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# Adaptation of vegetable farmers to climate change in the Parisian region: a participatory approach using climate data

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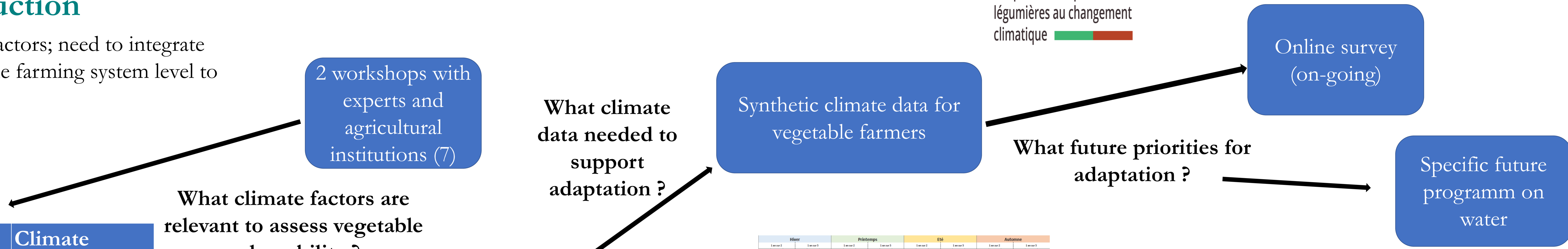


## Climate change is challenging vegetable production

But complex and many factors; need to integrate farmers' perspective at the farming system level to support adaptation

## A multi-step approach involving stakeholders

**CLIMALEG**  
Adaptation des productions légumières au changement climatique



Climate factor	Main vulnerable crops	Climate relevant indicator
Higher temperatures	Overall summer tunnel crops such as tomatoes, cucumbers, aubergines.	* Maximum daily temperature values from June to September; Number of days per month with temperatures > 30°C
Late frost	All frosty vegetables at the seedling stage (5, 7 leaves), especially when trying to advance them.	* Days with minimal temperatures < -2°C or 0°C from March to May.
...	...	....

Tab. 1 Example of some of climate factors affecting the main crops (in total 11 climate factors, around 20 indicators)

What climate factors are relevant to assess vegetable vulnerability?

What climate data needed to support adaptation?

What future priorities for adaptation?

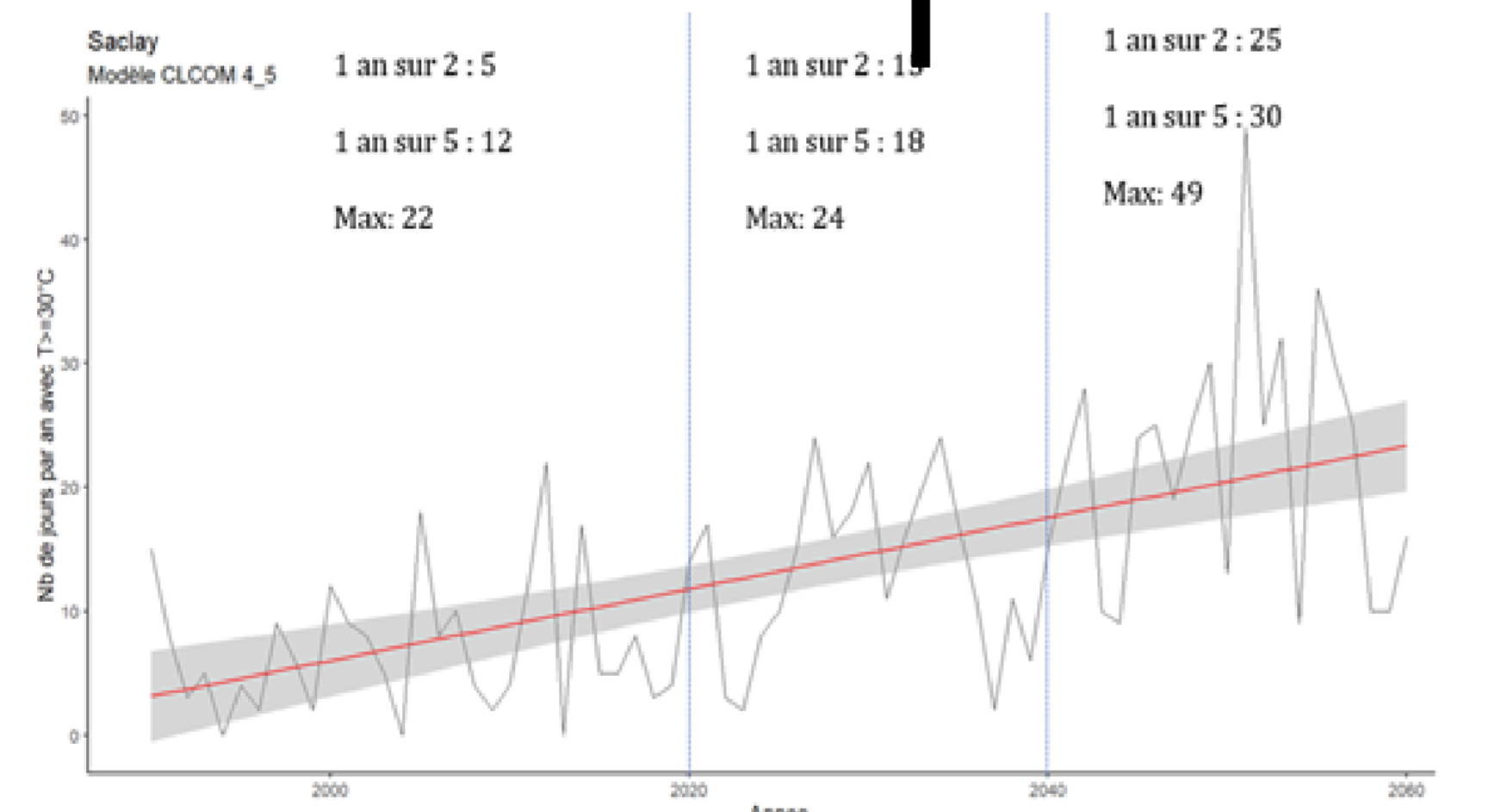
2 workshops with experts and agricultural institutions (7)

Synthetic climate data for vegetable farmers

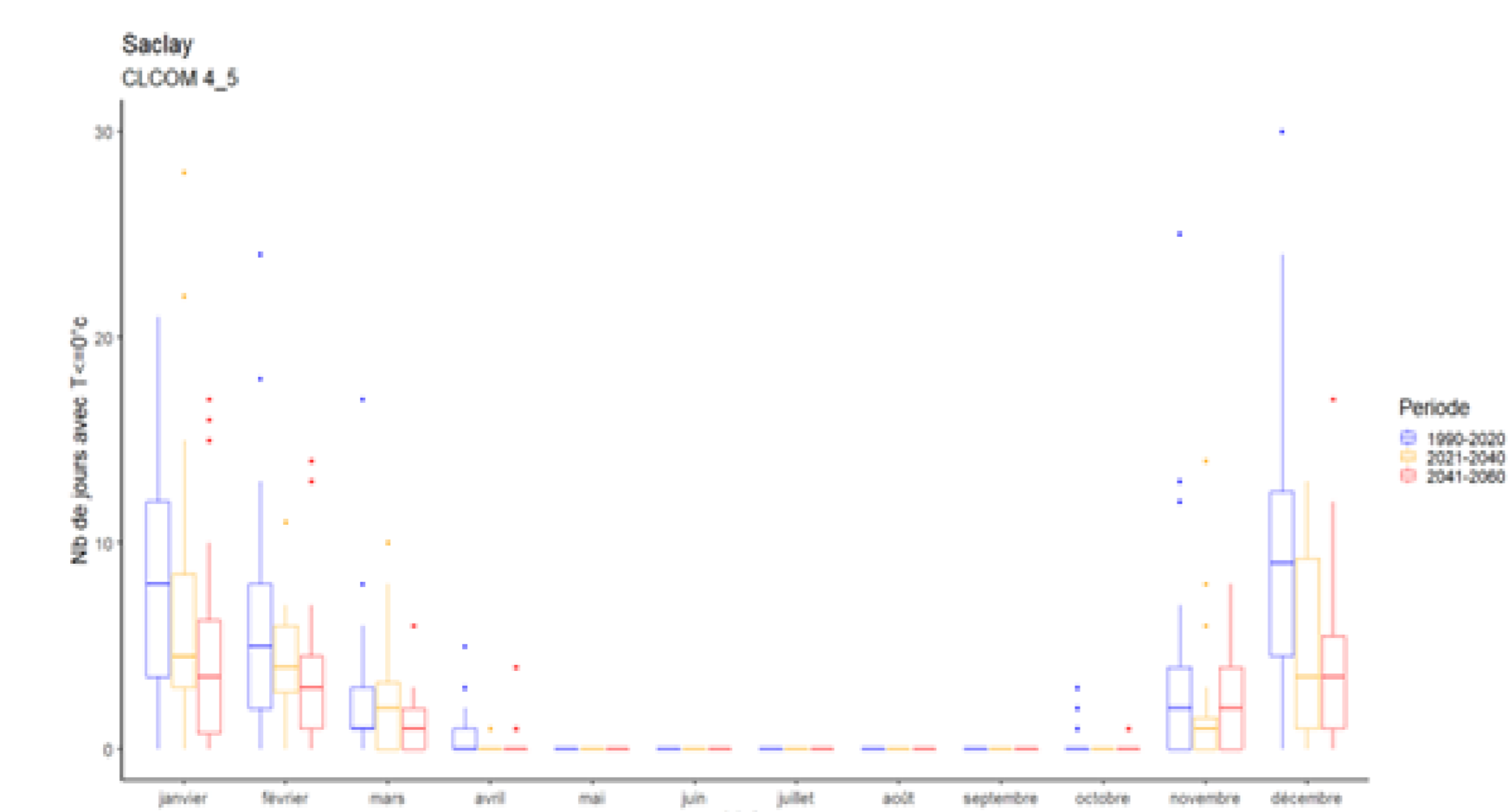
Online survey (on-going)

Specific future programm on water

3 workshops with local farmers (23)



Number of days per year with temperatures > 30°C



Number of frost days by 2060

	Summer					
	1/2 year			1/5 year		
	1990-2020	2021-2040	2041-2060	1990-2020	2021-2040	2041-2060
<b>Temperature</b>						
Maximal temperature	34,1	36,8	39,3	37,4	38,8	41,3
Days with T>30°C	9	16	25,5	17	22,2	32,4
Number of days of heatwaves	4	7,5	11,5	7	12,4	22,2
Thermal amplitude	16,5	17	18,7	17,8	18,3	20,5
<b>Synthesis</b>	Hot summers with higher extreme temperature, more frequent and long heat waves					
<b>Rain and droughts</b>						
Maximal cumulated rain in 3 days	39,9	34,4	42,6	54,6	47,7	64,4
Precipitation -ETP	-178	-266	-269	-291	-306	-376
<b>Synthesis</b>	Drier summers					

Fig 1 Zoom on the synthetic table with climate data for farmers. In total 17 indicators.

## Climate data needed by vegetable farmers to adapt strategies

- Multifactorial (T, Rain, wind...)
- Seasonal scale (winter, spring, summer, autumn)
- Risk (1 year out of 2, 5)
- Different time horizons (near and far future)

## Debates raised by farmers

Toward an increase use of protected tunnels and technology (cost, energy, plastic, inequality to access) or low-cost agroecological practices ?

Pressure on vegetable farmers to be more efficient in water use but political priority should be given to horticulture (sharing resources)

If change in crops and crop planning, consumers have to change eating habits

Presenting climate simulations (8\*8 km; CLMcom model; scenario 4.5)