

Appendix 1:  
SLUDGE Pseudo-class templates for “Mr. Potatohead” generic ABM/LUCC  
modeling framework  
9 June 2006

I. Information/Data classes:

1. Landscape Representation
  - Structure (Functionality)
    - \*Realism
      - Theoretical
    - \*Spatial data structure:
      - cell-based (raster, hex, etc.)
    - \*Parcel structure
      - Fixed
    - \*Agent holdings
      - One parcel per agent
    - \*Decision-making units
      - Single decision/land use per parcel
  - Data Layers/Themes
    - \*Land use (Urban or Agricultural)
    - Land rent
    - Productivity/output
2. Other spatial data inputs (potentially, GIS functionality)
  - Network models
    - Transportation: Euclidean distance
  - Neighborhood effects
    - fixed-radius (Nearest-neighbor spatial externalities)
3. Institutional/Political rules and constraints
  - \*Land tenure rules: Agent controls land use
4. Economic structures
  - Local markets for land inputs and outputs (functions)
    - Demand for urban land
  - Economic data values (data)
    - Output prices: Agricultural land
    - Transportation costs
    - Externality benefits/costs
5. Potential land uses
  - Urban
  - Generic agriculture
6. Factors affecting land productivity
  - Parametric settings for each land use

### III. Demographics classes:

#### 1. \*Agent class

- Profit-maximizing land owner

#### \*Agent decision model (function)

- \*Calculate payoffs: returns to each land use
- \*Decision strategy
  - Profit maximization based on expected price and neighborhood conditions

#### Internal characteristics (Data)

- Time horizon and discount rate
  - not forward looking
- Attitudes towards risk
  - no risk perceptions

#### IV. Land-use decision class

##### 1. \*Land-use decision

- \*Agent decision model (III.1)

##### Data

- \*Potential land uses (I.6)
- Parcel accessibility (I.2)
- Neighborhood effects (I.2)
- \*Institutional rules and constraints
  - Land-tenure rules (I.4)
- Economic data values (I.5)
- Biophysical suitability/capability

## VI. Model operation class

### 1. Model initialization

- \*Initial landscape structure (I.1)
- Transport networks and initial accessibility/travel costs (I.2)
- Neighborhood effects (I.2)
- \*Institutional rules and constraints (I.3)
- Economic data values (I.4)
- \*Agent types, numbers, and resource endowments (III)

### 2. Temporal Dynamics

- \*Number of iterations
  - Less than 20
- \*Event Scheduling
  - Discrete time, odd or even agents active each iteration