

Computational Modeling of Natural Resources and Maritime Issues



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What did you learnt, from this workshop?

- What Agent-Based Models can be used for
- Computation with NetLogo platform
- What is bio-economic dynamics modelization and its relationship with fishery management.
- Two different approaches to the modeling of bio-economic dynamics: system dynamic approach and agent-based approach both theories, practices with applications in Netlogo/Excel for simulation/modeling.



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Do you think the tools discussed in the lecture could be useful in your future professional lives ?

- Yes, especially Netlogo (PhD and professional life)
- Yes, to better understand other researchers
- Yes, in the perspective to become a researcher/teacher
- Absolutely, bio-economics and NetLogo are of significance to better understand trend of consumption, utilization and management of natural resources, and cooperation among regional and international nations for advocacy, prevention and action to be taken through academia, government, and research-based formulations of related policies regulations.



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What could be done to improve the quality of this training in future?

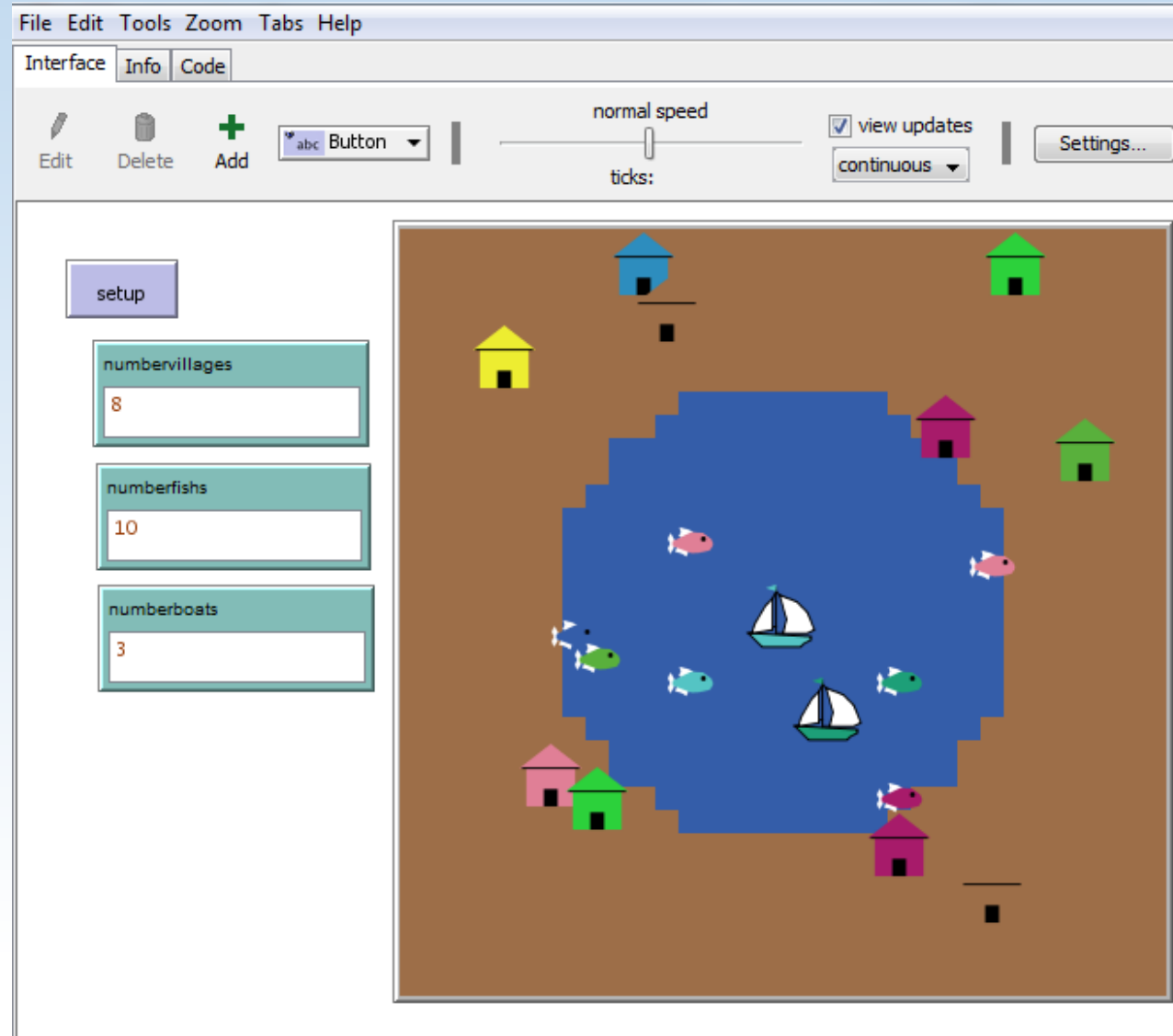
- Secure more practical application/interaction/discussion time
- More group work / peer learning
- Create a platform/forum/network among trainees and trainers such as in LinkedIn for future network collaborations.
- Save time to discuss, comment, consult and select the best research proposals topics for future potential support and cooperation research work (disciplinary and multidisciplinary).
- More engagement and participation from other higher education institutions, research centers and government institutions.
- Facilitate and seek to provide favorable access to research articles, journals, documents, applications, and software for strengthened research capacity for developing R&D.



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Case Study

Sustainable Bio-Economic Dynamics of Tonle Sap Lake



The screenshot shows a NetLogo simulation window with the following components:

- Menu Bar:** File, Edit, Tools, Zoom, Tabs, Help
- Interface Tab:** Info, Code
- Control Panel:** Edit (pencil icon), Delete (trash icon), Add (+ icon), a dropdown menu showing 'abc Button', a speed slider set to 'normal speed', a 'view updates' checkbox (checked), a 'continuous' dropdown menu, and a 'Settings...' button.
- Setup Panel:** A 'setup' button and three input fields: 'numbervillages' with value 8, 'numberfishs' with value 10, and 'numberboats' with value 3.
- Simulation Area:** A central blue lake on a brown land background. The lake contains several fish (pink, green, blue) and two sailboats. The land is populated with colorful houses (yellow, blue, green, pink) and small black squares representing trees.



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Motivation (why this study?)

The Phnom Penh Post articles:

- 25/04/2018 : “Families in Kampong Chhnang lose fish in mass die-off”
- 01/08/2017: “The point of no return”

“[...] **45 percent** of all Cambodian households are involved in the **fisheries sector**. “Nevertheless ... **fishing communities** remain often associated with **poverty, vulnerability** to external shocks, marginalisation,” he said, adding that the fisheries remain “exposed to strong external and internal threats, such as hydropower development, change in land use, pollution, **overfishing**”.



Motivation (why simulations?)

People may disagree on situation !!! But we need to understand where we are and where we may go.

The Phnom Penh Post : 11/12/2017

“Government, experts differ on fisheries outlook”

Simulations allow to analyze different situations (overfished or underfished situations) and check consequences of different policy rules.



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Objectives / research questions

Objective:

- To better understand sustainable livelihood of villages around Tonle Sap

Research Questions:

- To examine the fish consumption rates of those families.
- To analyze the impact of foreign boats (Vietnamese boats) and illegal fishing.
- Tension on the demand/supply and the market price.
- To analyze the impact on the fish biomass.



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Methodologies

- Data Collection:
 - Survey: Fish consumption (food + sale) in the lake villages
 - Historical: Fish breeds present in the lake + breeding & movements patterns
 - Fishing trends (foreign boats, illegal, local) + Market trends (Price, Demand)
- Simulations with Netlogo
- Sensitivity Analysis of results



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Difficulties, Limits and Results

Difficulties:

- Data collection (noise or lack)
- Writing a simple BUT realistic model

Limits:

- Use of a simplified model
- Some important effects are not taken in account (pollution, deforestation of mangrove, climate change, ..)

Results:

- Share the results with everyone (researchers, policymakers, NGO, community fisheries, etc.)



Thank You !



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