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LAND MANAGEMENT, ENVIRONMENT & SOLID-WASTE: INSIDE EDUCATION AND BUSINESS IN CENTRAL ASIA ERASMUS-EDU-2023-CBHE Project Number: 101129032

MICRO-CREDENTIAL

CLIMATE CHANGE FOR SUSTAINABLE LAND MANAGEMENT IN CENTRAL ASIA

4.- Water, Cryosphere and Climate in Central Asia

Discussion

Who should decide how climate-stressed water is allocated: farmers, utilities, basin councils, or ministries?

Co-funded by the European Union

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1. Background and Rationale

Water allocation has traditionally been treated as a technical issue: how much water is available, how much is needed, and how it can be distributed efficiently. However, under conditions of climate stress, this perspective becomes insufficient. Declining water availability due to climate change transforms water allocation into a fundamentally political, institutional, and ethical problem.

In many regions, especially those dependent on glacier-fed systems such as the Syr Darya and Amu Darya, seasonal water supply is becoming less predictable. Reduced glacier melt, rising temperatures, and changing precipitation patterns are altering long-established hydrological regimes. At the same time, demand for water is increasing across multiple sectors, including agriculture, urban consumption, and energy production.

Under these conditions, the central question is no longer simply how to manage water, but **who has the authority to decide how water should be managed**. This question reflects deeper issues of power, knowledge, legitimacy, and accountability.

Different actors bring different perspectives and priorities. Farmers often possess detailed local knowledge and depend directly on water for their livelihoods, yet their decisions may prioritize short-term productivity. Urban utilities operate within technical and infrastructural frameworks designed to ensure reliability and efficiency, but they may overlook rural needs. Basin councils attempt to integrate multiple stakeholders and promote coordinated management, yet their effectiveness depends heavily on institutional strength and cooperation. National ministries, on the other hand, have the authority to implement large-scale policies but may be disconnected from local realities.

This assignment invites students to explore these tensions in depth. Rather than identifying a single “correct” answer, students are expected to engage with the complexity of water governance and develop a reasoned, evidence-based position.

2. Learning Objectives

This assignment is designed not only to develop subject knowledge but also to strengthen higher-order thinking skills.

Students will learn to analyze water governance systems as complex socio-environmental structures rather than purely technical systems. They will develop the ability to compare institutional arrangements, evaluate trade-offs between competing objectives, and construct well-supported arguments.

By the end of the activity, students should be able to critically assess different models of decision-making under resource scarcity, understand the implications of those models for equity and sustainability, and articulate their own position in a structured and persuasive manner. In addition, through interactive components, students will experience the dynamics of negotiation, conflict, and compromise that characterize real-world water governance.

3. Assignment Instructions and Conceptual Framing

Students are required to prepare an analytical essay and actively participate in interactive classroom activities.

The central task is to address the following question:

Who should decide how climate-stressed water is allocated: farmers, utilities, basin councils, or ministries?

This question should not be approached as a simple opinion-based discussion. Instead, students must frame their response within a broader analytical perspective that considers governance theory, environmental constraints, and socio-economic realities.

Students are encouraged to think in terms of competing principles:

- **Efficiency**: Which actor can allocate water in a way that maximizes productivity?
- **Equity**: Which actor ensures fair distribution among users?
- **Sustainability**: Which actor is most likely to protect long-term ecological balance?
- **Feasibility**: Which governance model is realistic given institutional and political constraints?

Rather than choosing one actor uncritically, students should explore whether hybrid or multi-level governance systems provide more effective solutions.

4. Analytical Report Structure (Extended Guidance)

Students are expected to produce a structured analytical text of approximately 1,500–2,000 words. However, the emphasis is not only on structure but on depth of reasoning and clarity of argument.

The introduction should go beyond defining the problem and should situate it within a broader environmental and political context. Students should explain why water allocation is becoming increasingly contested under climate change and briefly introduce the governance dilemma.

In the main body, students should develop a detailed analysis of each actor. This analysis should not be limited to listing advantages and disadvantages. Instead, students should examine how each actor operates in practice, what types of knowledge they rely on, what incentives shape their decisions, and what limitations they face.

For example, when discussing farmers, students might consider how local knowledge and direct dependence on water influence decision-making, but also how economic pressures may lead to overuse. When analyzing ministries, students should consider both their capacity to implement large-scale policies and the risks of bureaucratic inefficiency or political bias.

The comparative section should synthesize these insights by evaluating which actors perform better under different criteria. Students should avoid simplistic conclusions and instead acknowledge trade-offs.

In the final section, students should present a clear, well-justified position. This may involve arguing for a specific governance model or proposing a combination of actors with clearly defined roles.

5. Extended Case Study: Water Allocation Conflict in the Chu River Basin

To ground the discussion in a realistic context, students will analyze a case based on a transboundary river system shared between upstream and downstream users.

In this scenario, water availability has declined due to reduced snowpack and glacier melt in upstream mountainous regions. Upstream communities prioritize hydropower generation and local agriculture, while downstream regions depend heavily on irrigation for large-scale farming.

During a particularly dry year, water inflow is reduced by 30%. Existing agreements on water sharing are vague and poorly enforced. Farmers downstream report severe water shortages, while upstream authorities argue that they must prioritize their own energy and food needs.

At the same time, a basin-level organization exists but lacks strong enforcement mechanisms. National ministries from both countries are involved, but their priorities differ, and coordination is limited.

Students must analyze the case and answer:

- Which actor currently holds decision-making power?
- Is this distribution of power effective or problematic?
- What alternative governance arrangement could improve outcomes?

This case is intentionally complex and does not have a single correct solution.

6. Interactive Learning Module I: Stakeholder Role-Play Simulation
Simulation Title: "Crisis at the Basin"

Students are assigned roles representing different stakeholders. Each group receives a detailed briefing describing their interests, constraints, and strategic goals.

The scenario begins with a sudden drought announcement: water availability has dropped by 40%, and immediate decisions must be made.

The simulation unfolds in stages. First, each group develops its internal strategy, deciding what outcomes it wants to achieve and what compromises it is willing to make. Next, groups present their positions in a formal negotiation setting. This is followed by an open negotiation phase, during which alliances may form and conflicts may emerge.

The final stage requires the groups to reach a collective agreement. If no agreement is reached, the instructor introduces a "crisis outcome," such as crop failure or energy shortages, to illustrate the consequences of failed cooperation.

This simulation allows students to experience the complexity of water governance in practice, including power dynamics, negotiation strategies, and the difficulty of balancing competing interests.

7. Interactive Learning Module II: Strategic Decision Game "Water Under Pressure"

In this activity, students engage in a dynamic decision-making game where they must allocate limited water resources over several simulated "years."

Each round represents a year with different conditions:

- normal year
- drought year
- extreme climate variability

Students must decide how to allocate water between agriculture, urban use, and environmental needs. Each decision affects future conditions, creating a feedback loop.

For example, over-allocation to agriculture may increase short-term yields but reduce long-term water availability. Underinvestment in environmental flows may degrade ecosystems, leading to further instability.

The instructor periodically introduces unexpected events, such as policy changes or infrastructure failures, forcing students to adapt their strategies.

The goal is not simply to "win" but to understand the long-term consequences of governance decisions.

8. Instructor Analytical Notes and Conceptual Insights

This activity is designed to guide students toward several key realizations.

First, no single actor is inherently "best" at managing water under climate stress. Each has strengths and weaknesses, and their effectiveness depends on context.

Second, water governance involves trade-offs that cannot be fully resolved. Efficiency, equity, and sustainability often conflict with one another.

Third, institutional capacity and cooperation are as important as physical water availability. Even well-designed policies fail without coordination and trust.

Finally, adaptive governance—flexible, inclusive, and responsive to change—is more effective than rigid, centralized systems.

9. Reflection and Deep Discussion Component

Following the activities, students engage in a structured reflection.

They are encouraged to move beyond surface-level answers and consider deeper questions:

- Is it possible to design a truly fair water allocation system?
- Should some stakeholders have more power than others?
- How do political realities influence environmental decisions?
- What lessons from this exercise apply to real-world water conflicts?

Students should connect their reflections to both the case study and their own analytical work.

10. Assessment and Evaluation

Assessment is based on a combination of written work and participation.

The analytical report is evaluated for depth of analysis, clarity of argument, and ability to integrate concepts. Participation in simulations and discussions is assessed based on engagement, reasoning, and ability to collaborate.

11. Expected Learning Outcomes

By completing this assignment, students will gain a deeper understanding of water governance as a complex and contested process.

They will develop the ability to think critically about environmental decision-making, evaluate competing perspectives, and propose balanced, realistic solutions.

Most importantly, they will recognize that sustainable water management under climate stress requires not only technical knowledge but also effective institutions, cooperation, and informed decision-making.