

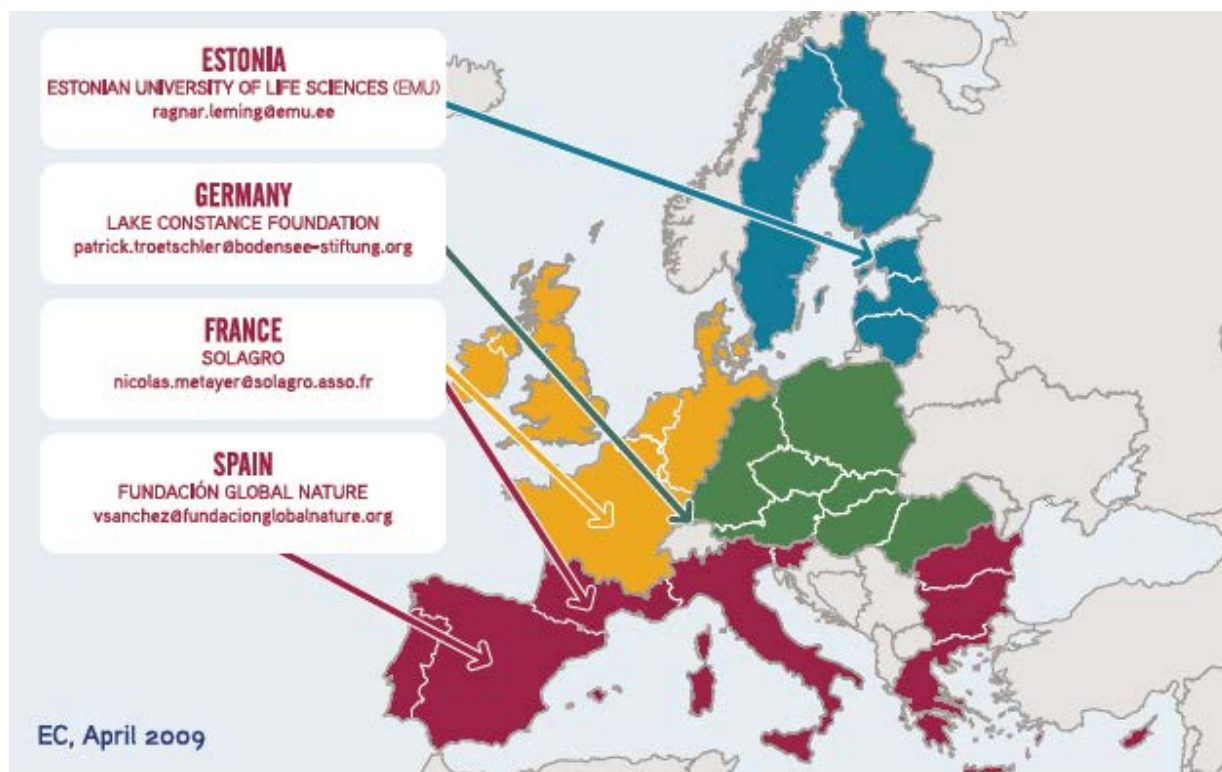


Sustainable Adaptation of EU Farming Systems to Climate Change

Jordi Domingo, Daniel Hernández (Fundación Global Nature)



Climate Change – Consequences on European Agriculture



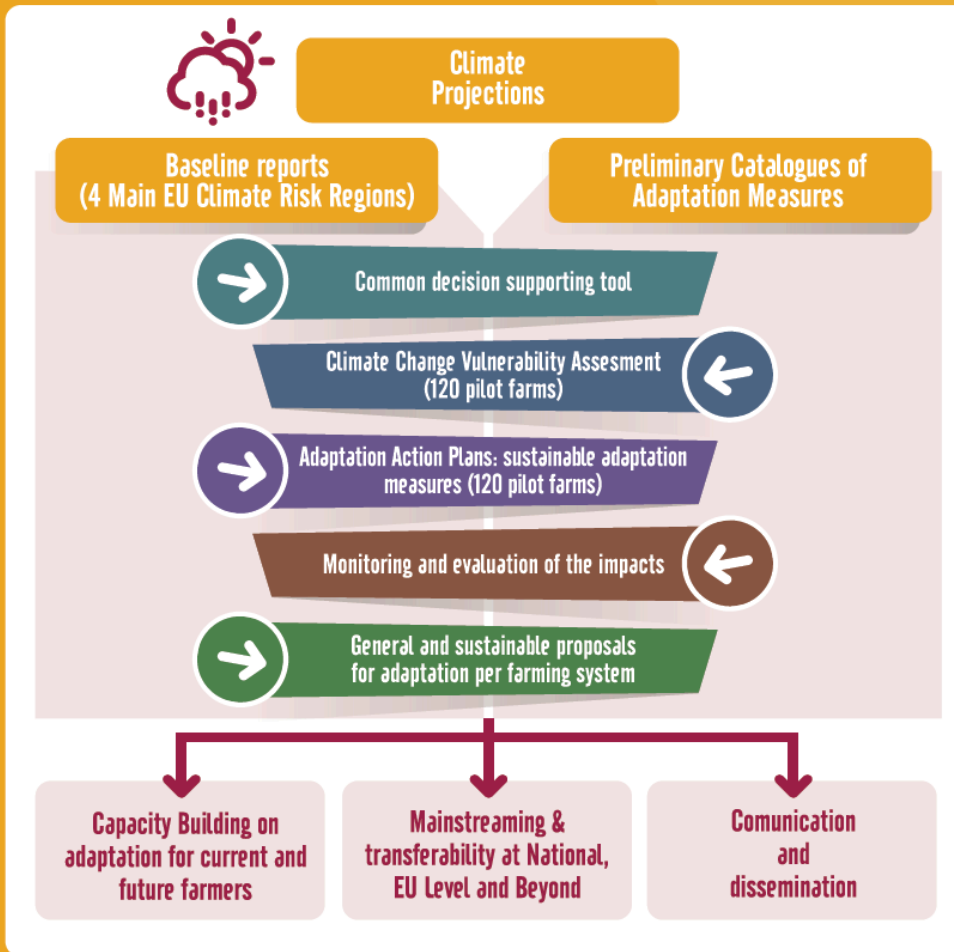
**4 PROJECT PARTNERS
IN 4 EU CLIMATE RISK AREAS**

**40 MONTHS
09/2016 – 12/ 2019**

**OVERALL BUDGET
2.150.000 EURO**

LIFE AgriAdapt

INVOLVING FARMERS IN THE FOUR MAIN EU CLIMATE RISK REGIONS



IN PRACTICE

4 BASELINE REPORTS WITH AGRO CLIMATE GRIDS PER CLIMATE ZONE

COMPILATION OF SUSTAINABLE ADAPTATION MEASURES

ONE DECISION SUPPORTING TOOL FOR THE FARM VULNERABILITY ASSESSMENT

120 PILOT FARMS WITH DOMINANT AND MINOR FARMING PRACTICES.

Agro Climate Zone Tool:

Climate

- Recent Past (30 years) observations
- Climate projections near future (about 2030)

Sum of precipitation (mm)

YEAR	TOTAL	Winter	Spring	Summer	Fall
1987	507	127	170	122	88
1988	826	255	397	110	64
1989	526	177	145	127	77
1990	572	122	162	100	188
1991	591	137	180	149	126
1992	855	85	365	135	270
1993	882	30	350	287	216
1994	628	116	254	147	111
1995	600	173	138	148	140
1996	727	175	158	149	246
1997	538	100	195	138	105
1998	498	72	149	122	155
1999	586	131	187	97	172
2000	634	75	248	121	190
2001	661	203	231	167	60
2002	796	124	252	189	231
2003	502	156	64	77	206
2004	709	221	204	89	195
2005	446	30	133	186	97
2006	507	170	100	145	92
2007	501	127	214	74	85
2008	615	118	203	88	206
2009	611	137	228	81	165
2010	590	113	249	66	162
2011	426	92	106	136	91
2012	444	53	170	84	137
2013	732	253	224	85	171
2014	689	216	199	154	119
2015	482	142	107	157	76
2016	599	224	192	84	100
Minimum	426	30	64	66	60
Quartile 1	507	103	151	89	93
Median	595	129	194	124	138
Quartile 3	682	175	230	149	190
Maximum	882	255	397	287	270

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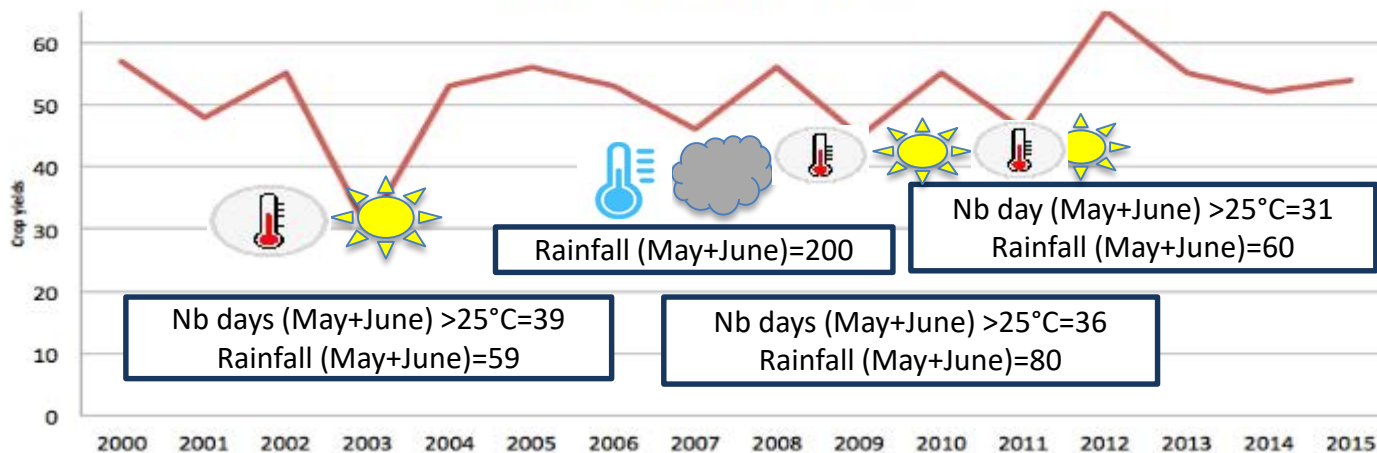
Crop

- Crop yield compilation (15 years)
- Average yield and variations

Yield compilation 100 kg/ha)

YEAR	Winter soft wheat	Maize for grain rainfed	Maize silage	Apples
2000	56	68	115	433,0
2001	55	68	110	389,0
2002	64	86	122	447,0
2003	52	33	90	357,0
2004	60	69	115	374,0
2005	60	58	100	450,0
2006	59	63	101	380,0
2007	48	79	145	605,0
2008	59	85	116	442,0
2009	48	50	100	474,0
2010	62	60	95	543,0
2011	47	90	150	
	65	55	116	435,0
	55	43	119	493,0
	57	101	115	451,0
	55	51	101	460,0
	59	66	94	460,0
	47	33	90	357
	57	66	112	450
	65	101	150	605
ts	24%	29%	41%	24%
e ields	17%	38%	20%	21%

Soft Wheat / Yields 2000 - 2016



Agro Climate Zone Tool:

Climate

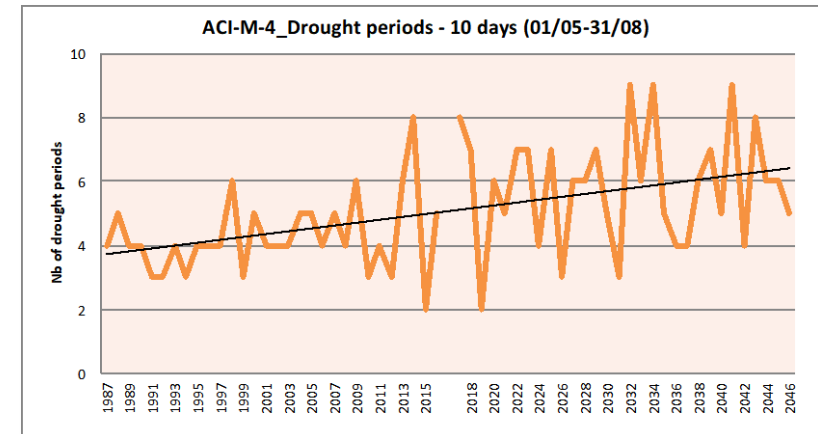
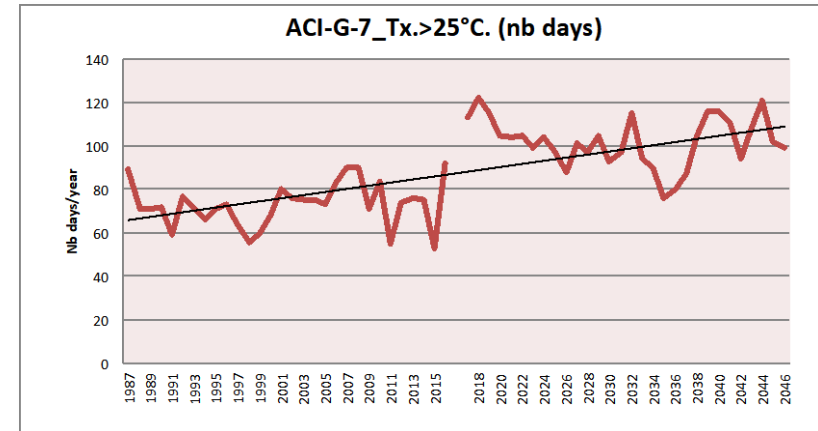
- Recent Past (30 years) observations
- Climate projections near future (about 2030)

Crop

- Crop yield compilation (15 years)
- Average yield and variations

IAC

- Automatic calculation of 60 Agro Climatic Indicators
- For Recent Past & Near Future



CLIMATE DATA

AUTOMATIC CALCULATION OF MORE THAN 65 ACI

- **Generic indicators:** rainfall, , temperatures, etc.
- **Fodder indicators:** date for grass regrowth, date for 1st grazing , etc.
- **Cereal crops indicators:** end of cycle thermal and hydric stress, etc.
- **Summer crops indicators:** temperatures > 32° C, summer hydric deficit, etc.
- **Rapeseed crops indicators:** drought at sowing, etc.
- **Vineyards and orchards indicators:** date of late frost, Huglin index, etc.
- **Animal indicators:** temperature-humidity index, etc.

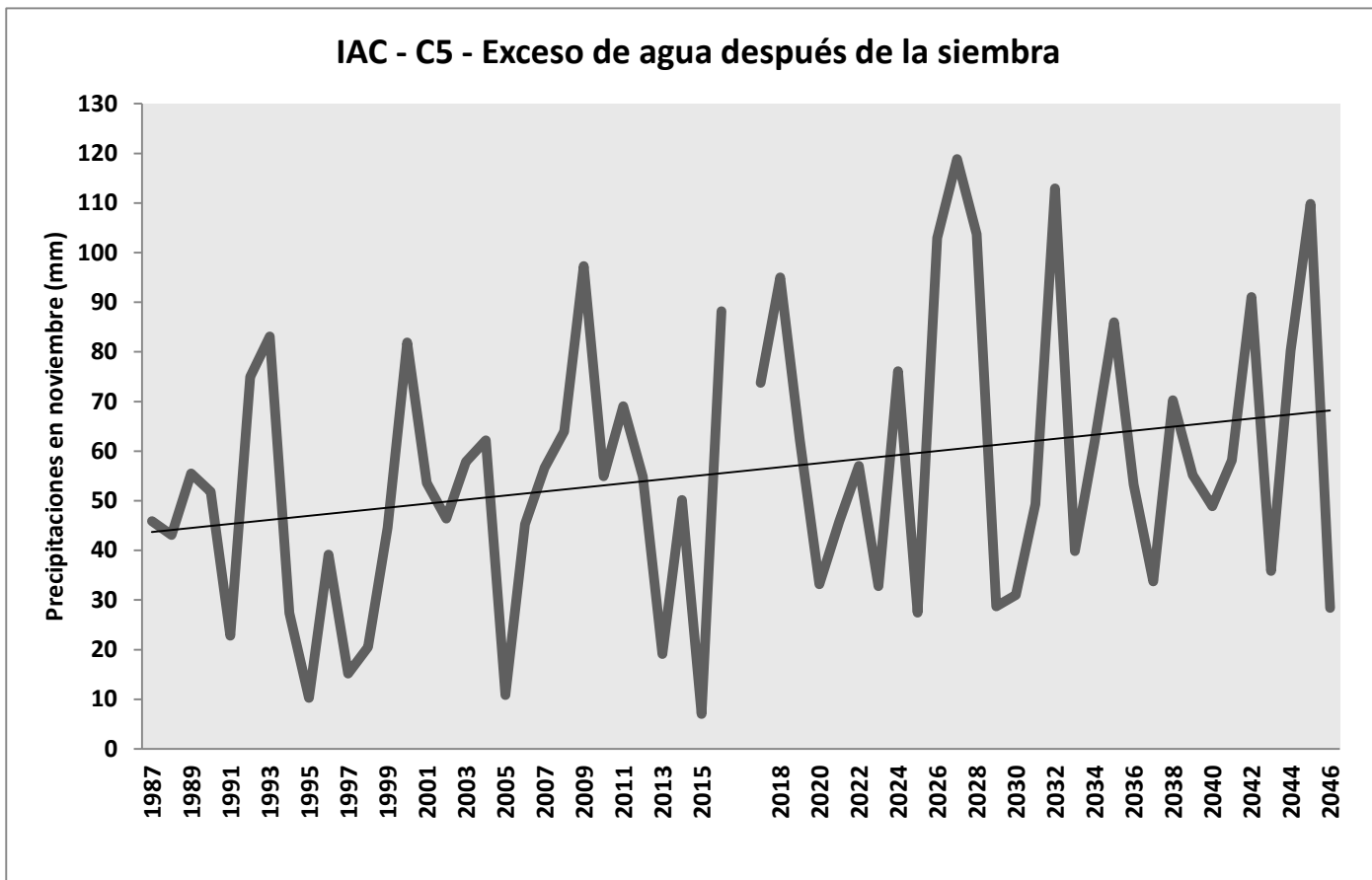


Example. Six-row barley

Agro Climatic Indicators (ACIs)

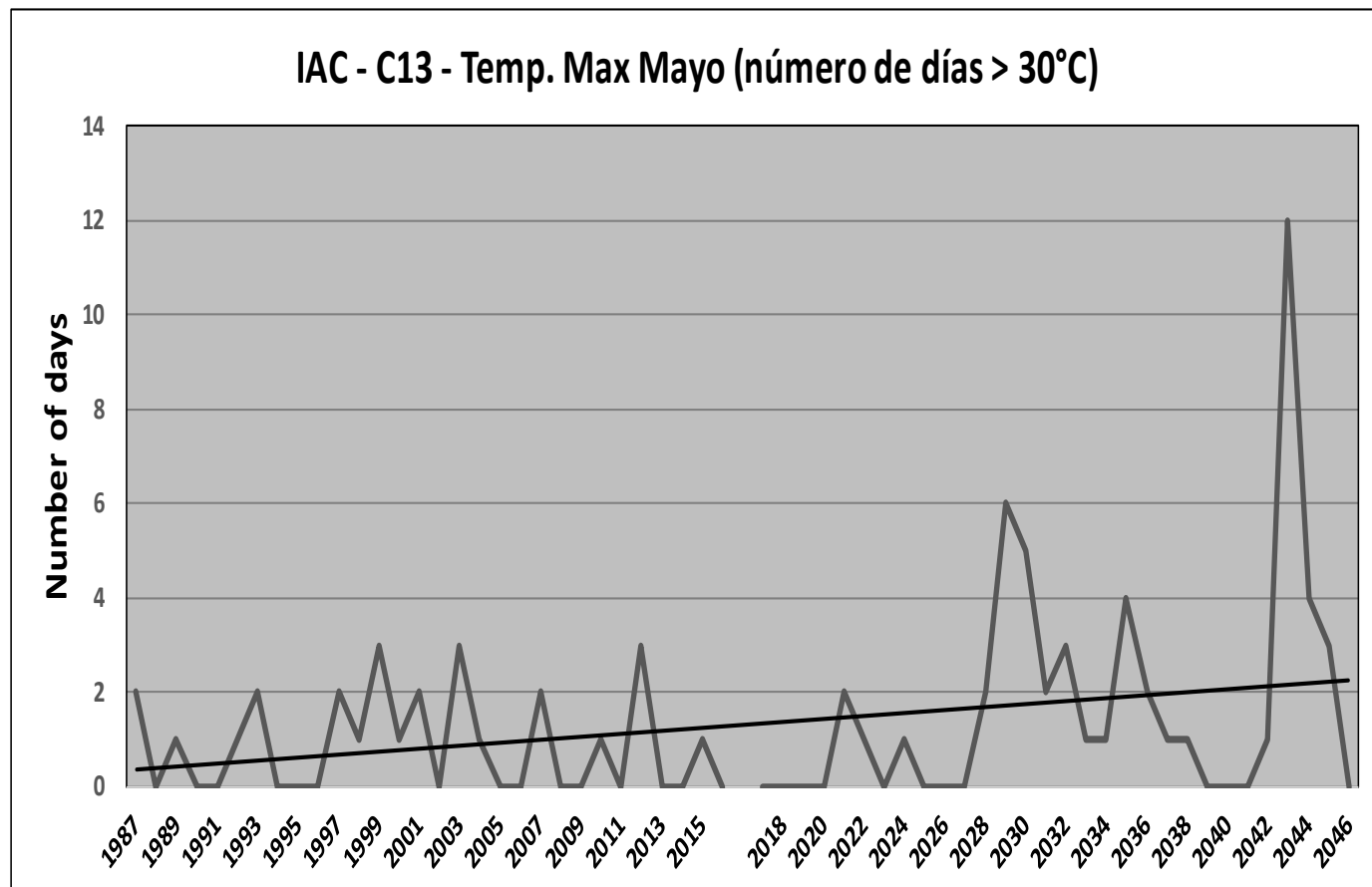
- **Water excess** after sowing: > 100mm between November and December
- **Ear formation and ripening** from 15°C to 20°C.
- **Proper sprouting** around 6° C
- **Growing Degree days:** 1.900°C
- **Extreme cold** never below -10°C.
- **Average temperature in December:** around 6° C.
- **Frost during first stages:** $T < -4.5^{\circ}\text{C}$ in late April/early May (critical > 5 days).
- **Low temperatures in April** (minimum < 4°C.) and **low radiation** (< 200 cal/m²/day) or **water excess** during several consecutive days.
- **Damage due to high temperatures in May:** nb of days with $T > 30^{\circ}\text{C}$ (critical > 20 days)
- **Number of days with no rain in April:** 15 consecutive days with no rain
- **Hydric stress (P-ETp)** between March and June < -300 mm

Example: yields. Six-row barley



AÑO	Kg/ha
2001	1270,00
2002	2500,00
2003	2796,15
2004	3403,37
2005	1400,00
2006	2289,94
2007	4262,20
2008	4052,00
2009	1801,09
2010	3000,00
2011	3100,00
2012	2130,00
2013	3289,98
2014	1868,00
2015	2370,54

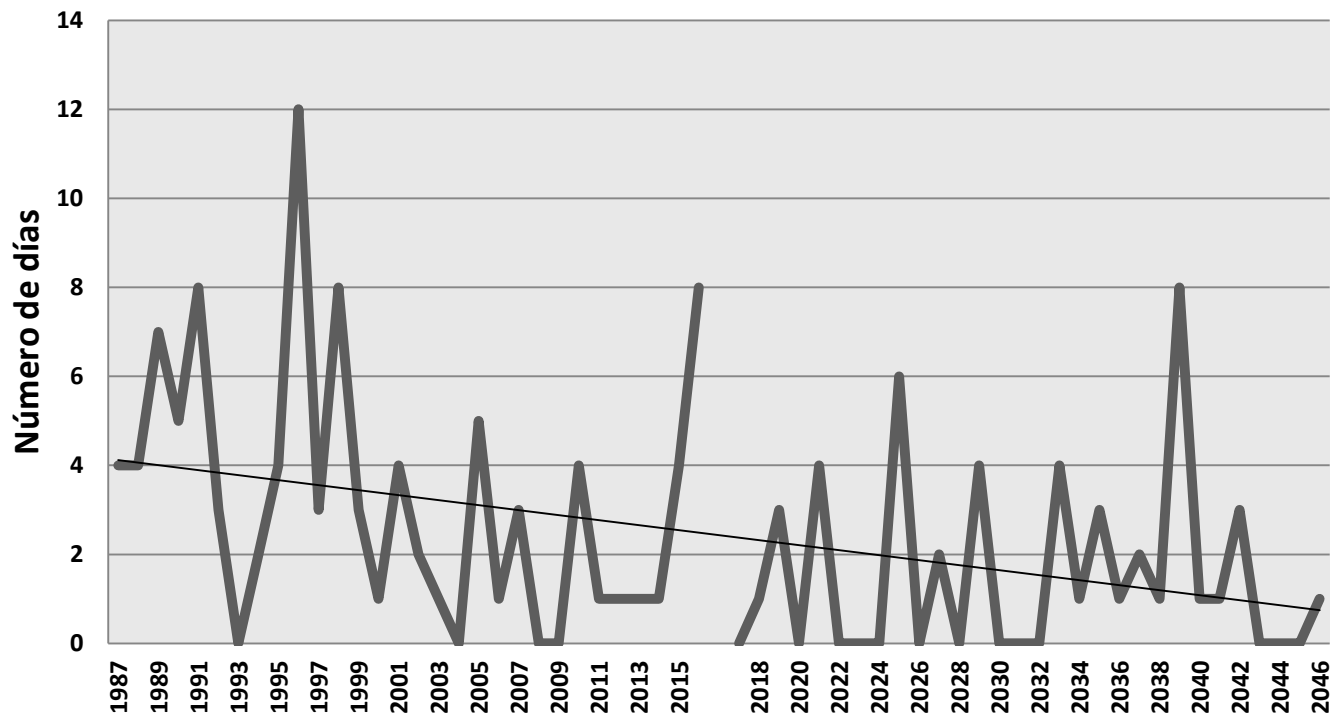
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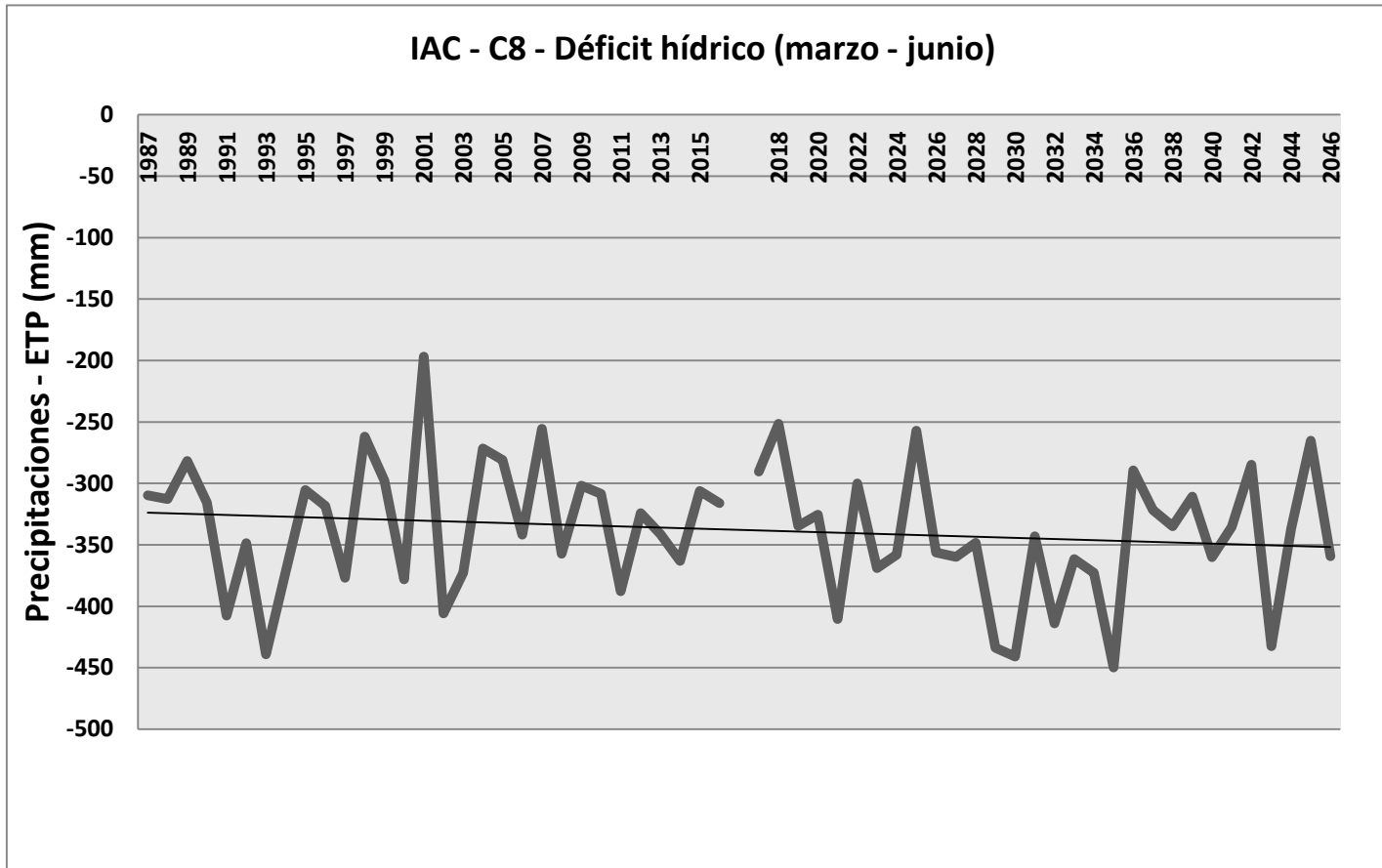
Example: yields. Six-row barley

IAC - C6 - Heladas en abril y mayo



AÑO	Kg/ha
2001	1270,00
2002	2500,00
2003	2796,15
2004	3403,37
2005	1400,00
2006	2289,94
2007	4262,20
2008	4052,00
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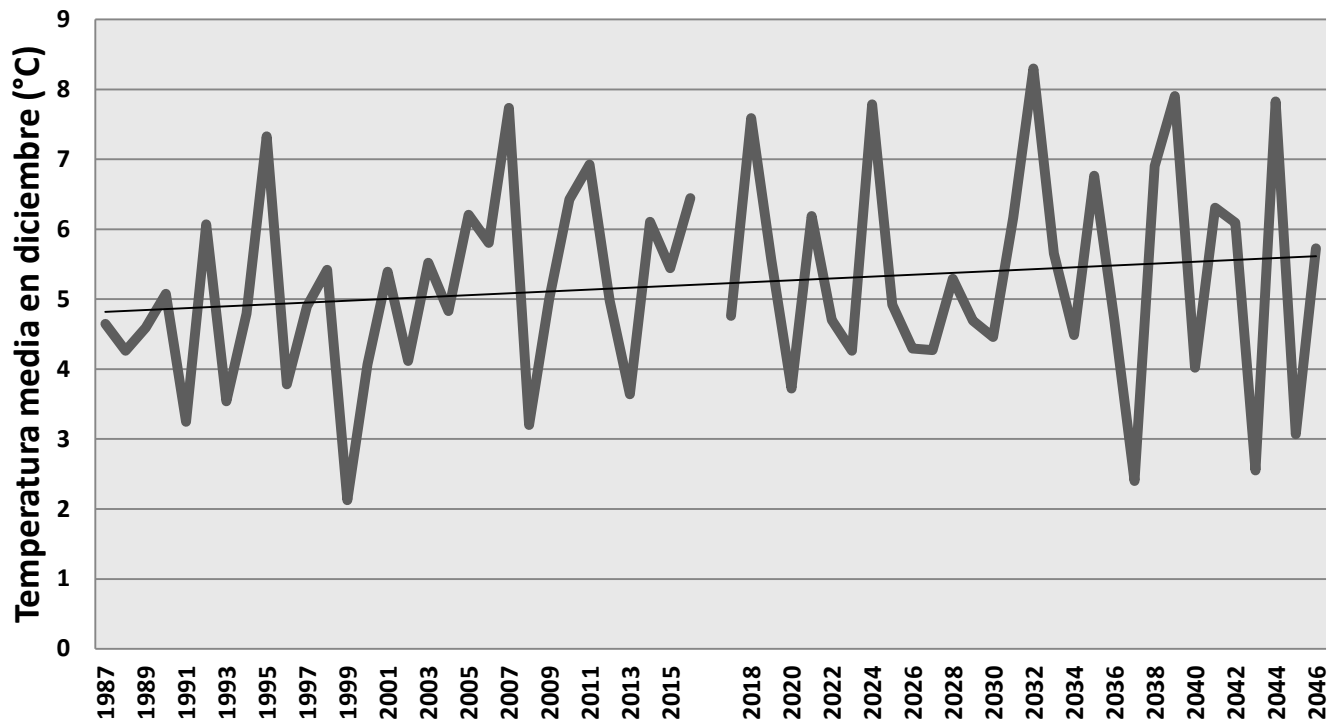
Example: yields. Six-row barley



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2002	2500,00
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2010	3000,00
2011	3100,00
2012	2130,00
2013	3289,98
2014	1868,00
2015	2370,54

Example: yields. Six-row barley

IAC - C9 - Temperatura durante la germinación



AÑO	Kg/ha
2001	1270,00
2002	2500,00
2003	2796,15
2004	3403,37
2005	1400,00
2006	2289,94
2007	4262,20
2008	4052,00
2009	1801,09
2010	3000,00
2011	3100,00
2012	2130,00
2013	3289,98
2014	1868,00
2015	2370,54

Recommendations for arable crops

- Create a varietal bouquet (traditional varieties, long cycle varieties...)
- Diversify crops and rotations (more crops in rotation, early crops, spring crops in case of dry autumns, more/less tolerant crops, monitor ACIs)
- Improve soils (winter crops, reduced tillage, organic amendments)
- Deficit irrigation and efficiency
- Hedgerow and flower strips plantations (added value to crops)





AgriAdapt

**SUSTAINABLE ADAPTATION
OF TYPICAL EU FARMING
SYSTEMS TO CLIMATE CHANGE**

Thanks for your attention

LIFE15 CCA/DE/000072

www.agriadapt.eu

