Environmental Release of Engineered Pests
Building an International Governance Framework
October 5-6, 2016
North Carolina State University
Raleigh, North Carolina

Outcomes from the Workshop
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Outline

1. Context & motivation
2. Meeting goals
3. Participants
4. Activities
5. Outcomes
Technology of Focus in the Meeting

Gene drives in agricultural pests / disease vectors:

Systems of biased inheritance in which the ability of a genetic element to pass from a parent to its offspring through sexual reproduction is enhanced.

A self-sustaining form of “genetic pest management” (GPM)
### Rationale

| Why have a meeting on international governance of GPM? | Rapid pace of research, increasing emphasis on governance... |

### What about the international dimension?

*Transboundary implications for biotech designed to spread...*
Gene Drive Governance & Global Commons?
Gene Drive Governance & Global Commons?

• Biodiversity has features of **common-pool resources** and **public goods**: Most benefits of biodiversity are non-excludable
  ➢ Institutions required to incentivize conservation.

• Transboundary movement of “Living Modified Organisms” (LMOs) presents an **externality**:
  ➢ Deploying countries may not internalize damages or risks (or benefits) spilling over to other countries.
  ➢ Especially for gene drives: because they are designed to spread

*But what exactly are the key decisions for global governance?*
Meeting Goals

1. Exchange experiences on national governments’ regulation of existing agricultural biotech
   • *Prospects of regulating gene drive applications in pest control?*

2. Identify the social, ethical, regulatory levers & barriers for effective of GPM

3. Develop recommendations for international coordination of gene drive governance
Gene Drive Governance & Global Commons?

A General Framework for Governing Commons: *Institutional Analysis & Development* (Elinor Ostrom)
Meeting Participants

- 17 speakers
- 65 participants
- Represented countries: Australia, Brazil, Canada, China, India, Japan, Mexico, Panama, Philippines, Spain, South Africa, UK, US
- Government & International Organizations: EFSA, FAO, OECD, CSIRO, USDA, FDA, EPA, CTNBio, Biotech Consortium India Ltd., Chinese Academy of Agricultural Sciences, U.S. National Academies of Sciences, Engineering and Medicine
Activities

Day 1: Presentation Sessions

I. Keynote by Professor Jim Collins (Arizona State Univ.)

II. Existing governance structures in OECD countries

III. Existing governance structures in non-OECD countries

IV. Socioecological Context: GMO Governance
Day 2: Presentation & Discussion

I. Keynote: Prof. Jennifer Kuzma (Director, GES Center)

II. Socioecological Context: GPM Governance

III. Breakout Discussion Sessions with Case Studies:
   a. Stakeholder Mapping
   b. Building Effective Stakeholder Engagement

IV. [Get out of North Carolina before the Hurricane arrives.]
Case Studies Used in Stakeholder Mapping

• International disagreement about release of gene drive mosquitoes for malaria control.
  ➢ Direct transboundary movement

• Complications with organic standards & international trade using a gene drive to control an invasive fruit fly in otherwise organic agriculture.
  ➢ Food quality standards & trade implications

• Escape of transgenic mouse for island conservation, implications for international trade
  ➢ International trade implications of gene drives used in conservation (inter-agency)
Stakeholder mapping & analysis

Method for understanding relationships & positions among stakeholders surrounding an issue.

Stakeholder Map:

<table>
<thead>
<tr>
<th>Power</th>
<th>Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low–High</td>
<td>Low–High</td>
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- “Latents”
- “Promoters”
- “Apathetics”
- “Defenders”

Terms in quotes are conventional labels for these categories.
“No, what I said was we need more stakeholders.”
Example: Mosquito case study
OUTCOMES
Key messages of meeting

1. Expanded on messages from U.S. National Academies report.
   - Ecological risk assessment of gene drive deployments
   - Expanded public engagement due to largescale implications of technology (which is designed to spread)
   - Engagement capacity by regulatory authorities limited by statutes
Key messages of meeting

2. Building international governance structure: Choice of institutional routes
   • Different institutions may address parts of gene drive governance
   • Participatory processes for civil society differ greatly between institutions
Choice of institutional routes in international gene drive governance

The WTO Route

• Codex Alimentarius
  – Food safety standards & GMOs
• International Plant Protection Convention
  – Phytosanitary standards
  – Precedent here for biocontrol standards
• (Existing WHO standards for GM mosquitoes.)

The CBD Route

• Cartagena Protocol for
  – Intentional & unintentional introduction of LMOs.
• Biosafety Clearinghouse:
  – Logical repository for risk assessment
• Supplementary Nagoya-Kuala-Lumpur Protocol
  – Codifies liability & redress for transboundary introductions of LMOs
The international governance context: civil society engagement varies dramatically

**WTO**

**CBD**

![Image of WTO protest]

![Image of CBD conference]

*Civil Society and Youth Alliances for Mainstreaming Biodiversity to Wellbeing*
Current CBD activities on gene drives

Side events for COP-13, Cancun:

- **Dec. 5: Gene Drives: Applications for Conserving Biodiversity and Public Health Benefits**
  - Biodiversity opportunities with gene drives
- **Dec. 5: CRISPR gene drives: the implications of extinction technologies and species-scale engineering**
  - Calling for a moratorium on gene drives
- **GES Center: Dec. 16: Synthetic biology, gene drives and the end of the world: Cutting through the noise to better understand the risks, benefits and governance options for synthetic biology within the CBD**
Publication Plans

• Set of 4-5 short, peer-reviewed papers based on presentations to be published open-access as conference proceedings in BMC Proceedings
  – *Current target publication date is June 2016*

• Final report to OECD in early 2017

• Synthesis report for general interest peer-reviewed publication, to be drafted in early 2017
Meeting Website
(with speaker abstracts & slides)
https://research.ncsu.edu/ges/oecd-crp-meeting/
Thanks to our meeting sponsors!