

# **The impact of local climate change on potato yield in the Leningrad Region according to 15 years data (2004-2019)**



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# Introduction

Agriculture is one of the main sources of income of the Russian economy. Russia is the third largest potato producer in the world in 2020 . Local climate changes affect food security and the sustainability of agriculture, which are necessary for the economic development of the country.

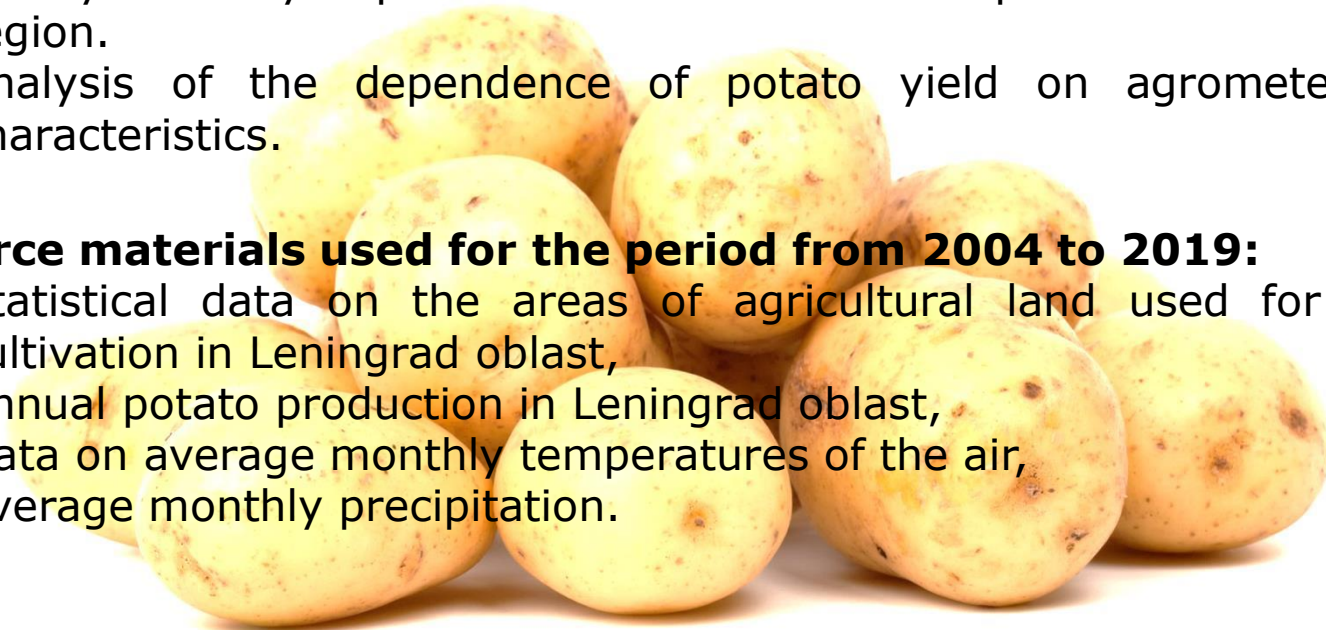
**The purpose of this work** : Assessment of the temperature regime, precipitation and related agrometeorological indicators impact on the potato yield in the Leningrad region.

## **Task :**

- A 15-year study of potato harvest and land use patterns in the Leningrad region.
- Analysis of the dependence of potato yield on agrometeorological characteristics.

## **Source materials used for the period from 2004 to 2019:**

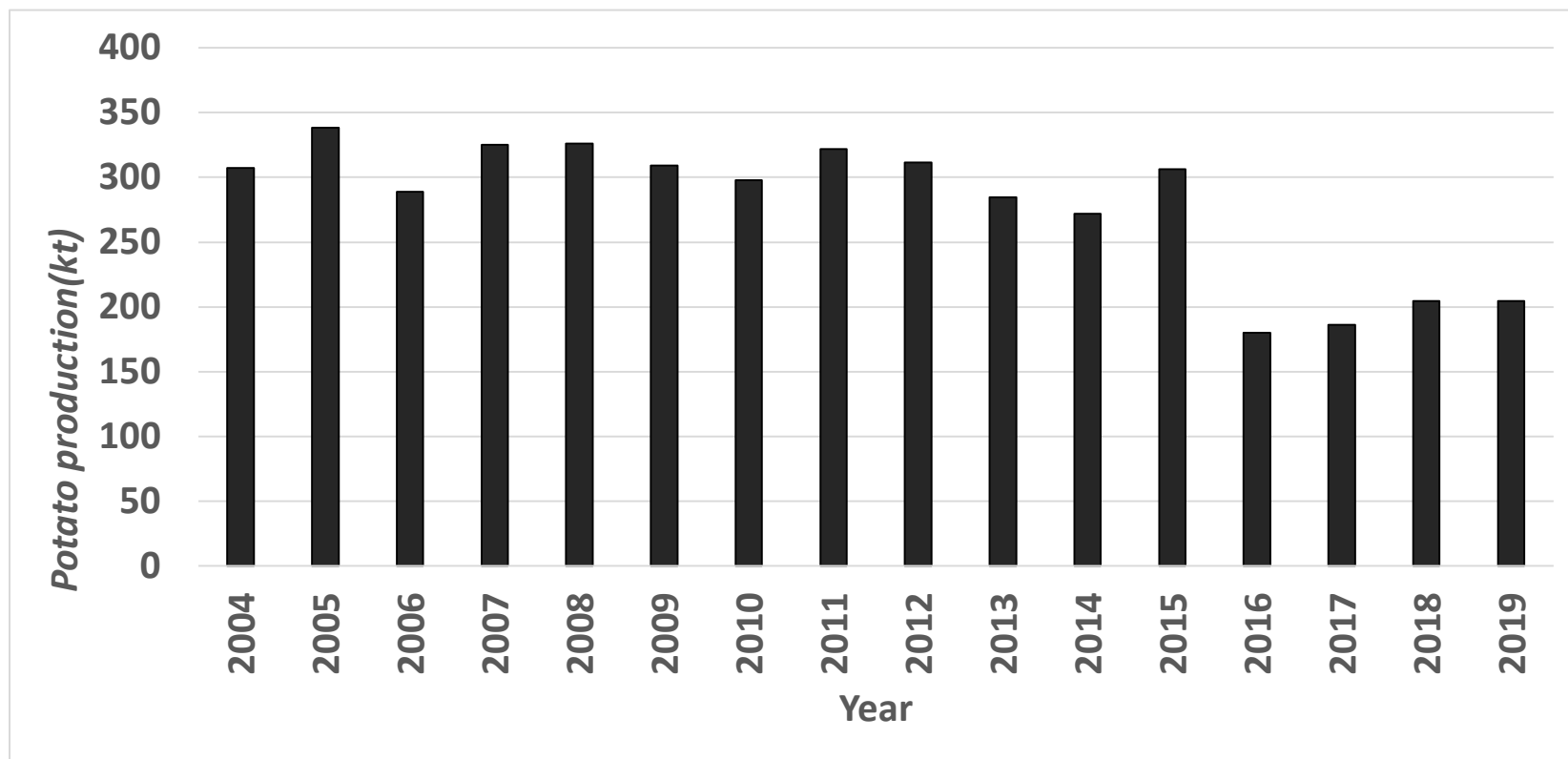
- Statistical data on the areas of agricultural land used for potatoes cultivation in Leningrad oblast,
- Annual potato production in Leningrad oblast,
- Data on average monthly temperatures of the air,
- Average monthly precipitation.



## Changes in potatoes cultivation area in the Leningrad region (2004-2019)

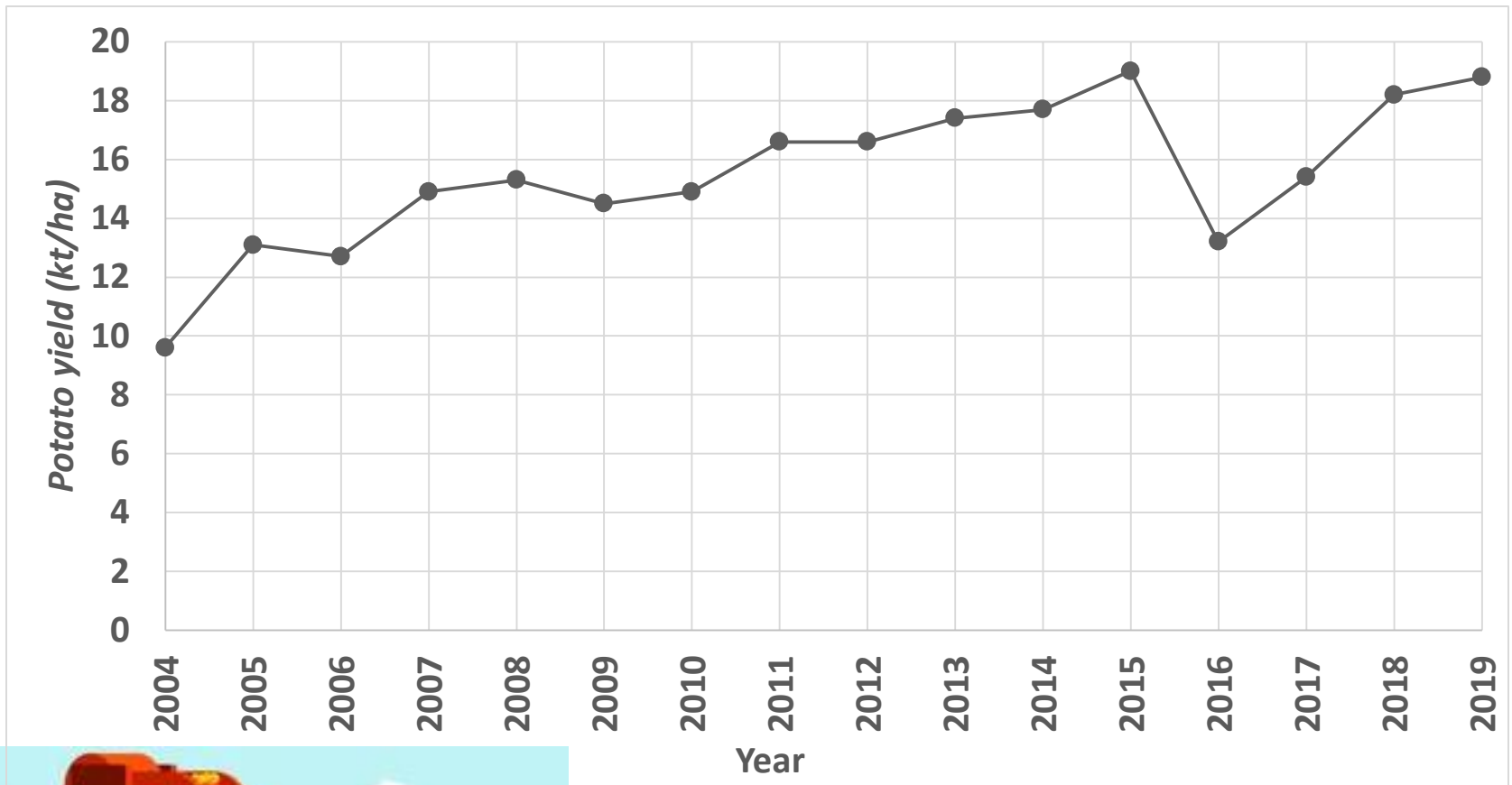


## Potato production in Leningrad region (2004-2019)

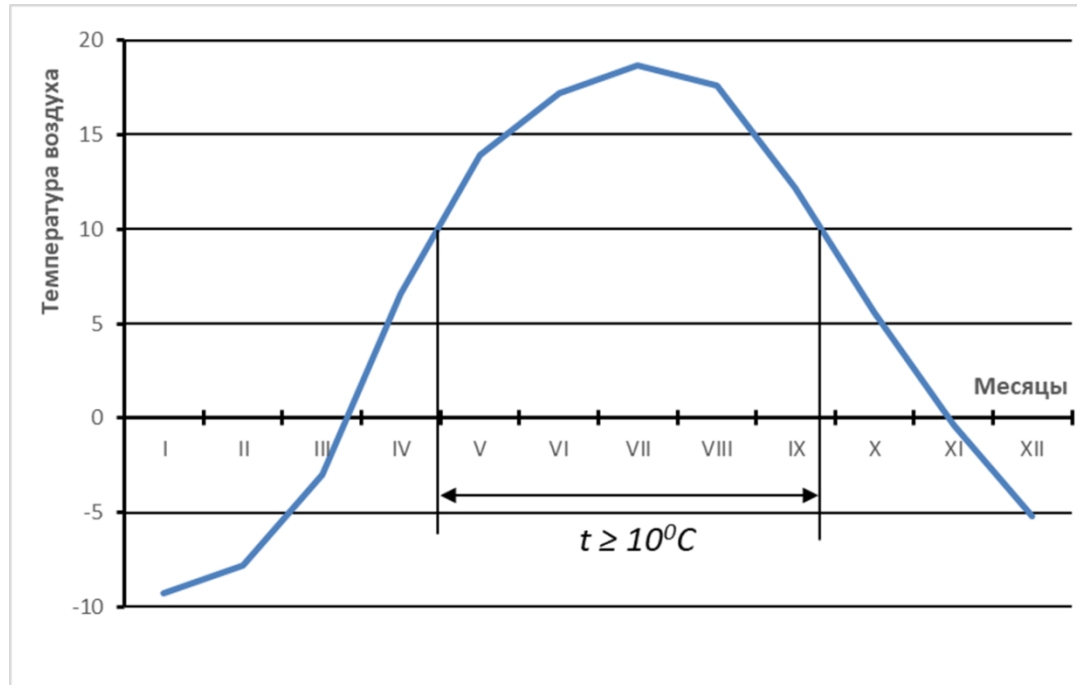




## Potato yield in the Leningrad Region (2004-2019)



## Method for calculating the sum of active temperatures (SAT) above +10 °C



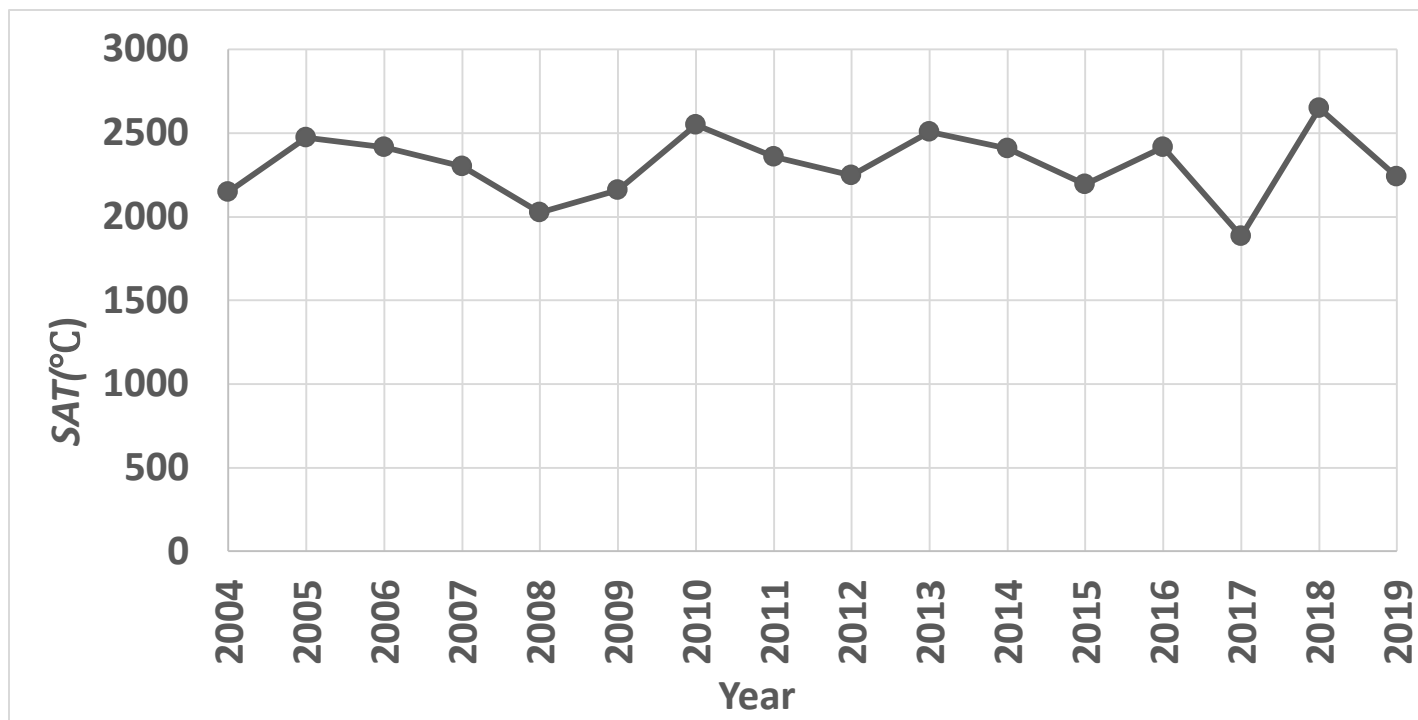
## Selyaninov's hydrothermal coefficient

$$HTC = \frac{\sum r}{0,1 \cdot \sum t_{\geq 10}}$$

Where  $\sum r$  – The amount of precipitation during the growing season (mm),  $\sum t_{\geq 10}$   
The sum of active temperatures above +10 °C for the same period.



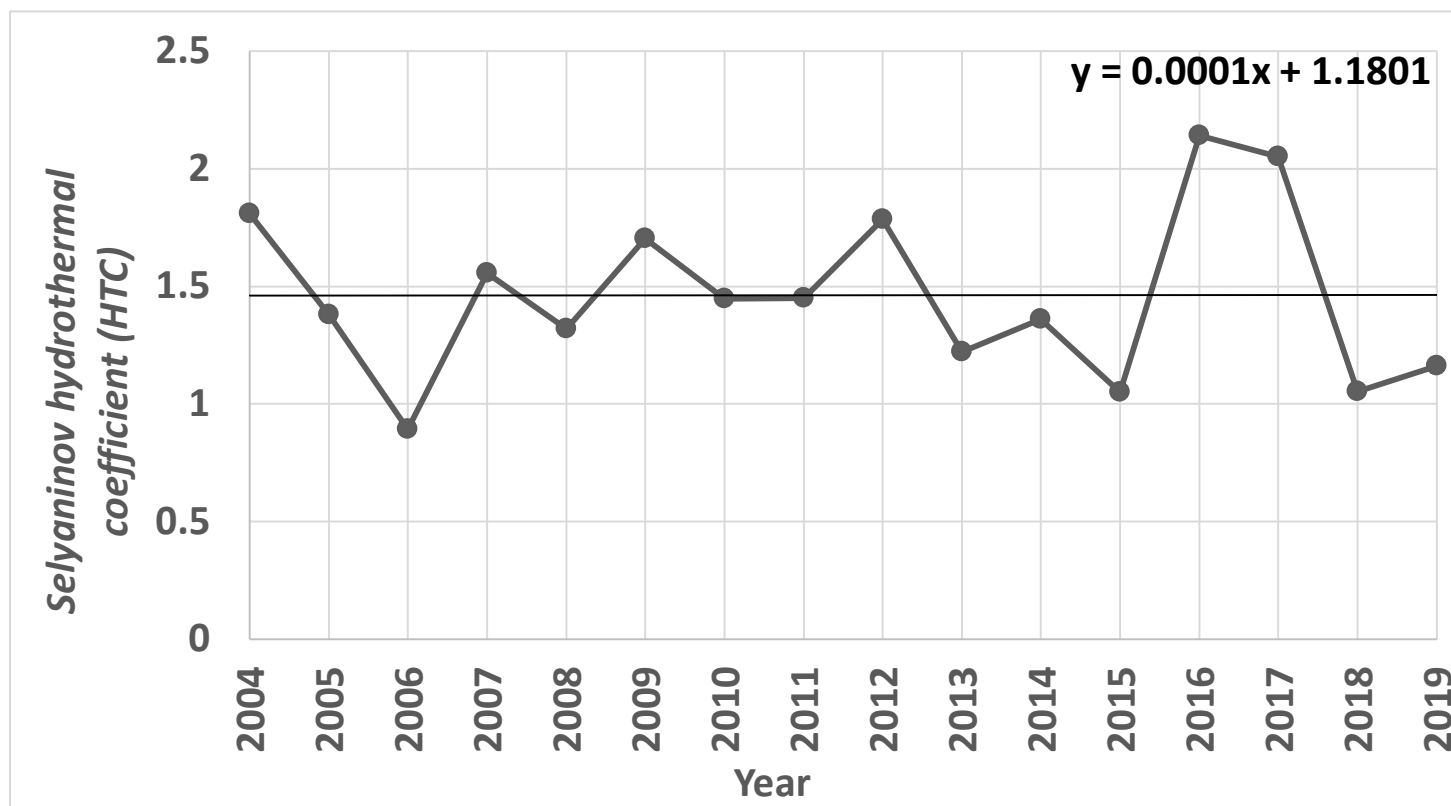
## SAT changes in the Leningrad Region from 2004 to 2019, °C



Year	SAT
2004	2147.7
2005	2472.2
2006	2415.6
2007	2302
2008	2026.3
2009	2160.1
2010	2548
2011	2359.3
2012	2246.9
2013	2507
2014	2406.7
2015	2191.7
2016	2415.1
2017	1885
2018	2647.9
2019	2240.4

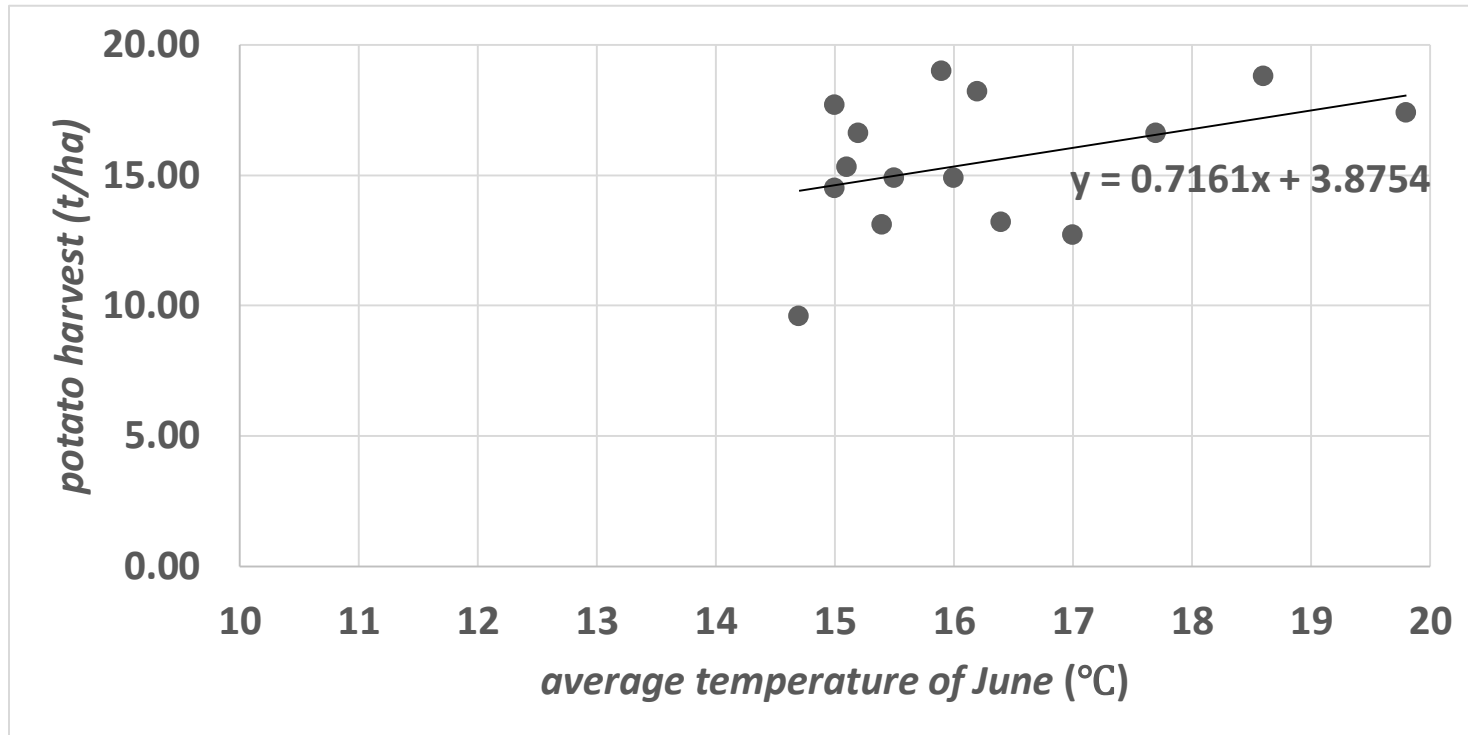


## Changes in the Selyaninov's hydrothermal coefficient (HTC) in the Leningrad Region from 2004 to 2019





## Graph of potato yield dependence on the average June temperature for 15 years (2004-2019)



# Conclusions

- The agricultural use of land for growing potatoes in the Leningrad region has been declining for 15 years, but potato yields have not changed significantly.
- Potato yield in the Leningrad region over the past 15 years has little dependence on such agrometeorological parameters as HTC and SAT.
- At the same time, increased values of average air temperatures in June contribute to an increase in potato yields, since root crops are formed at this time.
- The early start of the growth period leads to a sufficient accumulation of the sums of active temperatures by June, which also has a positive effect on potato yields.





THANK YOU!

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