

# Does Crop Diversity Stabilise Farmers' Income?

## Time Series Analysis of Agro-economic Data from South Korea



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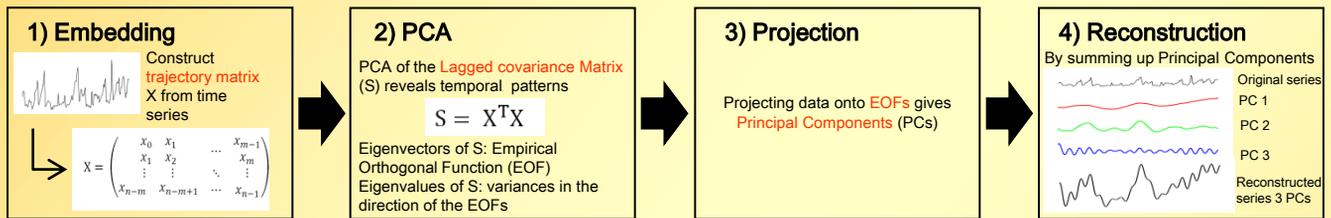
### Background

Temporal fluctuations of crop price and yield can have a strong influence on farmers' income<sup>1</sup>. Due to climate change, the uncertainty of farmers' decision making is increasing more than at any previous time. Under such conditions, diversified portfolios of crops can provide an insurance risk with respect to farmer's income as well as lead to positive effects with respect to landscape biodiversity and the general provision of ecosystem services<sup>2</sup>.

- Objectives:**
- ◆ To identify the impact of crop diversity on farmers' income
  - ◆ To apply Singular Spectrum Analysis (SSA) to quantify temporal fluctuation of crop prices in different crop portfolio scenarios (one crop, three crops, five crops)

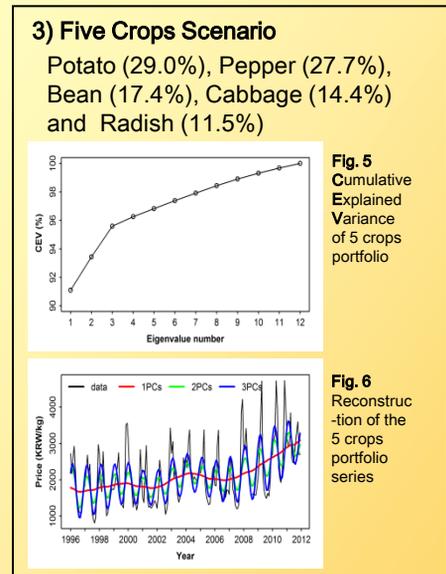
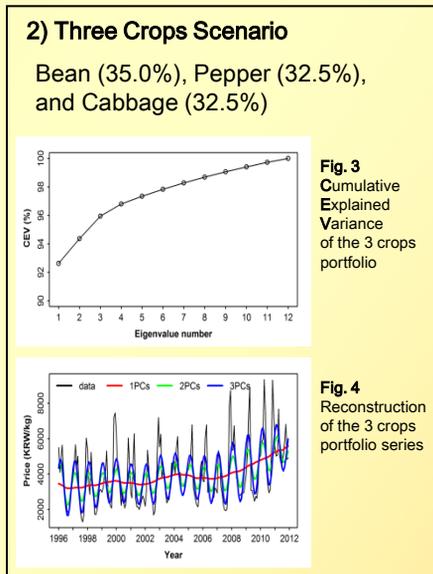
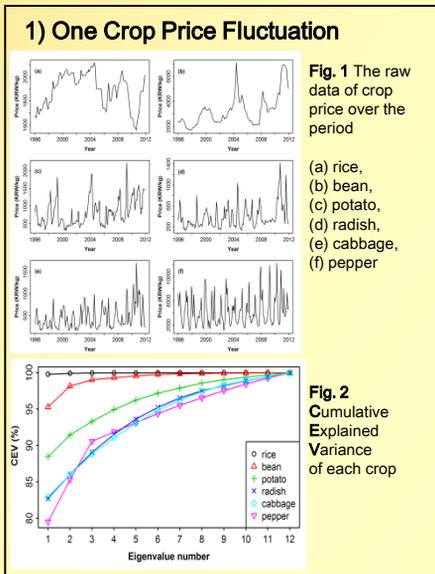
### Method

- ◆ Study Area: Gangwon Province, South Korea
- ◆ Scenarios based on survey data from TERRECO
- ◆ Singular Spectrum Analysis : a tool for global frequency decomposition without any fixed model<sup>3</sup>



### Results

- ◆ Rice is the most stable crop in South Korea due to governmental subsidies. Therefore, the one crop scenario was most stable.
  - 99.8% of the rice data was explained by the first PC (Fig. 2)
  - 80% of the pepper data was explained by the first PC (Fig. 2)
- ◆ Crop diversity can stabilise farmers' income with a portfolio of safe and higher risk crops.
- ◆ SSA can be a powerful tool to analyse crop diversity.



### Conclusion

Crop diversity can reduce fluctuations in farm income as a portfolio of safe and higher risk crops. Moreover, it is an important factor for landscape diversity. On the other hand, the direct influence of the increasing number of crops on farmer's income has not been fully identified. One possible explanation is that when farmers cultivated only one crop, they planted rice which is the most stable crop in Korea due to governmental subsidies. However, these subsidies will be reduced gradually. Thus, the risk of fluctuating income for rice farmers will probably increase. Our results may have practical consequences for farmers' decision-making. Furthermore, we show that SSA can be applied to analyse crop diversity.

### References

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2. Zegeye E.W. (2004) The Economics of On-Farm Conservation of Crop Diversity in Ethiopia, Incentives, Attribute Preferences and Opportunity Costs of Maintaining Local Varieties of Crops, Development Economics and Policy, vol.45, Peter Lang, Frankfurt am Main, ISBN 3- 631-53142-7
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