Decisions for the Decade: A “Serious Game” for Water Planners

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*with many thanks to Robert Lempert, RAND
Decisions for the Decade
How do we make smart long-term decisions?

All Participate
(...expect confusion...)

Special thanks to Pablo Suarez and Janot Mendler de Suarez (Red Cross / Red Crescent Climate Centre)
You: Principal Planner

...of a large city

within a region like this one
Your objective….
prepare your community for the future

- What will the future bring?
- Will it be different from the past? In what way?
- What investment decisions should we make?
- Will we be prepared?
The Set Up

Region 1

Region 2

Cities

Region 3
Making Decisions

City decisions are independent
• Use individual City boards and brown beans

Regional decisions require teamwork
• Use single Region board and white beans
## How to Win

### Winning City
- **Fewest Crises** within a city
- Only 1 city winner per region
- Tiebreaker within region: city with most prosperity

## CITY BOARD

### Investment & Development
Earn 1 Prosperity Point per bean, but only if no crisis.

### Drought Protection
If you roll a drought: lose 1 bean.

### Flooding Protection
If you roll a flood: lose 1 bean.

## 2. Investment Decisions

<table>
<thead>
<tr>
<th>Decade</th>
<th>FLOOD Protection (0 - 9)</th>
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## 3. Observations

- Annual Precipitation

## 4. Results

- # Crises
- # Prosperity Points

**TOTAL:**

---

Winning City

- Fewest Crises within a city
- Only 1 city winner per region
- Tiebreaker within region: city with most prosperity

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CITY BOARD

### Investment & Development
Earn 1 Prosperity Point per bean, but only if no crisis.

### Drought Protection
If you roll a drought: lose 1 bean.

### Flooding Protection
If you roll a flood: lose 1 bean.
### How to Win

1 Winning Region:
- **Most Prosperity**
- **Tiebreaker:** Region with fewest crises

### 2. INVESTMENT DECISIONS

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### TOTAL:

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### REGION BOARD

**FLOOD PROTECTION**
- If you roll a flood: lose 1 bean

**INVESTMENT & DEVELOPMENT**
- Earn 1 Prosperity Point per bean, but only if no crisis

**DROUGHT PROTECTION**
- If you roll a drought: lose 1 bean

---

**Choose Robust Option?**
- Yes / No
Steps of the Game

1. Receive Scientific Information

2. Make Decisions

3. Record Observations

4. Tally Results
Steps of the Game

1. Receive Scientific Information

2. Make Decisions

3. Record Observations

4. Tally Results
1. Scientific Information

Highest Monthly Precipitation for Tampa Area, FL

Typical Information
The game’s source of information

= Flood

= Drought
Steps of the Game

1. Receive Scientific Information

2. Make Decisions

3. Record Observations

4. Tally Results
2. Make Decisions

- Allocate resources for each decade
- Drought protection
- Flood protection
- New investments, operations, maintenance, infrastructure upgrades, roads
**DROUGHT PROTECTION**
If you roll a drought: lose 1 bean

**FLOOD PROTECTION**
If you roll a flood: lose 1 bean

**Investments & Development**
Earn 1 Prosperity Point per bean, but only if no crisis
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Steps of the Game

1. Receive Scientific Information

2. Make Decisions

3. Record Observations

4. Tally Results
3. Record Observations

Ten years of precipitation occur
### 3. Record Observations

**Ten years of precipitation occur**

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**TOTAL:**

*One Drought*
Steps of the Game

1. Receive Scientific Information

2. Make Decisions

3. Record Observations

4. Tally Results
We protected against 1 drought…
Since one drought occurs, we use one protection bean…
We protected against 1 drought…
Since one drought occurs, we use one protection bean…

…we get 9 Prosperity Points!
4. Tally Results

**FLOOD PROTECTION**
If you roll a flood: lose 1 bean

**INVESTMENT**
Earn 1 Prosperity Point per bean

**DROUGHT PROTECTION**
If you roll a drought: lose 1 bean

But what if we had a second drought?

Not enough protection…
…means a social and environmental crisis
…and 0 Prosperity Points!

Each shortage of protection is a new crisis!
4. Tally Results

*If one drought occurs:*

**City 1**

- Crises: 0
- Prosperity Points: 9

**City 2**

- Crises: 1
- Prosperity Points: 0
Repeat Steps of the Game

1. Receive Scientific Information
2. Make Decisions
3. Record Observations
4. Tally Results
Key Rules

Simplification of reality
No challenging the rules!

Decisions are individual
No consulting on City Decisions
Do collaborate on Regional Decisions

We will play 4 decades of decision making
Each round is 10 years
Winning The Game

Winning City:
• Cities with fewest crises for each Region
• Only 1 City winner per Region
• Tiebreaker within Region: City with the most Prosperity points

1 Winning Region:
• Most Prosperity Points
• Tiebreaker: Region with fewest crises

There Are Prizes!!!
Let’s Play!!!
Round 1
(years 1-10)
1. SCIENTIFIC INFORMATION

Historical Precipitation

- 6 = Flood
- 1 = Drought
2. DECISIONS
Make investments for the coming decade

- Allocate the beans
- Record your investments
3. Observations

Ten years of precipitation occur

*Use one die for the entire table—applies to City and Region
### 4. Results

**Record results**

<table>
<thead>
<tr>
<th>Annual Precipitation</th>
<th>4. RESULTS</th>
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**TOTAL:**

- **1**

**Any Crises?**

**How much prosperity?**
Round 2
(years 11-20)
1. SCIENTIFIC INFORMATION

Historical Precipitation

_dice_ = Flood

_dice_ = Drought
2. DECISIONS

New Investment Option: Robustness

- You are guaranteed a fixed number of prosperity beans, no matter how many floods or droughts occur
- But, you must give all beans above that fixed number to the bank
- How many beans would you accept for this robust option?
2. DECISIONS
Make investments for the coming decade

• Allocate the beans, or choose robust option
• Record your investments
3. Observations

Two years of precipitation

x2 only
Have you heard about...

CLIMATE CHANGE?

= Drought

= Flood

1 2 3
3. Observations

*Eight more years of precipitation*
4. Results

Record results

Any Crises?

How much prosperity?

= Flood
= Drought

2 = Drought
2 = Flood

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TOTAL:
Round 3
(years 31-40)
Precipitation Under Climate Change

1 = Drought
3 = Flood
6 = Drought

= Flood

= Drought
2. DECISIONS
Robust Option Again Available

Robust Option

- You are guaranteed a fixed number of prosperity beans, no matter how many floods or droughts occur
- But, you must give all beans above that fixed number to the bank
- How many beans would you accept for this robust option?
2. DECISIONS
Make investments for the coming decade

• Allocate the beans, or choose robust option
• Record your investments
3. Observations

*Ten years of precipitation occur*
3. Observations

Ten years of precipitation occur
4. Results

Record results

Any Crises?

How much prosperity?

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TOTAL:

3

= Flood

= Drought

1 2 3

3 1 6
Round 4
(years 41-50)
1. SCIENTIFIC INFORMATION

We have a **NEW MODEL** for climate change...
2. DECISIONS

Robust Option Again Available

Robust Option

- You are guaranteed a fixed number of prosperity beans, no matter how many floods or droughts occur
- But, you must give all beans above that fixed number to the bank
- How many beans would you accept for this robust option?
2. **DECISIONS**

Make investments for the coming decade

- Allocate the beans, or choose robust option
- Record your investments
3. Observations

Ten years of precipitation

Climate will remain deeply uncertain...
**Final Results: Decades 1-3 ONLY**

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**TOTAL:**

- **Fewest Crises = City winner!**
- **Most Prosperity Points = Region winner!**
Thank you for playing Decisions for the Decade!