

Workshop on Integrated Water Resources Management

Analysis of Water Conflicts across Natural and Societal Boundaries

跨越自然和社会界线的 水冲突的分析

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Agenda 议程

- Introduction to the Natural and Societal Systems (NSSs) Framework 自然和社会系统 (NSSs) 框架的简介
- Small reservoirs in Ghana as an example of using the NSSs Framework 以加纳的小型水库为例 NSSs框架的应用
- Lessons learned from the case study 从案例研究吸取的经验教训
- Summary 总结



Complexity of Water Problems

水问题的复杂性

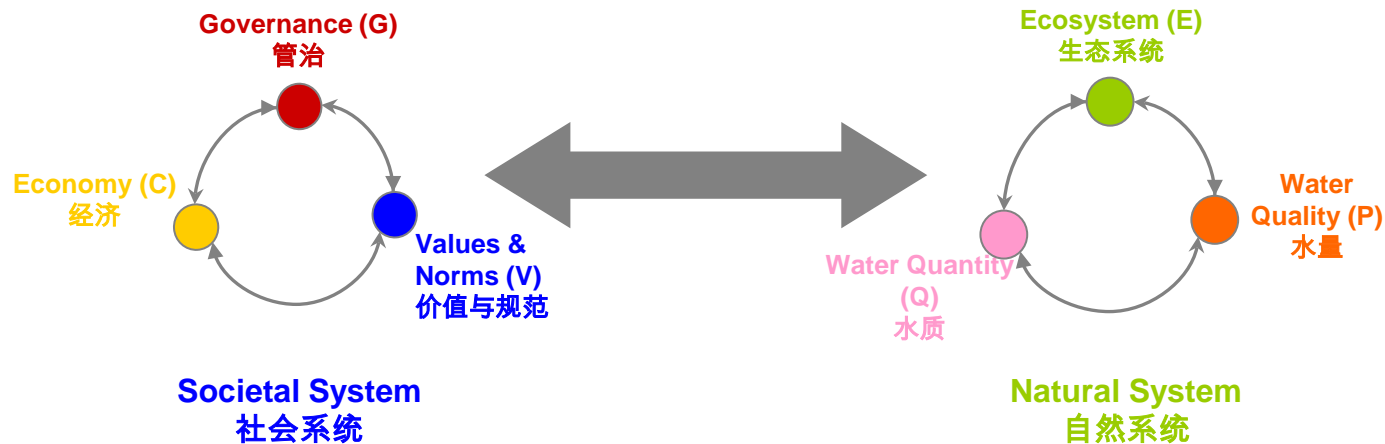
- Involve various stakeholders with multiple objectives 涉及不同的利益相关者和多个目的
- Cross multiple boundaries
- Context-specific and cannot be easily generalized 往往针对具体情况而定，不能轻易归纳概括
- Differences in socio-economic context and natural settings lead to different outcomes for the same water management intervention 社会经济和自然环境等因素的差异会导致相同的水管理措施产生不同的效果
- Need to be studied carefully before planning water projects or making policies 在规划水资源项目或制定政策前必须认真研究这些因素

Source: GLOWA-Volta



A Conceptual Framework 概念框架

- The origin of water problems can be understood as a dynamic consequence of competition, interconnections, and feedback among variables in the Natural and Societal Systems (NSSs)
水的问题的根源是自然和社会系统 (NSSs) 里6个变量之间动态的竞争、相互联系和反馈的结果



This Framework is developed by Prof. Shafiqul Islam in Dept of Civil and Environmental Engineering, Tufts University

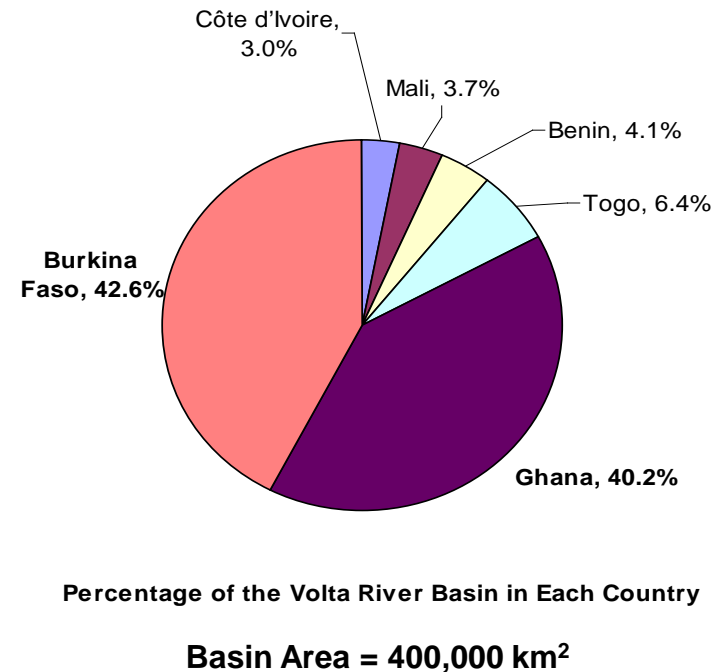
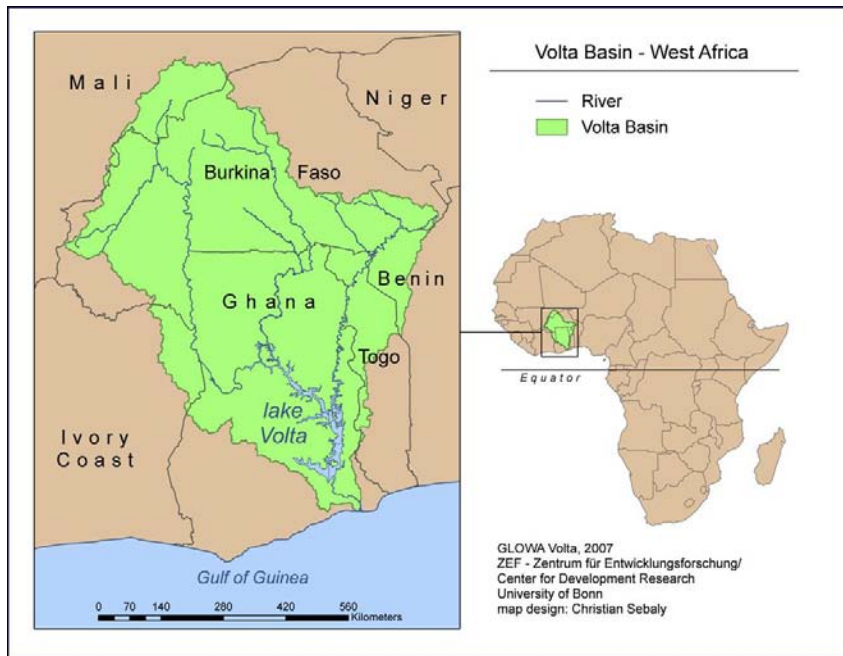
Use of the NSSs Framework

NSSs 框架的应用

- The presence or absence of patterns of key system variables (C, V, G, Q, P, and E) can be used to differentiate and better understand water problems 这6个变量 (C, V, G, Q, P, 和 E) 可以用来区分和更好地了解水问题
- Critical variables (and sub-variables) should be discussed and agreed upon by the stakeholders 哪些变量是关键应该由利益相关者讨论并达成一致的決定



Example: Small Reservoirs in the Volta River Basin 沃尔特河流域上的小型水库

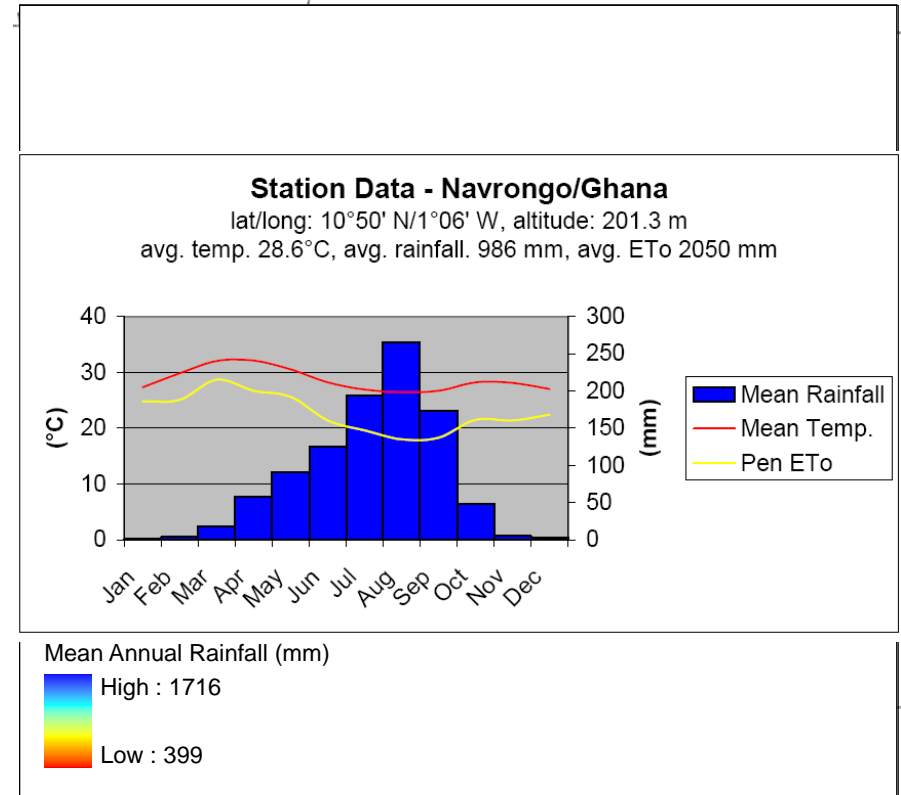


- Population: 18.6 million (2000), majority in rural area, growth rate = 2.5%
 1860 2000
 , 主要从事农业 , 增长率= 2.5
- Agriculture is mostly rainfed

Rainfall in Volta River Basin

雨

- Unevenly distributed spatially and temporally
分布不均
- Often comes in the form of thunderstorm 常以雷暴形式降雨
- Droughts and flash floods are frequent
干旱和洪水频繁
- Lead to insecure livelihoods
难以维持生计



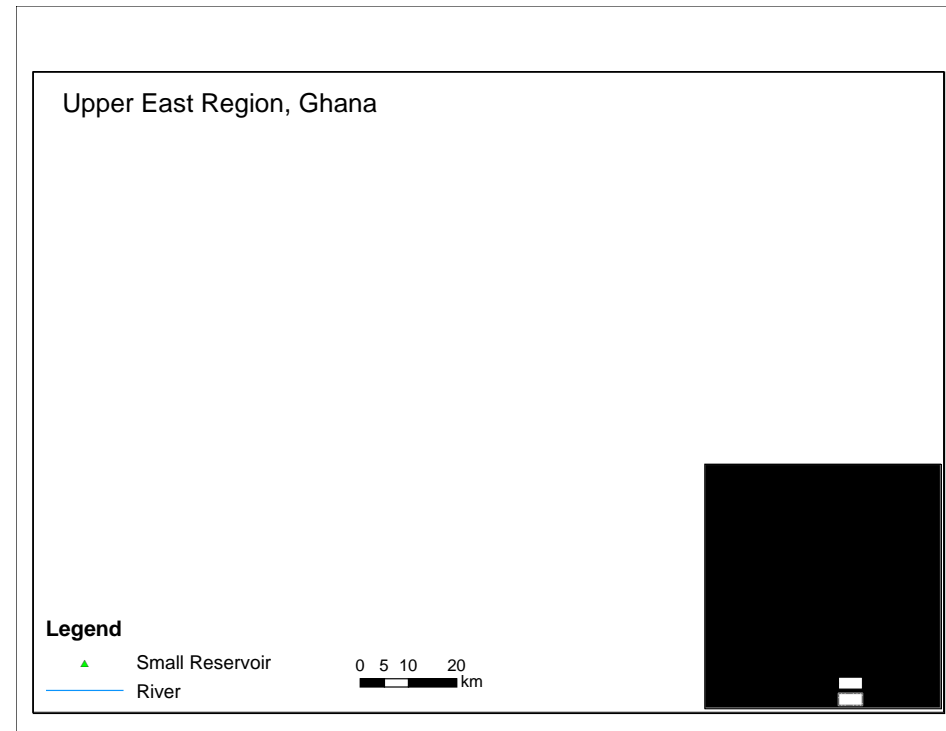
Small Reservoirs

- Many have been built for livestock watering, small-scale irrigation, domestic uses, fishery 建成许多小型水库以作牲畜饮水、农田的灌溉、住宅用途、养鱼等之用
- Very important for livelihood 对民生非常重要



Case Study in Ghana 案例研究

- Upper East Region of Ghana 加纳的上东省
- Hydrological, ecological and socio-economic implications of small reservoirs 小型水库的水文、生态和社会经济意义
- Interview with the farmers, government officials, extension workers 采访农民、政府官员、农务外展人员



This case study was funded by IWMI

Problem with Small Reservoirs

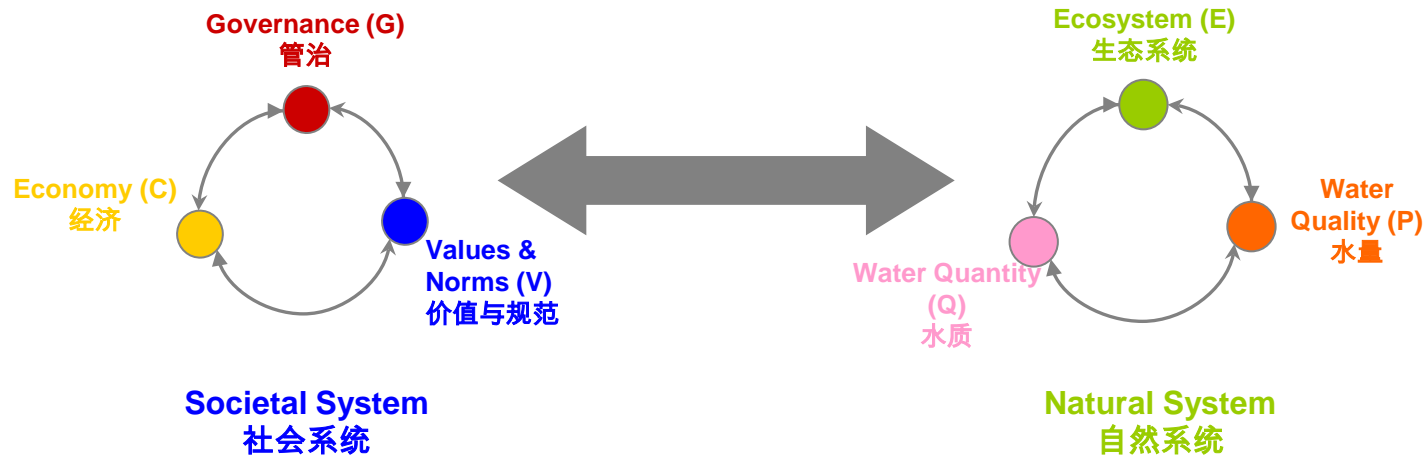
小型水库的问题

- Many have deteriorated due to poor maintenance
而毁坏
- Construction and rehabilitation are funded by different agencies, at different times, with little coordinative effort
建设和修复由不同的机构在不同的时间各自进行，没有任何的协调或统筹
- Ineffective Water User Associations
无效薄弱的用水户协会



Critical Variables

- Q- Water Quantity (自然系统)
- C- Economy
- G- Governance (管治 系统)



Q (Quantity) (水量)

- Limited water resource 水资源贫乏
- Rainfall varies greatly (only comes between May and October, the rest of the year is very dry) 每月降雨量差别很大 (全在5-10, 其余时间没雨)
- Irrigation is needed for dry-season farming
- Demand increases due to population growth 人口增长增加对水的需求



C (Economy) (经济)

- High levels of poverty 贫困
- Lack of finance for irrigation infrastructure 缺乏建设灌溉设施的资金
- Dry-season farming can significantly improve farmers' livelihood 旱季耕作可大大地改善农民的生活
- Competing water uses 竞争性用水
 - Irrigation 灌溉
 - Fishery and livestock watering 渔业和家畜饮水
 - Domestic uses 住宅用途



G (Governance 管治)

- A Water User Association (WUA) is required for each small reservoir 每一个小型水库都设有一个用水者协会 (WUA)
 - Executive committee 执行委员会
 - User fee for operation and maintenance 用户费用于操作和维修
- Ineffective WUA 无效薄弱的用水户协会
 - Lack of sense of ownership and incentives to participate in the WUA by farmers 缺乏主人翁意识和激励参与 WUA 的活动的机制
 - Lack of access to information 缺乏获取信息的途径
 - Lack of capacity building of WUA and outreach effort to educate the farmers by the government and donors 缺乏对WUA的能力建设，政府和捐助者没有在农民中进行推广
- Farmers are not involved in the planning process 农民没有被邀请参与规划的过程



Lesson Learned

- Involve stakeholders from the planning stage of the project 让利益相关者参与小型水库项目规划
- Improve farmers' access to information about the project and related water policy 的途径
- Water governance must take traditional values into account 资源的管理必须考虑传统的价值观
- Capacity building is needed to strengthen WUAs 向水户协会提供能力建设使之健全
- Extension service is needed to reach the farmers and monitor the performance of WUAs 政府应提高对农民的外展服务并监察用水户协会的表现



Summary 总结

- Rigid disciplinary boundaries between the natural and societal systems will not produce solutions to water problems 僵硬学科界限会妨碍产生水问题的解决方案
- Integrate two systems to study water issues and capture the contextual knowledge of water management 整合两个系统能更有效的分析并了解水问题、运用水管理的知识
- The NSSs Framework is a useful tool to analyze water issues across the boundaries NSSs框架是一个很有用的工具，有助分析复杂的水问题





Thank You

谢谢

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