Complex Dynamical Systems

A Series of Ten Lectures to the Ross Institute, 2011-2012

by

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Lectures 1-5

1. Nov 2, Intro: Epiphany, What, Why, How

2. Nov 9, Grs. K, 1: Dynamical Systems

3. Nov 16, Grs 2, 3, 4: Complex Dyn Sys

4. Nov 21, Grs 5, 6, 7, 8: NetLogo Models

5. Dec 7, Grs 9, 10, 11: NetLogo Models

Lectures 6-10

6. Jan 25, NetLogo Patches

7. Feb 1, NetLogo Turtles

8. Feb 8, NetLogo Links

9. Feb 15, NetLogo Extensions

X. Mar 28, NetLogo CDS Models

Lec. 6: Patches

- A. Complex Systems
- B. Computer Graphic Revolution.
- C. NetLogo Programming: Patch Patterns.

Lec. 7: Turtles

- A. The Limits to Growth
- B. NetLogo Programming: Turtles

A. Limits to Growth

An Chronology of System Dynamics

Industrial Dynamics

- 1950s, Jay Forrester: first digital simulations
- 1956, Forrester at Sloan School, applies system dynamics to social sysstems
- 1957, Ford grant for industrial dynamics
- 1961, Forrester's first book:
  Industrial Dynamics

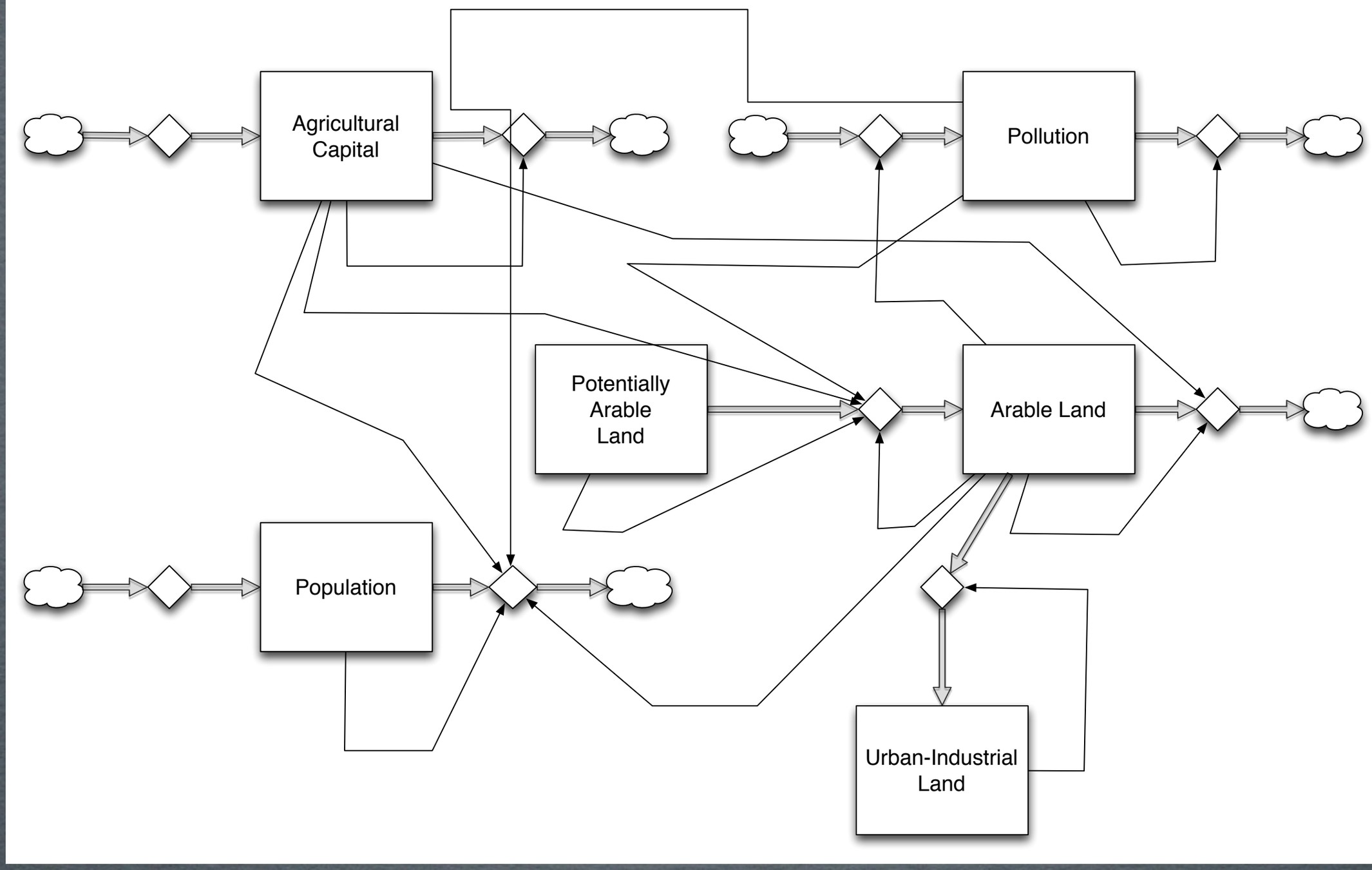
Urban Dynamics

- 1968, Urban dynamics project with John Collins (former mayor of Boston)

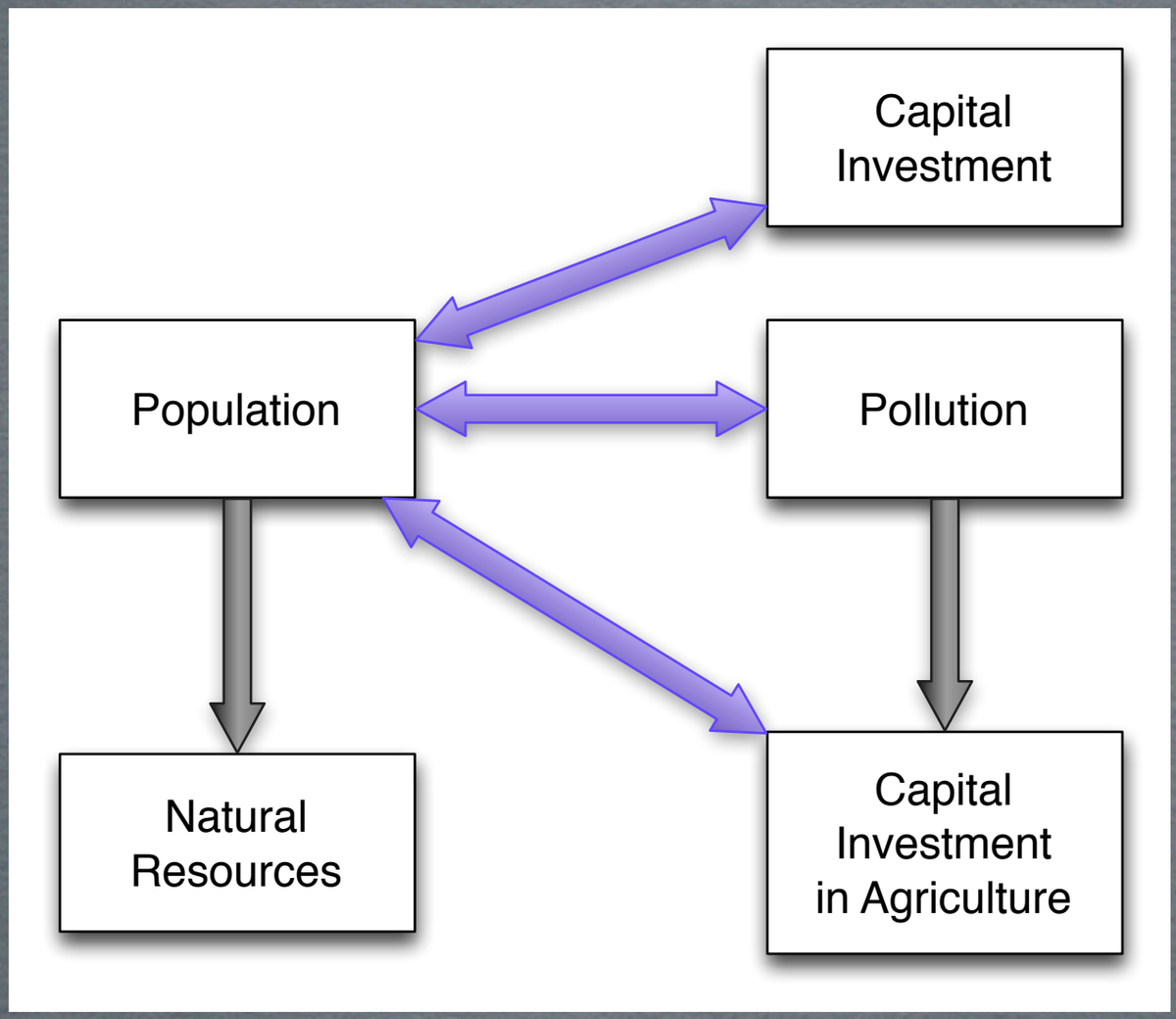
- 1969, Forrester's second book:
  Urban Dynamics

World Dynamics

- June, 1970, Club of Rome meeting, Bern,
- July, 1970, World1 model created
- July, 1970, Club to MIT for 10 days, grant
- June, 1971, Forrester's third book,
  World Dynamics
- March, 1972, *Limits to Growth* published



World1 Model



World2 Model

B. NetLogo Programming

Turtles

Homework

- Individuals: Create your own turtle drawing in NetLogo.

- Grade level teams: Describe (in a paragraph or two of text) how you plan to animate your favorite system (from HW#4 or other) in NetLogo.

End of Lecture Seven of Ten