exo-matriz

A fabulative simulation game about land, culture, resources and beetles

Team

Fime de la Fuente

Sacha kavanagh-sommerer

Leonardo Morales Vega


EXOMATRIZ
0
250
500 m
Search this area
SAN PEDRO
LA REFORMA
BARRIO
DEL NIÑO
CALLE GUERRERO
CALLE TRES CRUCES
AVENIDA FERROCARRIL
CALLE PINOPAA
CALLE TEOTZAPOTLÁN
Chocolate de
la Villa Real
Restaurante
La Capilla
Nieves Tipicas
Rey Cosijoeza
El casco de escarabajo te permite visualizar informacion a nivel territorio [...]

Leonardo Morales Vega -- kishongus@gmail.com

Keywords: agroecosystem, serious games, simulation, agent model, agriculture, ecology, traditional, cultural, narrative, education, fabulation

Research question: How can narrative-fabulation design, and game design, contribute to an understanding of agent dynamics within agroecosystem matrices in the context of traditional food production in Mexico?

Hypothesis: The discipline of Narrative Design in games can be expanded to encompass a fabulative world-building approach to soft-fantasy ‘serious games’ with an educational aim. And can aid in the dissemination of scientific knowledge of agro-ecological systems known as ‘matrices’ in a cultural context of traditional farming practices in Mexico.

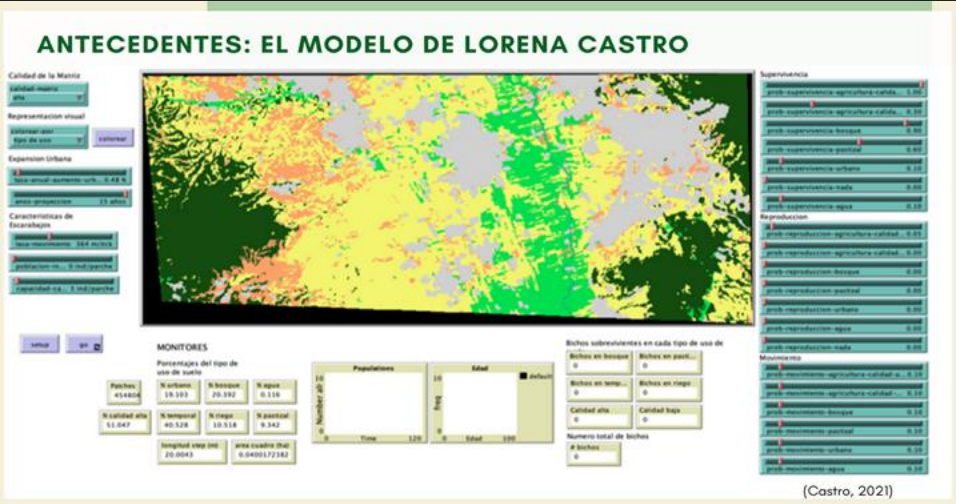
Research / narrative statement: Growing populations and urbanized living encroach on traditional agricultural practices in the municipality of Zaachila (Oaxaca, Mexico). Both the avoidance of food shortages, and the preservation of the biodiversity that we depend on for survival are crucial objectives of our age. Researchers have found that the presence and behavior of beetle populations (Coleoptera) in agroecosystems is a good indicator of ‘matrix health’ across both of those domains of concern.
Exomatriz is a top-down 2D simulation type game with soft-fantasy narrative elements that bridges the gap between science communication of how systems of variables in agroecosystems function, and the socio-cultural implications of human choice and non-human agency in an allegorical fabulative fictional setting.

Research objectives

- How can narrative-fabulation design, and game design, contribute to an understanding of agent dynamics within agroecosystem matrices in the context of traditional food production in Mexico?

- Exo-matriz is a top-down 2D simulation type game with soft-fantasy narrative elements that bridges the gap between science communication of how systems of variables in agroecosystems function, and the socio-cultural implications of human choice and non-human agency in an allegorical fabulative fictional setting.

Antecedents



- Lorena Castro's original model based on Zaachila data.

- Luis G.'s workshop pedagogical model.

HASTA AHORA...
VARIABLES IMPORTANTES A CONSIDERAR

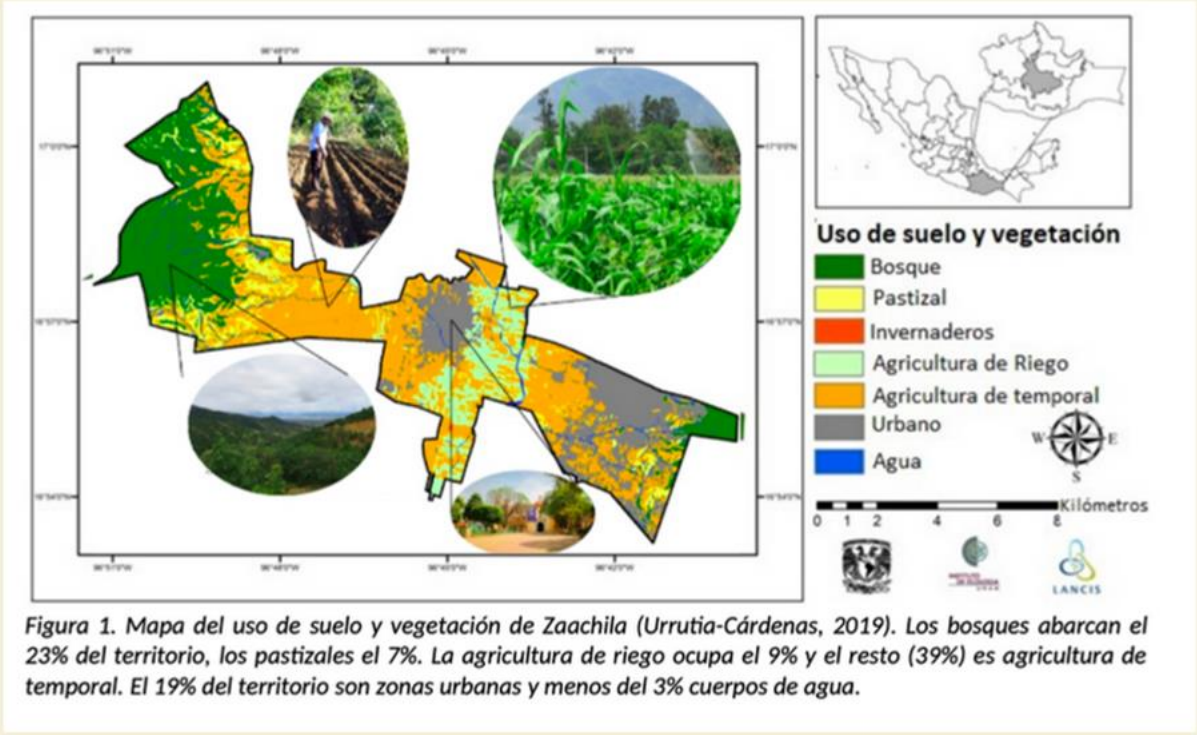


Figura 1. Mapa del uso de suelo y vegetación de Zaachila (Urrutia-Cárdenas, 2019). Los bosques abarcan el 23% del territorio, los pastizales el 7%. La agricultura de riego ocupa el 9% y el resto (39%) es agricultura de temporal. El 19% del territorio son zonas urbanas y menos del 3% cuerpos de agua.

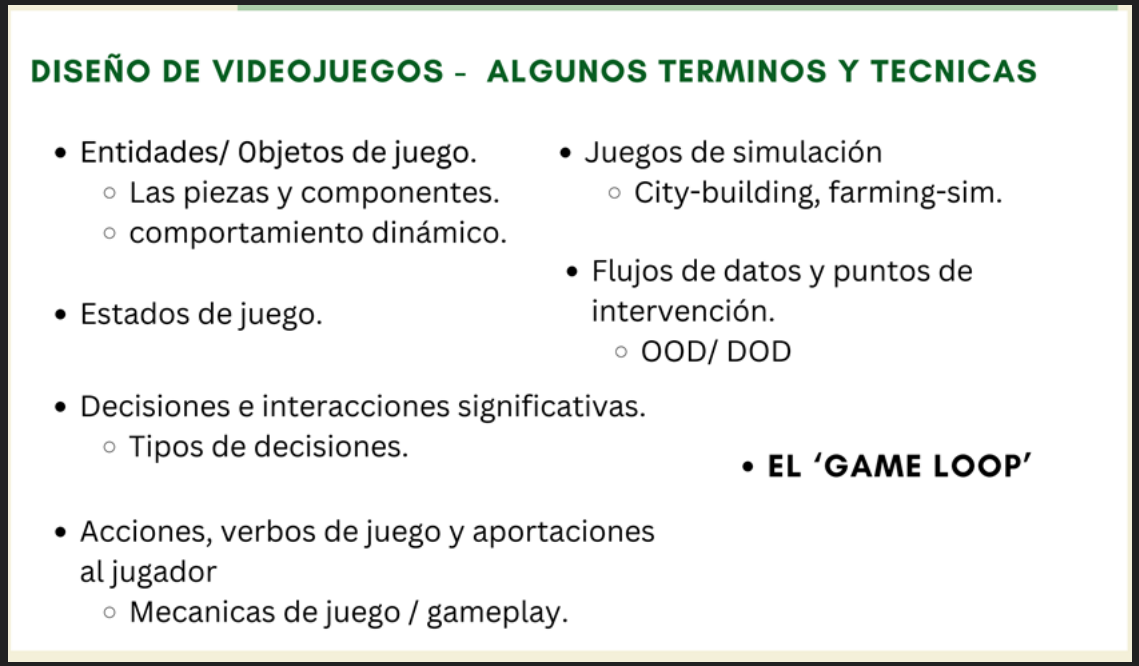
Diagram from Lorena Castro's paper on the agro-ecological matrix in Zaachila.

Evaluation of variables

- Matrix quality
- Model organism (coleoptera)
- Ways of life.
- Landscape
- Permeability
- Structural layout
- Conservation
- Property size
- Vagility
- Heterogeneity

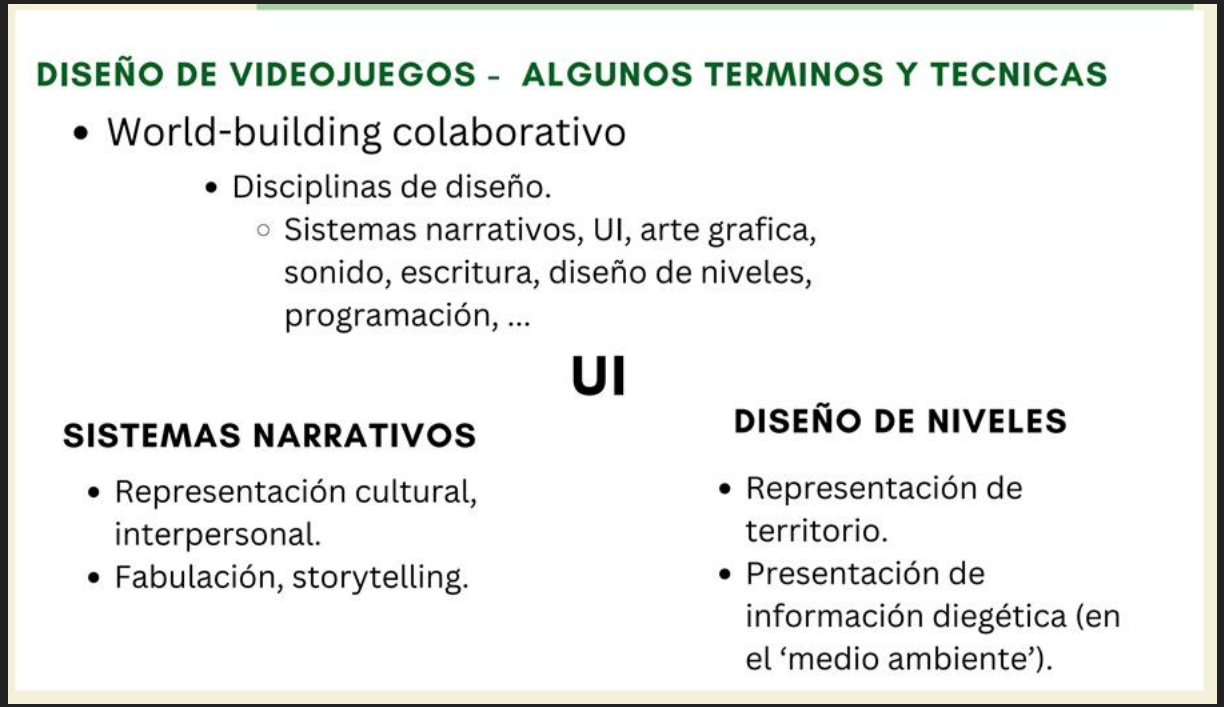
- Migration
- Metapopulation
- Food sovereignty
- Types of land use

- Population density
- Critical conservation
- Border density

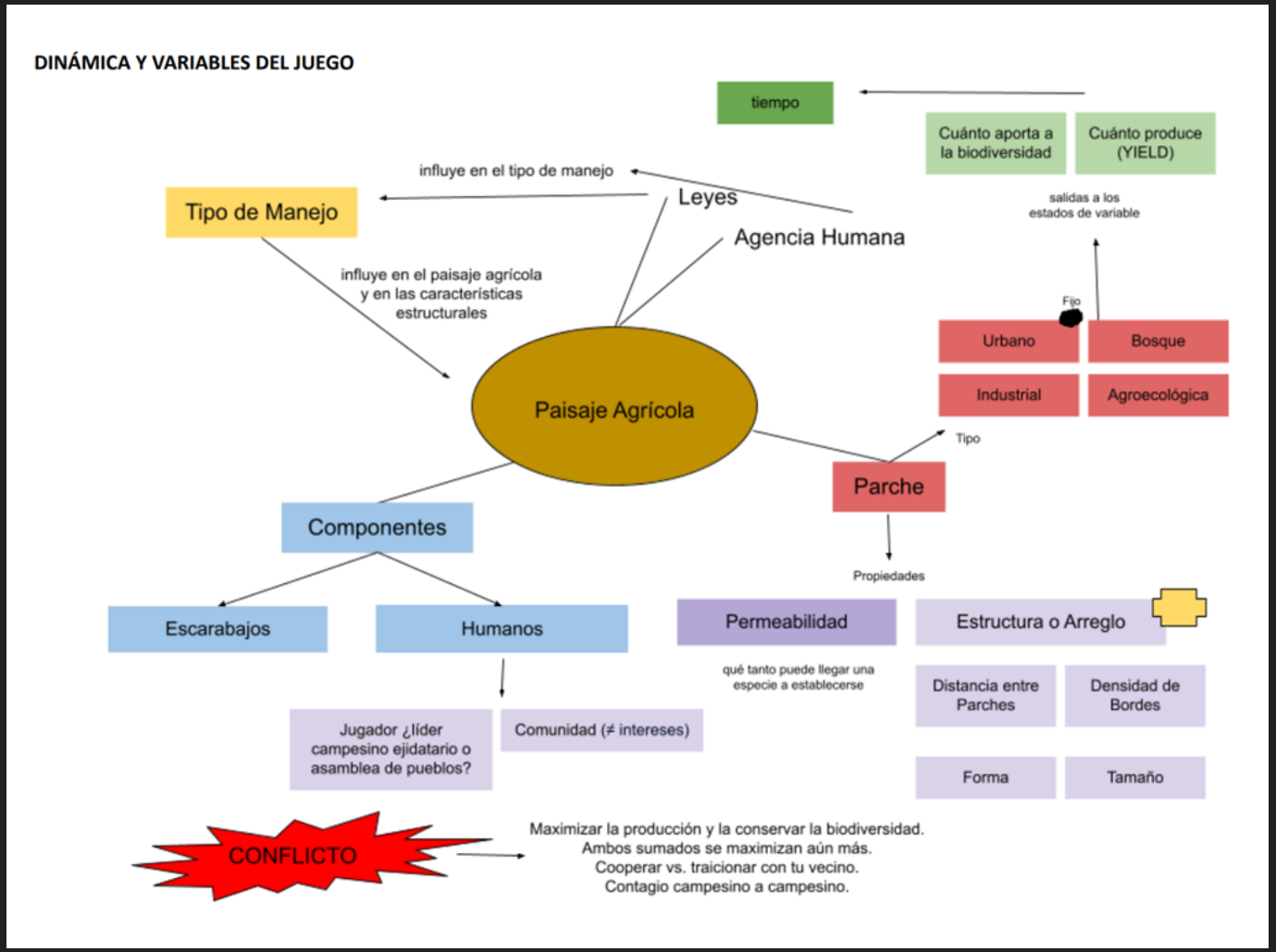


Game design

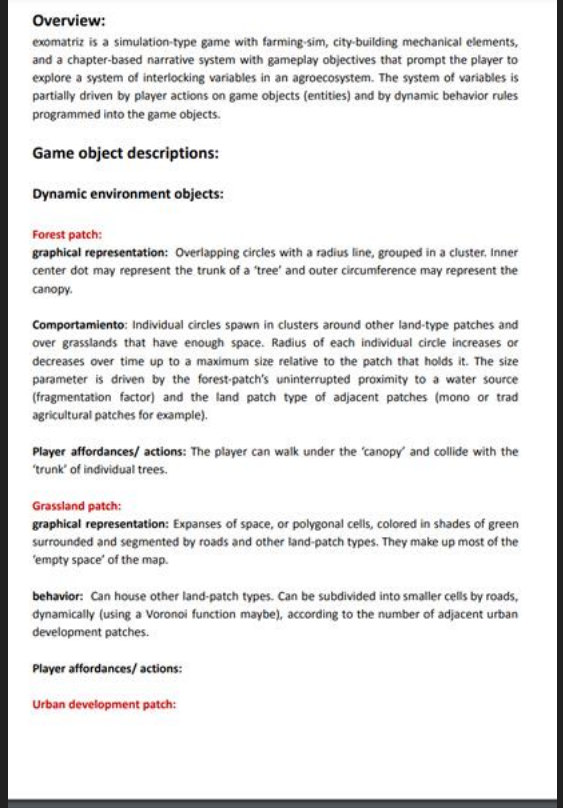
- objects/ entities
- Simulation games
- Data flows and intervention points
- Game states
- Significant decisions
- Action verbs, affordances
- The game loop



- Collaborative Worldbuilding (after Kaitlin Tremblay).
- UI
- Narrative systems
- Level design



- Agricultural Landscape
- Patch/ Patch type
- Variable states over time
- Human/beetle components
- Agency/laws, and land use
- Permeability
- Structural layout
- Conflict



Overview:

exomatriz is a simulation-type game with farming-sim, city-building mechanical elements, and a chapter-based narrative system with gameplay objectives that prompt the player to explore a system of interlocking variables in an agroecosystem. The system of variables is partially driven by player actions on game objects (entities) and by dynamic behavior rules programmed into the game objects.

Game object descriptions:

Dynamic environment objects:

Forest patch:

graphical representation: Overlapping circles with a radius line, grouped in a cluster. Inner center dot may represent the trunk of a 'tree' and outer circumference may represent the canopy.

Comportamiento: Individual circles spawn in clusters around other land-type patches and over grasslands that have enough space. Radius of each individual circle increases or decreases over time up to a maximum size relative to the patch that holds it. The size parameter is driven by the forest-patch's uninterrupted proximity to a water source (fragmentation factor) and the land patch type of adjacent patches (mono or trad agricultural patches for example).

Player affordances/ actions: The player can walk under the 'canopy' and collide with the 'trunk' of individual trees.

Grassland patch:

graphical representation: Expanses of space, or polygonal cells, colored in shades of green surrounded and segmented by roads and other land-patch types. They make up most of the 'empty space' of the map.

behavior: Can house other land-patch types. Can be subdivided into smaller cells by roads, dynamically (using a Voronoi function maybe), according to the number of adjacent urban development patches.

Player affordances/ actions:

Urban development patch:

Representación gráfica: Grupos de rectángulos agrupados (representando casas) entre calles y otros tipos de parches.

Comportamiento: Los parches urbanos pueden aparecer en espacios del mapa (pastizales) que tengan suficiente espacio para al menos una 'casa' y sean adyacentes a parches urbanos existentes --ya sean parte de el diseno de nivel inicial (landmarks) o nuevos parches creados durante la simulación. Parches urbanos aparecen a un ritmo constante durante el gameplay.

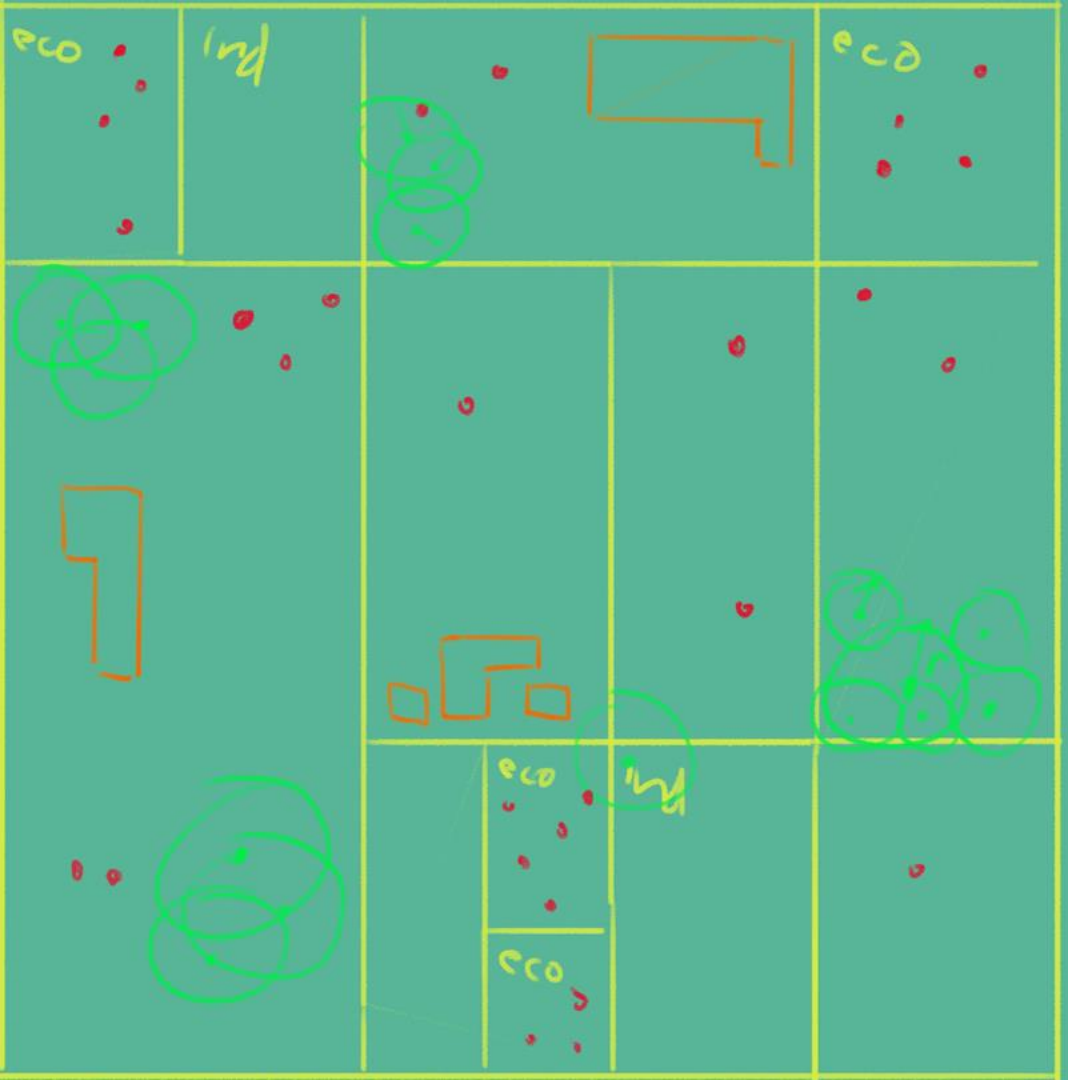
Aportaciones al jugador /acciones: Maybe player could create urban patches while on beetle helm mode? Or affect their spawn rate somehow?

Design strategies

- Descriptive writing approach.
  - Enforces clarity. Cristalizes abstract ideas.
  - Very time consuming and can still be not actionable enough.
  - No one is going to read it.
  - Good for ideation.

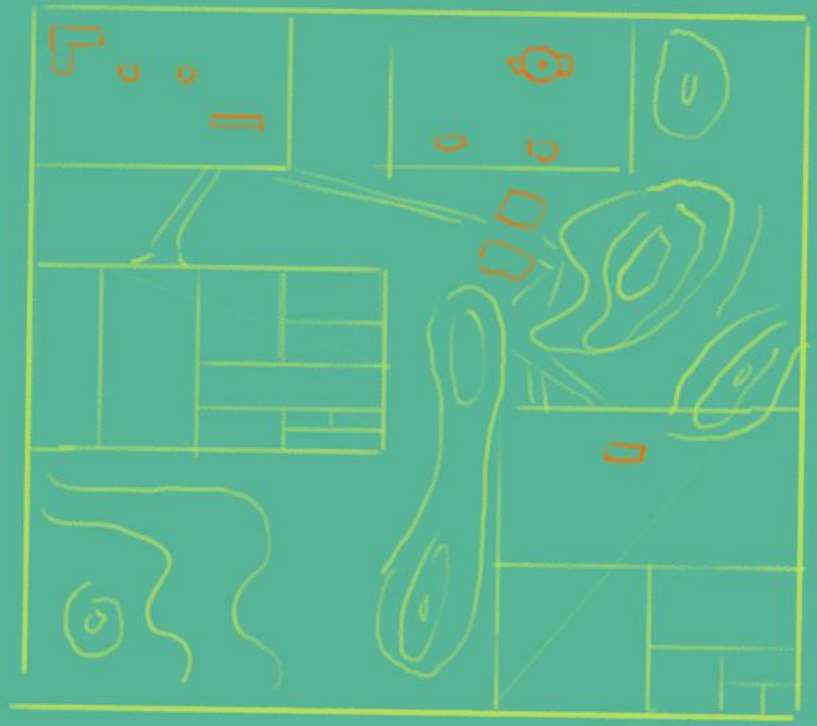
- Focused systems diagrams.
  - Enforces visual representation.
  - Promotes simplicity.
  - Easy to show and explain.
  - Springboard for implementation.

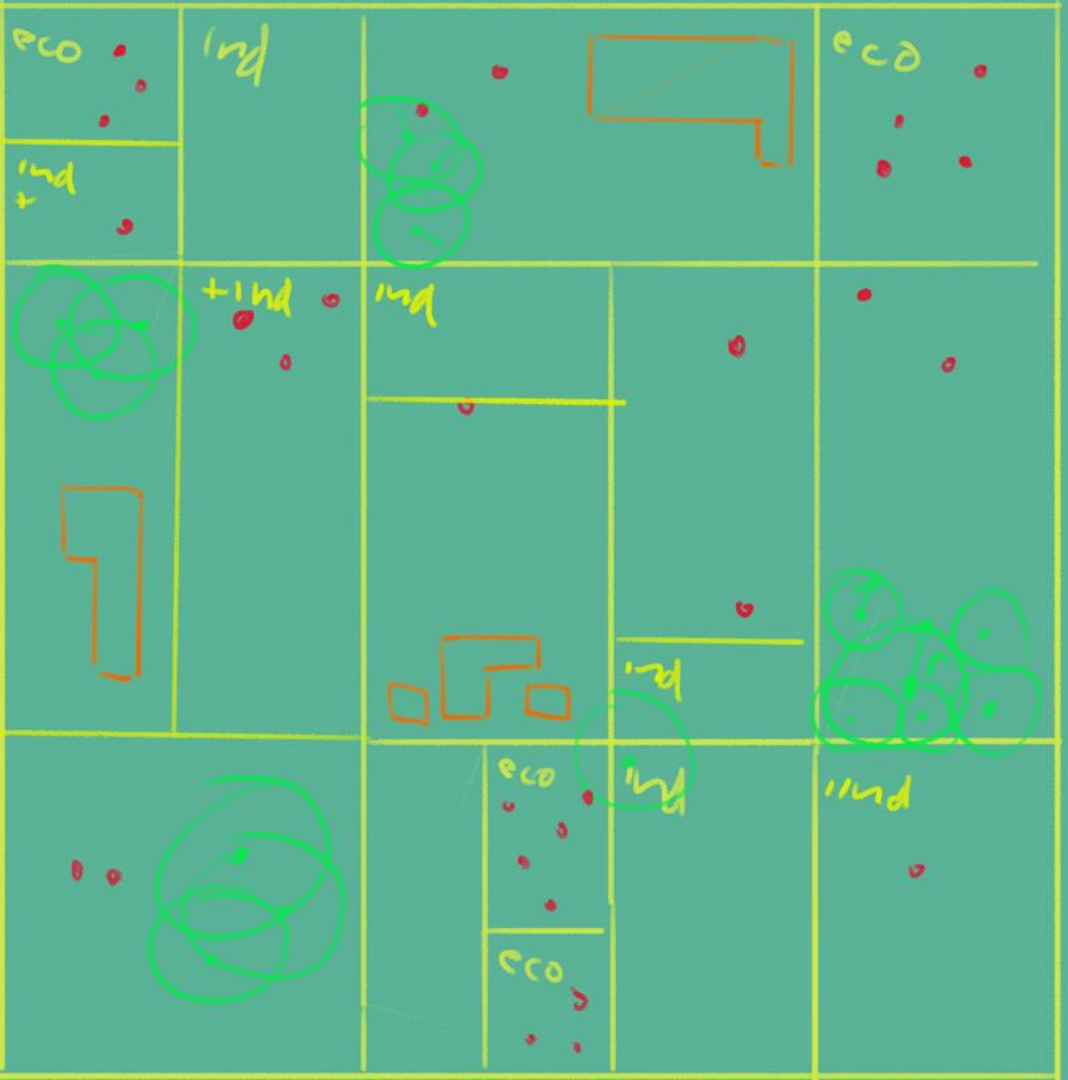
Farmland subdivision



Actions

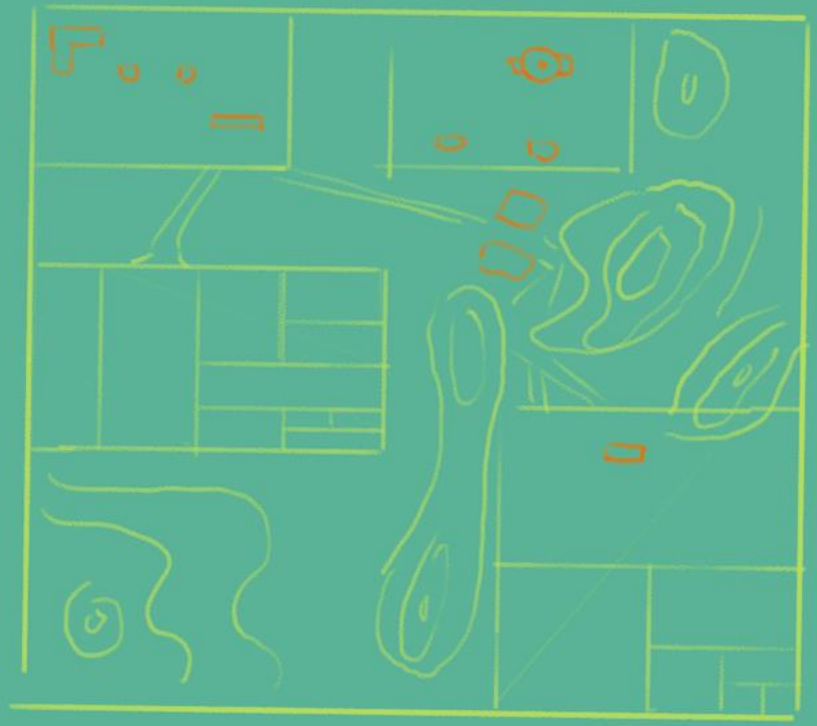
— Assign Patch Type.
— SubdividePatch (1/2).





Actions

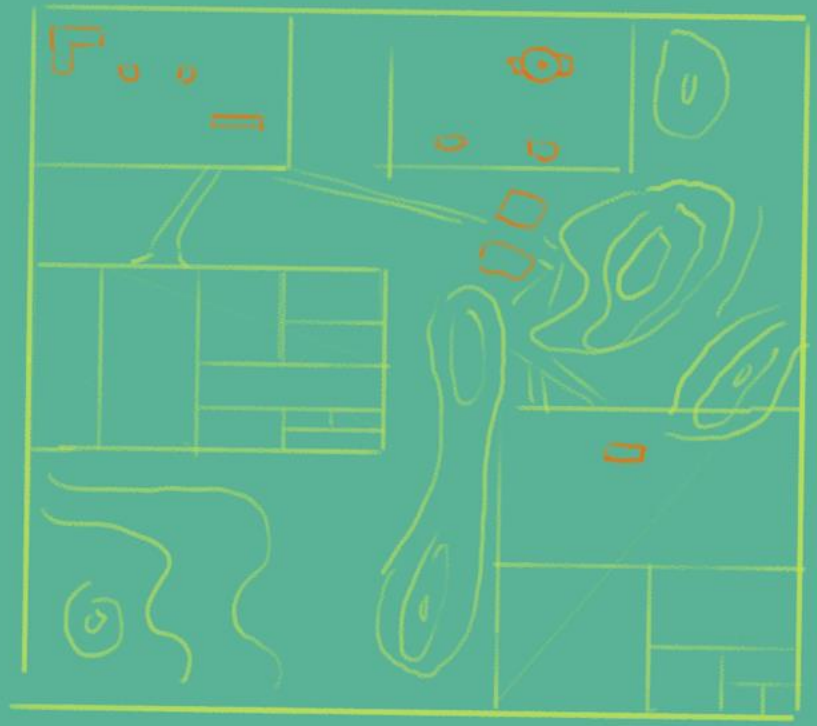
— Assign Patch Type.
— Subdivide Patch (/2).



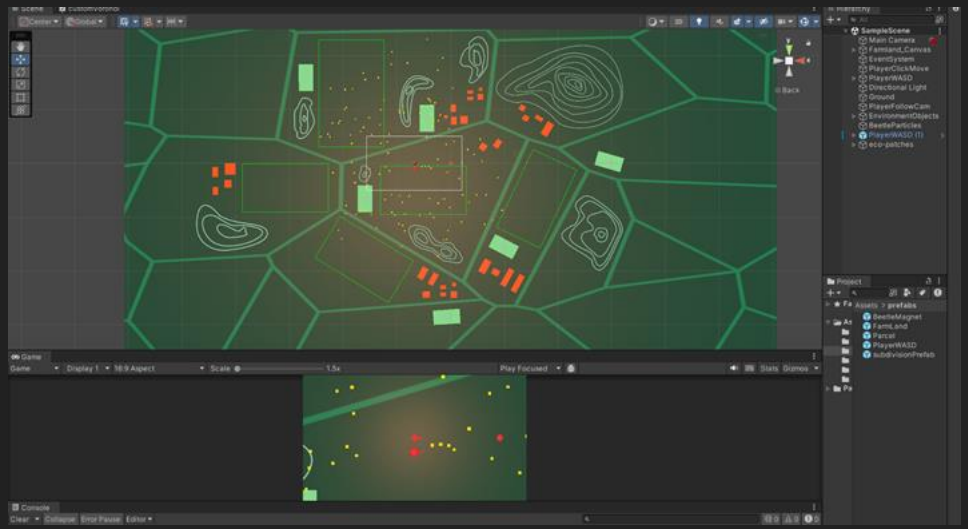
eco
ind
ind
eco
+ind
ind
ind
eco
ind
ind
eco

Actions

— Assign Patch Type.
— SubdividePatch (1/2).



Demo



Sources

- Ramos, I., González, C. G., Urrutia, A. L., Van Cauwelaert, E. M., & Benítez, M. Combined effect of matrix quality and spatial heterogeneity on biodiversity decline. Ecological complexity (2018) 36, 261-267.

- Castro Campero, Lorena. Dinámica espacial de poblaciones de coleópteros en un paisaje agrícola heterogéneo en Oaxaca, México (2021). [Licenciatura en Biología] Universidad Nacional Autónoma de México.

- González, C. G., García, T. L., Jardón-Barbolla, L., & Benítez, M.Linking Coleopteran Diversity With Agricultural Management of Maize-Based Agroecosystems in Oaxaca, Mexico (2020).

- Stone Librande, *One-Page Designs*, GDC Vault, 2010, Accessed: 2023/12/05 https://www.gdcvault.com/play/1012356/One-Page.

- Kaitlin Tremblay, *Collaborative Worldbuilding For Videogames* (2023). CRC Press.