An Economics-Driven Approach for Optimizing Water Use in Transboundary River Basins

Tobias Siegfried[1], Niels Riegels[2], Silvio Pereira[2], Roar Jensen[3], and Peter Bauer-Gottwein[2]

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Central Asia

Syr Darya River Basin

Headwaters

Toktogul Reservoir

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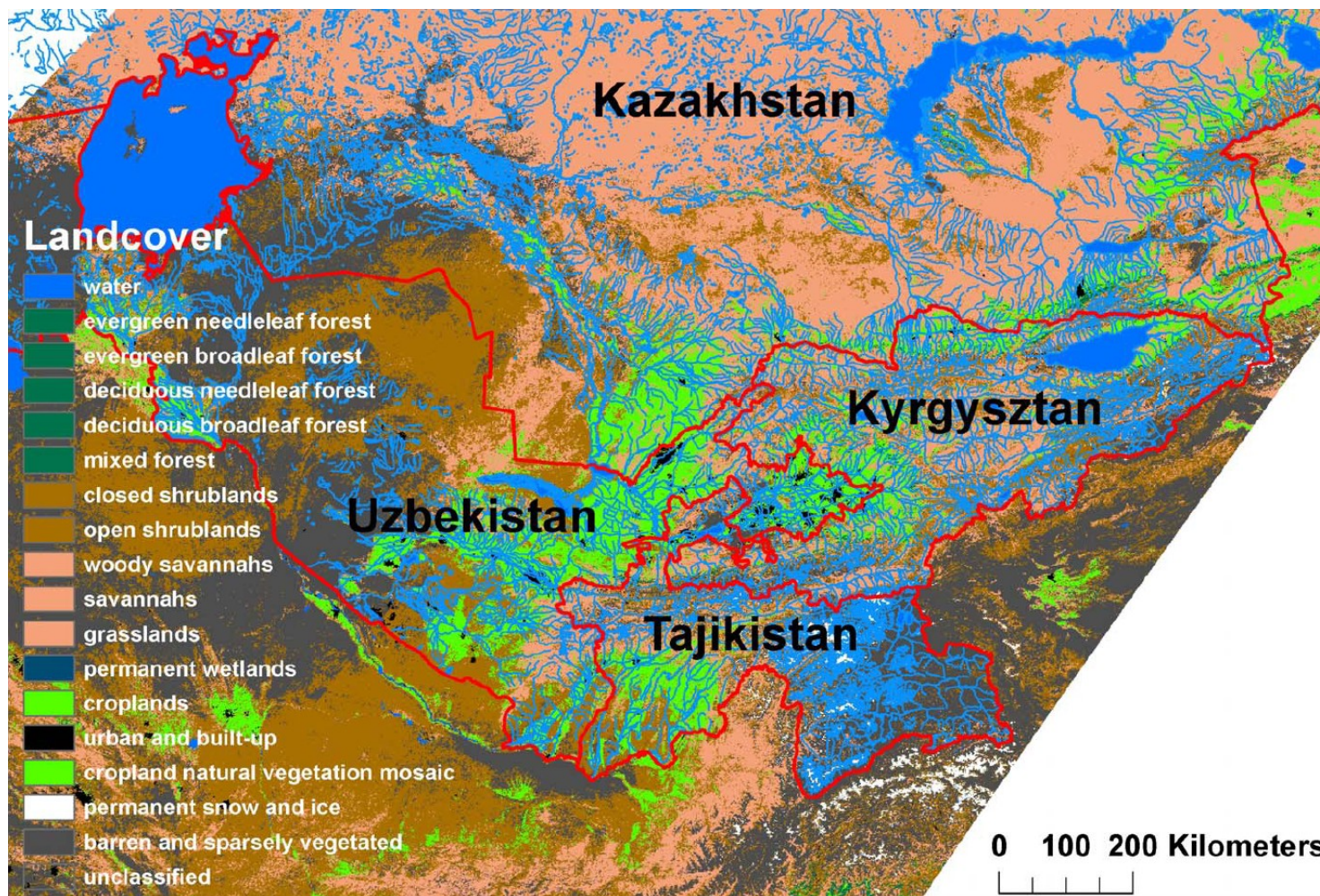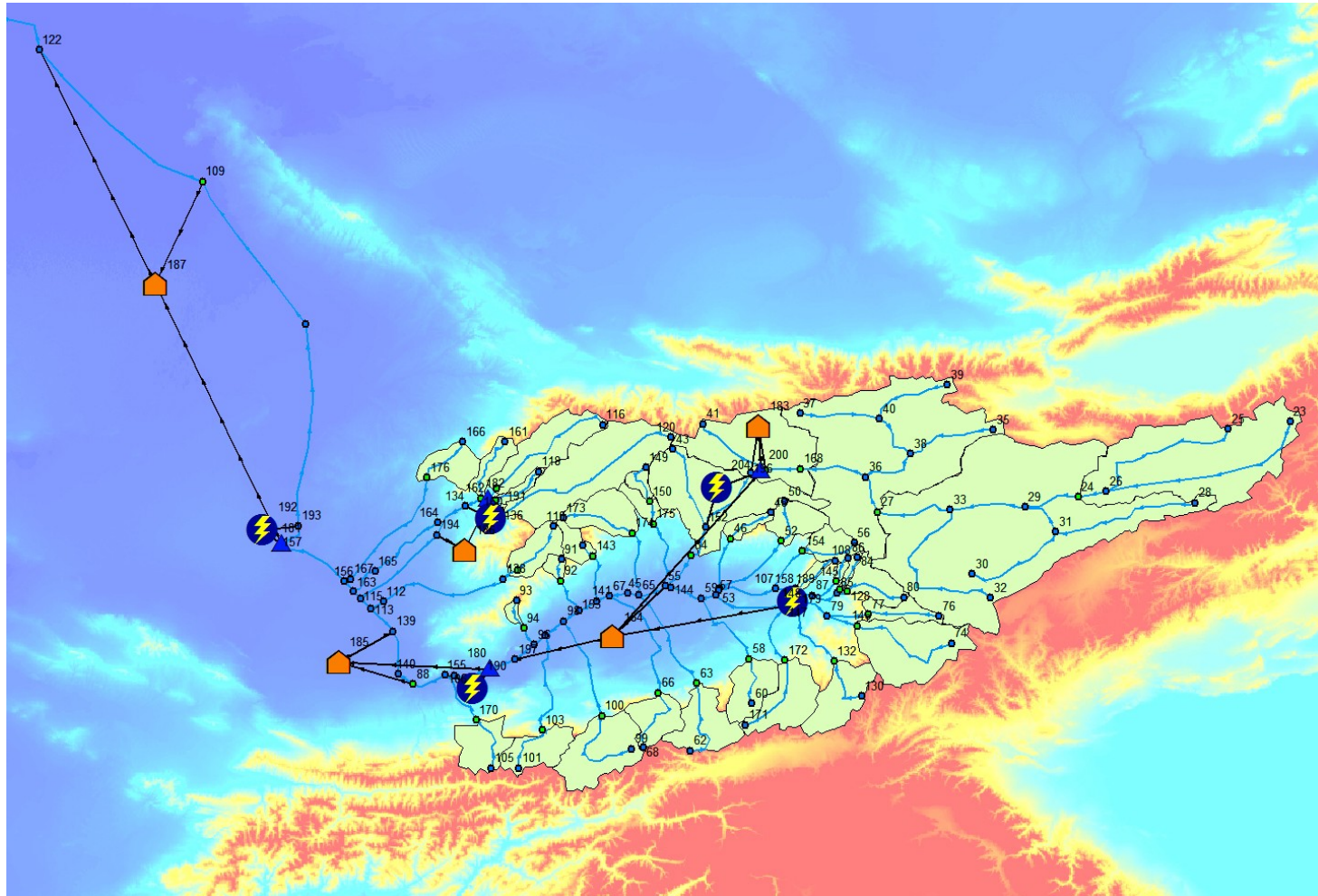Department of Environmental Engineering

Ferghana Valley

Syr Darya basin land use
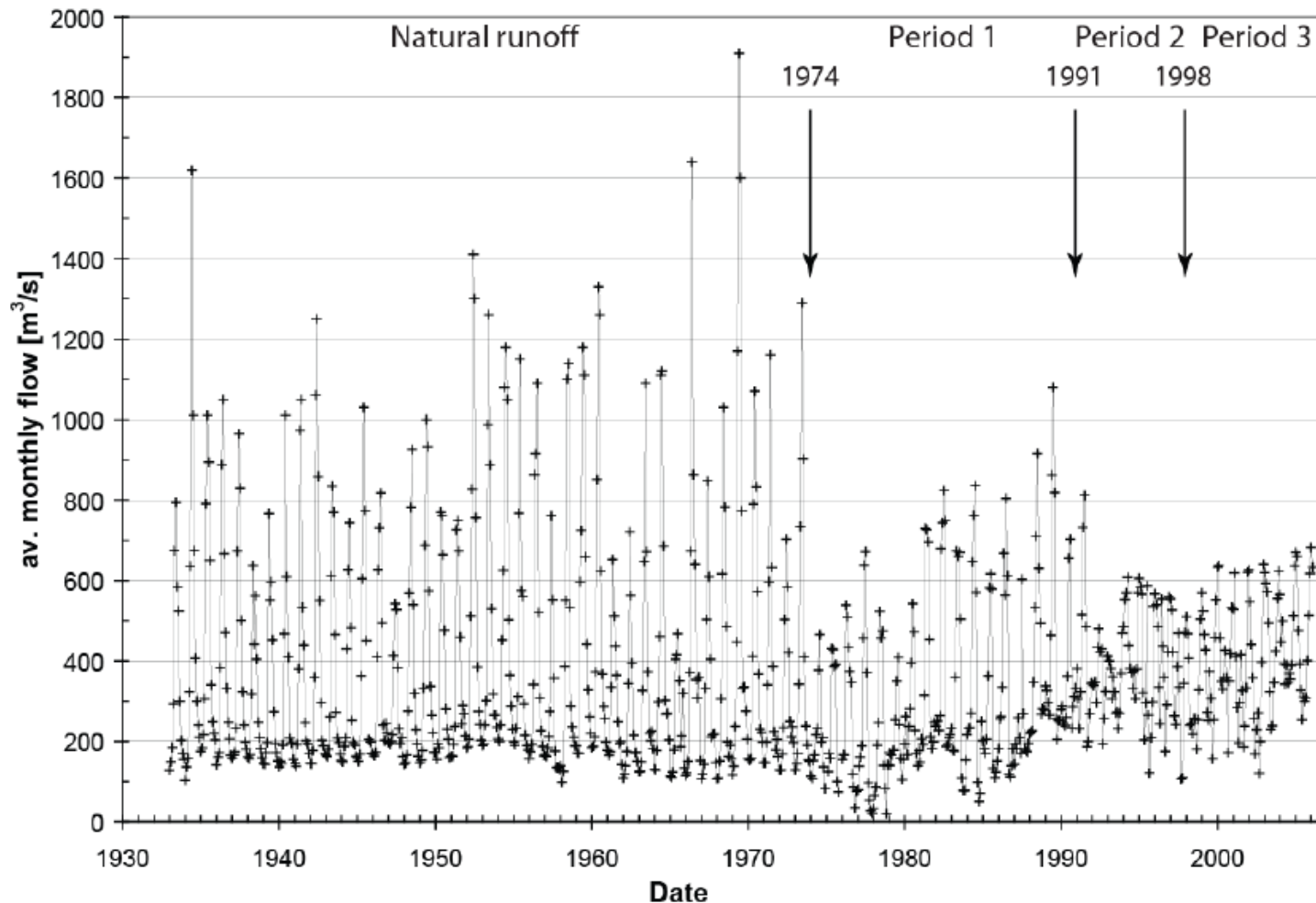
Syr Darya basin simulation model
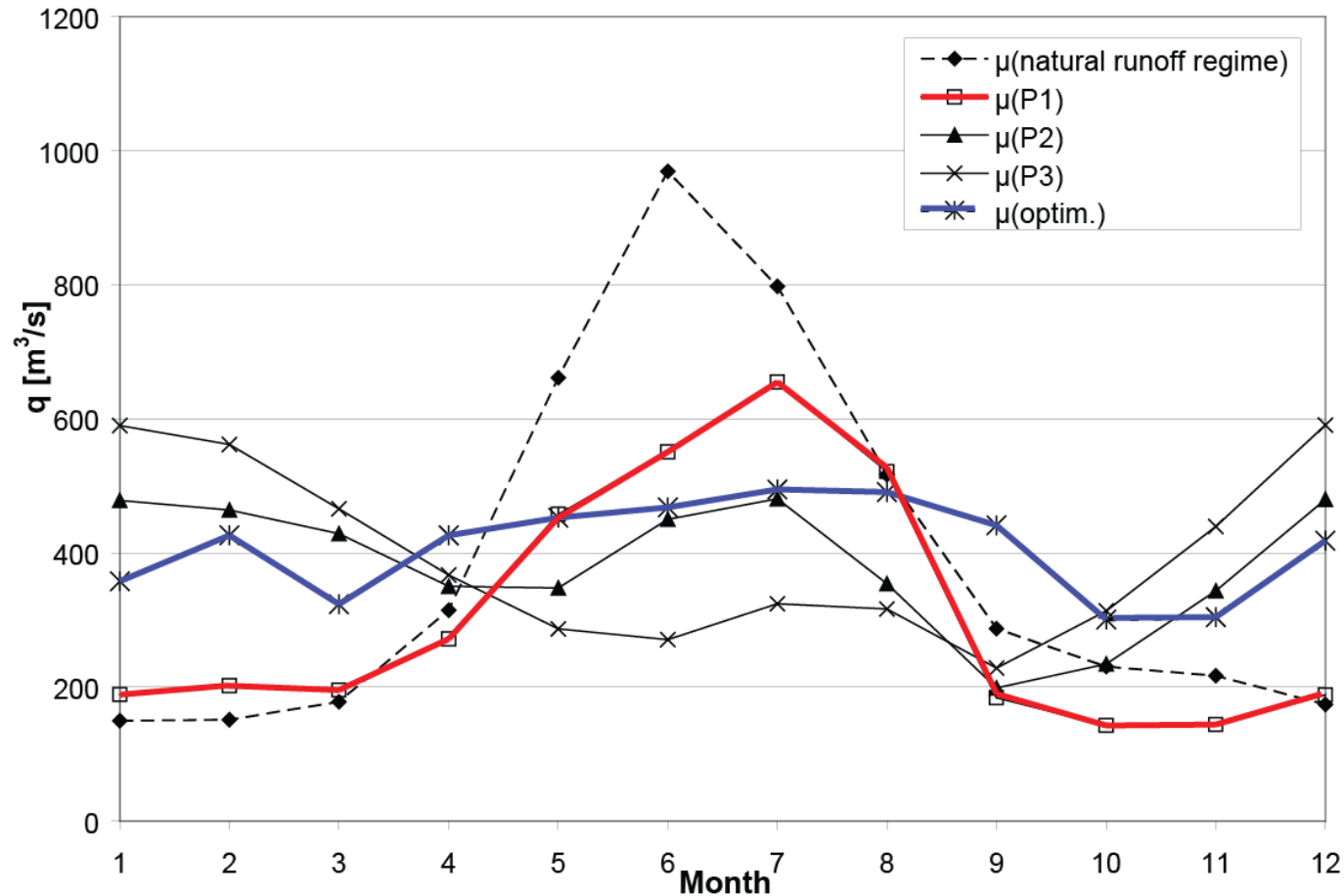
Economic valuation framework

- Domestic/Urban use
- Irrigated Agriculture
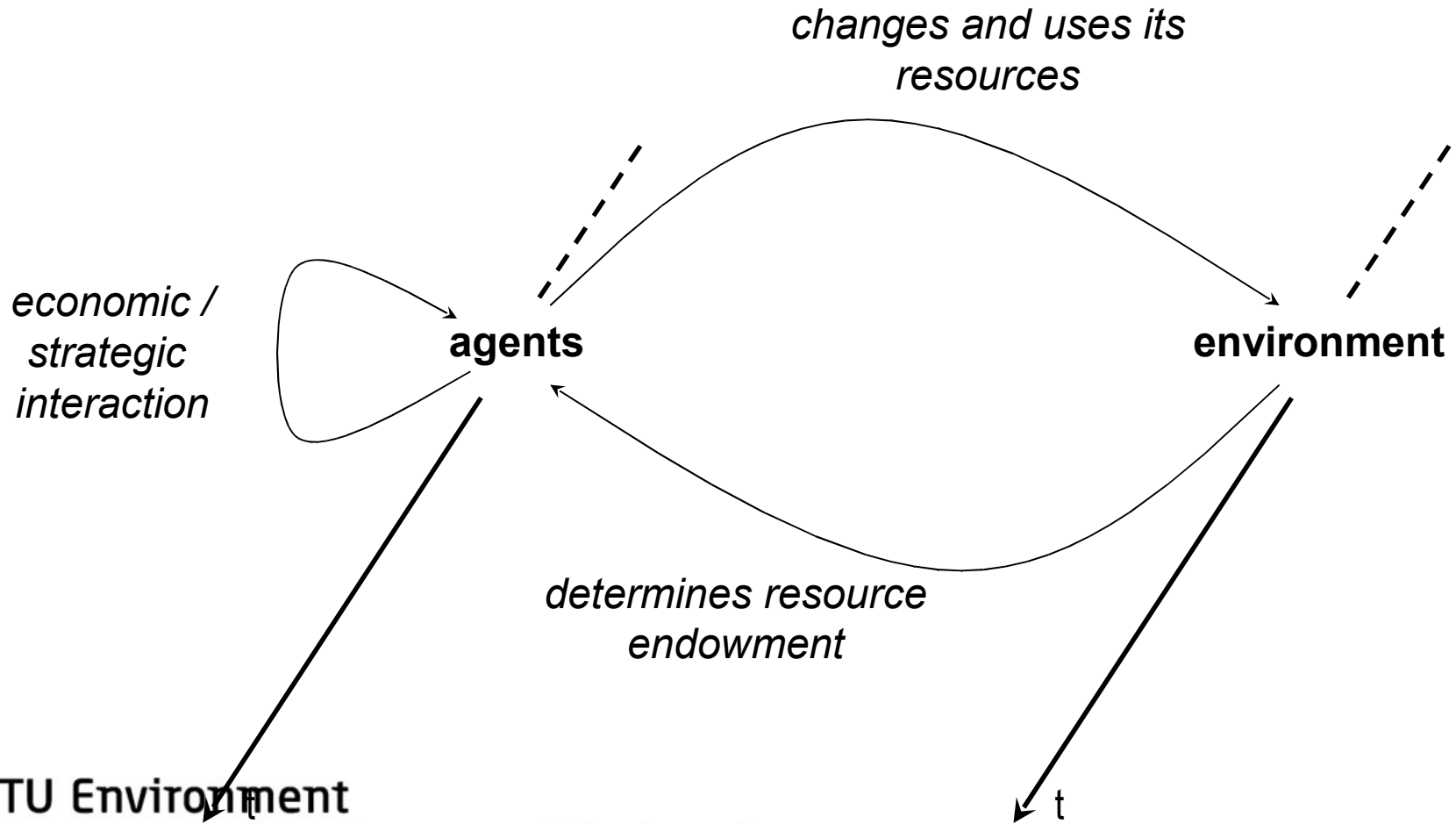- Industry
- Hydropower
- Ecosystems

Uch Kurgan gage

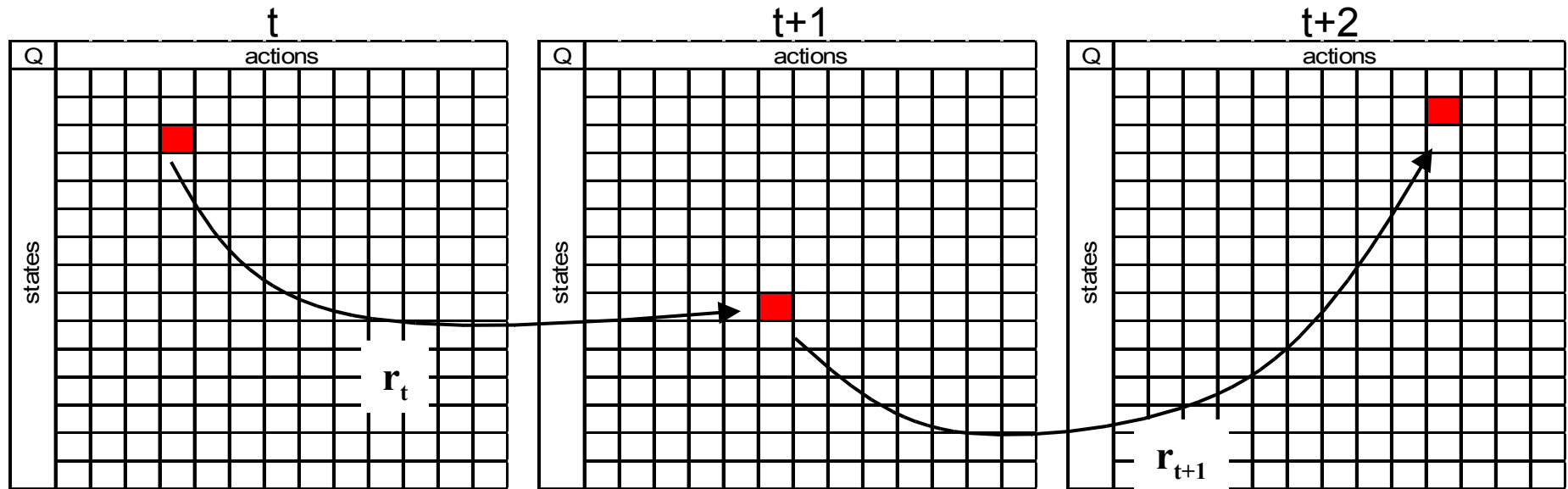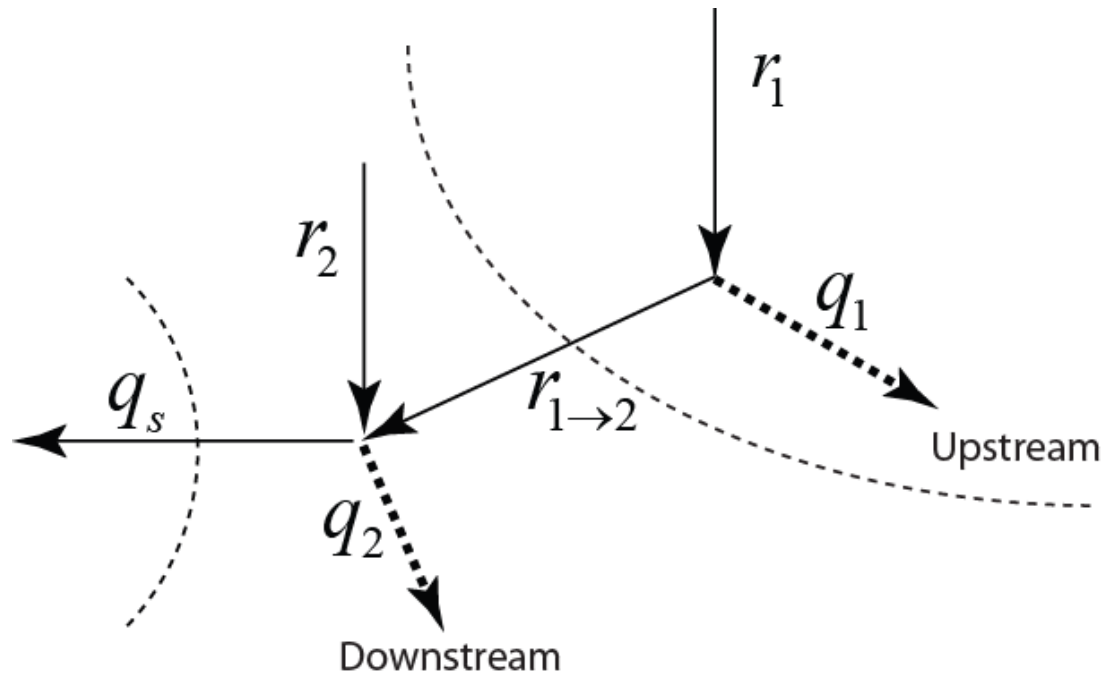# Uch Kurgan gage: Average monthly flows

Agent-based modeling

changes and uses its resources

economic / strategic interaction

agents

environment

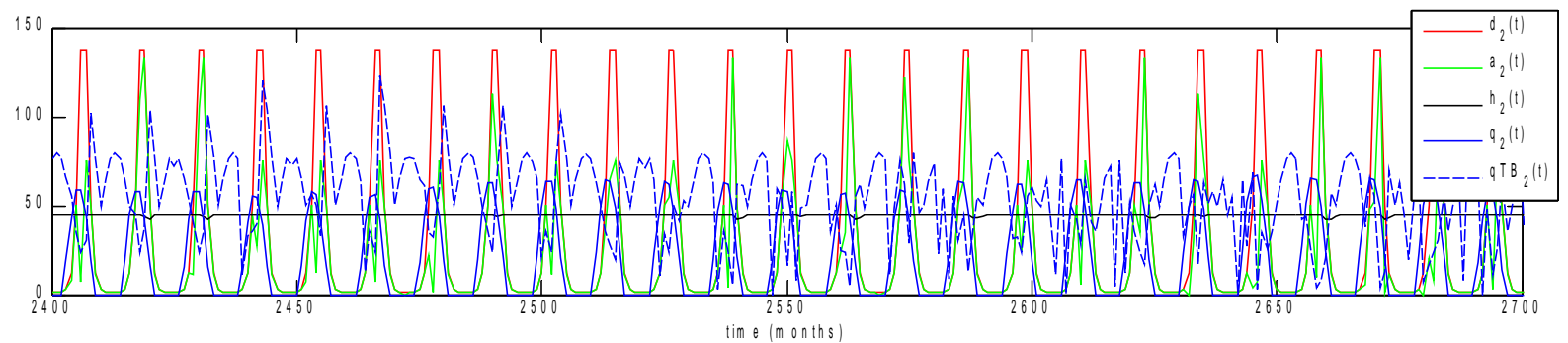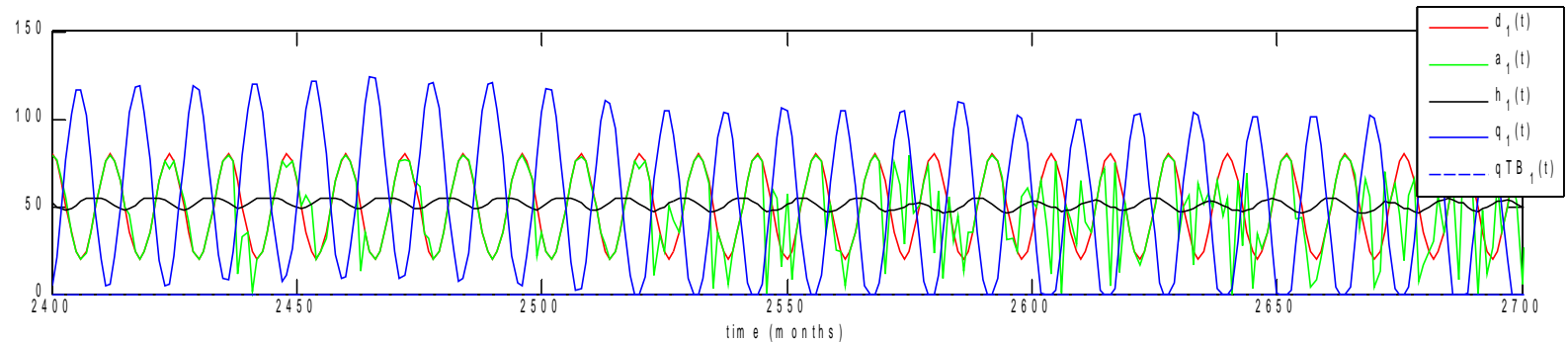*determines resource endowment*

t

t

State-action matrix

$$Q_i(\mathbf{s}, a_i) := Q_i(\mathbf{s}, a_i) + \alpha[R_i(\mathbf{s}, \mathbf{a}) + \gamma \max_{a_i'} Q_i(\mathbf{s}', a_i') - Q_i(\mathbf{s}, a_i)]$$

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Simplified Syr Darya representation

Preliminary results

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