Lecture 4: Climate risk assessment and communication

Training Course on Economic Assessment Methods for Policy Support of Climate Change Adaptation in the Agricultural Sector in Lao PDR

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1. Perfect World vs Reality

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What can researchers do?

Researchers can provide relative probabilities of a variety of future outcomes they think are possible. However, these probabilities are difficult to assess.

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What can researchers do?

Researchers can identify the *groups likely to be affected.* For example, rice farmers. Researchers can also identify the *locations* likely to have larger impacts (e.g., the tropics).

2. Quantifying Uncertainty

What kinds of uncertainty matters?

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Climate Uncertainty

Model Uncertainty

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What kinds of uncertainty matters?

Climate Uncertainty is the unknown surrounding future climate conditions. What will temperatures be in 50 years?

Model Uncertainty is the uncertainty surrounding researchers ability to model the relationship between climate and the outcome of interest (in this case, agriculture). Every model has some level of uncertainty.

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Which type of uncertainty is more important?

Researchers have found that climate uncertainty tends to be **more than twice as large** as statistical uncertainty.

What does this mean?

It is important to incorporate climate uncertainty into impact estimates, and to portray this info to policymakers.

3. Moving past means

Several important complexities of climate risk are often underappreciated:

1. Extreme events
2. Variance
3. Timing

3. Moving past means

1. Extreme events

- Oftentimes, extreme events have bigger impacts that increases in averages. Reasons include:

    1. Unexpected → unprepared
    2. Non-linear effects
    3. Cumulative effects

3. Moving past means

1. Extreme events

- However, it is difficult to study these events because they are rare and we do not have good forecasts of future event probabilities.

- It should be noted that increased average temperatures, for example, make extreme (hot) temperature events more likely because smaller aberrations become extreme events. Same for rainfall.

2. Climate variance

- Most GCMs forecast changes in mean conditions. We have less of an understanding of how climate variance will change.

- If climate change leads to higher climate variance, there are likely to be increased damages due to the difficulty of constantly coping with different conditions.

3. Timing

- The timing of climate is another important facet of this issue that is difficult for researchers to incorporate into impact estimates.

- Agriculture and rainfall timing is a good illustration of the important of timing. There are certain times during the growing cycles when additional rainfall is helpful and other times were additional rainfall is harmful to crops. The impact of more or less rainfall depends on when it occurs.

3. Timing

- Adjusting planting dates is also a common adaptation strategy to changing rainfall patterns.
- However, it is difficult to capture timing into risk analysis.
- Researchers are beginning to develop methods to better capture this component of climate risk.

Conclusions

- It is important to remember what information policymakers find useful, and to communicate with them to temper expectations about what is realistic.

- As researchers, we face a difficult task trying to provide useful evidence that is also scientifically responsible.

4. Conclusions

- Incorporating climate risk into policymaking is very challenging, but also very important.
- We want to provide policymakers with useful evidence while acknowledging the uncertainties that surround this evidence.
- Climate uncertainty, in particular, is important.

4. Conclusions

- Extreme events, not just averages, are important.

- Scientists often estimate future mean climate conditions, but less effort has been expended studying future climate variance. This an area of increasing research interest.

- More study needs to be devoted to the *timing* of climate events, not just the magnitude, because timing matters.

Questions? Comments?