

# A machine learning method for data driven approaches to sustainability \*

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This is just the first draft, everything should be attained to changes. Please feel free to edit this document.

## Abstract

In this paper we propose and analyze [...] In this part we write the possible abstract for the project.

**Key words:** Machine learning, agriculture, climate change, optimization, water

## 1 Introduction

Sustainability is the greatest challenge facing the human race. The United Nations (U.N.) Sustainable Development Goals describe a multi-faceted view of sustainability covering environment, economic and societal factors (see, ??). Agriculture is one of the most significant areas of economic activity for countries around the world and has significant amount of environmental impact. It is estimated that agriculture accounts for at least 10% of green house gas emissions in many countries (see, ??). In many areas the impact of agriculture is seen through changing land use, increased emissions and increased water consumption, leading to lasting changes to the rest of the environment. This challenge is focused on the use of open data to improve understanding and ideally predictability for environmental impact from agriculture. In nearly all countries there is impact from agriculture through changing land use, water consumption, use of fertilizer, GHG and other emissions. From

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a local perspective agriculture creates different dynamics for indigenous plant and animal life in addition to creating different micro-climates. On a more broad scale, agriculture can put pressure on entire river systems and lead to changing weather patterns as atmospheric humidity and solar radiation emission changes for land and sea. There are many data sources available to investigate environmental changes and impacts due to agriculture. Similarly there are an increase number of data sets which convey information about practices, agriculture production and green house gas emissions. Combining data across data sources and interpreting data in new ways could provide better insights on sustainability. Creating models to describe impact which can be predictive using machine learning could improve planning and shift practices to reflect longer term environmental impact. Utilizing technology like Blockchain may provide a foundation to create an immutable data ledger for environmental impact while also leveraging smart contracts to take action on data when conditions are met. In the ideal outcome, design of a model and a system of action for environmental impact which leverages open data provides a complement to the current TheoryMesh system which is capturing individual operation level impact from farm activities.

## Outline

Sebastian: Here a little bit of outline of the project, we should write this aprt after the main parts are in place.

## 2 Motivation

- Bullet points for the main motivation.
- Should talk about the importance of the model
- Why does it fit the data.
- etc.

## 3 Contributions

- Contributions of our work
- How does our work (try to-) fix the problem. etc

## 4 Related work

- A little of literature review

## 5 Setup

- Main mathematical setup. All that is needed to understand the problem. Sebastian: Maybe this part changes as we go with the project, because should be something more for the industry than theoretical.

## 6 The model problem

- What kind of model, prediction are we using. Machine learning approaches, regression models, etc...

## 7 Problem statement

- We should talk a bit of the statement of the problem

## 8 Main results

## 9 Conclusions

## 10 Future work

## References

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