CGIAR | INITIATIVE ON NEXUS Gains

Gender equity and social inclusion in the water-energy-food-ecosystems (WEFE) nexus

Frameworks and tools for moving from resource-centric to people-centric WEFE nexus approaches

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1 INTRODUCTION

Imagine that a hydropower plant, an industrial farm, and a small agricultural community are relying on the same water source. If that water resource becomes scarce, how will it be managed? **Who will decide what's most important, and how different interests** (e.g., water for hydroelectricity, irrigation, domestic use) **should be addressed?** Will representatives from the industrial farm, the hydropower plant, and the small community sit down and co-create a fair use agreement that considers the interplay of water, food, energy, and ecosystem security for multiple users and uses? Will the needs and interests of vulnerable community members, such as the wage workers at the industrial farm and those who reside in the farming community, be represented? Or will the stakeholders with the most economic and political influence leverage their power to secure the water rights for themselves?

It's easy to see how **politics and underlying power structures will play a major role in the management of this water-energy-food-ecosystems (WEFE) nexus**, and how **the most marginalized stakeholders risk losing out on the key resources that sustain their livelihoods.**

Past examples show how competition over WEFE nexus resources has played out, with stakeholders with less power losing out. In just one example from the Mekong Delta of Vietnam, hydropower dams benefitting distant communities in China have been constructed in spite of local counter-demonstrations. These dams are producing harmful effects on local fisheries and fisherfolk and threaten the livelihoods and nutritional security of rural Mekong Delta communities (Orr et al. 2012, Middleton 2014).

The Mekong Delta is far from the only hot spot, however. More than 730 million people currently live in countries with high and critical levels of water stress, 1.6 billion people stand to lack access to safe drinking water by 2030, and 2.4 billion people rely on inefficient and polluting cooking systems (United Nations 2022). Addressing these challenges in an integrated way is thus critical to the livelihoods of billions of people – but development **interventions may miss their targets and harm the very populations they seek to benefit, if they do not carefully embed gender and social inclusion considerations** (Sachs 2020, Pyburn & van Eerdewijk 2021).

Developing the WEFE nexus in sustainable and equitable ways to meet the needs and strategic interests of multiple stakeholders – including users of WEFE resources who are socio-economically and politically marginalized – **will require moving away from a narrow and technical focus on resource efficiency to consider aspects of gender equality and social inclusion** (Müller-Mahn et al. 2022).

1.1 Learning objectives

This learning module focuses on how to integrate **gender equality and social inclusion (GESI) considerations in WEFE approaches to contribute to more effective and equitable WEFE initiatives for current and future generations**. Intentionally focusing on GESI in the design, implementation, and monitoring of WEFE initiatives is critical to ensure that these initiatives do not harm – and, rather, benefit – women and vulnerable groups and communities.

At the end of this lesson, learners will be able to:

- Explain the importance of GESI for achieving sustainable development outcomes in the WEFE nexus
- Describe common GESI challenges and issues that WEFE projects face
- Describe the main steps for better addressing GESI considerations

1.2 Audience

This lesson is intended for a broad audience that is working on, or interested in, cross-sectoral issues around sustainable use of water, energy, food and ecosystems, including:

- Decision-makers in the public and private sectors as well as from civil society
- Practitioners and project implementers
- Graduate students and researchers
- Donors

The lesson is designed to be accessible to audiences from a variety of disciplinary backgrounds, from water management, agriculture, forestry, ecology and economics to social sciences.

1.3 Organization

The lesson is structured as follows:

- Overview of the social dimensions of resource access
- A social equity framework for addressing GESI in the WEFE nexus
- GESI considerations in the WEFE nexus project cycle
- A synthesis against the learning objectives

1.4 Key terms

Box 1 introduces key terms that inform WEFE nexus and GESI approaches.

Box 1. Glossary of key terms

The **WEFE nexus** refers to the interactions between people and ecosystems across the interrelated sectors of water, energy and food (Simpson & Jewitt 2019). Nexus thinking is an integrated approach to describe and address the **complex interrelations and interdependencies** among these resources and people, including the trade-offs and synergies involved in managing these resources to meet the needs of diverse stakeholders across multiple levels (e.g., local to international) and scales (across space and over time) (FAO 2014).

Trade-offs and compromises: A 'trade-off' is a situation where one objective is sacrificed in favor of another; whereas 'compromise' refers to a situation where a less than ideal result is accepted in order to achieve a common good (IWA/IUCN/ICA 2015, p. 1).

Synergies refers to a scenario in which one intervention helps achieve multiple nexus objectives, in a 'win-win-win' for more sustainable, prosperous and equitable development (IWA/IUCN/ICA 2015, p. 10).

Externalities (or external costs) refer to situations where the production or consumption of goods and services results in costs or benefits on others which are not reflected in the prices charged for those goods and services (Khemani 1993).

Gender equality and social inclusion (GESI) aims to foster equal rights, responsibilities and opportunities for women and men and girls and boys. GESI aims to enable all people, regardless of their social identities, to feel that they are valued, their differences are respected, and their basic needs are met, so they can live in dignity (UN Women 2001, Das et al. 2013, Huyer 2016).

A **social equity framework** helps to understand equity (and how to promote it) across three dimensions: a) *recognition* of diverse individuals, especially those who are marginalized, as legitimate actors in the processes that affect their lives; b) *representation* of these actors as active participants in the decisions that affect them; and c) *redistribution* of resources in equitable ways among these and other actors (Fraser 1998, 2010).

2 FROM RESOURCE- TO PEOPLE-CENTERED WEFE NEXUS APPROACHES

2.1 Current WEFE nexus thinking: Focus on resources over people

WEFE Nexus approaches differ from traditional, sector-specific policies and practices in that they do not focus on productivity gains *within* individual WEFE sectors, but instead **seek to manage tradeoffs and reduce inefficiencies at a systems level, *among* water, energy, food, ecosystems and other land use sectors**. By accounting for the interactions between resource use in different sectors, nexus approaches can support the needed shift towards increased resource use efficiency and more sustainable consumption patterns (Hoff 2011).

However, **WEFE nexus thinking has traditionally been resource-focused and has overlooked the social, economic, political and cultural dynamics that shape resource use**. Often it seems as though resource scarcity was the main constraint to sustainable socio-economic development, and that this problem could be solved through managing, rationalizing and optimizing resource use across sectors (Allouche et al. 2015). This focus on resource efficiency and technical solutions hides a bigger debate about inequal access to resources, which feeds poverty and contributes to social instability (Allouche et al. 2015, Purwanto et al. 2021, Gadsden et al. 2022).

In reality, decisions on who can control and use resources are deeply political and often contested. Persistent poverty is not a technical problem of simply not having enough food or income: it results from policies, institutions, and practices (i.e., a political economic context) that systematically limit opportunities available for the poor, compared to other, better-off social groups. This political economic context spans scales – such that what happens at the local level is influenced by what happens at higher (national and even international) levels, and vice versa.

Importantly, this context shapes resource access and control, governance, use, and management. Taken together, this means that **resource use dynamics and their impacts are not restricted to local contexts, but span space, time, and scales, from local to international**. Changes in land use and resource availability in one geography are influenced by changes elsewhere (Natarajan et al. 2022).

These inequalities in access to and control of resources cannot be solved solely through biophysical modeling, economic optimization exercises, or transfer of technology such as solar pumps, dams for irrigation or hydropower, that are typical to traditional WEFE nexus approaches. By overlooking inequalities, these approaches miss opportunities to intentionally advance social equity and may often worsen inequality instead. Moving forward, WEFE nexus approaches need to better consider the contexts and politics of resource use. This requires examining the *relative* power of different social groups (across scales) who have stakes in resource use – how the privileges and activities of one group affect those of the others (Natarajan et al. 2022).

2.2 Gender equality and social inclusion: The missing links in WEFE nexus approaches

Around the world, we see persistent gender inequalities in access to resources and decisions over how to use and manage these. Rural women and men, in particular, rely on land and other natural resources for their livelihoods. But often, only men are recognized as the authorities, providers, farmers, and resource managers of their households and communities – even though women, too, are responsible on a daily basis for providing and managing food, water, fuel, cash and other resources.

In general, patriarchal norms give more status, influence and rights to men than women (Doss et al. 2015, UN Women 2022). Too often, **women are left out of development and environmental initiatives, since they are not seen as legitimate stakeholders** (Elias et al. 2021). In reality, however, women have unique knowledge of and priorities for the management of WEFE resources. They also face different and often unequal risks and rewards than men when it comes to accessing and controlling, governing, using, and managing these resources. There are many gender- or inclusion-specific barriers that make it difficult for women to access and progress in decision-making spaces, from underlying societal norms to practical constraints such as time availability and mobility outside of home. This is particularly true in the WEFE sectors as they are considered very technical and thus, due to societal norms, typically associated with men.

Importantly, **women (and men) are heterogeneous groups**, and may have vastly different experiences based on other social factors. For example, poor women in rural areas have different needs and realities with respect to energy or water use than better-off women in cities. Age, marital status, and in some areas caste or ethnicity, among other factors, will influence their access to resources and they ways they use and prioritize these. Overall, however, compared to men, women in all their diversity have limited control over management decisions all levels.

Many categories of men also experience marginalization. Men in disadvantaged groups (e.g., ethnic minorities, lower castes, landless men) may struggle to have their voices heard in their communities and in higher level governance spaces that shape their local opportunities and resource access in significant ways. Advancing GESI in the WEFE nexus is also about recognizing and including these marginalized stakeholders in WEFE decision-making and benefit-sharing.

By addressing these inequalities across sectors in policy and practice, nexus approaches can enable more equitable access to WEFE decisions, services, and benefits for all. In this way, rather than accentuating inequalities, **nexus approaches that carefully address GESI can foster poverty reduction, better health and environmental sustainability for a greater diversity of stakeholders** (Elias et al. 2021). As such, a GESI perspective has much to contribute to the conversation as nexus thinking continues to evolve.

3 A SOCIAL EQUITY FRAMEWORK FOR ADDRESSING GENDER EQUITY AND SOCIAL INCLUSION IN THE WEFE NEXUS

GESI strategies can help identify entry points for fostering equitable and sustainable resource access for diverse WEFE stakeholders at different scales. A social equity framework (Fraser 1998, 2005, 2010) can help guide this process by drawing attention to the *who*, the *how*, and *why* in WEFE initiatives in order to achieve equitable outcomes.

The social equity framework features three pillars (Figure 1):

- **Recognition** – right to dignity
- **Representation** – right to equally participate in and influence decision-making processes
- **Redistribution** – more equal rights to assets and resources fundamental to human rights

These pillars are held together by the guiding principle of ***participatory parity*** – or the ability of all members of society to interact with one another as peers (Fraser 1998). These pillars are explained in the following sections one by one, and concrete approaches and tools are described to help consider these different dimensions of gender and social equity in WEFE nexus interventions.

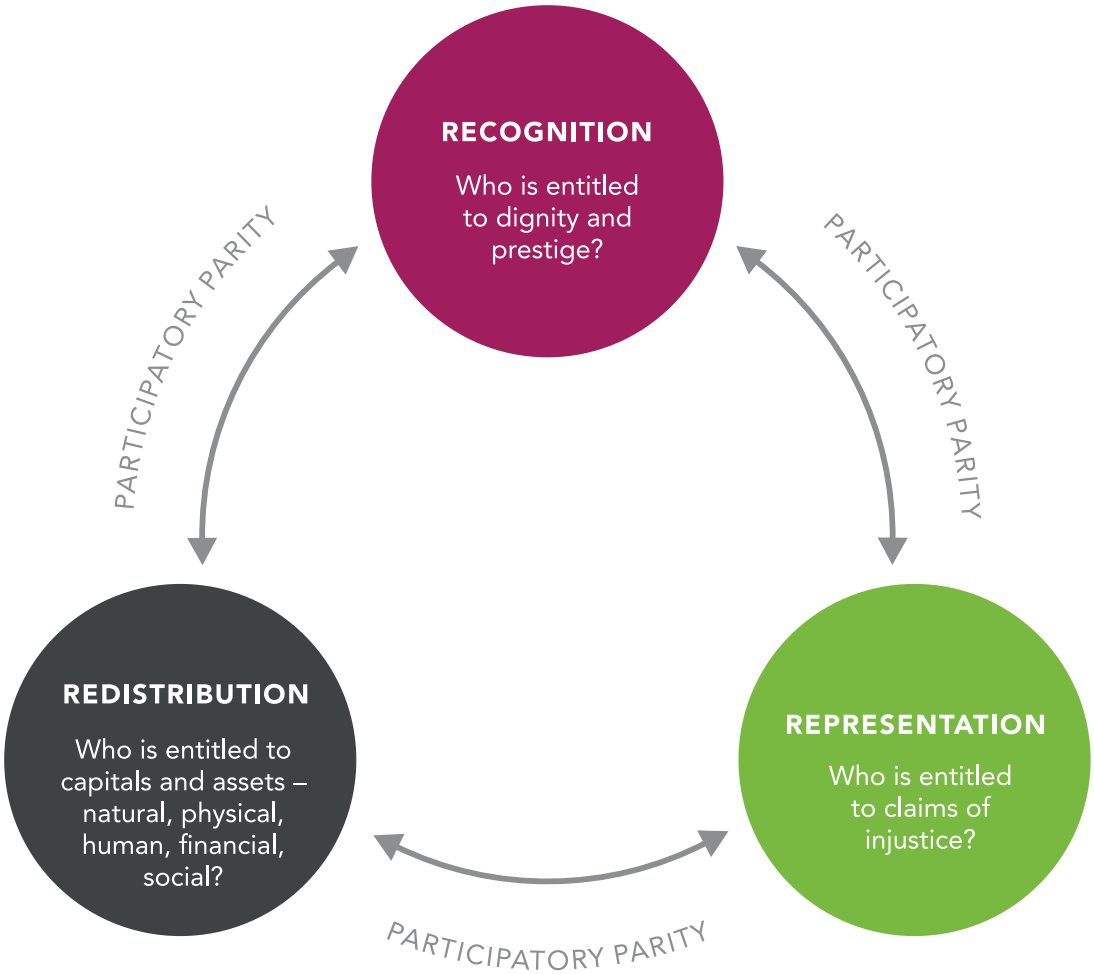

Figure 1. Social equity framework

Source: Fraser 1998, 2005, 2010

3.1 Recognition

Recognition refers to whether a person or social group have equal opportunities to be valued as legitimate, respected, and dignified participants in society. The recognition a person or social group receives is influenced by the (often hidden) attitudes that society holds toward gender and other social categories, such as age, race, caste or occupation (Fraser 1998, 2005, 2010; see also Tilly 1998, Ridgeway 2011). For example, many rural women carry out as much or more farm work than their spouses, but are not recognized as farmers in their own right, and their knowledge and skills are undervalued. As such, they are frequently not considered legitimate stakeholders in agricultural interventions.

WEFE nexus initiatives will need to **identify which social groups will affect and be affected by WEFE nexus interventions**. This **broad range of stakeholders** may include: policymakers, staff of national and local government agencies participating in the implementation of interventions, intended beneficiaries in all their diversity, persons or groups who may be affected adversely by the interventions in the short- or long-term, private sector actors, interest groups, civil society organizations and donors. Among these stakeholder groups, there are highly **unequal power relations**. This means that the knowledge and priorities of some may be perceived as having more legitimacy than those of others. Importantly, from the perspective of social equity, **the needs, rights, knowledge systems, and priorities of different groups – particularly those most marginalized – must be recognized and legitimized**.

These stakeholders, who come from many levels – from local to national and international – are not all usually present in the same WEFE decision-making spaces. Typically, stakeholders with less social and financial capital are the ones who are left out. For example, a decision made in a capital city about rural resources may not include any spokespeople from the impacted rural area. If interventions do not intentionally seek to genuinely recognize all stakeholders, they risk stripping certain communities of their resources for the benefit of other (more powerful) groups.

From a rights-based perspective, those who live in proximity to the resources in question, and whose livelihoods are directly linked with them, deserve particular recognition and protection. In this sense, it is important to make the distinction between *rights-holders* (those with customary and historical rights to determine use and access to natural resources, in ways that are fundamental to their human rights, e.g., indigenous peoples and marginalized groups in local communities) and *stakeholders* (individuals or groups claiming a stake in a decision-making process, e.g., political elites or private companies interested in using the resources) (Armitage et al. 2020). **A 'do-no-harm' principle means that initiatives must ensure, *at a minimum*, that they do not pose undue risks to local people and marginalized community members (rights-holders), and do not jeopardize their livelihoods and well-being**. WEFE nexus initiatives will also have to be accountable to these rights-holders.

Approaches and tools: Stakeholder analysis

To make sure that all relevant groups are included in WEFE nexus decision-making, intervention planning should begin with a stakeholder analysis. **Stakeholder analysis is the process of identifying the social groups who may affect and be affected by WEFE nexus interventions in different ways** (Rietbergen-McCracken & Narayan 1996, Bendtsen et al. 2021). Basic stakeholder analysis **should be done before interventions are designed, and should be revisited and deepened through the design process** as more information about the context is obtained (Holland 2007).

A study aimed at informing the design of agricultural development projects in Kenya's arid and semi-arid lands examined stakeholders' participation in agricultural innovation projects (Eidt et al. 2020), including their:

- Roles in the agriculture sector and interactions with other stakeholders
- Knowledge of agricultural technologies
- Position on agricultural innovations and potential conflicts with other stakeholders
- Ability to mobilize collective action
- Access to other resources that they could use to support or oppose change, and power to effect change as a combination of the above-mentioned factors

It is often difficult to define and identify 'legitimate' stakeholders, and, as a consequence, many projects avoid clearly defining stakeholders. The researchers in the Kenyan study assumed a position that *the legitimacy of a group's claim as a stakeholder is less important than their ability to affect change* in the given system (Frooman 1999). The study results indicated, among others, that farmers who were not affiliated with farmer

groups were particularly marginalized, and had little interactions with dominant, knowledgeable stakeholders such as extension officers and researchers through whom they could access information on improved agricultural practices. Agricultural development projects often prefer to work with existing farmer groups to capitalize on the existing trust and cooperation between group members, but this may result in further marginalization of farmers who don't belong to groups (Eidt et al. 2020).

Village chiefs in Kenya are powerful stakeholders who can call local meetings and make announcements to advance different issues around agricultural development. However, other stakeholders lamented that the chiefs' interest to engage in community development activities varied widely. This affected which communities agricultural extension officers chose to work with, and communities with disinterested chiefs would lose out on access to innovation projects and related human, social and financial capital (Eidt et al. 2020).

3.2 Representation

Representation relates to the ways in which different stakeholders are able to shape the agendas and influence the important decisions that influence their lives. Diverse social groups should be able to participate with equal standing in the governance institutions that affect them, and should be able to speak up to and have their claims addressed if they are unfairly treated (Fraser 1998, 2005, 2010).

WEFE nexus approaches aim to build bridges between different WEFE sectors to develop integrated resource management initiatives. There are often power differentials and competing objectives across government ministries that manage different WEFE resources, with some ministries having more influence and bigger budgets to shape development agendas. At other levels too, diverse stakeholders (e.g., women and men from agriculturalist or herding communities) may have competing priorities for how to manage WEFE resources.

At local levels, resource users have typically maintained a more interconnected view of water, energy, food, and ecosystems, and more integrated land use practices. These resources are often already managed to meet multiple livelihood needs for multiple users. Questions around whose priorities count and how to manage multiple resource use goals are relevant across all levels (local to national and international), but the institutional challenges related to breaking down sectoral silos are generally less relevant among local users/managers, and at more local administrative levels where responsibilities for managing multiple resources are concentrated in the same authorities.

From a GESI perspective, successfully co-developing and implementing WEFE initiatives requires the meaningful participation of diverse nexus actors within and across multiple levels (e.g., local, provincial, national, etc.) in making decisions about how the resources over which they have claims should be managed. **Measures are needed to ensure that diverse actors – and particularly rights-holders in all their diversity – and their interests and priorities, are adequately represented across all phases of a WEFE nexus initiative: from planning to implementation and monitoring**. A GESI approach should seek to ensure that women and marginalized social groups can have voice and influence in the processes shaping resource access and use at the household, community, and higher decision-making levels (Agarwal and Steele 2016).

Unfortunately, **the very stakeholders who have the most to gain or lose from WEFE nexus interventions often have the most limited influence in intervention planning**. These groups frequently lack the means to participate effectively and shape projects in ways that would enable them to benefit from the results. Rural women, for example, often face physical, social or time constraints that prevent them from attending or speaking up at workshops or consultations. These constraints include being busy with domestic and caretaking responsibilities, lack of transportation, and social norms that discourage them from speaking in mixed public spaces (Elias et al. 2021). If meeting invitations are given to households, often it is the male household head who attends. Additionally, poorer social groups may not be able

to forgo work to attend meetings, or may mistrust consultation processes involving authorities based on previous bad experiences (Holland 2007).

Approaches and tools: Recognizing and fostering higher forms of participation

It is important to note that **not all participation is created equal**. To illustrate this, Table 1 shows six levels of participation that range from being included in name only to having voice and influence over decisions. In the **highest level of participation, all are able to interact as peers and to express views with equal weight (i.e., participatory parity)**. Achieving such interactive (empowering) participation requires ongoing negotiation and management of unequal power relations and conflicting interests. This is a challenging process, particularly as there are often limited resources, skills and trust among different participants (Vermunt et al. 2020).

Even when women and other marginalized groups attend a multi-stakeholder meeting, they may not be able to express their views, and may lack influence when doing so *(nominal, passive or consultative participation)*. **Targeted measures are needed to ensure that women and other less powerful actors can express their voices and priorities and that their views are meaningfully considered** *(active and interactive/empowering participation)*. In many contexts, specialized information resources may be needed to expand access to basic information about the intervention (e.g., by considering different levels of literacy and access to information and communications technologies). Project consultations may need to include facilitated sessions where small groups of women or socio-economically marginalized groups can learn about and interact effectively with one another on intervention planning, implementation, or monitoring needs, and have their priorities tabled. Other strategies, such as having a critical mass of women at meetings, and inclusive facilitation tactics, have been shown to support inclusion in decision-making forums (Box 2) (Bailey et al. 2021, Zaremba et al. 2021).

Enabling marginalized groups to meaningfully participate in WEFE initiatives requires addressing the context-specific barriers they face, described above. Skilled field teams can help identify these barriers using tools such as participant observation, key informant interviews, consultation workshops, and shared action learning programs. To understand and lift these barriers, interventions must carefully consider the local context, including power relations and the history of WEFE sector development in the project area. Box 2 provides examples of strategies to foster equitable participation.

Empowering participation and bottom-up learning requires continuously asking: what voices are being heard at the different stages of decision-making processes, and what is the weight and legitimacy given to diverse voices (e.g., those of indigenous women and men concerned with cultural or traditional values, energy companies primarily

Table 1: Typology of participation

Form of Participation	Characteristic Features
Nominal participation	Membership in the group
Passive participation	Being informed of decisions *ex post facto*; or attending meetings and listening in on decision-making, without speaking up
Consultative participation	Being asked an opinion in specific matters without guarantee of influencing decisions
Activity-specific participation	Being asked to (or volunteering to) undertake specific tasks
Active participation	Expressing opinions, whether or not solicited, or taking initiatives of other sorts
Interactive (empowering) participation	Having voice and influence in the group's decisions

Source: Agarwal 2001

Box 2. Tactics for supporting equitable and active participation in meetings

- Center meetings on issues of importance to women and other marginalized groups, placing these issues at the top of the agenda
- Actively seek contributions from quieter groups
- Call on women to speak first
- Include women in facilitation, moderation, and leadership roles
- Establish quotas for women's and men's participation, consultation, decision-making, and voting
- Communicate that there are no right or wrong answers and no bad questions
- Promote and respect distinct and gendered speech patterns and meeting rhythms
- Allow for discussions in informal settings, smaller groups, and single-gender groups
- Ease into difficult topics with ice breakers and other planned approaches to find common ground between partners
- Be explicit and deliberate about how and why various inclusive tactics are being used

Source: Zaremba et al. 2021

concerned with profitability, etc.). This means involving stakeholders, building trust, and giving enough space and time for collective learning. It also means **allocating adequate financial and technical resources from the beginning to facilitate the process, mobilizing the right skills to support a rigorous action learning initiative, and strengthening local capacities for conflict mediation and negotiating power imbalances**.

3.3 Redistribution

Redistribution refers to an intentional effort to bring more equity to how rights and goods, as well as costs, risks, and responsibilities, are distributed in a society. These rights and goods give power (including power over others) to those who control them. Resource access shapes and is shaped by gender differences, class structures, and other group-based differences that empower some groups while marginalizing others (Fraser 1998, Tilly 1998, Ridgeway 2011).

Recognition and representation are goals in and of themselves, as they are essential to fairness and human dignity; **but they are also important to ensure that the costs, benefits, and risks of WEFE initiatives are equitably distributed (which generally implies a need for *re*distribution)**. Interventions usually have both planned and unplanned outcomes. These may be positive or negative, and will affect different stakeholder groups unevenly. Achieving equitable outcomes requires that stakeholders have equitable influence over WEFE agendas and decision-making.

Approaches and tools: Understanding different types of livelihood assets

To examine the distribution of costs, benefits and risks in WEFE nexus interventions and help identify ways to achieve a more equal distribution, we use the **Sustainable Livelihoods Framework (SLF)**.[1] The SLF focuses on the different types of (tangible and intangible) assets that resource users can draw upon to secure their livelihoods, and how these assets interact with each other. Assets can take many forms, and the SLF shines a light on: natural, physical, human, financial, social and political assets or 'capitals' as they are called in the framework (Box 3) (Chambers & Conway 1992, Meinzen-Dick et al. 2014, Zhang et al. 2021). Availability and access to these assets to achieve livelihood outcomes depend on structural factors – global policies, norms, other institutions, and markets – which affect diverse social groups in different ways and can systemically marginalize, include or exclude certain groups.

Key characteristics of the SLF are as follows:

- **Assets are interdependent and partially interchangeable**: for example, physical capital (such as a tractor) can be used to replace manual labor, and social capital (such as social networks) may compensate for the lack of financial assets by serving as safety nets when disasters hit. Likewise, natural resources such as fuelwood, wild fruits and nuts can be harvested for subsistence if access to physical or financial capitals is disrupted.
- **Access to human, social and political capitals is relational**: as some social groups gain access to these capitals, other groups may lose or have to surrender power over

Box 3. Different types of livelihood assets or 'capitals'

- **Natural capital**: e.g., land, water, fuelwood, wild food sources, genetic resources
- **Physical capital**: e.g., irrigation and road infrastructure, transport, electricity, tools and machinery, storage, production inputs (seed, fertilizers, pesticides)
- **Financial capital**: e.g., regular income, savings, liquid assets, formal and informal credit facilities
- **Human capital**: e.g., knowledge and skills, education/training, health, nutrition, capacity to work
- **Social capital**: e.g., membership in formal and informal groups (such as Water User Associations, producer groups, etc.), collaboration, access to opportunities through social networks
- **Political capital**: citizenship, enfranchisement, effective participation in governance

Source: Adapted from Meinzen-Dick et al. 2014, Natarajan et al. 2022

[1] Here, we use an updated version of the SLF which gives more weight to structural factors, pays attention to relational aspects of resource distribution (e.g., power dynamics), and includes contexts of globalization and urban-rural interdependencies (Natarajan et al. 2022, revised from Scoones 1998 and DFID 1999).

them. For example, empowering women and marginalized groups in resource management often requires traditionally dominant decision-making groups to relinquish some of their control.

- **Social structures and norms that impact resource users' options have been shaped through historical processes, policies and mechanisms**. To effectively address constraining structures and norms, it is important to understand how these structures have emerged and are reproduced (Natarajan et al. 2022).
- In an **interconnected world**, changes in capitals in one location are affected by resource use and decision-making in other geographies.

The SLF framework helps to understand how costs (reduction of capitals), benefits (gains in capitals) and risks are distributed among different stakeholder groups, as well as the tradeoffs and synergies among assets that may result from WEFE nexus interventions. In this way, the framework helps to consider different pathways for achieving sustainable livelihood outcomes,[2] while acknowledging that all livelihoods are dynamic and that, as such, outcomes of any given intervention can vary.

To identify potential (re)distributional outcomes of WEFE nexus interventions among different social groups, key questions include:

- How do the planned interventions affect the availability, flows, and distribution of different capitals among diverse social groups? Which groups would gain which types of capitals or resources? Which groups would lose access to and control over capitals or resources as a result of interventions?
- How do history and context (policies, norms, other institutions, and markets) influence the distribution of costs, risks, and benefits of the planned interventions among social groups, from local to global levels?
- What structures, processes, checks and balances are needed to level the playing field and improve opportunities for women and marginalized social groups?

A hypothetical example of how an asset-based approach can shed light on the distributive outcomes of a WEFE intervention is provided in Table 2. It describes some of the many possible changes in assets among various stakeholder groups in 'Nexus Land' as a national program is established to increase positive water-energy-food interactions through the widescale adoption of solar pumps (a technology commonly used to address WEFE nexus challenges).

[2] For Bebbington (1999, p. 2029), sustainable livelihood outcomes are: "income, dignity, power, and sustainability: or in other words… consumption levels that reduce [people's] poverty; living conditions that imply an improved quality of life according to people's own criteria; human and social capabilities to use and defend assets ever more effectively; and an asset base that will continue to allow the same sorts of transformations."

Table 2: Hypothetical examples of costs, benefits and risks of a WEFE nexus intervention (solar pumps) for different social groups, assessed using the Sustainable Livelihoods Framework

Natural capital	Physical capital	Financial capital	Human capital	Social (and cultural) capital	Political assets
Farm-household level Stakeholders: Men and boys, women and girls from different generational groups; heads of household, aunts and uncles, siblings, in-laws					
Older men from farming households claim previously less productive lands for irrigation that were under the control of women and young (single) men. Older men from farming households grow more or new water-demanding crops. Men and women from herder and landless communities are disadvantaged as the common property lands they rely on are privatized to support new irrigation arrangements.	Better-resourced men from farming households own new solar pumps. With additional income, these men are increasingly able to afford inputs for agricultural pursuits and consumption goods (motorcycles, mobile phones, etc.).	Irrigated cash crops increase household income. In most households, income from cash crops is controlled by the (male) head of household; women and young men have fewer claims to this income.	Men's skillset for irrigating cash crops and using water pumps increases. In farming households, cultivation of more or new irrigated crops requires labor contributions from all able-bodied household members. Increased income leads to some positive changes in diets for all household members.	Erosion of rituals and gender-specific social status associated with subsistence crops.	
Village level Stakeholders: Women and men of multiple generations from founding lineages and newcomers, groups of farmers and herders, wealthier and poorer households, landowners and landless groups, multiple ethnic groups					
Biodiversity is reduced as biodiversity-friendly parcels, such as fallow lands, home gardens, and seminatural habitats are replaced by farmed fields. Land conversion puts pressure on ecosystems and the services these provide (e.g., food from the forest during the dry season). The livelihoods of women from those groups who are responsible for collecting forest foods are increasingly fragile.	With increased incomes in the village, new infrastructure (e.g., small shops and kiosks, solar electricity) is established in the village. Although it is largely owned by elites, this new infrastructure brings benefits to all village residents.	Overall income increases for participating families, and increased cashflow catalyzes development and buoys the village economy. Since a greater share of benefits accrue to wealthier, landowning families who profited the most from the solar project, there is increasing social differentiation within the village.	New dry season income-generating opportunities lead to reduced off-season outmigration of young men from the village. The national solar pump program deploys training on irrigation systems targeted to formal (male) landowners, which increases their knowledge and capacities.	Unclear social norms for water pumping cause difficult conversations, but open the door for potential transformation of discriminatory norms. Young men with more formal education play leadership roles in new irrigation arrangements and thereby gain social status.	Local politicians distribute subsidized equipment to consolidate their power.

Table 2: *Continued...*

Natural capital	Physical capital	Financial capital	Human capital	Social (and cultural) capital	Political assets
Watershed level Stakeholders: Multiple villages, administrative units and levels, possibly multiple countries					
Upstream users increase their water consumption, whereas downstream users (across villages and state lines) have less water available for their use. Environmental flows are affected, and aquatic biodiversity becomes more vulnerable.	The adoption of solar pumps in multiple villages improves multiple assets/infrastructure.	Private sector actors who sell solar irrigation pumps develop their market shares and profits.		Multi-village associations/user groups of irrigators are put in place at the watershed level. Male village elites are positioned to represent their communities and benefit from these, but quotas for other groups (women, herders) encourage them to participate.	Representatives from local water user groups build ties with higher-level authorities in multi-stakeholder platforms. This allows them to bring other issues of concern to them to higher-level authorities.

4 CASE STUDY: ADAPTIVE COLLABORATIVE MANAGEMENT FOR EMPOWERING LOCAL COMMUNITY MEMBERS IN NATURAL RESOURCE MANAGEMENT

The above examples illustrate different dimensions of gender and social equity that project teams need to consider in planning and implementing WEFE nexus interventions, to ensure that the interventions benefit marginalized social groups, or, at minimum, do not further disadvantage them. In this case study, we demonstrate collaborative process approaches can be used to strengthen resource users' capacities and empower them to identify and implement their *own* solutions for sustainable resource management.

By adopting collaborative approaches for planning, monitoring and reflection, projects can support participants and other stakeholders and create enabling spaces for them to innovate, identify and implement their own WEFE nexus solutions. Such approaches, which center on rights-holders and places them at the heart of decision-making, in collaboration with other key stakeholders, contrast with the more conventional externally determined interventions. They contribute to a sense of ownership among participants, which is crucial for sustainability after project support ends. Engaging diverse stakeholders in cycles of reflection and action, wherein they are able to set their own agendas, also helps to address the underlying power imbalances that ultimately constrain access to and use of WEFE resources. The political nature of resource use decisions highlights the need for transparency and decentralized decision-making in nexus approaches (Allouche et al. 2015).

In our example, an approach called **Adaptive Collaborative Management (ACM) was used to empower multiple users to co-manage forest resources in three communities in Indonesia** (one in Sumatra's Jambi province and two in East Kalimantan; Kusumanto et al. 2005). ACM is an iterative and participatory process that centers on cycles of shared action learning and reflection, and on the active participation of disadvantaged stakeholders as the intervention unfolds (Figure 2).[3] Trade-offs and synergies of resource use decisions and their potential implications for different stakeholders are explored under multiple 'solution' scenarios, using both modern scientific and local and traditional knowledge. Conscious and constant efforts are made to build bridges among

[3] ACM entails a bottom-up action learning process whereby the "people who have interests in a forest agree to act together to plan, observe, and learn from the implementation of their plans while recognizing that plans often fail to achieve their stated objectives." (Colfer 2005, p. 4).

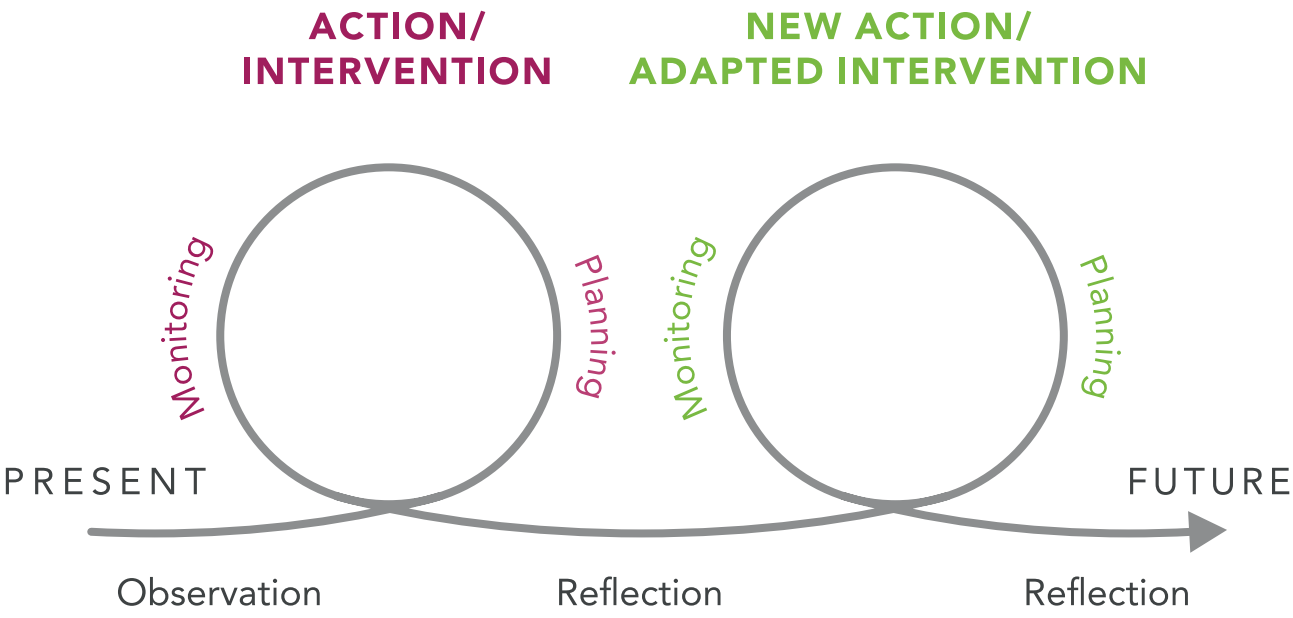

Figure 2: Iterative cycles of observation-planning-action-monitoring-reflection that characterize Adaptive Collaborative Management

Source: Kusumanto et al. 2005

stakeholders to achieve equitable collective decision-making and learning (Kusumanto et al. 2005). Synergistic strategies are identified while minimizing trade-offs. From there, community members begin to innovate by, for example, testing new livelihood opportunities or new avenues of political influence with local authorities to better meet the community's needs for resource access.

ACM initiatives are typically community-based and center on local processes, supported by external field researchers. Although they focus on the grassroots, ACM initiatives also link communities with other stakeholders, including government authorities and private sector or civil society organizations. Using the example of Kusumanto et al. (2005), we demonstrate that ACM's learning cycle engages all three pillars of social equity (recognition, representation, and redistribution) to achieve sustainable and equitable WEFE nexus solutions.

While the example focuses on the management of forest resources – important for water regulation, energy, food and other ecosystem services – the ACM approach can equally well be used to help plan management of other WEFE resources in other land management contexts.

4.1 Recognition

In the three Indonesian communities, stakeholder analysis was included in an early step in the learning process to empower multiple users to co-manage forest resources through ACM. The analysis asked, among other questions:

- Who should be involved in the process?
- Who are the stakeholders in forest management in this area?

Table 3 illustrates key actors identified through the stakeholder analysis activities conducted in each community. The facilitation team spent months visiting each community to get to know the local contexts and to build trust with the many different segments of each community.

These key stakeholders were then involved throughout the intervention, and their knowledge systems, experiences, and priorities were considered as equally valid and important throughout the planning and reflection process.

Table 3. Key stakeholders in ACM communities

Baru Pelepat Village, Jambi	Rantau Layung and Rantau Buta Villages, East Kalimantan
■ Nomadic *Orang Rimba* (women and men) ■ Original community (women and men) ■ Settler community (women and men) ■ Village elite ■ Youth ■ Customary institution ■ Village government ■ Religious institution ■ Women's groups	■ Farmer groups (women and men) ■ Youth (women and men) ■ Forest workers (all men) ■ Elderly (men) ■ Village elite (formal government officials and customary leaders)

Source: Kusumanto et al. 2005, p. 42

4.2 Representation

ACM is particularly well suited to advance representation, as it is designed to enable action learning among community members with different understandings and experiences. Active participation of all key stakeholders along the entire ACM intervention – from stakeholder analysis to shared planning, action, performance monitoring and reflection – are central to learning and progressing toward the desired resource management goals or shared vision (Kusumanto et al. 2005, Giller et al. 2008). Along this iterative cycle, ACM principles focus on:

- Effective communication and information flows among stakeholders
- Active participation and wider representation in decision-making and negotiation of all important stakeholders
- Mechanisms to manage conflicts, adapt to rapid changes/surprises and uncertainty
- Intentional learning and experimentation
- Institutional willingness (i.e., attitudes) and capacity (i.e., skills and resources) to learn and respond to learning
- High mutual respect/trust and transparency
- Shared knowledge/skills
- Collective planning, decision-making, action and monitoring, including attention to relationships within and between human and natural systems

In the Indonesian ACM experiments, tools used to support inclusive decision-making included participatory boundary or social mapping exercises and small-group meetings among different sets of stakeholders (such as young women or men from groups that recently settled in the community) to undertake shared visioning or priority-setting exercises that addressed livelihood needs or resource scarcities. Over time, as more and more was shared, participants developed a collective understanding of current socio-ecological processes (e.g., land degradation), interactions, and power struggles related to natural resource management (e.g., land claims among groups in marginal lands; pressures from the palm oil industry, settler groups' differing needs and interests). In the East Kalimantan villages, for instance, traditional and official authorities each claim rights to manage the local forests. These processes of shared learning, including about different authority systems, strengthened the capacity and confidence of weaker groups to:

- Manage new information
- Negotiate
- Organize and gain institutional competence
- Problem-solve

Among other changes observed, women from the villages began to be represented in local resource management decision-making for the first time. Villagers (women and men) also observed greater trust and ability to communicate and network with other communities, and with authorities from logging companies and the government.

4.3 Redistribution

The ACM process built on the Sustainable Livelihoods Framework to monitor changes in the (social, human, natural, financial and physical) capitals in the three ACM intervention communities (Figure 3). The most evident benefits concerned *human* and *social* capital, including in participants' leadership skills, technical knowledge (mapping skills, recording and analyzing data), communication and negotiation abilities. Stakeholders of different social status developed the motivation and confidence to improve their relationships with each other). By building up social capital, ACM was seen to offer more collaborative livelihood strategies for stakeholders to test as part of the learning process. ACM's bottom-up agenda-setting and shared learning approach also inspired changes in other capitals by supporting livelihood strategies that not only improved incomes, but also reduced vulnerability, increased community members' well-being, improved food security, and led into more sustainable use of natural resources.

In sum, the example of ACM implementation in Indonesia from Kusumanto et al. (2005) shows that **it is possible, over time, to build collective learning and trust across the phases of WEFE interventions by being interactive, interdisciplinary, multi-level, multi-stakeholder, collaborative and iterative**. Marginalized groups that have a stake in WEFE nexus interventions should be recognized as legitimate actors, and their knowledge systems, priorities, and experiences valued. These stakeholders should actively participate in making decisions about processes that affect their lives, and they should receive an equitable share of the benefits (and not only carry the costs or risks) of those interventions. Specific measures will be needed to support the interactive participation of these less powerful groups and their capacity to influence agendas and outcomes. Defining a clear monitoring strategy, with indicators specifically focused on GESI, is crucial for tracking progress, commitments and agreements made among stakeholders and partners. When and how monitoring takes place, by who and for whom, is critical for local empowerment and a sense of ownership of the project or initiative. By placing GESI considerations at the heart of WEFE nexus interventions, it is possible to advance a more equal and sustainable management of WEFE nexus resources.

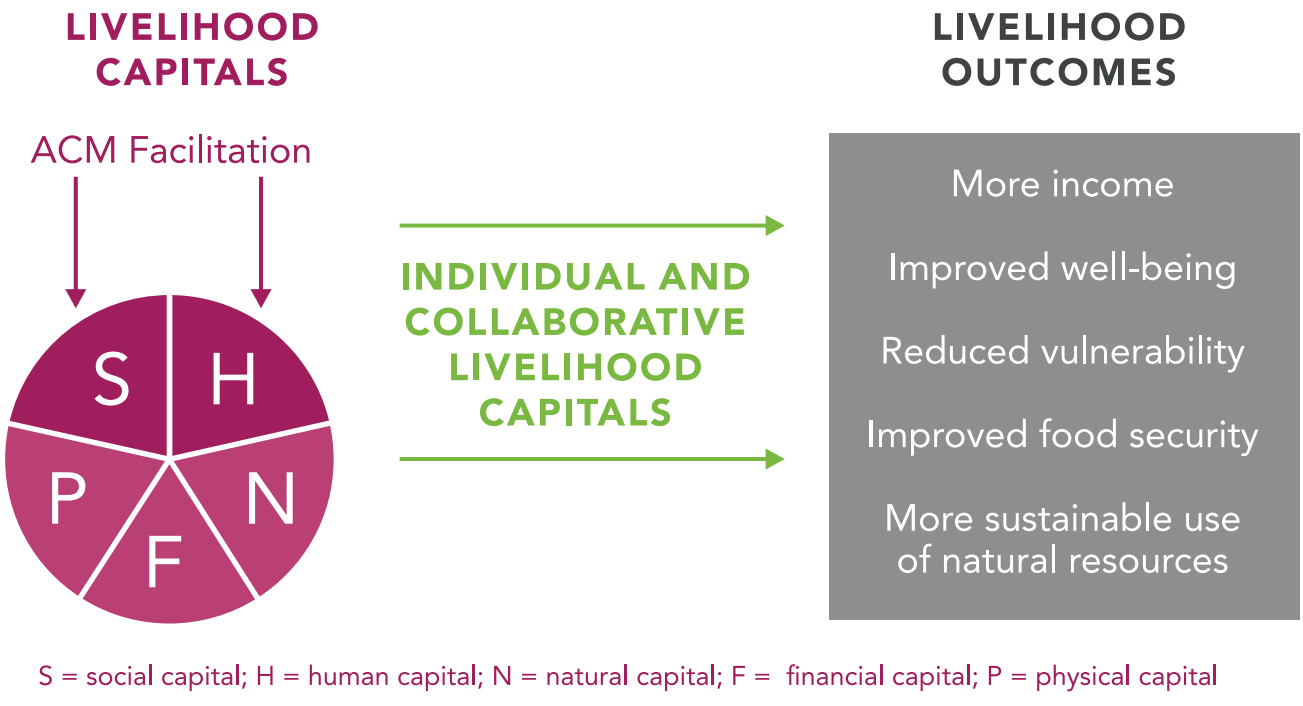

Figure 3. ACM and the Sustainable Livelihoods Framework

Source: Kusumanto et al. 2005, p. 99

5 SYNTHESIS

Learning objective 1: Explain the importance of gender equality and social inclusion (GESI) for achieving sustainable development outcomes in the water-energy-food-ecosystem (WEFE) nexus

A GESI lens highlights the unevenly distributed constraints and opportunities that shape decisions, resource access, and benefits among different WEFE nexus stakeholders. Understanding these inequalities is important for developing more equitable and sustainable WEFE nexus research and development initiatives. GESI approaches include systematic monitoring to reduce risks of harm to women or vulnerable social groups that may arise from an intervention.

Nexus approaches must look beyond resource conservation, productivity, and efficiency objectives to consider:

i) the political economic context (policies, institutions, and practices) that shape the access and control, use, governance, and management of water, energy, food, and the environment, and that generate and maintain inequalities, and;

ii) measures that can lift these barriers and expand access to, decisions on, and benefits from WEFE resources for women and other disadvantaged groups.

The Social Equity Framework's principles of recognition, redistribution, and representation, together with its overarching concern for participatory parity (Figure 1), can offer entry points to identify and address these GESI considerations.

Learning objective 2: Describe common challenges and issues that WEFE projects face with GESI

Development interventions that impact livelihoods, such as those focused on the WEFE nexus, have uneven effects on different social groups. Influential stakeholders often dominate decisions and capture the bigger share of benefits, whereas those with less power may not be able to influence agendas and/or gain substantial benefits from interventions. They may also bear a disproportionate share of the costs and risks of interventions. Still others may be excluded altogether. These dynamics, and how they may take shape over time, should be considered and addressed to ensure that interventions ease (rather than increase) power imbalances and reverse (rather than accentuate) resource degradation.

Learning objective 3: Describe the main steps for better GESI considerations

A GESI lens and the frameworks and concepts shared in this lesson help to understand how interventions can have unequal effects on women and men from the many social groups who depend on WEFE nexus resources. Recognition is the starting point for enabling processes of participation, accountability, and inclusion. Stakeholder analysis is one tool to identify actors – including those most marginalized – with stakes in WEFE nexus management, and engage a wider range of actors, networks, institutions, and knowledge systems. The legitimacy of rights-holders, in all their diversity, who have stakes in WEFE nexus management should be recognized.

These actors should be represented in WEFE nexus governance as equals, expressing their needs and priorities for WEFE nexus management. This calls for reflecting throughout the intervention on what voices shape agendas, and ensuring sufficient resources to enable cycles of reflection-action-learning in favor of more marginalized groups. Throughout the process, practitioners should ask: what mechanisms need to be implemented to enable inclusive and active participation? What strategies can level power imbalances? How can collective reflection and learning be supported?

Finally, the potential benefits, costs and risks of interventions should be assessed for different stakeholder groups. The Sustainable Livelihood Framework offers a multidimensional perspective on capitals and assets to shine a light on these potential or actual outcomes. Outcomes will vary for different stakeholders, and will need to be examined for each group to support their equitable distribution. Important questions

include: who benefits from interventions and how, and who pays the costs? What alarm systems and safeguards are needed to mitigate and address unintended negative consequences? And which trusted actors can play a part in these early warning systems, to ensure no one is harmed by interventions? From a monitoring perspective, what indicators can help understand the effects of interventions on GESI, and what (participatory monitoring) approaches can support adaptive learning toward more equitable outcomes?

Carefully integrating GESI considerations throughout all phases of WEFE nexus initiative planning, implementation, and monitoring will contribute to more socially equitable and resilient nexus management across scales and over time.

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