A Serious Game for Collaborative Sanitation Planning

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SPANS project - Sanitation Planning for Alternative Nutrient-recovery Systems

The project is exploring how new technologies and ways of planning can improve the recovery and reuse of important fertilizing nutrients from wastewater/faecal sludge

Objectives

- Investigate the technical and market readiness of nutrient-recovery technologies,
- Study the readiness of society to accept alternative systems,
- Evaluate alternative planning techniques for promoting innovation.
Why Games?

*Research has shown serious games to be effective for:*

**Motivating learning**
- Visualization enhances understanding of complexity situations
- Fun = increased learning

**Problem-solving**
- Improves decision-making and analytical skills
- Stimulates creativity

**Increasing engagement & participation**
- Creates trust and partnerships
- Develops the ability to function cooperatively

**Collective learning**
- Understanding other perspectives
- Understanding stakeholder roles & responsibilities
- Reflecting together
The game aims to share knowledge about nutrient resource recovery from sanitation and supports attitude-change and collaboration between players.

Other aims of the game:
- Increase understanding of the need for sanitation
- Increase understanding of other stakeholder perspectives
- Increase collaboration between actors
- Inform about new technologies
- Having fun - be engaging
Concepts included in the game

- **Potential benefits** of safe reuse
  - Fertilizers
  - Link to food production
- **Potential negative consequences:**
  - Water pollution
  - Disease
- **Different roles** within sanitation chain
  - Housing
  - Treatment
  - Farming
  - Private Contractor
- **Unexpected event cards**
  - Negative – e.g. floods, disease
  - Positive – e.g. innovations, development
Target audience

*Politicians and professionals in decision-making positions*

Other possible users of the game:
- Students
- Professionals involved in sanitation planning
- Citizens (private entrepreneurs, landlords, home owners, community groups, farmers)
Context

Players work together to manage the sanitation situation in a growing city.

- Each round the city grows
- Improper management leads to a collective loss!
- Follow your personal agenda
Personal Agendas

Environment – e.g. keep the water clean

Economy – e.g. avoid expensive imports

Happiness – e.g. clean housing areas

Public Good – e.g. keep people healthy
Earn Points for built Infrastructure
RECLAIM Game

Board
- Urban areas
- Rural areas
- Water
- Unusable land (e.g. swamp)

Resource Dice
- Food
- Waste
- Sorted Waste
- Sludge
- Fertilizer
- Disease outbreak
Infrastructure

Housing blocks
- Unconnected
- Improved
- "Safe collection"

Transportation
- Roads
- Pipes

Treatment
- Existing system
- Improved
- Resource recovery

Farms
- Simple
- Improved (2x food)

50% risk of failure!
Limits

Max 4 of same resource per hexagon!

4 Houses per Hexagon

Each House needs 1 Food → 1 Waste

2 Treatment plants per hexagon

Treats 4 Waste

Treat 2 Waste

1 Farm per hexagon

Converts 2 NKP → 2 Food

Converts 4 NKP → 4 Food
Event cards – every 10 min

INNOVATION: HOUSING

Upgrade a Housing Block for free. Housing role chooses which one.

Don't draw any card.
Tutorial
Gameplay

Order of play:
Housing → Treatment → Farming → Independent Contractor

I  Each player’s turn:
   1. 3 build actions
   2. Fetch resources
   3. Convert resources
   4. Send resources

II: Political decisions – all players together

Game consists of 4 rounds – roles rotate each round
Housing role starts

- Builds **houses** & transportation
- Converts **food** to waste
Treatment Role

- Builds **treatment plants** & transportation

- Converts **waste** to sludge or NPK
The old treatment plant only has half capacity: throw the dice for each waste and see if it turns into sludge or will be dumped in the water.
Farming Role

- Builds farms & transportation

- Converts NPK or sludge to food

50% risk for disease!
Private Contractor Role

Can choose to act as any of the other roles

However, everything is built to a higher cost
## Political decisions

<table>
<thead>
<tr>
<th>Vaccinate</th>
<th>Import Food</th>
<th>Import NPK</th>
<th>Dump Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 €</td>
<td>200 €</td>
<td>100 € FREE</td>
<td>100 €</td>
</tr>
<tr>
<td>400 €</td>
<td>300 €</td>
<td>200 €</td>
<td>100 €</td>
</tr>
</tbody>
</table>
Watch your progress on sanitation provision!

**BASIC SANITATION COVERAGE**

- **60 000** | Current Population
- **30 000** | Number of people covered
- **30 000** | Number of people remaining

**SANITATION LEVELS**

- **25%** | Safely managed sanitation
- **25%** | Basic sanitation
- **25%** | Limited sanitation
- **25%** | Unimproved sanitation
End of Game

All players have **lost**, if at the end of a round:
- River is fully polluted
- More than 4 disease dice on the board
- Not enough food

If the players have not lost, then the player with the most points at the end of Round 4 **Wins!**
Let’s play!
Counting Points

Points for Infrastructure

Points for Hidden Agendas
Post-discussion

Presentation of overall results *(Excel model)*

- How do you think that you performed?
- Do you wish you had played differently? In what way?
- In what ways does this game reflect reality?
- Can you apply lessons from this game in your own work?

*(Present the Reuse-Compilation)*

- What else is missing to improve the sanitation situation in your town?
- What more knowledge is needed to improve the sanitation situation in your town?
- What can you start working with now?
SPANS TEAM

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