

An overview of the



# Threshold 21 (T21) Framework

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# T21

INTEGRATED DEVELOPMENT MODEL



# Summary



1. Background: the Millennium Institute (MI)
2. T21: History
3. T21: the Starting Framework
4. Conclusions

# Millennium Institute – Mission



**Help people and organizations enhance insight for decision-making in complex systems** towards the development of a global sense of shared responsibility about our common future.

- Developing and disseminating advanced analytical tools that support prospective strategic planning
- Increasing capacity among a broad range of partners in System Dynamics and Threshold 21 around the world

## History of T21

# The origins: 1980 - 1994



1980: Dr. Gerald O. Barney directs the Global 2000 Report for President Carter

1983: Millennium Institute is founded

1983-1993: Research on national planning models (Managing a Nation)

1994: First application of T21 (Bangladesh)

## History of T21

# Recent evolution: 1995 - 2007



- Applications in over 25 countries

T21 Bangladesh, T21 India, T21 Kenya, T21 Nigeria, T21 South Africa, T21 Thailand, T21 USA, T21 Brazil, T21 Ghana, T21 Mozambique, T21 Senegal, T21 Liberia, T21 Cambodia, T21 Jamaica

- Trained hundreds of people
- Broadening of basic structure
- Continuous update of key relationships
- Development of user interface

## History of T21

# Recent evolution: 2005 - 2007

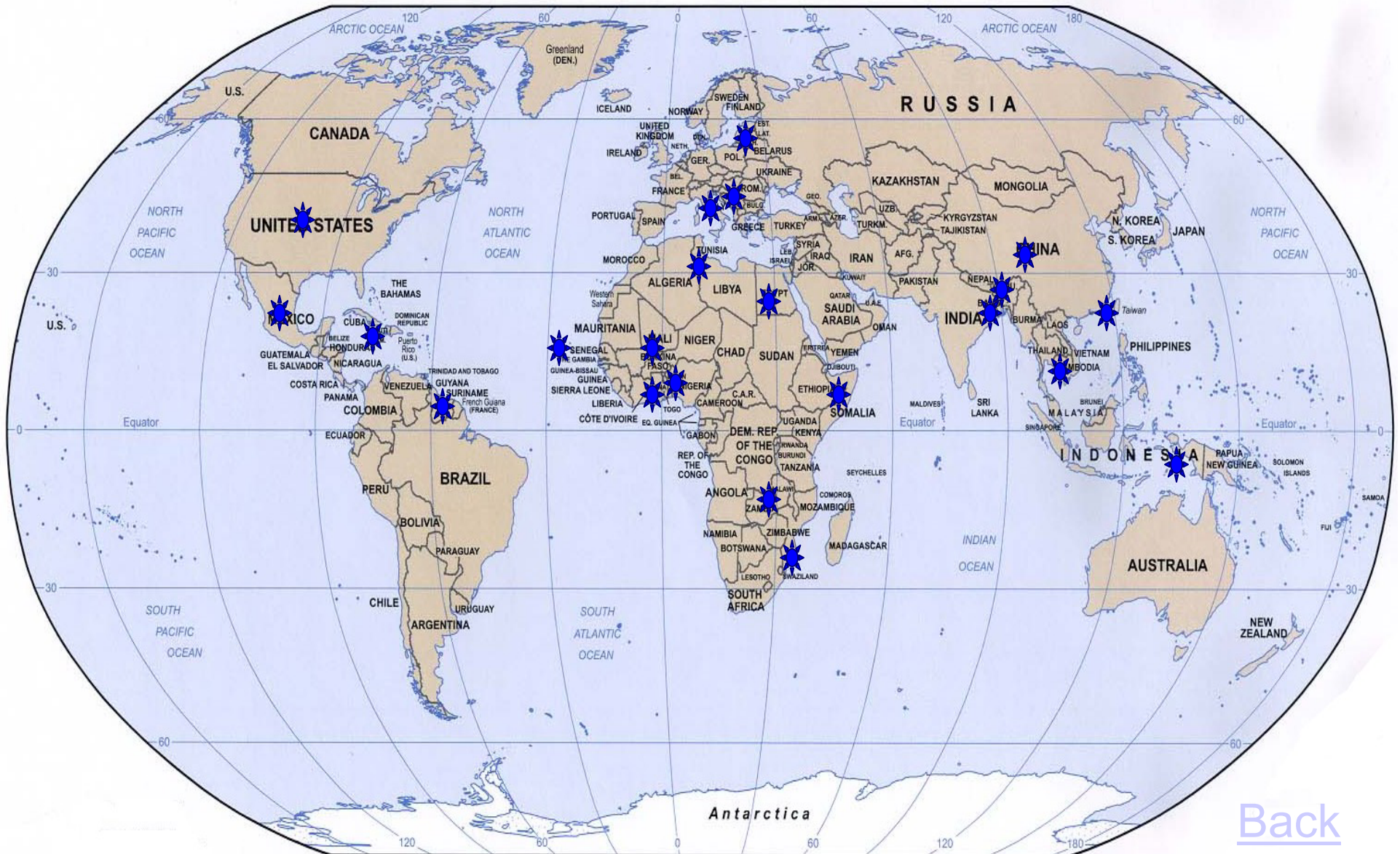


- Series of external reviews:
  - ✓ Jack Homer (MIT)
  - ✓ University of Bergen
  - ✓ UNDP
- Open source – non commercial purposes
- Models' library for download



# History of T21

## T21 applications worldwide



[Back](#)

## T21 Implementation

# Implementation process outline



1. Identification of key issues to be analyzed
2. Data collection and analysis
3. Training Phase I – min. 6 weeks
4. Development of T21-Country first version
5. In-depth analysis and discussion of results
6. Training Phase II – min. 2 weeks
7. Modification of the model => final version
8. Analytical report, documentation and user version

Time required: Min. 6 months



## T21 Overview

# What is T21 for?



The model was originally built for serving three purposes:

(1) Studying mid-long term development issues

(2) Testing alternative policies

(3) Enhancing learning about system

=> Support mid-long term planning through understanding of the system

# Necessary characteristics

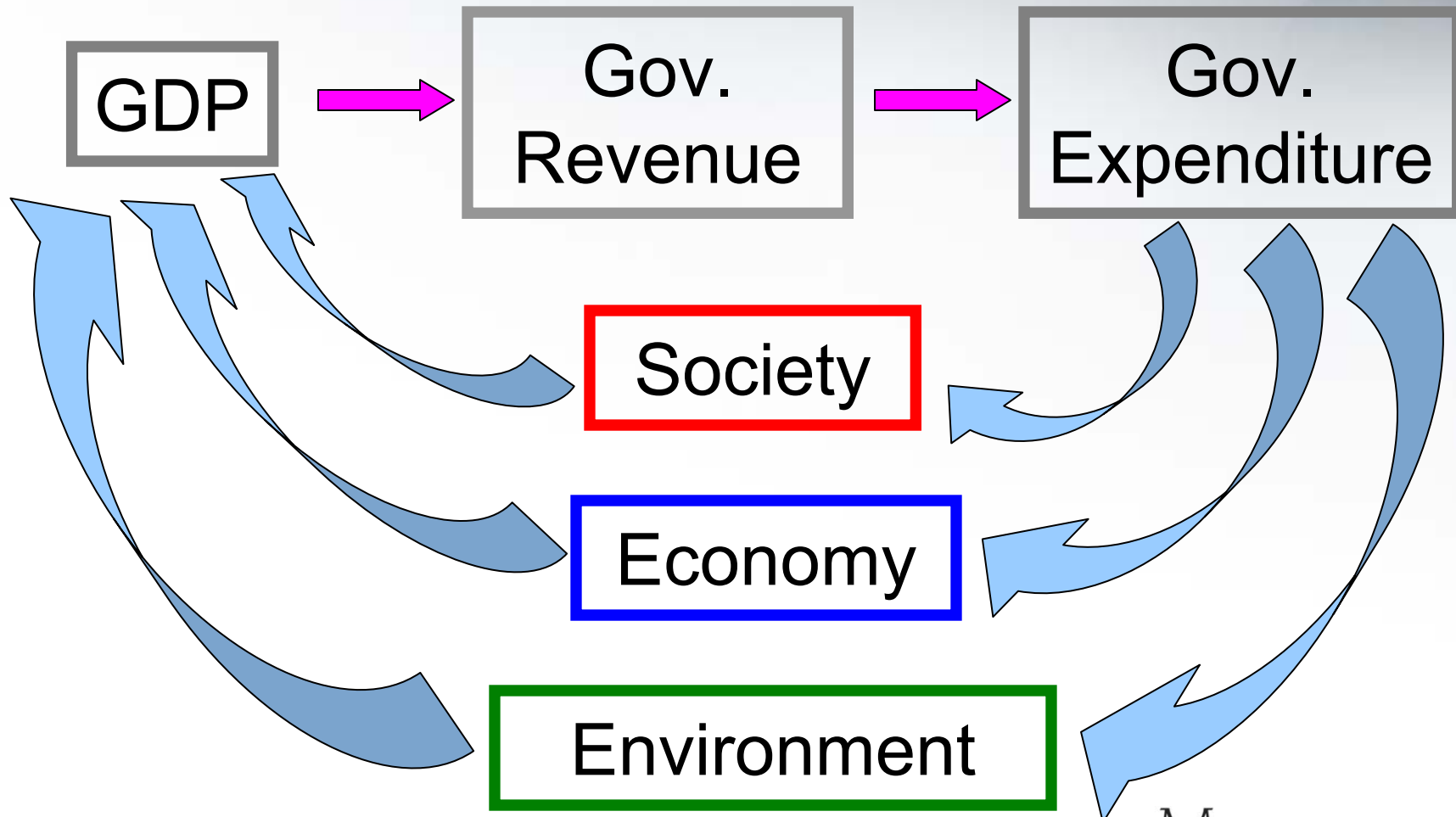


Necessary characteristics for mid-long term planning models:

1. Endogenously represent key variables (E)
2. Comprehensive (C)
3. Properly represent dynamic complexity (D)
4. Transparent (T)

# T21 Overview

## Exogenous vs. Endogenous GDP



## Overview of Approaches

# Commonly used approaches



<b>Approach</b>	<b>Software</b>	<b>E</b>	<b>C</b>	<b>D</b>	<b>T</b>
Accounting spreadsheets	MS-EXCEL	NO	NO	NO	YES
Macro-econometrics	EIEWS	YES	NO	YES	NO
Computable general eq.	GAMS	YES	NO	YES	NO
System dynamics	VENSIM	YES	YES	YES	YES

T21 Overview

# System Dynamics approach



## Strengths of System Dynamics - Vensim approach:

1. Proper representation of complexity
2. Multidisciplinary
3. Transparent – User friendly
4. Flexible
5. Powerful

## T21 Overview

# Time Horizon of Analysis



2030

National Vision

2015

National Development Plan  
MDG Strategies

2011

Mid Term Strategic Plans

2008

Yearly Budgets



## T21 Overview

# Type of issues at stake



Some examples of issues T21 can address:

- Poverty
- Economic and demographic growth
- Access to social services
  - Education
  - Healthcare
- Environmental sustainability
- Energy transitions
- ...

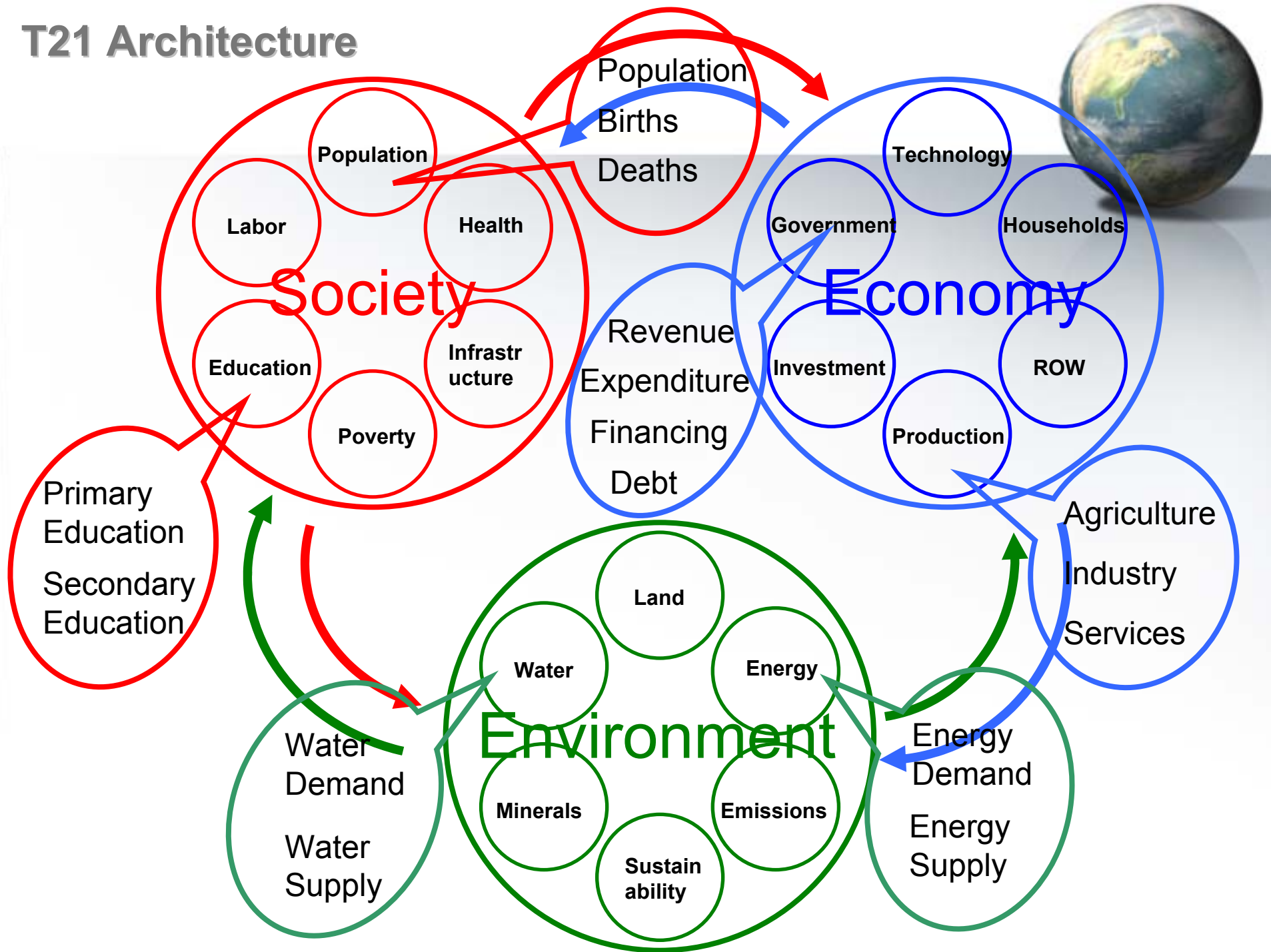
## T21 Overview

# Type of model

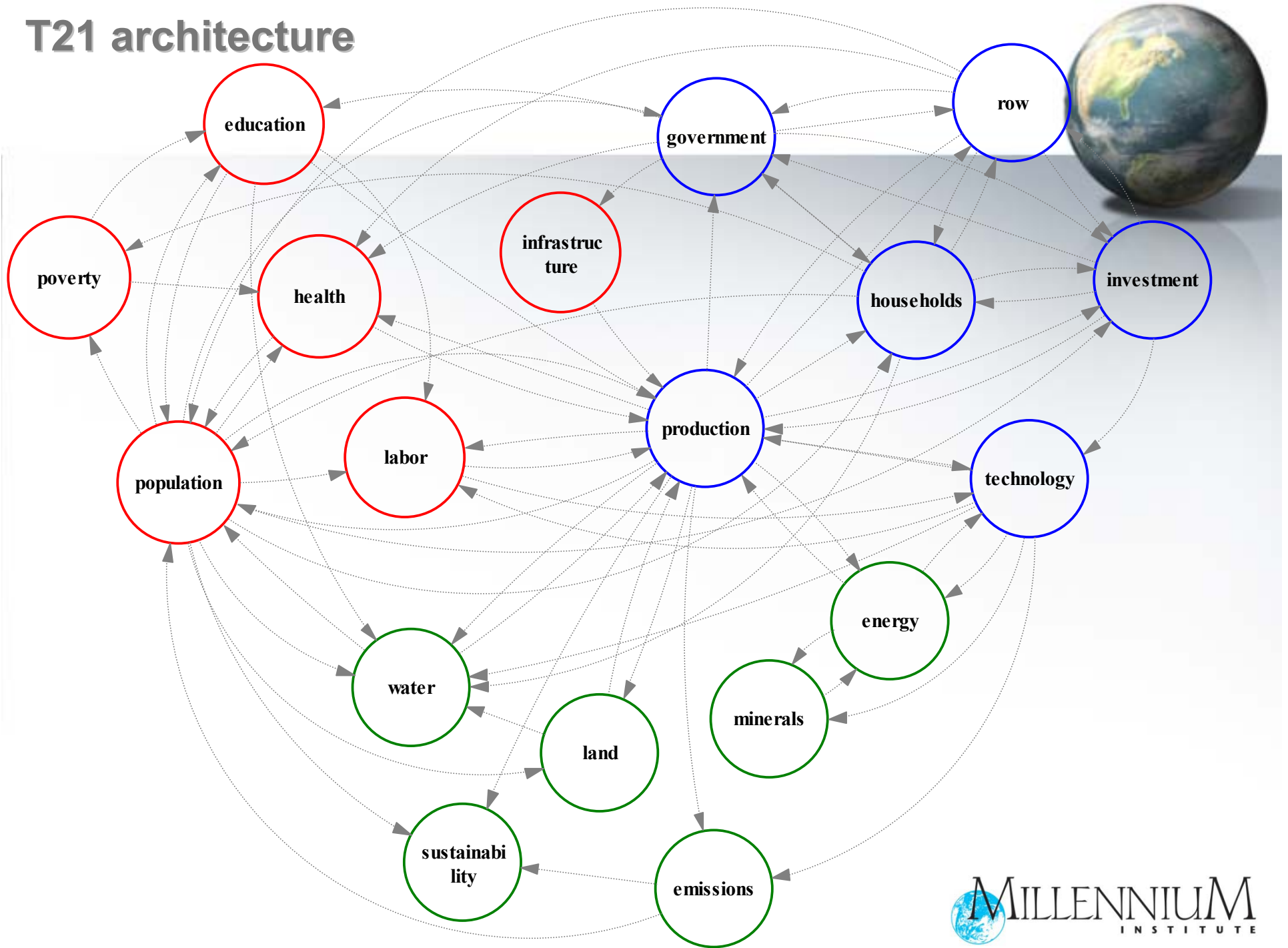


- System Dynamics model
- Dynamic
- Model is solved via simulation
- Uses sensitivity analysis (Kalman filtering)
- Uses optimization techniques (Montecarlo)
- Represents causal relationships
- Structural approach

# T21 Architecture



# T21 architecture



## Advantages and Limitations

# Advantages of T21 approach



1. Captures overall socio-economic-environmental developments
2. Proper representation of dynamic complexity: Feedbacks and Delays
3. Multidisciplinary
4. Transparent – User friendly
5. Flexible
6. Powerful engine - Vensim

## Advantages and Limitations

# Limitations of T21 approach



- Mid-long term approach: misses short-term dynamics
- National/Global perspective: does not consider local diversity
- Medium-High level of aggregation: parameters are averaged by sector
- Requires active involvement of client in definition of model's structure



T21 Examples

# T21 Applications: examples



- Mali: PRSP II & MDG analysis
- Malawi: Vision 2020 and Policy Framework Paper (PFP)
- Mozambique: Agenda 2025
- Jamaica: Development Plan
- Ghana: MDG Analysis

# Activities



- Develop T21-Starting Framework (SF):  
Open Source, for non-commercial purposes
- MCM customization
- T21-SF customization
- On site custom training (2 weeks)
- 6-week training
- 2-day Development exec. course

Millennium Institute

## Vision for the future



- Internationalization and decentralization
- Emphasis on MDG and national priorities
- Emphasis on Africa (& developing nations)
- Capacity building for long term (Universities)
- New partnerships (public & private) - UNU

**Thank you for your attention**



***Questions and comments  
are welcome***

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