing value count:		474		
Min	Mean	Median	Max	SD
1.00	3.54	3.00	100.00	3.72

19	Column name:	total_wheat_area		
Column description:		Total milling wheat land registered to farm [ha]		

Source information:	Extracted variable from the nutzungsflächen map (2023) provided by geodienste.ch			
Data type:	Numeric			
Unique non-missing value count:	30			
Missing value count:	474			
Min	Mean	Median	Max	SD
1.00	6.17	5.00	30.00	4.96

20	Column name:	avreage_clay_content_wheat			
	Column description:	Average soil clay content - milling wheat fields - 5-15cm depth [%]			
	Source information:	Extracted variable from the soilgrids provided by the International Soil Reference and Information Centre (ISRIC)			
	Data type:	Numeric			
	Unique non-missing value count:	9			
	Missing value count:	474			
	Min	Mean	Median	Max	SD
	10.00	24.57	25.00	50.00	6.01

21	Column name:	avreage_sand_content_wheat			
	Column description:	Average soil sand content - milling wheat fields - 5-15cm depth [%]			
	Source information:	Extracted variable from the soilgrids provided by the International Soil Reference and Information Centre (ISRIC)			
	Data type:	Numeric			
	Unique non-missing value count:	12			
	Missing value count:	474			
	Min	Mean	Median	Max	SD
	10.00	39.84	40.00	65.00	9.66

<b>22</b>	<b>Column name:</b>	<b>avreage_silt_content_wheat</b>		
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Column description:	Average soil silt content - milling wheat fields - 5-15cm depth [%]			
Source information:	Extracted variable from the soilgrids provided by the International Soil Reference and Information Centre (ISRIC)			
Data type:	Numeric			
Unique non-missing value count:	9			
Missing value count:	474			

Min	Mean	Median	Max	SD
20.00	35.62	35.00	60.00	5.12

<b>23</b>	<b>Column name:</b>	<b>average_altitude_wheat</b>
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Column description:	Average altitude - milling wheat fields [metre a.s.l.]			
Source information:	Extracted variable from the digital height model DHM25 provided by the Federal Office of Topography (swisstopo)			
Data type:	Numeric			
Unique non-missing value count:	18			
Missing value count:	474			

Min	Mean	Median	Max	SD
250.00	540.42	500.00	1100.00	115.24

<b>24</b>	<b>Column name:</b>	<b>average_slope_angle_wheat</b>
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Column description:	Average slope angle - milling wheat fields [%]			
Source information:	Calculated variable derived from information extracted from the digital height model DHM25 provided by the Federal Office of Topography (swisstopo)			
Data type:	Numeric			
Unique non-missing value count:	17			
Missing value count:	474			

Min	Mean	Median	Max	SD
0.00	3.77	3.00	19.00	2.59

25	Column name:	average_temp_2022_09			
	Column description:	Average temperature - milling wheat fields - September 2022 [°C]			
	Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
	Data type:	Numeric			
	Unique non-missing value count:	7			
	Missing value count:	477			
	Min	Mean	Median	Max	SD
	10.00	14.05	14.00	16.00	0.72

26	Column name:	average_temp_2022_10			
	Column description:	Average temperature - milling wheat fields - October 2022 [°C]			
	Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
	Data type:	Numeric			
	Unique non-missing value count:	5			
	Missing value count:	477			
	Min	Mean	Median	Max	SD
	11.00	13.41	13.00	15.00	0.63

27	Column name:	average_temp_2022_11		
	Column description:	Average temperature - milling wheat fields - November 2022 [°C]		
	Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)		
	Data type:	Numeric		
	Unique non-missing value count:	6		
	Missing value count:	477		
Min	Mean	Median	Max	SD

4.00	6.99	7.00	9.00	0.65
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<b>28</b>	<b>Column name:</b>	<b>average_temp_2022_12</b>
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Column description:	Average temperature - milling wheat fields - December 2022 [°C]
Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	5
Missing value count:	477

Min	Mean	Median	Max	SD
1.00	2.78	3.00	5.00	0.77

<b>29</b>	<b>Column name:</b>	<b>average_temp_2023_01</b>
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Column description:	Average temperature - milling wheat fields - January 2023 [°C]
Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	7
Missing value count:	477

Min	Mean	Median	Max	SD
-1.00	2.47	3.00	5.00	0.81

<b>30</b>	<b>Column name:</b>	<b>average_temp_2023_02</b>
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Column description:	Average temperature - milling wheat fields - February 2023 [°C]
Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	6
Missing value count:	477

Min	Mean	Median	Max	SD
-1.00	3.14	3.00	5.00	0.56

31	Column name:	average_temp_2023_03
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Column description: Average temperature - milling wheat fields - March 2023 [°C]

Source information: Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)

Data type: Numeric

Unique non-missing value count: 7

Missing value count: 477

Min	Mean	Median	Max	SD
3.00	6.84	7.00	9.00	0.67

32	Column name:	average_temp_2023_04
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Column description: Average temperature - milling wheat fields - April 2023 [°C]

Source information: Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)

Data type: Numeric

Unique non-missing value count: 7

Missing value count: 477

Min	Mean	Median	Max	SD
4.00	8.14	8.00	10.00	0.76

33	Column name:	average_temp_2023_05
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Column description: Average temperature - milling wheat fields - May 2023 [°C]

Source information: Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)

Data type: Numeric

Unique non-missing value count:		7		
Missing value count:		477		
Min	Mean	Median	Max	SD
10.00	13.87	14.00	16.00	0.80

<b>34</b>	<b>Column name:</b>	<b>average_temp_2023_06</b>
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Column description:		Average temperature - milling wheat fields - June 2023 [°C]		
Source information:		Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)		
Data type:		Numeric		
Unique non-missing value count:		6		
Missing value count:		477		
Min	Mean	Median	Max	SD
15.00	19.70	20.00	21.00	0.74

<b>35</b>	<b>Column name:</b>	<b>average_temp_2023_07</b>
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Column description:		Average temperature - milling wheat fields - July 2023 [°C]		
Source information:		Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)		
Data type:		Numeric		
Unique non-missing value count:		8		
Missing value count:		477		
Min	Mean	Median	Max	SD
16.00	20.17	20.00	23.00	0.76

<b>36</b>	<b>Column name:</b>	<b>average_temp_2023_08</b>
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Column description:		Average temperature - milling wheat fields - August 2023 [°C]		
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Source information:	Extracted variable from the gridded monthly average temperature data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
Data type:	Numeric			
Unique non-missing value count:	7			
Missing value count:	477			
Min	Mean	Median	Max	SD
16.00	19.87	20.00	22.00	0.76

<b>37</b>	<b>Column name:</b>	<b>total_prec_2022_09</b>
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Column description:	Total precipitation - milling wheat fields - September 2022 [mm]			
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
Data type:	Numeric			
Unique non-missing value count:	24			
Missing value count:	477			
Min	Mean	Median	Max	SD
40.00	161.58	160.00	280.00	36.04

<b>38</b>	<b>Column name:</b>	<b>total_prec_2022_10</b>
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Column description:	Total precipitation - milling wheat fields - October 2022 [mm]			
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
Data type:	Numeric			
Unique non-missing value count:	11			
Missing value count:	477			
Min	Mean	Median	Max	SD
40.00	78.06	80.00	140.00	12.95

<b>39</b>	<b>Column name:</b>	<b>total_prec_2022_11</b>
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Column description:	Total precipitation - milling wheat fields - November 2022 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	12
Missing value count:	477

Min	Mean	Median	Max	SD
30.00	77.78	80.00	140.00	15.15

40	Column name:	total_prec_2022_12
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Column description:	Total precipitation - milling wheat fields - December 2022 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	13
Missing value count:	477

Min	Mean	Median	Max	SD
40.00	96.22	100.00	160.00	19.83

41	Column name:	total_prec_2023_01
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Column description:	Total precipitation - milling wheat fields - January 2023 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	11
Missing value count:	477

Min	Mean	Median	Max	SD
20.00	62.15	60.00	120.00	16.36

42	Column name:	total_prec_2023_02			
	Column description:	Total precipitation - milling wheat fields - February 2023 [mm]			
	Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
	Data type:	Numeric			
	Unique non-missing value count:	8			
	Missing value count:	477			
	Min	Mean	Median	Max	SD
	0.00	11.34	10.00	70.00	8.38
43	Column name:	total_prec_2023_03			
	Column description:	Total precipitation - milling wheat fields - March 2023 [mm]			
	Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
	Data type:	Numeric			
	Unique non-missing value count:	12			
	Missing value count:	477			
	Min	Mean	Median	Max	SD
	60.00	99.94	100.00	180.00	17.17
44	Column name:	total_prec_2023_04			
	Column description:	Total precipitation - milling wheat fields - April 2023 [mm]			
	Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)			
	Data type:	Numeric			
	Unique non-missing value count:	16			
	Missing value count:	477			
	Min	Mean	Median	Max	SD



50.00	93.25	90.00	220.00	21.48
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<b>45</b>	<b>Column name:</b>	<b>total_prec_2023_05</b>
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Column description:	Total precipitation - milling wheat fields - May 2023 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	19
Missing value count:	477

Min	Mean	Median	Max	SD
20.00	75.23	70.00	200.00	27.76

<b>46</b>	<b>Column name:</b>	<b>total_prec_2023_06</b>
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Column description:	Total precipitation - milling wheat fields - June 2023 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	7
Missing value count:	477

Min	Mean	Median	Max	SD
20.00	41.18	40.00	80.00	10.20

<b>47</b>	<b>Column name:</b>	<b>total_prec_2023_07</b>
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Column description:	Total precipitation - milling wheat fields - July 2023 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	20
Missing value count:	477

Min	Mean	Median	Max	SD
30.00	104.70	110.00	230.00	34.13

48	Column name:	total_prec_2023_08
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Column description:	Total precipitation - milling wheat fields - August 2023 [mm]
Source information:	Extracted variable from the gridded monthly average precipitation data provided by the Federal Office of Meteorology and Climatology (MeteoSwiss)
Data type:	Numeric
Unique non-missing value count:	24
Missing value count:	477

Min	Mean	Median	Max	SD
60.00	106.33	100.00	310.00	33.18