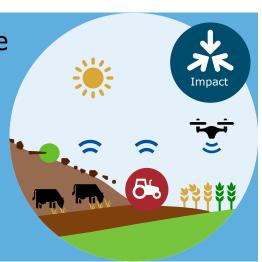# AI driven discovery of the linkage between climate extremes and food fraud

Using AI to predict food fraud due to extreme climatic events

Emerging DS/AI methods

WAGENINGEN
UNIVERSITY & RESEARCH

Impact

Data Driven Discoveries in a changing climate (D3C2)

Objective: The aim of this project is to find linkages between extreme climatic events and the occurrence of food fraud within the EU.

Activities

We first consulted experts and asked which drivers of change could influence food safety. We then collected and integrated data from different data sources, such as production, trade, climate and food fraud. And finally, to predict food fraud, we developed two models: a Bayesian Network (BN) model an Extreme Gradient Boosting (XGB) model.

Achievement

We identified and integrated relevant data sources as model inputs for prediction of the food fraud type. Results of BN model and XGB model showed that adding climate variables increased the predictive performance. Using these models, we found out that climate extremes, especially dry spells and frosty days, have a substantial positive influence on making predictions of food fraud categories.

The investment theme has provided us the possibility to collaborate with different institutes within Wageningen Research. It allows us to combine the knowledge of climate resilience, food systems seismology and food fraud. As a result, we were able to synchronise data and model to make the first steps in making predictions on what kind of fraud on which commodity can be introduced in the global food system following an extreme climate event.

We exchanged views with experts on different domains, such as food safety, food systems seismology and climate resilience. As a result, we were able to take a multidisciplinary and interdisciplinary approach to identify relevant data sources and develop relevant data models. This allows us to lay a solid foundation that will contribute to a proactive early warning system. Such a system can provide notifications to relevant stakeholders, such as food safety officials and food enterprises. These notifications can relate to food fraud probability in different regions of the world for different products, under the occurrence of climate extremes.

Outlook

Future project proposals can be developed with the knowledge derived from this project. Next to this, close collaboration has been established between different groups within Wageningen University. Possible EU calls and PPS project calls can be potential possibilities for future collaboration.
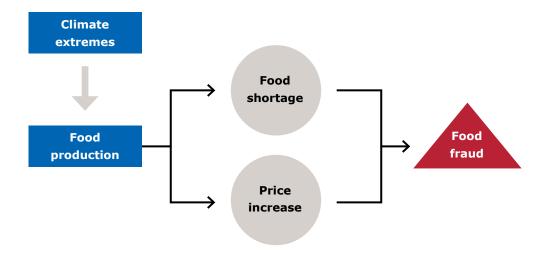
Deliverables

Our project report.

Lessons learned

Our project has a high-risk and high-reward character as there has not yet been scientifically proved that there is a linkage between food fraud and climate extremes. We appreciated that we had the opportunity to combine forces from different domains to address this high-risk, but innovative research. Within the short time of project duration, we were able to work as a team to identify relevant data sources and to develop effective models together. The results of the project are also promising as we have shown that climate extreme variables can positively contribute to the prediction of food fraud type. The research outputs can be a good basis for future further development of a proactive early warning tool for food fraud under climate extremes adaptation. Thanks to this grant, we established new connections between different groups in within Wageningen Research. This provides us future opportunities for further collaborations on addressing the challenges in climate adaptation using Big Data and AI in combination with relevant domain knowledge.

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