

Extended Abstract

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Paper/Poster Title	To Adapt or Not to Adapt: How Swiss Fruit Farmers Respond to Climate Change
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Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	200 words max
<p>This study investigates the impact of climate change on Swiss fruit farmers, focusing on frost and drought events. Surveying over 500 participants reveals that frost has caused more significant damage, with a mean loss of 20.7% compared to 7.5% from drought over the past decade. Farmers' adaptation strategies vary based on the frequency of severe events, with nuanced responses identified. Effective adaptation and mitigation require understanding climate change's underlying causes and impacts. Preliminary findings show that belief in climate change and human contribution correlates with more accurate climate perceptions. Additionally, those with fixed irrigation systems demonstrate enhanced proficiency in identifying precipitation trends. The findings underscore the importance of tailored adaptation strategies based on event frequency and belief systems for sustaining agriculture amid climate challenges.</p> <p>In conclusion, the study provides insights into the adaptation dynamics of Swiss fruit farmers, emphasizing the need for tailored interventions and proactive measures to sustain agriculture amidst evolving climate challenges.</p>	
Keywords	Farmers perception, farm adaptation, climate change, perennials
JEL Code	Q12, Q15, Q54 see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	100 – 250 words
<p>This study addresses climate change's impact on agriculture, focusing on frost and drought events and their consequences for Swiss fruit farmers. Past heat waves and droughts have significantly affected agriculture, impacted harvests, and posed economic and ecological challenges.</p> <p>Given the substantial risks climate change poses to agricultural activities and farmers' livelihoods, it is essential to develop proactive, planned adaptations, including structural changes, and involve relevant stakeholders, such as farmers and policymakers. Notably, the focus should be on more than just how climate change may affect specific agricultural products but also on how farmers may respond and adapt to these changes, considering their reliance on favorable climate conditions. In</p>	

this regard, cropping system changes have been shown to have significant adaptation benefits in the United States, such as increased net farm income. Effective adaptation and mitigation of climate change demand an understanding of its causes and impacts and a willingness to change behavior. This issue is particularly interesting when dealing with perennial crop farmers, as they are believed to exhibit a more long-term perspective due to the significant path dependencies of their crops.

Through a survey approach, this research aims to fill this gap by exploring past yield losses due to drought and frost events and the relationship between climate perceptions and adaptation behaviors among Swiss fruit farmers.

Methodology

100 – 250 words

An essential approach to extracting otherwise invisible factors, such as perceptions and beliefs, is surveying. Hence, to elicit farmers' characteristics, infrastructure on the farm, climate perceptions and beliefs, we conducted an online survey using the platform Qualtrics. In several rounds, feedback was gathered from local producers, Swiss Fruit Association SOV employees, Agroscope, the Swiss Confederation's center of excellence for agricultural research, and Agridea, the center for Agricultural Advisory and Extension Services. After completion, the survey was sent to around 1800 fruit farmers, i.e., all fruit farmers in Switzerland, cultivating more than 20 acres of orchards, and took place in 2022/2023. Participation was incentivized by the opportunity to win a Landi voucher. In total, we received more than 500 responses, which equals a response rate of 28.9%.

The survey encompasses various thematic blocks, including questions about the farm's characteristics (type, acreage, distribution, irrigation), the impact of drought and frost on fruit growing (financial loss, adaptation measures), assessments related to climate perception and beliefs (worries, political alignment), and closing questions regarding individual characteristics (gender, age, experience, education, farm category). The diverse topics aim to gather comprehensive insights into farmers' experiences, perspectives, and adaptations to climatic challenges.

To evaluate the accuracy of climate perceptions, historical weather data provided by MeteoSwiss is compared to farmers' perception of changes in summer temperature, winter temperature, annual precipitation, number of heat days per year, number of frost days per year, frequency of drought and frequency of heavy precipitation events.

Results

100 – 250 words

When examining the impact of drought and frost over the past decade, it becomes evident that frost has inflicted more significant damage. The mean loss as a percentage of the average agricultural income over the last ten years is 7.5% (20.7%) from drought (frost).

Farmers were surveyed regarding their adaptation intention in response to frost and drought at varying intervals. The analysis assumed adaptation consistency across intervals. Results indicate that when severe events occur every ten years, most

farmers intend to absorb losses without immediate mitigation investment. As event frequency increases to every 5 and 2 years, strategies diverge. For droughts every two years, most farmers expressed willingness to invest in fixed irrigation. Conversely, when it comes to frost events, the most prevalent response among farmers was to abandon their orchards.

When looking at climate perceptions and examining the ability of farmers to identify temporal shifts in precipitation relative to their employed irrigation systems, we find that farmers employing a fixed, installed irrigation system are significantly more proficient in detecting the mostly adverse trend in yearly precipitation.

Considering different climate change belief typologies, farmers acknowledging climate change and the human contribution to climate change are closely associated with more accurate climate perceptions. A preliminary finding is that this belief typology correlates more strongly with accurate climate perception than other groups, such as those who believe the climate is not changing or that there is no human contribution to climate change.

Discussion and Conclusion

100 – 250 words

In addressing the impact of climate change on Swiss fruit farmers, this study explores responses to drought and frost events, emphasizing the risks to agriculture and livelihoods. We gathered responses from 547 fruit farmers using an online survey encompassing various themes, including farm characteristics, climatic impacts, and individual traits. Preliminary findings reveal nuanced adaptation strategies based on the frequency of severe events. Examining climate perceptions, farmers who believe in climate change and human contribution exhibit more accurate perceptions. This underscores the role of belief typologies in shaping responses to climatic challenges. There are, however, many more aspects to be considered and evaluated. This is only a tiny part of what this survey has to offer.

In conclusion, the study will provide insights into Swiss fruit farmers' adaptation dynamics. Proactive interventions are vital for sustaining agriculture amidst climate change challenges.