

# New tools and approaches for the assessment and management of sustainability in infrastructure projects (II)

## *Hydropower Sustainability*

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*IAIA Special Symposium*

**Sustainable Mega-Infrastructure and Impact Assessment**

*Panama*

*2-3 December, 2015*

# Hydropower Sustainability Assessment Protocol

*Objectively Measured Sustainability --  
A tool for Improved Hydropower Projects*



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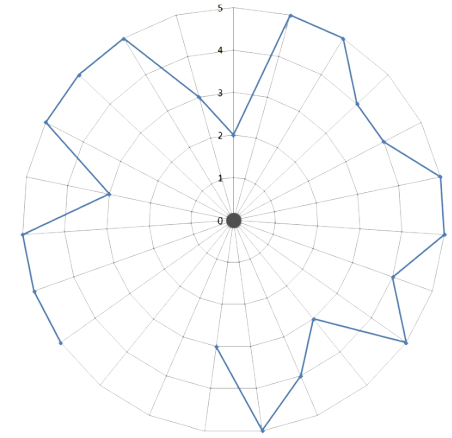
## Reduced Risk for Hydropower Investments



## Improved Outcomes for People and Nature



- A quick review of the Protocol
- Current status of Protocol Use
- Future Directions for the Protocol



# Hydropower Sustainability Assessment Protocol

*Not a sustainability “standard” --  
but a standardized system for measuring sustainability*

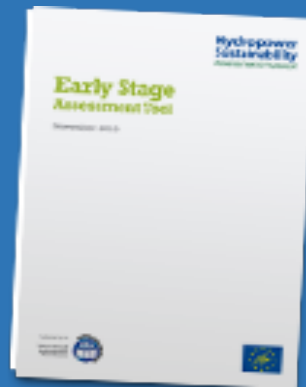
*You can only manage that which you measure -- sustainable  
hydropower requires measurement of sustainability*

Background document:



Four methodology documents for four stages of development:

Early Stage



Preparation



Implementation



Operation

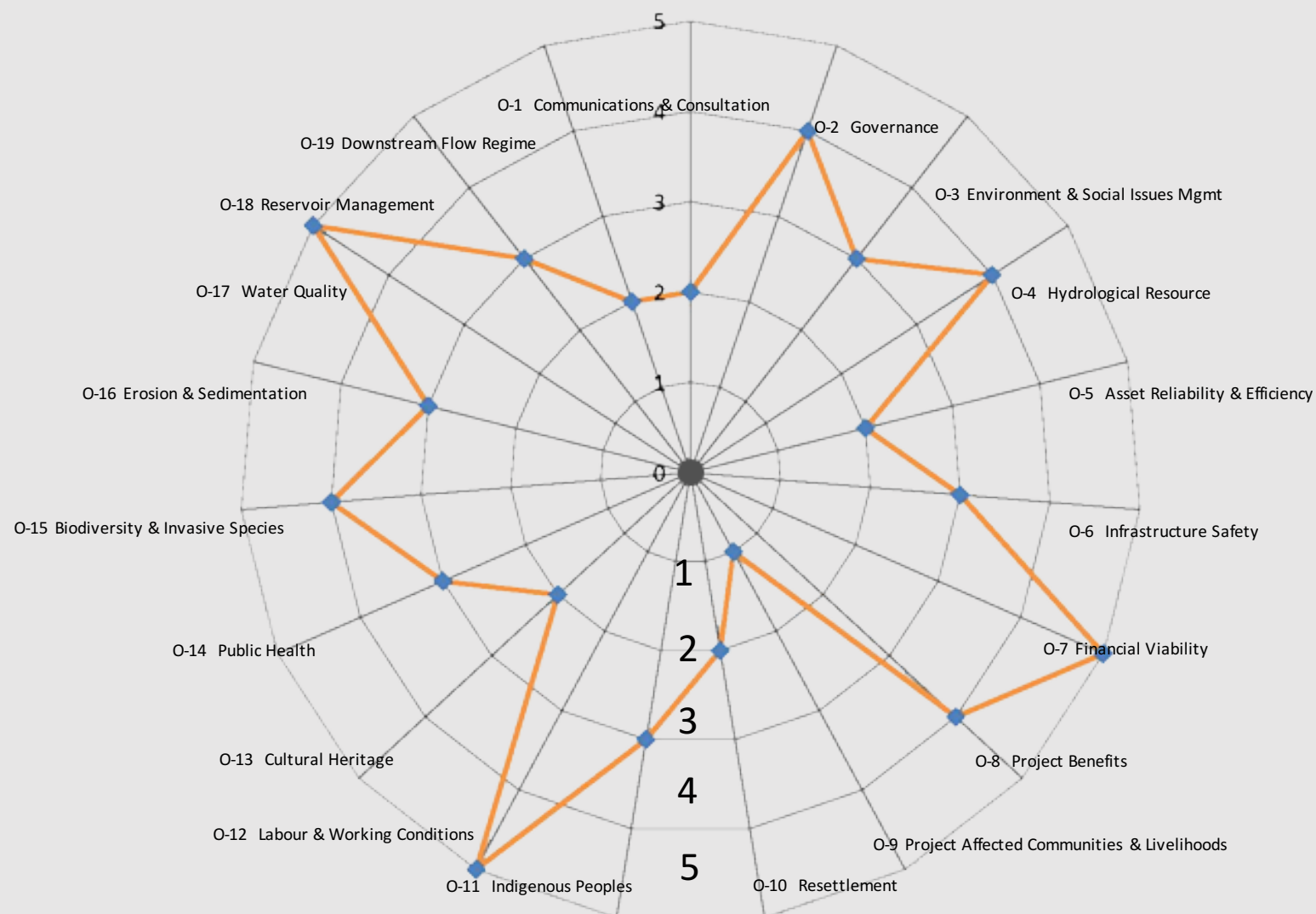


# Sustainability topics covered

The Protocol encompasses all aspects of sustainability				
TECHNICAL	ENVIRONMENTAL	SOCIAL	ECONOMIC AND FINANCIAL	INTEGRATED
Siting and design	Downstream flows	Project affected communities and livelihoods	Economic viability	Demonstrated need and strategic fit
Hydrological resource	Erosion and sedimentation	Resettlement	Financial viability	Communications and consultation
Reservoir planning, filling and management	Water quality	Indigenous peoples	Project benefits	Governance
Infrastructure safety	Biodiversity and invasive species	Cultural heritage	Procurement	Integrated project management
Asset reliability and efficiency	Waste, noise and air quality	Public health		Environmental and social issues management



# Sustainability Profile: relative numerical scores

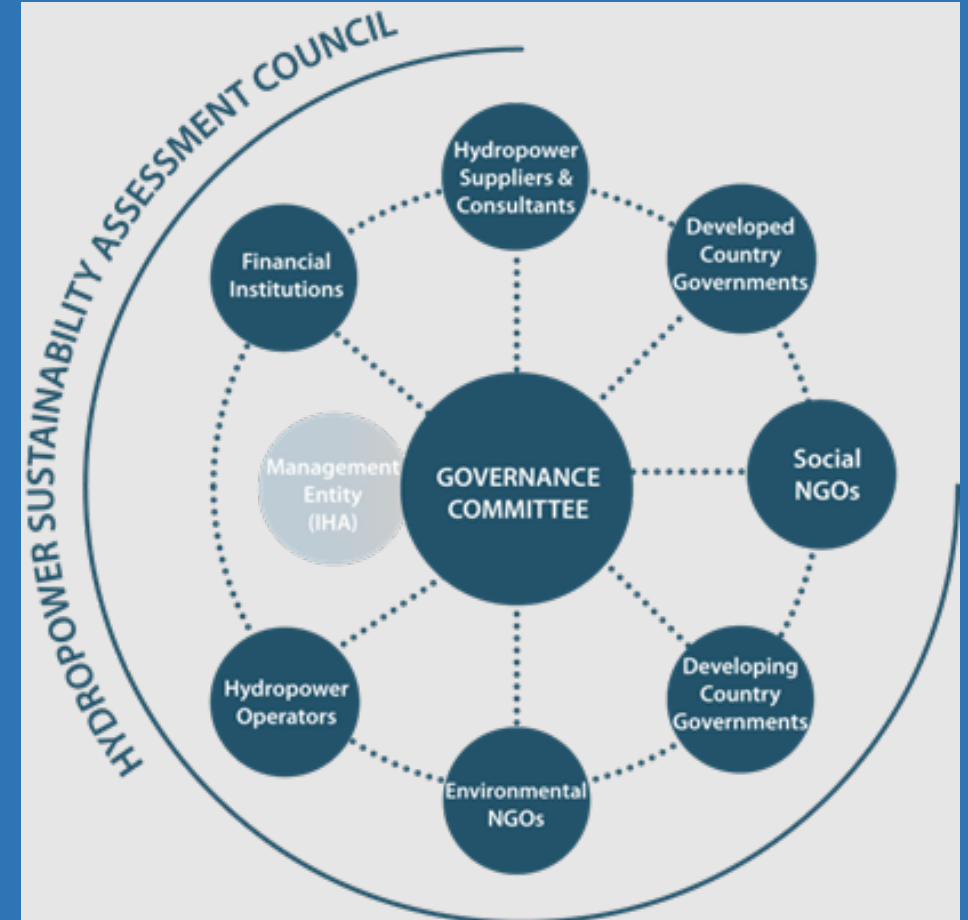


# Current status of Protocol Use -- Training and assessments



# Governance and quality control

- **Hydropower Sustainability Assessment Council**
  - **Multi-stakeholder** body with a Governance Committee
  - governed by a **Charter**
  - **Terms and conditions** for use of the Protocol defining allowable uses -- official and unofficial
- Only **Accredited Assessors** (AA) authorised to use the Protocol commercially
  - Stringent qualifying criteria, training and systems ensure AA maintain **highest quality of assessments, and uniformity of results**



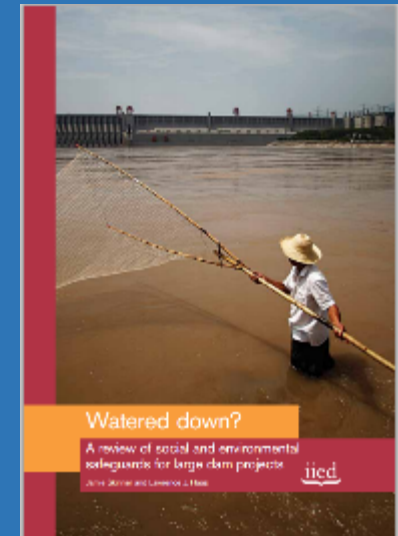


## Assessments to date (published official assessment reports)

Date	Project Name	Developer	Country	Size	Stage
Oct-10	Shardara	Shardara HPP JSC	Kazakhstan	100	Operation
Oct-11	Trevallyn	Hydro Tasmania	Australia	97	Operation
Mar-12	Walchensee	EON	Germany	124	Operation
May-12	Hvammur	Landsvirkjun	Iceland	84	Preparation
Aug-12	Jostedal	Statkraft	Norway	290	Operation
Sep-12	Murum	Sarawak Energy	Malaysia	944	Implementation
Sep-12	Jirau	ESBR (GDF Suez)	Brasil	3750	Implementation
Dec-12	Keeyask	Manitoba Hydro	Canada	695	Preparation
Jun-13	Gavet	EDF	France	92	Implementation
Sep-13	Blanda	Landsvirkjun	Iceland	150	Operation
Oct-13	Sogamoso	Isagen	Colombia	820	Implementation
Jan-14	Trung Son	EVN/TSHPCo	Vietnam	260	Implementation
Mar-14	Canafisto	Isagen	Columbia	936	Preparation
Apr-14	Santo Antonio	SAE	Brazil	3150	Implementation
Jun-14	Sava river	HEP	Croatia	160	Early Stage
Jun-14	Miel	Isagen	Colombia	260	Operation
Sep-14	Kabeli A	Kabeli Hydro	Nepal	38	Preparation
Nov-14	Semla	EON	Sweden	3	Preparation
Nov-14	San Francisco	EPM	Columbia	52	Preparation
Apr-15	Multiple	Ministry of Power, Ghana	Ghana		Early Stage
Apr-15	Nam Lik	China Three Gorges	Laos	100	Operation
Jun-15	Chaglla	Odebrecht	Peru	456	Implementation

## The Protocol is referenced by:

- **World Bank:** The Protocol for use by World Bank clients: lessons learned and recommendations.
- **OECD:** Common Approaches
- **IIED:** A review of social and environmental safeguards for large dam projects
- **WWF:** Everything you need to know about the UN Watercourses Convention
- **Citi:** Hydropower sector brief
- **ICPDR:** Sustainable Hydropower Development in the Danube Basin: Guiding Principles.
- **EON:** The Hydropower Sustainability Assessment Protocol in practice – a utility's perspective
- **TNC:** The Power of Rivers – Finding balance between energy and conservation in hydropower development



## What's next for the Protocol?

- Push for wider use and adoption as standard practice
- Particularly encourage its use in situations where lower scores might be expected
- Use the results of Assessments as basis for improving performance in lower scoring topic areas
- Increased emphasis as tool for assessing risks and impacts relating to climate change
- Increased interest in using Protocol as basis for screening and qualifying advantageous financing – Green Bonds, Climate Bonds
- Evolving the Early Stage tool; pushing for system-level planning and management



## Beyond individual projects, need to address system-level issues

- Getting individual projects right is only part of the sustainability challenge
- Even the very best projects have inevitable impacts; even with the best mitigation measures; even with off-site offsets.
- The real promise of sustainability: through collaborative, multi-stakeholder planning, at a system or basin scale, determine the optimal portfolio of projects to construct and the optimal set of river segments to conserve for socio-environmental purposes
- Building the right projects in the right places



- And not just large hydro projects
- numerous small hydros also cause problems and need to be planned at a system-level

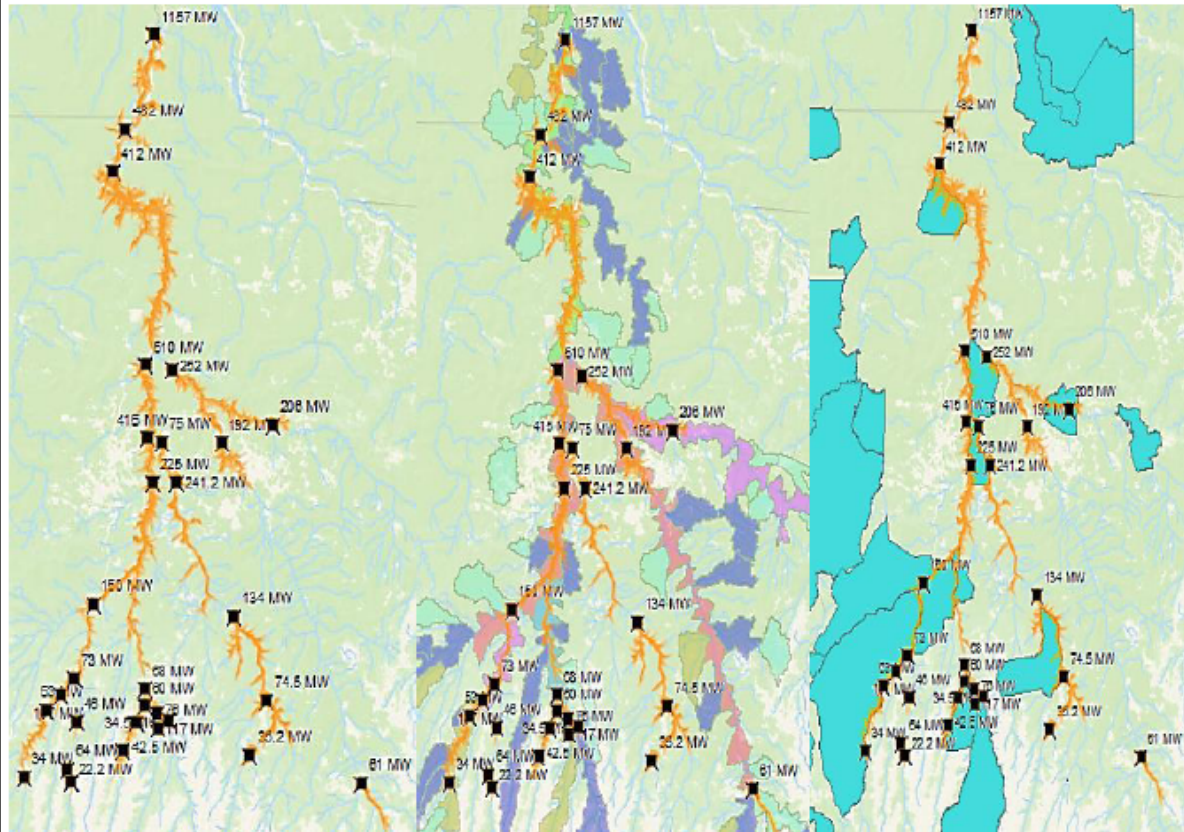




# System-level or basin scale planning

Figure 1. Maps of Scenarios

Scenario One --Full Hydropower Potential

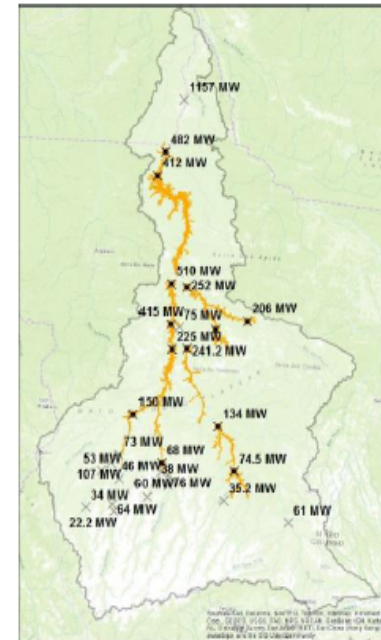


Footprint of Direct Impacts  
(Dams and Reservoirs)

Direct Impact Footprint on  
Conservation Portfolio

Direct Impact Footprint on  
Indigenous Lands

Scenario 4



Value

Percent of Base

Hydropower

62%

Indigenous Intact

59%

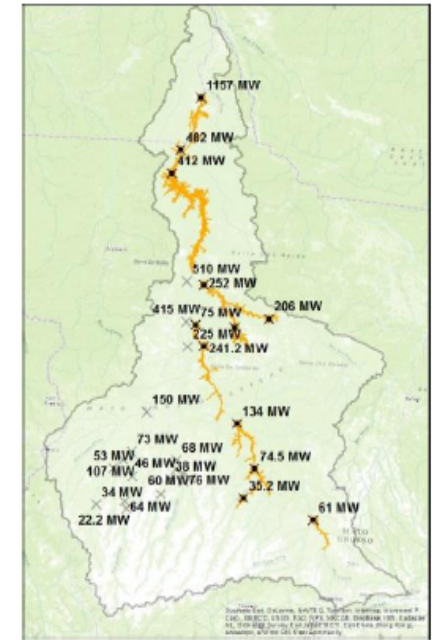
Biodiversity Intact

68%

Connectivity Intact

17%

Scenario 7



Value

Percent of Base

Hydropower

61%

Indigenous Intact

77%

Biodiversity Intact

73%

Connectivity Intact

27%

# How does Protocol link to System-level issues and planning?



## Early Stage Assessment Tool

November 2010



### ES - Early Stage

ES-1 Demonstrated Need

ES-2 Options Assessment

ES-3 Policies & Plans

ES-4 Political Risks

ES-5 Institutional Capacity

ES-6 Technical Issues & Risks

ES-7 Social Issues & Risks

ES-8 Environmental Issues & Risks

ES-9 Economic & Financial Issues & Risks

- Early Stage Tool topics touch on system-level considerations, although they are still focused on a particular project under consideration at an early stage.
- There is interest in extending this to looking at groups of projects under consideration, such as in the recent trial in Ghana.
- A key consideration with the Early Stage Tool is that it addresses issues that are usually considered the province of governments; the other Protocol tools are directly aimed at individual projects usually the responsibility of project developers or financiers.
- A PGC Working Group is reviewing Early Stage Tool to push toward a stronger system-level planning protocol

## The Risk to Projects of not getting it right

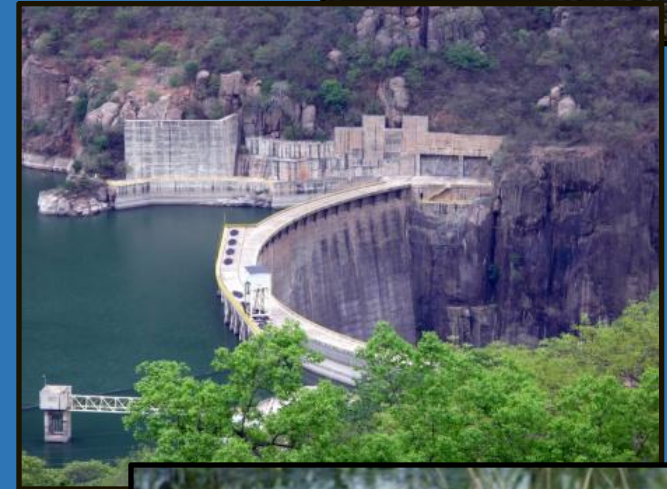
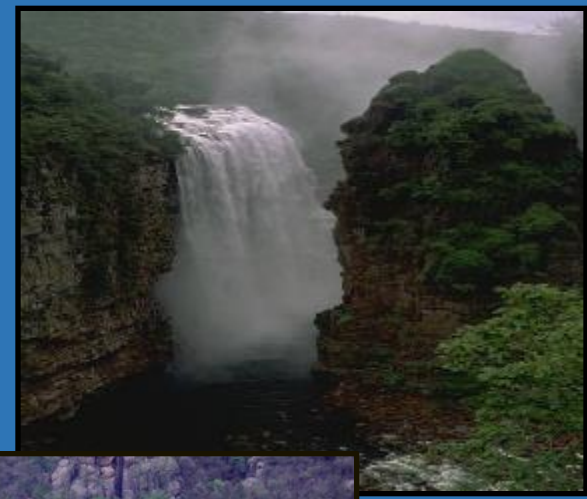
- Bumbuna (Sierra Leone) 50MW: 85% complete when abandoned in 1997. Commissioned 2010. Delay predicted to reduce the ERR from 42.2% to 28.5%.
- Rampur (India) 410MW: Commissioned 2014 with total investment cost of US\$665m. A 1-year delay in construction predicted to reduce ERR from 14.5% to 12.4% and financial rate of return from 9.3% to 7.7%.
- Lower Subansiri (India) 2000MW: Forced suspension of work (protests about dam safety and potential environmental and social impacts). The total project cost increased by US\$195m in the initial two and a half years of delay.
- Belo Monte (Brazil) 11,400MW: Numerous delays and cost over-runs seriously impact economics of project

Others: Myitsone, Myanmar; Murum, Malaysia; Xayabouri, Laos; HydroAysén, Chile



# Key messages

- Sustainability is no longer just 'nice to have'
- You can only manage that which you measure -- sustainable hydropower requires measurement of sustainability
- There is growing evidence that getting sustainability issues right, up front, delivers better projects, faster
- The Protocol is a cost- and time-effective way to identify issues and put in place solutions
- The Protocol de-risks projects
- Need to address system-level issues as well as ensure individual project sustainability





Thank You!



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