Future DAMS

Design and Assessment of water-energy-food-environment Mega-Systems

GUIDE

Engaging stakeholders in water-energy-food-environment systems assessment and planning: A FutureDAMS guide

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Executive summary

This guide proposes a series of steps and principles for conducting stakeholder engagement in decision making around water–energy–food–environment (WEFE) interventions, whether building or repurposing new infrastructures or implementing policies. It outlines a 5-step process that can be run alongside multi-criteria assessment and design of natural-human systems like river basins. The guide is our attempt to describe an ideal process that can be adapted to each place where it is being used. Our approach is underpinned by the idea that better decisions will be generated if a broad range of stakeholders are included in a genuinely participatory manner to allow for a holistic, system-scale consideration of development options. Conducting such a stakeholder approach can even generate consensus across a diverse set of representative actors on a short-list of interventions to make in WEFE systems; it can also help build more useful environmental simulation models. This document therefore sets out the process for achieving stakeholder engagement by describing an ideal standard for undertaking participatory WEFE assessment modelling using established stakeholder methods.

In brief, the FutureDAMS Approach involves:

1. Foresight development needs
2. Which projects meet development needs?
3. Participatory stakeholder modelling exercise
4. Options assessment
5. Recommendation report

Who is this guide for

The proposed process is intended for those considering model-assisted WEFE system option assessment tool. It is therefore directed towards convening organisations, such as government ministries, utilities or river basin associations, and facilitating organisations, ie consortia or operational teams assembled to manage the stakeholder process. Such institutions may be national or international, or a mix of these. They may also include private companies, like consultancies or (semi-) privatised utility companies. Crucially, however, the convening organisation(s) should have an appropriate remit and be a decision maker for some or all of the resource systems being considered, as well as having the scope and power to convene stakeholders for this participatory planning process. The document describes the steps and process for these *conveners* and *facilitators* to consider. Considerable emphasis is placed on the key mechanisms that should make this stakeholder process genuinely participatory; we also provide an extensive overview of possible difficulties and risks in conducting such design assessments, and discuss how to potentially overcome or mitigate these. Additionally, in condensing information on participatory approaches, we believe that this guide will also be useful for researchers and other practitioners interested in stakeholder processes and participatory modelling. The guide aims to bring together the sum of knowledge and points to further more detailed resources.

The challenges of decision making

We believe that following the process outlined here provides a good opportunity for achieving development. But in preparing this guide, we are aware of the difficulties in convening and implementing an ideal process – even in well established, industrialised democracies. We are also aware that, even if all the steps advocated here are followed, they may not lead to socially or environmentally just outcomes. Fundamentally, the process outlined here is a political one, involving the selection of a balance of benefits and costs anticipated to arise as a result of one or more proposed WEFE system changes (such as a new dam, a change to water and/or energy allocation, etc). We understand stakeholder co-produced processes cannot operate independently from the wider political contexts or the formal and informal power held by individuals and institutions. Undertaking the proposed approach therefore entails inherent risks. We offer ways to assess and potentially mitigate such risks. We also present a methodology for conducting a political economy analysis to build an overarching understanding of the political environment in which the FutureDAMS research is being undertaken, thereby generating an idea of how this might enable or hinder its success.

This guide aims to inform potential *convenor* and *facilitator* institutions and individuals on how to maximise their potential to improve design, assessment and decision making on WEFE systems through a participatory process. While acknowledging the risks and limitations in undertaking such stakeholder human–natural system design processes, we hope this guide may increase the efficacy of a stakeholder co-production approach and its ability to improve decision making.

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Contents

> Introduction 5

> Making Better Decisions in WEFE systems: A proposed 5-Step Approach 11

> A 4-Part Process for Forming and Convening a Stakeholder Group 17

> Concepts of stakeholder-based planning 26

> The Importance of Participation in WEFE Decision Making 29

> Challenges to the Stakeholder Participatory Processes 33

> The Proposed Stakeholder Process - A Comparative Perspective 40

> Further Reading 45

> References 46

Introduction

Context and Justification 6

The Proposed Framework 6

The Principles Informing the FutureDAMS Approach 7

Justifying a Role for Stakeholders 8

What are the Key Roles in the Stakeholder Process? 8

Differences Between the FutureDAMS Approach and Other WEFE Frameworks 10

Context and Justification

By the 2050s it is predicted that 2.1 billion people will be added to the human population, and that 68% of these will live in cities (up from 55% currently).[1] This growth will lead to new demands, and an intensification of the use of natural and human-provisioned resources like water, energy and food, and will place increased stress on the natural environment. Large-scale interventions are being implemented to prepare for future resource demands, with many more planned. These interventions involve mixes of new infrastructure and new ways of allocating and managing natural and human-developed resources. How should proposed projects be evaluated? Or, more fundamentally, how should proposed projects be identified? The traditional approach to evaluating investments is to assess a single project's costs and benefits. But as awareness of the interconnections between systems has grown, and given increased social and environmental pressures across the water–food–energy–environment (WEFE) nexus, questions have been asked about the interrelationship of impacts across this system. This is the motivation behind the tools like those being created in the FutureDAMS project, which integrate water, energy and agricultural models. This document presents ways of undertaking stakeholder engagement to co-produce resource-systems planning using integrated human-natural system assessment tools.

The Proposed Framework

This guide is based on the premise of a convenor, typically envisioned to be a government or development agency, initiating planning given their mandate to develop a country or river basin. In order to undertake the stakeholder process, this convener will need to appoint a *facilitator* who can bring together the stakeholders and manage the modelling process. This guide proposes a 5-step process, building on conventional public policy analysis,[2] which starts by identifying problems and proceeds to elaborate and compare solutions until an option is identified.

Step 1 involves identification of development needs. Following that, **Step 2** considers potential technologies or projects that could support these needs. Then, if these projects involve water, energy, irrigation or ecosystem service infrastructure investments or policies, the integrated assessment model offers an assessment of these options' impacts and interactions.

Step 3 involves a modelling exercise with a participatory, stakeholder process, whereby a representative group of interested parties further deliberates the developmental needs and a set of proposed projects to meet them, this time more confined to the water-energy-food-environment nexus. This should produce a list of interventions – quantitative metrics that define the tangible services which would meet these needs. These performance metrics may be diverse; they help stakeholders define the extent to which their goals have been met. Stakeholders and experts can then help define uncertainties in supply and demand. At the same time, sensitivity analysis and/or more advanced approaches like 'Robust Decision-Making' may be used to identify the relevance of any sensitivities (ie which of them could derail the achievement of needs and aspirations). They should also help define the system model, establishing connections within the WEFE nexus, for instance in the location of farms' use of a river in the wet season or the nature of fish migration, etc.

In **Step 4**, once the system has been modelled and options for new or repurposed infrastructure established, computer 'simulation' models are used to track resource availability and distribution (supply and demand). These WEFE integrated assessment models consider the distribution of resources and the generation of associated impacts over space (resource creation, transmission and storage if relevant) and time (when services/resources are delivered). Step 4 then involves assessing the different infrastructure and policy options. A computer simulates all possible combinations of the identified options in the WEFE system and presents results which demonstrate how far they meet the stakeholder-defined performance metrics. Typically the search considers different states of the world, specifically any relevant supply and/or demand uncertainties identified in Step 2. While this search might initially reveal inevitable errors and unacceptable assumptions (e.g. over demand/

[1] UNDESA, '2018 Revision of World Urbanization Prospects'.
[2] Bardach, A Practical Guide for Policy Analysis.

supply metrics) they can be corrected through iterative refinement. The outputs of this option filtering and evaluation can then be presented as trade-off on a graph identifying which combinations of interventions lead to which benefits. Application of multi-criteria decision-making (MCDA) approach like this enable debate over which infrastructure investments or policy changes should be short-listed in light of their performance, and over their distribution of costs and benefits over space and time (which impacts start when).

This supports the final, **5th step**, which is the creation of a report recommending a set of (non) interventions and the rationales behind them.

An essential element to all phases is the active participation of a diverse coalition of willing and interested stakeholders engaged in a consensual co-production process, with institutional backing and credibility. Participation refers to a set of mainstream practices in public policy and international development that attempts to ensure that those on the receiving end of 'development' can influence decisions about the goals and means of said development. Participation is premised on the idea that giving the subjects of development a greater role will produce better decisions, because it fosters greater mutual understanding and cooperation between stakeholders and enables a consensual distribution of benefits and costs by communities. In the proposed approach, participation involves shaping decision-making processes addressing water, energy, food-security and environmental stability. These are likely to include decisions about where dams and other major water infrastructure management projects (ranging from 'build' to 're-operate' to 'remove') are options, so that the voices of those potentially benefiting from and/or being harmed by infrastructure can be heard in relation to their preferences, concerns and possible alternative options. However, such participatory ambitions face numerous challenges and are rarely fully realised.

In order to successfully conduct a stakeholder process, it is important to specify who the stakeholders are, and to map out the potential field of relevant people and organisations before convening them. This document sets out principles and practical steps to achieve these stages of analysis and convening. It then reviews debates in the literature to provide a context, ending by outlining the risks and problems in stakeholder processes that require consideration by all actors, including those providing decision-making support services (modellers, economists, engineers, social scientists, agriculturalists, etc).

The Principles Informing the FutureDAMS Approach

- **Start by identifying development needs, not with an infrastructure project:** based on mainstream public policy analysis and the World Commission on Dams' recommendations, we believe that any WEFE nexus approach should start by thinking about what a place's development needs are. Before identifying any individual projects or technology, the purpose of the exercise, its end goal of creating development, need to be clear.
- **Participation:** our premise is a democratic one, namely that including the range of people positively and negatively affected by an infrastructure project, and particularly a dam, improves the assessment of whether it is needed, what it will deliver and what can be done to mitigate the negatives and maximise benefits.
- **Adaptation:** this guide is a generic, idealised version that requires tailoring to the diversity of historical, political, economic and environmental contexts across the world. We provide a basic process which *should* be adapted and changed by conveners and *facilitators* to their own circumstances
- **The role for modelling:** fundamentally, the value of the FutureDAMS Approach is that it enables a simplified presentation of complex technical assessments so that more informed, rigorous decision making can happen.

Justifying a Role for Stakeholders

Globally, the importance of giving a relevant and diverse group of civil society and private sector actors an active role in decision making is increasingly recognised. This is linked to normative support for the ideal of democracy but also to attempts to address 20th century failures in delivering development. Too often large projects like dams and irrigation schemes have failed to meet promised benefits. One way of increasing the rigour of policy making in this area is to open decision making to those affected by such infrastructure. This can enable a more accurate understanding of the baselines conditions of developmental needs, of the value of the environment and of possible solutions or effective mitigation measures. Additionally, project delays and cancellations generate large costs and may exacerbate political and social conflicts. Engaging with a broad range of stakeholders can help avoid these by improving the choice of investment or policy to pursue in order ideally to maximise benefits while minimising negative impacts. Studies demonstrate that undertaking effective stakeholder engagement, while requiring time and finance, can be highly beneficial. In fact, their benefits are argued to outweigh such costs.[3] Engaging a broad range of relevant societal representatives also allows governments to gain greater public support for a set of interventions and choose a project less likely to provoke social unrest, thereby reducing the chance of generating conflict and delays caused by protests and legal action.

The public licence to go forward with a consensus on what actions to take is the ideal goal of stakeholder involvement. Therefore, our proposal does not set out to create a consensus and a coalition behind a particular intervention, like the construction of a certain infrastructure project. Such a purpose would consciously or unconsciously bias the *conveners* and *facilitators*, co-opting the stakeholder process towards a desired outcome. Rather, its purpose is to create a forum for debate and discussion. In an ideal world, this would allow for all sides of a debate to be argued out and resolved in the perfect solution. The more muddling reality is that stakeholder processes tend to produce major disagreements. This may either result in the abandonment of a policy intervention in favour of an alternative or, if a large majority can agree on a way forward, it may create a coalition of civil society groups, governmental and private actors behind a particular option. Given the grievances aired during the process, such a majority will be in a good position to offer mitigation policies, compensation and support to those who have disagreed.

Thus, the *purpose* of the stakeholder process is to create a forum to debate, discuss and discern policy interventions affecting the water-energy-food-environment nexus. A potential *outcome* of this may be the creation of a coalition of actors behind a policy option that maximises benefits while minimising losses. It is therefore important to differentiate between these purposes and outcomes. But how does such stakeholder engagement work? How can meaningful participation be achieved and the effectiveness of decision making increased?

What are the Key Roles in the Stakeholder Process?

The stakeholders

Stakeholders, meaning 'those who have an interest in, or who could be positively or negatively affected by the construction of water-energy-food-environment infrastructure', are crucial actors in the proposed FutureDAMS process of WEFE decision making. They are involved from an early stage, defining needs and possible intervention options. They are co-creators and users of an integrated system simulation model representing the relevant resource flows and impacts. They determine the metrics used to evaluate the performance of different development options. Finally, they help decision makers assess and evaluate the best available interventions such that they appropriately trade off conflicting interests.

[3] Readers may wish to further consulate Bryson, 'What to Do When Stakeholders Matter'; Mayers and IIED, 'Stakeholder Power Analysis' and Stakeholder Research Associates et al (2005).

Their importance derives from:

- Having knowledge about development needs, intervention options and the biophysical river system. This includes resource managers, policy practitioners and academic with knowledge of the modelled systems, but also those with informal, so-called 'indigenous' knowledge potentially held in rural communities.
- Their institutional roles and interests in building, managing or regulating WEFE infrastructure such as dams.
- Their potential to benefit or be negatively affected by the proposed developments.

The role of stakeholders is thus to represent the relevant interest groups, their needs and preferences, and to contribute information about the functioning of water, energy and agricultural technical and biophysical systems. This will both improve the validity of the WEFE system simulation model and potentially lead to more socially, economically and environmentally just outcomes.

WEFE assessment *conveners*

The 'convener' is the organisation initiating the process of stakeholder engagement. *Conveners* consequently tend to be those who want to intervene in the WEFE nexus with an investment in infrastructure or change of policy, based on an assessment of developmental needs.

Various types of institutions could be the *convener* of a participatory WEFE intervention assessment, using a modelling process like the FutureDAMS Approach to inform decision making on strategies to address development needs. For example:

- national governments via one or more ministries, inter-ministerial committees or regulating bodies;
- single-country regional organisations like internal national river basin organisations, often acting on behalf of ministries.

The scope or remit of these institutions is that they have a statutory duty and authority over one or more of the WEFE resource systems to be intervened in. They may work in conjunction, depending on context, with one or more of the following organisations:

- international organisations such as the UN economic commissions, the Food and Agriculture Organization (FAO) or other UN agencies, or subcontinental-scale gatherings of countries that address regional issues, e.g. the Economic Community of West African States (ECOWAS), ASEAN, etc;
- multilateral donor banks (MDBs) such as the World Bank, African Development Bank, Asian Development Bank;
- bilateral donor organisations like USAID, DfID, the EU or ECOWAS;
- energy and water utility companies;
- international non-governmental environmental organisations (eg IUCN, WWF, TNC) or development organisations (eg IWMI, ODI, IIED).

The *facilitator*

In order to deliver on WEFE intervention assessments, best practice would involve the appointment of an additional *'facilitator'* to conduct the stakeholder decision-making and modelling process. Stakeholder decision-making processes often work like a project, in that they involve relevant qualified individuals hired specifically to undertake and manage the assessment and its process. Staff may comprise a mix of existing (seconded) or past members of institutions like those above, but may also include consultants (either independent or from consulting firms). In practice, typically, the operational convenor comprise a collaborative group themselves, ideally containing a mix of expertise, eg convening agency staff, consultants and international organisations. Their remit is to support the *convenor* in identifying stakeholders, and then undertake the process of convening the stakeholder group and facilitating discussion on the eventual policy outcome report.

Differences Between the FutureDAMS Approach and Other WEFE Frameworks

In summary, this guide proposes a process for undertaking a multi-criteria WEFE intervention option assessment process. It differs from other frameworks and decision-making processes in the water–energy space. High level differences are summarised in Table 1.

	FutureDAMS proposed approach	World Commission on Dams	Integrated Dam Assessment Model (IDAM)	Hydropower Sustainability Assessment Protocol
Purpose	To create a report recommending infrastructure options based on a participatory, stakeholder-driven, multi-criteria modelling process	To improve the cycle of dam building, from planning to construction, operation and decommissioning	To assess different options for dam operation and building sites	To create a ranking of different elements of planning, construction and operation processes of dam building through a sustainability criterion
Key focus	Planning development of infrastructure (not just dams) in water basins by integrating energy, environment and water models which can compare different infrastructure construction and operation options	Planning for dams starting from a strategic assessment of river basins and including free prior and informed consent of affected people	Including qualitative and quantitative assessments into an options assessment of different dams	Creating a certificate of sustainable dam building by quantitatively assessing one project or a connected set of projects

Table 1: summary comparison of the futuredams approach in contrast to other major policy interventions around dams and wefe infrastructure.

Making Better Decisions in WEFE systems: A proposed 5-Step Approach

Step 1	12
Step 2	12
Step 3	12
Step 4	13
Step 5	13

There are many proposals for how to examine dam and infrastructure decision making. We suggest that the following will elicit the best results.

Step 1.

Identification of the water, energy, food and environmental needs for development

It is essential to start by considering what the developmental needs in the nexus are, in what some call a foresighting process. Is the priority an insufficient supply of electricity, water scarcity or food poverty? The decision-making approach should not start with the assumption that we need to build a dam or any other infrastructure, simply because it will provide 'more' electricity or 'more' water.

Step 2.

What are the investments, polices or infrastructure that would address the needs within the nexus?

This could include a range of different sectors, potentially including:

a. Agriculture: options including (and not limited to) smallholder farmer support, informal/small-scale irrigation, dryland irrigation, riverbank cropping;

b. Water supply: water efficiency and demand reduction, groundwater recharge, reservoir storage;

c. Ecology: protecting areas' biodiversity and landscapes using 'natural' infrastructure more effectively, participative conservation policies;

d. Energy:

   i. should strive towards environmental sustainability and therefore low carbon emissions;

   ii. should consider off- and micro-grid distributed technologies;

   iii. could include heat and cooking solutions like biogas;

   iv. should involve improving the electricity sector, with close attention to:

   - when electricity is needed (daytime/evening, power peaks or baseload?);
   - who needs the electricity (industries, off-grid rural communities?);
   - where it is needed (large cities, or are they near the grid?);
   - can it be paid for (are energy tariffs affordable for investors or poor households?).

e. Consideration of re-purposing or changing existing dams to create benefits and reduce costs.

Step 3.

If WEFE intervention options are proposed, a participative stakeholder process can be convened to implement the proposed WEFE assessment approach. This begins with listing WEFE development options and deciding on the measures of performance the assessment exercise will quantify to compare interventions.

This involves a number of actions, outlined in greater detail in the following section.

a. stakeholder mapping to identify who to include and who should facilitate a convener process;

b. training and capacity building:

   i. for those with low literacy skills;

   ii. for those with limited understanding of modelling;

   iii. for those who aren't highly motivated or are sceptical of a bottom-up, participative modelling process.

Step 4.

An iterative assessment process with stakeholders

This step uses integrated WEFE computer simulations and trade-off analysis (see Matrosov et al., 2015 or Hurford et al, 2020 for technical desciptions).

a. It requires being able to simulate (computer model) the numerous combinations of different proposed interventions (new infrastructure or policies).

b. An iterative process whereby stakeholders learn progressively more how their WEFE system works and how proposed interventions affect measures of performance.

c. Deliberation around visual trade-offs and synergies implied by the best performing interventions.

Step 5.

Recommendation

a. A documented reduced set of plausible acceptable interventions may be produced. Selected interventions will ideally balance benefits and costs and minimise negative socio-environmental impacts.

b. Possible interventions impacts and their trade-offs are clearly presented. The groups or 'portfolios' of stakeholder selected interventions will need to be assessed in more details using social, environmental and risk assessment methods. The report documenting group selected system designs should reflect on any synergies and conflicts identified. Social or economic costs are aren't compensated by other benefits will need to be addressed separately (e.g., resettlement and compensation).

c. A common output (e.g. a report) should document the process and documentstakeholder group deliberations and its recommendations.

d. The final decision on how to intervene in the WEFE system (e.g. which new infrastructure to build) is taken by the responsible agency, typically a national government, in a way that ensures the decision has political legitimacy.

The process of ranking the quality if stakeholder involvement and rigour of the FutureDAMS decision-making approach is outlined on pages 14-16.

Ranking the Quality of Stakeholder Involvement and Rigour of the FutureDAMS Decision-Making Approach

Step 1

Holistic Needs Assessment			Score
Multi-perspective and participative	Consider the needs of people, from a series of different perspectives. This should take into consideration:	Geography	8–10
		Class (wealth and social status)	
		Ethnicity or race	
		Gender	
		Disability	
		Age	
	Consider the needs of a range of livelihoods and sectors in both the informal and formal sector	Primary sector: farming and use and/or exploitation of natural resources	
		Manufacturing	
		Trading, services and public sector	
	Use a range of participative methods, including interviews, surveys, focus groups and interviews (with the six groups outlined above) to organically generate an understanding of key developments	Participants help produce outputs and approve final report	
Involvement	A broad but incomplete range of socioeconomic groups is considered and included in the assessment		5–7
	A broad but incomplete range of livelihoods/economic sectors is considered and included in the assessment		
	Public meetings are held and surveys conducted where participants have space to voice their own opinions	Participants' voices are presented but they do not create or approve the final report	
Consultation	An incomplete range of socioeconomic groups is considered/included. Or certain socioeconomic groups are privileged		3–5
	An incomplete range of livelihoods/economic sectors is considered/included. Or a certain set of livelihoods/ sectors are privileged		
	Public meetings are held and surveys conducted where participants give feedback on pre-decided options		
Narrow process	Focus on the interests of a small number of socioeconomic groups		1–3
	The interests of a small number of livelihoods and industries take precedent		
	The public are informed and allowed to ask questions, but are not involved in creating/influencing the assessment		

Step 2

Holistic Options Assessment			Score
Critical and wide-ranging	Consider the needs of people, from a series of different perspectives. This should take into consideration:	Formal and Informal sectors	8–10
		Large-scale and Small-scale options	
		Repurposing existing Infrastructure	
		The merits and services of existing ecosystems	
		Distributed and centralised systems	
	Focus on which technologies suit which developmental needs		
Broad	Broad range of alternative investments		5–7
	Attention to which technologies suit which developmental needs		
Biased	Broad range of alternative investments considered but with a bias towards certain types of solution		3–5
Narrow	Limited number of development options considered, with a strong bias towards certain types of solution		1–3

Step 3

Quality of Stakeholder Convening		Score
Diverse range of stakeholders represented. Demonstration of the legitimacy of these stakeholders to their stakeholder groups and trust of the constituents in the stakeholders	Geography	9–10
	Class (wealth and social status)	
	Ethnicity or race	
	Gender	
	Disability	
	Age	
Diverse range of stakeholders represented. Weak demonstration of their legitimacy and of trust		7–8
Broad range of stakeholders included and factors of trust and legitimacy considered		5–6
Limited range of stakeholders included that over-represents certain interest groups and socioeconomic categories		3–4
Narrow range of stakeholders included that over-represents certain interest groups and socioeconomic categories		1–2

Step 4–5

Degree of Participation in Model and in the Creation of a Report			Score
Empowering	Hands power to the participants, who include those who will benefit and those negatively affected	Directly built the model and dictated its measurement parameters	17–20
		Participants co-wrote final report	
		Directly influenced the model building and its metrics	
		Agreed to content of the final report	
Collaboration	A partnership with stakeholders who influence the model process	Directly influenced the model building and its metrics	13–16
		Agreed to content of the final report	
	Events have an open forum format to allow the stakeholders to generate ideas. They don't merely follow the convener's or facilitator's format		
Involvement	Ensure participants' concerns are understood and considered	Workshops and information from stakeholders inform the model and decisions over metrics	9–12
		Findings are presented and discussed with stakeholders	
		Events have a somewhat open forum	
Consultation	To understand the opinions and feedback of stakeholders	Surveys, focus groups and public meetings used to gather indigenous knowledge and opinions of stakeholders on a pre-made model and about the simulation's outcomes	5–8
		In consultation events the convener asks questions rather than having an open forum	
Inform	Limited number of development options considered, with a strong bias towards certain types of solution	Public meetings and large focus groups are used to inform stakeholders of the modelling exercise	1–4
		There may be opportunities for comment without these being systematically included	

Score	Ranking
40–50	***** Very High Quality
30-40	**** High Quality
20-30	*** Medium Quality
10-20	** Poor Quality
0-10	* Very Poor Quality

A 4-Part Process for Forming and Convening a Stakeholder Group

Part A: Contextual Assessment 15
- Who undertakes the political economy analysis? 15
- I) Overarching analysis of national-level politics 16
- II) Political-economy analysis of the WEFE nexus 16
- Key elements to ensuring success 16
- How does a Political Economy Assessment's (PEA) findings relate to the FutureDAMS Approach? 17

Part B: Stakeholder Identification 18
- Selecting stakeholder institutions and their representatives 18
- Selecting individual stakeholder representatives 19

Part C: Enabling Stakeholder Representatives 21

Part D: Convening the Stakeholders 22

Part A: Contextual Assessment

The first stage involves the *facilitator* conducting a background analysis of the context in which the stakeholder process is taking place. Primarily, this involves a political economy analysis. Conducting such an institutional analysis before undertaking the FutureDAMS Approach allows a potential *facilitator* to understand the influences on broader, structural processes that are beyond their control. This step is premised on the recognition that conducting participatory stakeholder planning is a political act and will be influenced by the governmental, geographic and historical context. In essence, the analysis involves understanding the key political and economic processes at work in a given geography, the drivers shaping processes of decision making. It also builds understanding of the pertinent actors, of their level of power and of their rationales.

Who undertakes the political economy analysis?

A specialist skill set, requiring a background in social science, and particularly political science, is needed for conducting political economy analyses. Typically, therefore, political economy analyses are outsourced to an external partner. In the FutureDAMS Approach, it may be taken on by part of the facilitator team. However, it could also become a standalone report commissioned from academics or consultants.

A key concern in any political economy analysis is to ensure the presence of local expertise and experience. Engagement of those with intimate knowledge of the country's politics and of its hydrological, energy, infrastructure and agricultural sectors is vital. There may also be an advantage to external perspectives, however, as local actors may at times be too close to events to take a balanced, broader perspective.

Whatever the case, there are two key areas for the analysis to cover.

I) Overarching analysis of national-level politics

The first stage involves analysing the political-economic processes occurring at the wider geographic scale. In most cases this is likely to be on the national scale, but some WEFE decision-making processes might occur at international or regional levels, for instance by examining an entire river basin.

This involves understanding:

- What the key economic sectors and functions are:
  - What are the main industries and to what degree are they politically connected?
- Who are the elite?
  - Do they have a particular sociological basis (eg from a certain region, educational background, ethnicity, etc)?
- The recent political history of the country:
  - The legitimacy of the ruling party;
- The character of the government and nature of politics:
  - The concentration of power in the central executive (states with a very powerful centre, with an ability to speedily implement development designs, are less likely to be interested in an assessment process that calls for alternatives to their preferred investments);
  - The strength of the rule of law. Where this is weaker, there are also lower barriers to protections for the environment and people. This reduces leverage for arguing for mitigation measures or projects that reduce environmental and social impacts;
  - The degree to which the government adopts more reformist policies. This will affect their interest in best practise approaches and alternative, novel policy and infrastructure interventions;

- The degree of economic inequality and unevenness of political power in a country. This often has strong historic foundations and can be expressed geographically – where core areas of political power contrast with weaker peripheries – or socially – typically along lines of class, race, caste, ethnicity and gender. Such degrees of inequality affect the status, confidence and capability of participants and the extent to which they are listened to.

- The degree of freedom of speech as expressed by the extent of press freedoms, political freedoms around public speaking or opposing government intimidation of its opponents. Such freedoms will affect people's ability to speak publically in a critical way, how comfortable they feel in critiquing a government's or a powerful organisations' preferred option.

These questions form a background understanding which overlaps with a more specific analysis of the water-energy-food-environment nexus.

II) Political-economy analysis of the WEFE nexus

A further set of questions is then needed to analyse the sector within which the FutureDAMS Approach is taking place, and its key actors.

- What is the history of the WEFE nexus?
  - key projects;
  - key institutions (governmental, private sector, civil society);
  - Recent policy changes and attempts at reform.
- What are the immediate pressures coming from groups and interests who influence the sector?
  - For instance, are they pushing a particular project in the WEFE nexus?
  - Who stands to gain from particular types of intervention – irrigation projects, large dams, conservation areas?
- What are the processes, both formal and informal, through which decisions are typically made in this sector?

Overall, these two elements to the political economy analysis establish an important background understanding in which the FutureDAMS stakeholder decision-making process takes place. This context will help build an understanding of key issues such as the ability of stakeholders to meaningfully engage, the likelihood of the process to be subverted, potential issues with data access and the potential for political tensions. It will also form an important context informing the selection of stakeholders, covered in Step 2.

Key elements to ensuring success

Analytical themes

Understandings of informal and formal coalitions of power involved in policy areas, economic sectors and geographic areas:

- Understanding the incentives of key players;
- Understanding the ideological interests of key players – their ideas for how government should function and how development happens;
- Understanding the mechanisms to ensure and/or increase political support. For instance, use of:
  - forms of patronage, distribution of resources;
  - bargaining (formal and informal) between key constituencies or regions.
- Inclusion of historical perspectives on present day processes.

Rigour and evidence

It is crucial that these studies maintain intellectual rigour. They will probably involve qualitative evidence from interviews, archival work and document analysis. This can be combined with quantitative studies on economic data, electoral records, budgetary spending and the allocation of resources. Crucially, however, to ensure validity, it is necessary to:

- Triangulate data – ensure it is supported by more than one source;

- Use data from different types of sources:
  - different methods;
  - governmental, private sector, civil society and international organisations.

Engaging with government

It is important to carefully consider engagement with the government in producing the assessment. On the one hand, governments have unrivalled data sources and constitute a key actor to understand. On the other hand, they also have a strong interest in manipulating data and analysis.

The politics of political economy assessments

A major limitation of the political economy assessments is that they can rarely address the political issues hampering or constraining the remit, processes and conclusions of their analysis.

How does a Political Economy Assessment's (PEA) findings relate to the FutureDAMS Approach?

- The central purpose of the PEA assessment is to establish the potential barriers, risks and structural issues that will affect the process. These are important to understand as they should shape the way in which the facilitator runs the following steps and will affect the legitimacy of the process's conclusions.
- It also informs decisions over who to invite to the stakeholder process and how to engage with them.
- The conclusions of the assessment may also determine whether the partners engaged in facilitating the FutureDAMS Approach wish to proceed and could indicate the likelihood for the stakeholder modelling process to influence policy makers.
- In this sense it can also help identify opportunities for the conclusions of the stakeholder process to be adopted by decision makers. Its assessment of actors and their agendas, and of the processes and interests in policy making, can deliver lessons about which actors would be most appropriate and how the conclusions could be framed to ensure their interests were met.

The key PEA methodologies

The Key PEA Methodology Guides
DfID: How to Note
ODI: Applied political economy analysis
World Bank's: Problem-Driven Political Economy Analysis
Democracy and Governance Strategic Assessment Frameworks – USAID
Power Analysis – SIDA

Table 2: list of pea methodologies

Part B: Stakeholder Identification

This involves identifying all potentially relevant stakeholder organisations, ie all major geographical and economic sector groups.[4]

It is important to consider the relevant different geographic levels.

- **At a transboundary level** it means knowing whether the dam's basin is transboundary, whether International groups (often advocating environmental conservation) are engaged in the region and If there financiers, investors, consultants or engineers have been engaged.
- **Nationally** it involves identifying:
  - National government and subsidiary agencies responsible for elements of the energy-water-food-environment system, typically this involves ministries and their associated regulatory agencies
  - Utilities
  - Consumer groups
  - Other civil society groups likely to be impacted by proposed interventions
- **At the 'local' or 'regional' (intra-country) level** it involves identifying:
  - Those living and farming around proposed infrastructure or adjacent to the river (women and men, old and young etc)
  - Local Government and authorities, including politicians and traditional leaders
  - Companies
  - NGOs and civil society groups
  - Consider upstream and downstream groups

It is equally essential to stakeholders from the different resource systems exploiting economic sectors; these may include agriculture (irrigated farming, but also fisheries and livestock), power generation, businesses affected by flooding, and businesses affected by water supply services levels.

Selecting stakeholder institutions and their representatives

Once relevant stakeholders have been identified, the operational convenors, often in collaboration with the convening organisation(s), must select which organisations to invite into the coalition. The criteria below rest on two central themes: trust in an actor's legitimacy in representing certain interests or communities; and inclusivity, balancing those potentially negatively affected with those who will benefit or those with local or national governmental power with smallholder farmers and village women's leaders.

Criteria for selecting institutions:

- **Social power:** Are those with the most political and economic power included (eg government, financiers)? This is particularly important as, if such actors are excluded, they are less likely to engage and agree with the outcomes produced.
  - Are those with the least political and economic power included (eg smallholder farming communities)? It is crucial that the process also includes those who are most likely to suffer negative impacts from system interventions.
- **Influence:** Are those who have influence over public debate/opinion included (eg journalists, NGOs, academics)?
- **Their position on WEFE infrastructure and management:** Are they more supportive or critical of water infrastructure? What benefits or costs are they most interested in?

[4] This section is influenced by Chevalier, 'Stakeholder Analysis and Natural Resource Management'; Mayers and IIED, 'Stakeholder Power Analysis'; Stakeholder Research Associates et al., 'The Practitioners Handbook on Stakeholder Engagement'.) and discussion at meetings in Accra (October 2018) with FutureDAMS researchers.

- **Their willingness to collaborate and share data:** A central feature of the WEFE intervention assessment approach is the use of simulation models to assess the implications and impacts of different development options referred to as interventions. Such models require accurate data. Therefore it might be strategic to include those with access to this data in the stakeholder process.
- **Trust:** Is the institution trusted by the group they are intended to represent? If a stakeholder is chosen as representative of a sector or community, what is their relationship with people from that group?
  - Look beyond seeing just one unified community (often a 'community' is comprised of several competing groups). Are there some among them who don't/wouldn't feel represented?
- **Accountability:** Is a chosen stakeholder accountable to the community or interest group they are representing? This could be in the form of elections, or more informal selection/nomination mechanisms.
  - Accountability could be an alternative way of assessing degrees of trust.
- **Representative, inclusive balance:** Has the broad range of those affected by dams in positive and negative ways been included?
  - Is there a balance between the different types of actors and interests (eg are there voices that are more likely to be critically outweighed by interests in favour of a particular intervention; is there a mix of different types of international/national/local actors; is there a mix of governmental, private, independent and civil society groups)?

Selecting individual stakeholder representatives[6]

Although it is important to acknowledge and consider stakeholder organisations' hierarchies and procedures for allocating personnel, in many cases the facilitator will have some flexibility to invite certain individuals. WEFE assessments are a new way of working, and having credible, motivated or even charismatic individuals will go far towards the goal of implementing system-scale planning.

- **Competence of staff:** If this stakeholder process lasts over several years, staff turnoff will be likely. Does the organisation have a deep pool of individuals who can engage in high level discussions on WEFE system design? Does the individual stakeholder representative have nuanced and open views, or closed opinions? Thus consideration of the following is important:
  - Is the stakeholder representative considered an 'honest broker', or an advocate of a particular type of solution?
  - The stakeholder group should ideally balance these types of interests and individual personalities to increase openness and dialogue.
- **Stakeholder's group dynamics and prior relations.** Where possible, it is important to establish where individual and institutional stakeholders stand in relation to the rest of the group. This should consider:
  - historic relations;
  - present connections;
  - power hierarchy;
    - relations between the convenor and the stakeholders.
- **The socio-cultural context.** This involves the considering whether there is a socio-cultural structural context which enables or prevents participation? What are these norms and how do they apply to the stakeholders? Do they apply to the above intra-stakeholders relations in terms of:
  - gender;
  - ethnicity;
  - geography;
  - race;
  - caste (where relevant)

[6] This section draws on the work of Grimble and Chan, 'Stakeholder Analysis for Natural Resource Management in Developing Countries'; Stakeholder Research Associates et al., 'The Practitioners Handbook on Stakeholder Engagement'; Bryson, 'What to Do When Stakeholders Matter'.

- Secondary practical considerations: Although subsidiary, it is worth considering a number of practical implications to ensure success. These could include stakeholders'':
  - willingness to be involved and history of consistent engagement in professional events;
  - knowledge of the field;
  - combativeness and/or inclination towards compromise and consensus building;
  - membership within a group (which could send other people to future meetings) or dependence on one key individual.

Group size is an important consideration and should be adapted to each case. If there are too few stakeholders, key interests will be excluded. If there are too many, meetings will be very long and slow and contributions may become tokenistic. If necessary, sub-groups may be convened, then brought together by representatives at later stages.

Part C: Enabling Stakeholder Representatives

It is, then, important to think about the stakeholders' existing skills, their ability to engage in the process and whether these need to be strengthened. Support may include specific training and financial support. Additionally, for those participants from poorer and more socioeconomically marginalised backgrounds, a broader idea of empowerment could be important to their voice being heard and for their perception of their inclusion. Thus there need to be:

- reading and writing skills;
- basic knowledge of the approach and the integrated model:
  - computer literacy;
  - geographical knowledge of the river basin;
- experience of and comfort with participation, asserting one's voice and public speaking.

On a large river, affected stakeholders may be hundreds of kilometres away from the capital and speak a different language. Getting representatives of such groups to travel so far and be meaningfully included represents a significant challenge.

Challenges to ensuring participation include:

- difficulty in taking time to participate, especially for farmers or fishermen, whose activities, like planting and harvesting, are seasonal;
- difficulty in accessing the meeting location;
- ability to cover transport and accommodation costs, where relevant.

The role of politics also comes into play in the following ways:

- Does the government, or other powerful actors, favour some groups over others?
- How tolerant is the state of criticism from its citizens? This will shape norms of criticism of proposals made by the government, of talking freely in front of government officials and talking freely in private, as indicated, as indicated by:
  - laws stifling free speech on the statute book;
  - freedom of the media;
  - Freedom House and other indices.

Part D: Convening the Stakeholders

A central feature of the FutureDAMS stakeholder approach is the use of workshops to help build:

- an integrated water-energy-food-environment model so that it represents stakeholders' understanding of how the water, energy, agricultural and environmental systems work;
- a series of measures ('performance metrics') that quantify the impacts of interventions;
- a series of scenarios which represent the interests and concerns of stakeholders about the future.

To organise this process, an independent facilitator should be considered. Such a person must be seen as independent of local or national government (and/or widely trusted/respected and neutral), and thus able to encourage or embody open discussion. Said person must also not be invested in the decision to build infrastructure, nor should they make an intervention.

Facilitators should provide an inclusive discussion environment that allows a balance between the different interest groups. However, this is not a simple procedure:

- Facilitators will not necessarily be trusted by all participants and this can hamper discussion unless carefully developed.
- Meetings should be held in neutral locations.

To encourage transparency, the convening process should be understood as involving a timeline of activity.

Before the event:

- Building trust in the process, building awareness of what it will involve;
- Explanation of the purpose of the meeting:
  - Its place within the FutureDAMS Approach
  - The outputs being produced.

At the start of the event, the *convenor* should:

- build trust between participants and agree on some form of contract or 'rules of engagement';
- instil 'principles of engagement' in participants through activities;
- co-create an action plan;
- hold regular 'check-ins' to gauge how the stakeholders feel about the process, whether there could be improvements or adjustments.

Conflict in the workshop process:

With high-stakes intervention decisions and significant potential impacts, conflict is likely. As described above, this stakeholder process is not intended to smooth over such conflict and engineer 'good' (consensual or optimised) decision making. Rather, working out and demonstrating conflicting interests and trade-offs – especially in a polite and respectful way – is an important output from the process. Assessing the model's validity could also be a way of resolving some issues:

- Have the identified benefits and impacts of the infrastructure been documented in academic or policy analysis?
- Are they found to be over/under-stated in the model in contrast to other studies?
- Have legal rights of those positively/negatively affected been established?

Concepts of stakeholder-based planning

Given the broad field of writing and advice on stakeholder analysis it is important to situate where the FutureDAMS Approach lies, its contrasts to and similarities with other approaches. Many approaches stem from stakeholder analysis's origins in business management. In this field, the purpose of stakeholder mapping and convening is to improve understanding of the market and policy environment and to get stakeholders to 'buy into' a policy or new product (a much simpler goal than those pursued by public policy and WEFE). Given this agenda, the convener pursuing a stakeholder approach is particularly interested in the stakeholder traits of power and interest in their proposed ideas.

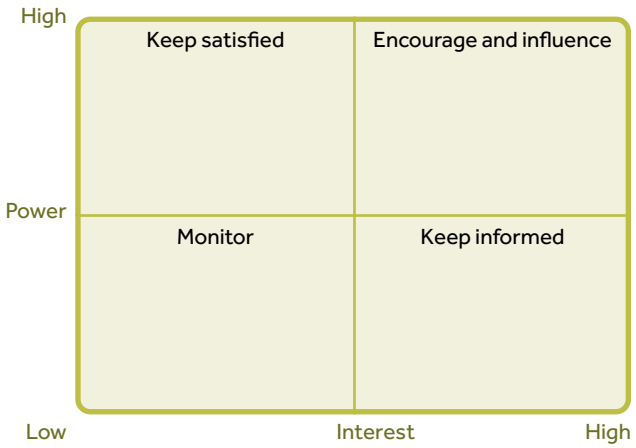

Figure 1: The influence–interest matrix Source: knowhownonprofit.org

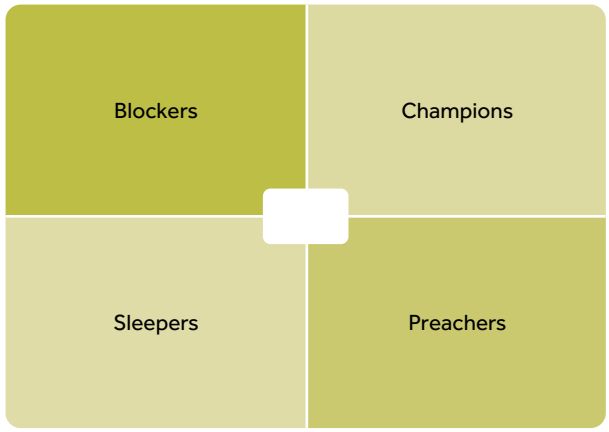

Figure 2 Another conceptualisation of the influence–interest matrix Source: World Bank et al (2010)

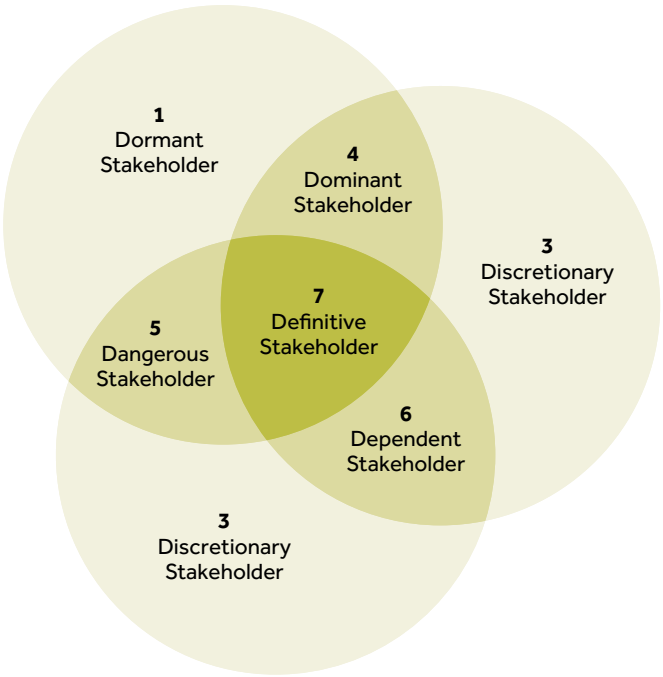

Figure 3: The salience model conceptualisation Source: Mitchell et al (1997)

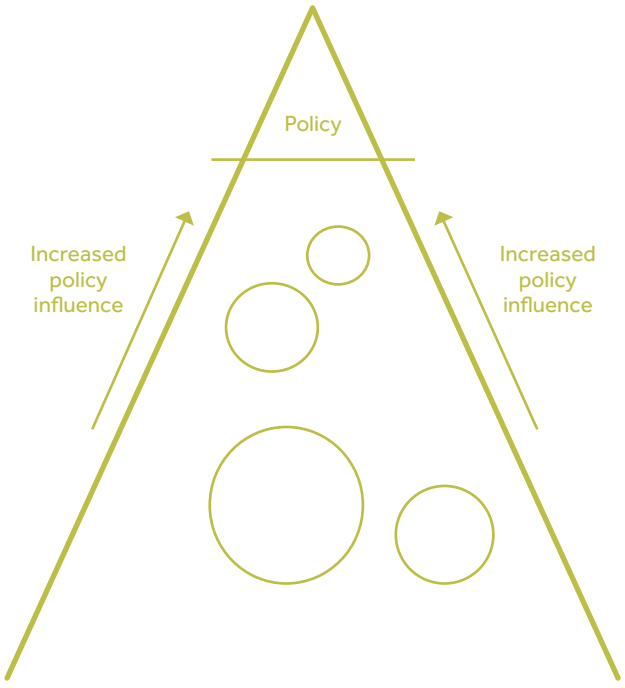

Figure 4 A pyramidal depiction of stakeholder mapping Source: Mayers and IIED (2005 p. 2)

The literature has conceptualised this in two ways. The first identifies four types of stakeholder with a view to identifying 'enablers' and 'blockers' (Figures 1 and 2). Alternatively, the salience model creates a typology of eight categories (Figure 3). The purpose of both conceptualisations is to identify and map the relevant field of actors in order to identify the 'right' stakeholders to achieve a particular agenda, while also identifying other stakeholders who might prevent the achievement of an objective or might only be able to provide limited support. This singular purpose is demonstrated by the pyramidal diagram in Figure 4, which shows the identification of different stakeholders (smaller and larger groups) and which of them are most able to influence policy.

Such types of stakeholder analysis, with their specified, outcome-driven purpose, influence much of the advice, tools and reports on stakeholder engagement. This influences other guide's interest in stakeholder representatives' personal traits. For instance, one toolkit describes the importance of participants having patience, interpersonal skills and an ability to listen and facilitate; these attributes are to be considered when deciding who to convene.[7] Another World Bank stakeholder report suggests that consensus among stakeholders is an important prerequisite.[8] If followed here, these approaches would lead to the exclusion of certain actors, which would be problematic, since such actors are typically the more marginalised, poorer communities most affected by system interventions.

Therefore these approaches are not followed by the FutureDAMS stakeholder process: orientation is at odds with the role of stakeholder engagement within the FutureDAMS Approach. In this document, the purpose is to create consensus and a shared vision of a system model and what it measures and to provide a forum to debate what future actions should be taken. The ultimate output of this process is a shortlist of acceptable WEFE interventions (policies or infrastructures) and a report summarising the key trade-offs and proposed future actions.

The FutureDAMS Approach is influenced by stakeholder processes in natural resource management, discussed by Grimble and Chan.[9] These authors describe stakeholder analyses designed for a context where the convener only experiences the benefits, not the costs of their choices, a context that frequently exists in WEFE interventions. In this guise, stakeholder engagement's purpose is to increase the breadth of the decision-making process beyond the possibilities of cost–benefit analysis, in order to include benefits and costs which cannot be monetised in a straightforward manner. This orientation is particularly relevant to FutureDAMS Approach given the history of infrastructure investments in WEFE systems. Dams built in the 20th century had significant costs and in some cases overestimated benefits.[10] There is an opportunity for a multi-criteria assessment of alternative interventions to better capture non-monetary costs and benefits. Stakeholder engagement that empowers marginalised voices, whether of those whose livelihoods could be negatively affected, have been displaced or are the 'silent stakeholder' of the environment, has the potential to promote this.

Alternatives to traditional participative stakeholder policy making are gaining attention. Citizen juries, citizen's assemblies or mini-publics are all increasing as a democratic mechanism designed to help resolve significant social debates. They were perhaps most famously used to consider the question of whether Ireland should change the law on abortion and hold a referendum. In that case they gained public acceptance and legitimacy, which eventually elicited constitutional change. These processes typically involve random and representative selections of citizens who are then convened to discuss the arguments for and against a policy or project and recommend an outcome. The selected citizens are given the materials and resources to inform themselves about an issue, and time to debate and distil outcomes. Such a citizen-led process could be used in the FutureDAMS approach, as opposed to the representative stakeholder engagement outlined above, which includes government and the public. However, it is likely to be particularly prone to the political risks outlined in the 'Challenges to the Stakeholder Participatory Processes' section below. In more authoritarian, centralised and state-dominated developing countries, such citizen-led processes are likely to be distrusted by officials, seen as illegitimate and therefore ignored. In a worst-case scenario, authoritarian governments may see such mini-publics as a potential mobilisation of opposition to the state.

[7] Stakeholder Research Associates et al., 'The Practitioners Handbook on Stakeholder Engagement'.
[8] The World Bank, Communication for Governance & Accountability Program, and CommGAP, 'Multi-Stakeholder Dialogue'.
[9] Grimble and Chan, 'Stakeholder Analysis for Natural Resource Management in Developing Countries'.
[10] Ansar et al., 'Should We Build More Large Dams?'; Moran et al., 'Sustainable Hydropower in the 21st Century'.

The Importance of Participation in WEFE Decision Making

Participation implies meaningful engagement in the process; that people are handed power over processes of knowledge production and decision making. This section explores the concept of participation in greater detail, outlining what it involves and why it is important.

What is Participation and Why is it Important?

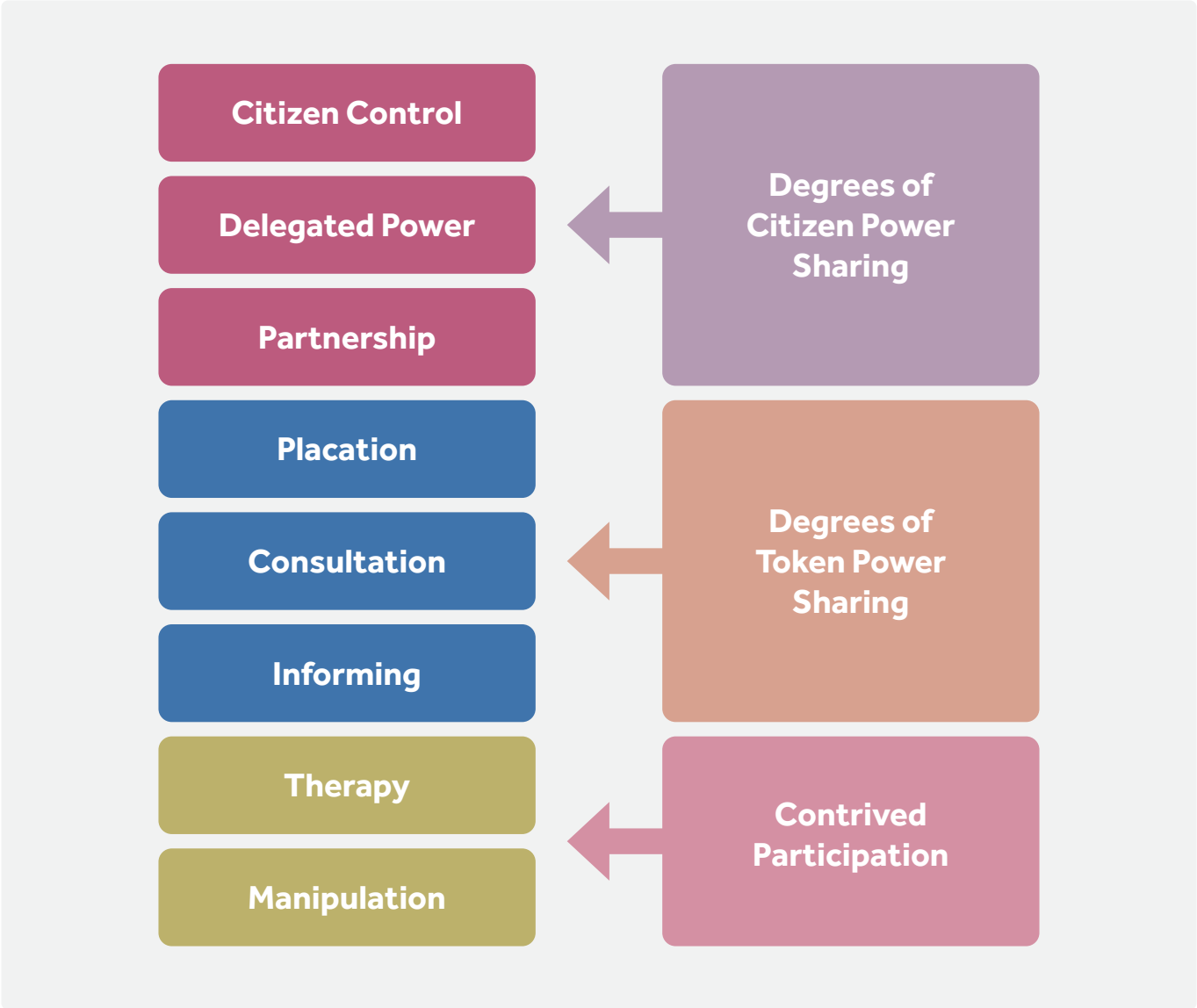

Figure 5: Arnstein's participation ladder

Public Participation Spectrum

Developed by the International Association for Public Participation

Increasing Level of Public Impact

Inform	Consult	Involve	Collaborate	Empower
Public Participation Goal	**Public Participation Goal**	**Public Participation Goal**	**Public Participation Goal**	**Public Participation Goal**
To provide the public with the balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision, including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
Promise to the Public	**Promise to the Public**	**Promise to the Public**	**Promise to the Public**	**Promise to the Public**
We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
Examples of Techniques	**Examples of Techniques**	**Examples of Techniques**	**Examples of Techniques**	**Examples of Techniques**
• Fact sheets • Websites • Open Houses	• Public Comment • Focus Groups • Surveys • Public Meetings	• Workshops • Deliberate Polling • Scenario Workshops	• Citizen Advisory Committees • Consensus-Building • Participatory Decision-Making	• Citizen Juries • Ballots • Delegated Decisions

Figure 6: figure 6 international association of public participation 2010

The FutureDAMS Approach is influenced by ideas about participation. This term refers to a set of mainstream practices in Development Policy that attempts to hand power to those on the receiving end of imminent (externally driven) 'development'.[11] Participation is premised on the idea that giving the subjects of development a greater role improves policy making and implementation and the reason for advocating a stakeholder engagement process is premised on the valuing of genuine participation. This is based on a belief that ordinary citizens and civil society groups, often excluded from policy decisions, should be included in the decisions affecting their livelihoods and interests, but also that these groups add value. In the FutureDAMS stakeholder process, participation involves increasing the breadth of voices which deliberate over specific tasks, namely, identifying needs, options for addressing needs, modelling and filtering of the best potential interventions and recommendation of the latter in WEFE systems. The nature of the FutureDAMS

[11] Hickey and Mohan, Participation, from Tyranny to Transformation?; Hickey and Mohan, 'Relocating Participation within a Radical Politics of Development'; Mohan, 'Participatory Development'.

Approach means that participation is not envisaged as part of a project of community development or wider political change.[12] It is rather styled as a process of empowerment, one that not only involves and consults a variety of actors, but which also gives them power. This is expressed in conceptual models (below) that create a ladder of participation, with providing information seen as the lowest level, rising to consultation and then partnership and citizen control. Arnstein produced the most well-known of such models (Fig 5), but Shipley and Utz's paper reviews a wider selection of models that have influenced the scoring of the FutureDAMS Approach (see pages 14-16).[13]

There are several good reasons for promoting local participation in dam development.

- Indigenous knowledge: Smallholder farmers and rural communities hold valuable knowledge about the environment they live in and farm. That it is largely un-formalised and not scientifically tested does not make it invalid. Rather, specific knowledge about farming cycles, fishing, fertility, animal migration, the climate and other biophysical processes can be extremely valuable, especially in contexts of limited scientific research data.

- This indigenous knowledge and lived understanding of relevant environments and societies can add significantly to the usefulness of the model and to the degree to which the analysis can claim to be holistic.

- Therefore, it is important that these groups' involvement is raised above mere 'consultation as participation'. This means that they are given more agency and allowed to shape the process rather than passively asked for opinion.

The participation of those affected by nexus infrastructure projects is valuable for two reasons:

- A technical concern with gathering the best available data. Unlike conventional policy making that tends to include economic and government perspectives, participatory approaches can capture indigenous knowledge.[14]
  - This refers to information which is not formalised and is held at a more local level about particular places, and could improve the model's accuracy and enable more reliable understandings of positive and negative impacts. The premise here is that smallholder farmers and rural communities hold valuable knowledge about the environment they live in and farm. That it is not likely to have been scientifically tested does not make it invalid. Rather, specific knowledge about farming cycles, fishing, fertility, animal migration, the climate and other biophysical processes can be extremely valuable, especially in contexts of limited scientific research data.
  - Such information is usually held orally within communities and families but its quality and presence will vary from person to person. While an important resource, indigenous knowledge should not be romanticised.
  - However, the importance of this knowledge requires processes to be raised above mere 'consultation' to something genuinely 'participative'. This means handing over more agency and allowing participants to shape the process rather than passively asked for opinion, as it outlined by the FutureDAMS process.

Participatory advocates and practitioners have developed an array of tools to aid the process. This includes knowledge production processes ranging from participatory mapping, to problem mapping and consensus building exercises.[15] For the purposes of the FutureDAMS Approach, participation is therefore a vehicle for changing who is influencing decisions in dam projects, and changing a status quo to include those citizens potentially benefiting or being harmed by such projects. However, such participatory ambitions come with numerous pitfalls and are rarely fully realised.

[12] These ambitions are more common drivers for participation (Mohan, 'Participatory Development'; Hickey and Mohan, Participation, from Tyranny to Transformation?).
[13] Arnstein, 'A Ladder Of Citizen Participation'.); Shipley and Utz (2012).
[14] Chambers, Rural Development; Scoones and Thompson, Beyond Farmer First.
[15] See reviews by Brouwer, Hiemstra, and Martin, 'Using Stakeholder and Power Analysis and BCPs in Multi-Stakeholder Processes'; Brouwer, Groot Kormelinck, and van Vugt, 'Tools for Analysing Power in Multi-Stakeholder Processes – a Menu'.

Challenges to the Stakeholder Participatory Processes

Challenges to the Stakeholder Participatory Processes 31

What are the Risks? 31

- Securing data 31
- Challenges in participative decision making 32
- At a wider level 32
- Risks from individuals and during participatory stakeholder events 33

How to Mitigate Risks 34

- Fundamental challenges 35
- Political governance and ideology 36

Challenges to the Stakeholder Participatory Processes

It is important to recognise that the FutureDAMS project builds on a long history of attempts to improve decision making around water infrastructure, particularly dams. Initiatives, most prominent of which was the World Commission on Dams, have advocated a more holistic and participatory approach and advanced thinking around mitigation, benefit sharing and compensation. But such initiatives have also suffered. Many have been largely overlooked, with limited implementation, while others have encountered significant problems in their application. The literature has therefore established a well-known set of risks to undertaking such approaches to intervention planning in WEFE systems. At a minimum, awareness of these difficulties is necessary to prevent their occurrence. Additionally, an understanding of what they might include should mean that conveners of the FutureDAMS Approach not be naïve in their assumptions of how it is supposed to work. Therefore potential risks are outlined here, with the following section setting out a political economy analysis that helps understand the likelihood of their occurrence.

What are the Risks?

Securing data

All system simulation models rely on the availability and quality of the data. The FutureDAMS modelling process requires data on the hydrology of rivers at numerous sites, location data on agricultural, energy and water investments, on the productivity of irrigated areas, population and on the energy grid, its demand, generation and transmission, etc. However, such data are not always available, particularly in developing countries. For instance, even if agricultural data on large formally owned schemes is available, typically, informal, small-scale farms remain absent from national economic data despite their potentially high cumulative impacts and importance for employment, livelihoods and human wellbeing. Other statistics that are measured, for example through population censuses, may have an incomplete record. For instance, Potts' work on rural–urban migration in Africa exposes the significant gap in migration and population statistics.[16] Accurate predictions of displacement also require precise topographical surveys, which for large tracts of the world have limited detail. There is also a significant likelihood of many areas in developing countries having undiscovered species, or at least incomplete knowledge of ecological function, richness and biodiversity. This is demonstrated by two dams built in remote parts of Tanzania that unearthed new species: the Kihansi Spray Toad at the Kihansi Falls Dam[17], and the Igamba snail and Goby cichlid at Malgarasi Dam in the Rufiji Basin.[18]

There is therefore a significant risk that many countries will not have the data necessary to realise the full potential of the FutureDAMS modelling software as a tool for evaluating the impacts of different intervention strategies in WEFE systems. In many African countries, structural adjustment programmes in the 1980s drastically reduced government data collection.[19] As well as affecting availability, this has also had an effect on the quality of collected statistics.[20] With budgets and staff cut, most African countries have not had the ability to collect accurate data on a range of subjects, affecting population numbers and GDP calculations. This poses significant challenges to modelling processes like that available through FutureDAMS which will depend to some extent on the accuracy of input data to make assessments of the impacts and benefits of dams. Another important data risk relates to politics.

[16] Potts, Circular Migration in Zimbabwe & Contemporary Sub-Saharan Africa; Potts, 'Whatever Happened to Africa's Rapid Urbanisation?'
[17] Channing et al., 'The Biology and Recent Historyof the Critically Endangered Kihansi Spray Toad Nectophrynoides Asperginis in Tanzania'.
[18] Hovland, Bingham, and Nash, 'When Green Is Not Green: A Case Study of the Proposed Malagarasi Hydro Power Project'.
[19] Jerven, Poor Numbers.
[20] Jerven.

Controversies around data

There are numerous reasons why governments want to manipulate data relevant to the FutureDAMS Approach. Key factors include:

- a desire to produce statistics that show economic growth is occurring (and hence to over-report agricultural production);
- changing hydrology data to facilitate basin (dis) agreements between countries. For example, inflating rainfall and flow data to assure a downstream country that a new dam will not reduce water flows;
- increasing the recorded productivity of farms, irrigation schemes and infrastructure to justify investment and construction which achieve political goals.

Relatedly, there may be a variety of geopolitical and security reasons for countries withholding the data required by the FutureDAMS Approach. National Grid electricity data, for instance, are considered a national secret in many countries, as is hydrology in transboundary river basins. The politics of data therefore presents a significant risk to the application of the FutureDAMS Approach.

Challenges in participative decision making

The pitfalls of participation can be organised into categories:

- Participants do not, or cannot effectively transmit their concerns and opinions about what they feel should be considered, their aspirations for system performance, or the future scenarios and uncertainties they would like to explore. This could because of:
  - wider inhibitions stemming from the political context;
  - (a lack of) their own capabilities;
  - dynamics within the group, whether related to personality or to structural issues like class, race, gender or age;
  - or because the facilitator does not give them space to participate.
- The process is compromised because of who is or is not present, ie some institutions are represented inappropriately (eg too much emphasis) or some are left out.

In short, the key issues here relate to the difficulty of engaging with poorer and more marginalised people because of their education, material poverty, potential perception of inferiority and unfamiliarity with governmental decision-making processes. Participation is also endangered by officials' potential perception of non-technical people as having nothing important to contribute. This can be exacerbated by conscious or unconscious beliefs about rural and poorer people being backward and unworthy of contributing. This can hamper the holistic potential of a participative process. In addition, there is a danger of a participatory process being manipulated to support a particular position (eg legitimating the construction of a controversial dam that powerful actors had already selected).

At a wider level

'Technicise': It is easy for participatory techniques to become mere steps in a technical process, tick-boxes to be filled in on the way to completing a project. Participatory tools are thus used, with limited impact on real political decision making or empowering participants.[21] This reflects a long history of participatory techniques and policies existing within various political structures, from colonialism to structural adjustment policies in the 1980s.[22] The language and ambitions of participation are therefore easily co-opted. Participation can function only in its technical sense, when devoid of ambitions of changing decisions made about the nexus.[23]

Legitimating decisions: related to the above, a participative stakeholder process can easily become an end in itself, the silver bullet that solves controversies around dams and other WEFE infrastructure.[24] Reading the literature on stakeholder processes, there sometimes appears to be a premise that if projects are designed through the approach, they will have overcome

[21] Cooke, 'Towards Participation as Transformation: Critical Themes and Challenges'; Hickey and Mohan, 'Relocating Participation within a Radical Politics of Development'.
[22] Mohan, 'Participatory Development'; Williams, 'Evaluating Participatory Development'.
[23] Cornwall, 'Spaces for Transformation? Reflections on Issues of Power and Difference in Participation in Development'.
[24] Chevalier, 'Stakeholder Analysis and Natural Resource Management'.

the historic inequalities and controversies around natural resource management. The argument here suggests that such a premise is misleading – it promises to remove power relations. This is not only because convening stakeholders, even if following the guidelines here, could follow many paths and is always dependent on the *convenor*, the facilitator and participants. It is also because it does not guarantee a result that will be acceptable to all participating stakeholders, or to the communities and interests they represent. Additionally, it does not mean that governments or dam builders will follow the spirit of what has been agreed, either in the choice of infrastructure construction or in the operation of such infrastructure. Therefore, stakeholder processes may legitimate controversial infrastructure projects with significant impacts.

Culture and society: Another set of issues with participation concerns the social norms in which any process exists. One can create new spaces for participation to occur but this will not free it from its socio-cultural context.[25] Therefore actors in the process will be affected by cultural rules and models around public discourse, such as who should speak and how, that may not be conducive to participatory aims. For instance, they may preclude confrontation and so hide disagreement and negative impacts. They may also work against participation of certain genders and ages. Finally those able to exert some power over others (financially or through employment) may be able to silence competing voices.[26]

Risks from individuals and during participatory stakeholder events

Facilitator – mission Impossible? Attempting to overcome these challenges, and those more widely associated with participation (outlined in an accompanying document), is the task of the facilitator. They are required to ensure a fair, balanced and inclusive process that accounts for personality differences, education levels and power inequalities between participants. Additionally, the facilitator must gain the trust of participants to ensure the process is seen as legitimate and must ensure all participants feel able to speak. Such a task verges on the impossible. Simultaneously it means that the facilitator is in a unique position to consciously or unwittingly derail or manipulate a participative stakeholder process. This issue has even been noted in the context of planning among educated and less diverse stakeholders in the US.[27] Thus, it is important to understand the limitations of a *convener* to overcome the inherent problems embedded within participatory stakeholder processes.

Manipulation and transparency: Stakeholder processes can be manipulated. This can happen through two principal mechanisms:

- *Invitation* – only inviting those who are biased or interested in one set of policy options;
- *Controlling the discussion* – denying a voice and influence to those with a certain set of opinions and interests.

Toolkits like the World Bank et al advise that a way to avoid this is to make stakeholder processes transparent, asking participants to declare their interests.[28] Additionally, they suggest researching potential stakeholders to ascertain this information. However, this is problematic given that agendas to subvert stakeholder processes are unlikely to be widely volunteered or even possible to ascertain.[29]

Power: One cause for this merely technical realisation of participation lies in the two ways in which power has been overlooked. One is the tendency to look only at the 'local' level, at the community or village participating. This overlooks wider global, national and regional geographical levels that constrain, enrich and impoverish the locale.[30] The second is through conflating the community as one entity, as having one self-evident voice, opinion and experience. This ignores the differentiation that even the lowest geographic levels can have, and the inequalities in class, gender, geography and race that are present at such lower levels. Such inequalities enable some while constraining others.[31]

[25] Cleaver, 'The Social Embeddedness of Agency and Decision-Making'.
[26] Cleaver, 'Institutions, Agency and the Limitations of Participatory Approaches to Development'.
[27] Creighton and Lorie, 'Differences in How Modellers and Facilitators Approach Computer–Aided Dispute Resolution'.
[28] The World Bank, Communication for Governance & Accountability Program, and CommGAP, 'Multi-Stakeholder Dialogue'.; See also Stakeholder Research Associates et al., 'The Practitioners Handbook on Stakeholder Engagement'.. And dam building modelling processes (...)
[29] Chevalier, 'Stakeholder Analysis and Natural Resource Management'.
[30] Mohan and Stokke, 'Participatory Development and Empowerment'.. Mohan, 'Participatory Development'. underlines this by asserting the social constructed nature of power.
[31] Hickey and Mohan, 'Relocating Participation within a Radical Politics of Development'.

Personality: Another related aspect is the importance of considering personality. This is rooted in the idea of power as socially constructed rather than as only resting with traditionally recognised authorities. Thus power exists within communities, being codified through norms and rules and is partly exercised through people's personality, with more dominant individuals able to exert more influence.[32]

Another point here is the way poverty and a lack of education may inhibit participation. Not only may they engender insufficient skills to engage fully in a process that frequently utilises reading and writing, computer use and potentially sophisticated language, they may also result in a lack of confidence, and a lack of experience of public discussion and engagement in decision making. This includes little understanding of the way government works or of large infrastructure projects. Indeed, engaging with models of macro-scale environmental systems is challenging. As well as the technical difficulties, the gap in understanding can also create a feeling of inferiority, a self-imposed sense of an inability to engage. Issues of understanding modelling have been noted even among academics from different disciplines when engaged in a modelling process.[33]

Cost and timeliness: There are also practical factors which undermine stakeholder processes.

- They may end in stalemate. Bringing a group of people together for whom the stakes are very high is just as likely to create conflict as agreement. On one side sit civil service jobs, companies' profits, election wins, etc; on the other, people's livelihoods, their culture, social relations and 'communities'.
- Undertaking a stakeholder process that empowers disadvantaged participants is costly. It will probably involve training and extra support as well and processes that are time-intensive.[34]
- There will always be time and money constraints on conducting stakeholder processes as compared to proceeding immediately with a dam (although doing the latter is likely to throw up future issues during construction and operation).

Practitioners taking the FutureDAMS Approach need to consider how these critiques apply to their practices and what can potentially be done to mitigate them.

How to Mitigate Risks

Having established these numerous pitfalls, what might be done to address and minimise them? Recognition is often the first step, as are:

Awareness: The *convener* and *facilitator* of any participatory process needs to be aware of all the process's potential flaws. These would include the ability of any process to be manipulated by more powerful voices and the potential for social, cultural and other factors to silence certain people. The facilitator needs to gain an understanding of these factors and to attempt to handle discussion in such a way as to overcome them. This requires an understanding of culture and norms and maintenance of a constantly reflexive attention to power within participatory processes.[35]

Capturing diversity: Attempts must be made to capture the diversity of potential opinion, experience and knowledge with an awareness of class, ethnicity, race, gender, geography and age.[36]

Empowerment support: In order to encourage those who are marginalised, specific empowerment steps are likely to be necessary. These are partly described in the stakeholder process, including training, but should be demand-led wherever possible. Other policies could include mentoring, which could be handled by local or other civil society groups. It may also be necessary to provide finance to enable marginalised people to attend and take time out from their livelihoods.

Re-politicising participation and the lens of citizenship rights: Perhaps the most important element for any successful participation is to treat it as political, as a process that aims to politically empower those with limited influence over development policy. Hickey and Mohan propose a rights-based idea of

[32] Kothari, 'Power Knowledge and Social Control in Participatory Development'.
[33] Creighton and Lorie, 'Differences in How Modellers and Facilitators Approach Computer–Aided Dispute Resolution'.
[34] Langsdale et al., 'Collaborative Modeling for Decision Support in Water Resources'; Creighton and Lorie, 'Differences in How Modellers and Facilitators Approach Computer–Aided Dispute Resolution'; Stephenson and Shabman, 'Bringing CADRe to Contemporary Water Policy-Some Challenges'.
[35] Hickey and Mohan, 'Relocating Participation within a Radical Politics of Development'.
[36] Hickey and Mohan.

citizenship as the principle cornerstone upon which to achieve this.[37] This principle sees citizens' rights not as a mere legal framework, but as something to be exercised and used to influence politics. Thus, the principle asserts a legal duty to include people but also sees participation itself as a form of citizenship, something to be exercised.

Fundamental challenges

A political Trojan horse?

However, even if the above steps are taken, the many barriers outlined above are inherent to the participatory process and are unlikely to be fully overcome. Participation, the genuine empowerment of people and handing over of decision-making power, is extremely difficult to deliver. Moreover, it is necessarily a political act and therefore bound up in the wider nature of a country's politics. As reflected in the risks and political conditions document, in authoritarian contexts where critique of the government is informally and formally policed, and where the space for free public speech and the media is limited, the likelihood of creating an open space for reflection is low. The self-imposed policing created by such governance constraints may fall disproportionately on the poorest, who have most to lose and are the easiest for authorities to target. Many of the countries in which big decisions about big dams have recently been taken, are planned or are under consideration are governed by authoritarian regimes. By contrast, a country with strongly ingrained human rights and protections for free speech and critiques of authority will have enhanced prospects for participation.

Thus, many development practitioners have effectively, but often unknowingly, used participation processes as a 'Trojan horse' to create more democratic decision making. Such subversive policies are likely to run into difficulties. This is because of the near impossibility of avoiding the effects of broader political suppression of individuals' engagement and because, if the state does not, at some level, believe in the value of participative exercises, it is likely to undermine or ignore its outcomes. While it is therefore possible to produce somewhat holistic decision-making processes, an understanding of participation as merely technocratic will doubtless lead to interactions that replicate existing power structures, maintaining rather than challenging and changing the status quo in decision making. Consequently, critical scholars propose that participation should take a more politically activist form.[38] This involves explicitly linking attempts at increasing participation to assertive grassroots political action – to organisations, movements and activities that increase the voice and power of particular affected groups and that therefore change or influence formal political systems.

Practicalities

Undertaking these various ameliorative measures is not without cost. Most critical scholars examining participative processes emphasise that, to turn out well, they essentially need significant time and money, and will probably be arduous. This is particularly true of processes that attempt to include those who are poorest and have low levels of education.

Moreover, they may end in stalemate. Bringing a group of people together for whom the stakes are very high (civil service jobs, company profits, election wins, etc on the one side and peoples' livelihoods, their culture and community on the other), is just as likely to create conflict.

Moreover any participative stakeholder process places a huge burden on the facilitator. It is extremely reliant on their ability to understand the contexts, cultures and social norms of the participants, to adequately empower those who require support, to negate and overcome inequalities between participants and to resist the pressure of dominant interest groups. It is therefore incumbent on the ethics and capabilities of such an individual or team to remain above politics and yet enable empowerment.[39]

Political governance and ideology

The FutureDAMS project is attempting to change the nature of high-stakes decision-making processes. It addresses decisions potentially involving large infrastructure with significant benefits and associated finance that can be flagships for governments, helping to build legitimacy, win votes, create resources for

[37] Hickey and Mohan; See also Gaventa, 'Towards Participatory Governance: Assessing the Transformative Possibilities'.
[38] Cornwall, 'Spaces for Transformation? Reflections on Issues of Power and Difference in Participation in Development'; Gaventa, 'Towards Participatory Governance: Assessing the Transformative Possibilities'; Cooke, 'Towards Participation as Transformation: Critical Themes and Challenges'; Mohan, 'Participatory Development'; Hickey and Mohan, 'Relocating Participation within a Radical Politics of Development'.
[39] Mohan, 'Participatory Development'.

patronage and rents, build alliances with international partners and fulfil narrow development missions. It is therefore likely that governments will try to manipulate any stakeholder process through the mechanisms discussed in the stakeholder and participation sections. These include controlling discussion within the process, influencing the selection of participants and the data used or projects considered by the modelling tool. If the process produces an outcome that questions or counters the government's chosen/preferred infrastructure path, they may simply ignore it. This is highlighted by the wider literature on modelling, which asserts the importance of the *convenor* believing in the process, and seeing value in participation and in a holistic systems-scale options assessment.[40] This point is particularly made by Jeuland et al, who argue that academics frequently complain about the quality and quantity of data, blaming this for the lack of influence their water-system models have.[41] Jeuland et al argue that, on the contrary, there needs to be more focus on the public and private actors using such models, a close consideration of what they will find useful; more data won't create policy change by themselves.

Another concern is a country's political system. More authoritarian, repressive governments are likely to jeopardise the degree of participation in any FutureDAMS Approach. Such governments tend to restrict space for public disagreement with the government through the media, and block the voices of opposition parties and civil society. Doing the latter means that NGOs and academics operating in such countries are therefore likely to be allied to, or confirmative of, the state. Additionally, there is likely to be a significant degree of self-censoring under such political systems. The absence of an independent judiciary and the presence of laws that make criticism of the regime illegal, in addition to the precedent of violent suppression, create a fear of speaking out and a wider social norm of conforming to the state's development plans. This is particularly likely in formal settings, like those proposed in the FutureDAMS' approach, and when government officials are present. In addition, such authoritarian states are likely to have strongly centralised, even pyramidal structures of decision making. This means that, unless the president and key personnel are convinced by new policy ideas, they are not implemented. This could also limit the extent to which the FutureDAMS Approach is used in practice and/or create the risk that, if the FutureDAMS Approach is utilised, it will be manipulated to produce the 'right result'. Whether this means the approach is not worth using under such circumstances, or what the alternative should be, is debatable.

Significantly, given the wider political causes of such factors, it is very difficult for them to be overcome. As discussed in the review on participation, such informal, social mechanisms of suppression are not unique to authoritarian governments, but such governance conditions are likely to produce and strengthen closed public fora. This is underlined by the fact that many key successful cases of participative modelling come from the US. In these examples, a respect for the opinions of citizens, and the rights they are guaranteed, as well as for the broader context of a norm of public political debate, provided key enabling conditions. Indeed, one of the best examples of an early version of the FutureDAMS' approach was conducted in the UK, where it was used to facilitate discussion about development of regional (ie multi-river basin) water resources.

Furthermore, influential political ideologies may have a significant influence on the inclusiveness of the FutureDAMS Approach. Modernising ideologies have long been influential in dictating what development should look like, and how its decision making should function. They originate in the Enlightenment era, and became particularly prominent in developing countries after World War Two.[42] The ideology is based on a belief in a binary between backward, irrational traditional people, and modern ideas of science and technology, with the latter seen as exclusively capable of discerning the path to development, and best able to solve political problems. These beliefs continue to influence governments.[43] This is significant as belief in such an ideology leads to participative processes being seen as irrelevant, and the knowledge, experience and perspective of non-technical people as illegitimate.

[40] Dehoff and Beauduy, 'Use of Modeling to Facilitate Interstate Collaboration on the Lower Susquehanna River'; Stephenson and Shabman, 'Bringing CADRe to Contemporary Water Policy-Some Challenges'; Langsdale et al., 'Collaborative Modeling for Decision Support in Water Resources'.
[41] Jeuland et al., 'The Economic Impacts of Water Information Systems'.
[42] Scott, Seeing like a State; Ferguson, The Anti-Politics Machine; Bähre and Lecocq, 'The Drama of Development'.
[43] Dye, 'The Return of "High Modernism"?'; Dye, 'The Politics of Dam Resurgence: High Modernist Statebuilding and the Emerging Powers in Africa'; Fantini, Muluneh, and Smit, 'Big Projects, Strong States? Large Scale Investments in Irrigation and State Formation in the Beles Valley, Ethiopia'; Jones and Dye, 'The Modernisation Projects of Africa's Illiberal Statebuilders'.

The Proposed Stakeholder Process – A Comparative Perspective

Integrated Dam Assessment Model (IDAM) 38

Hydropower Assessment Framework Protocol (HSAP) 39

Participative Modelling Exercises in the USA 40

The Challenge-and-Reconstruct Learning (ChaRL) Approach in the Greater Mekong 41

To further understanding of the challenges involved in undertaking WEFE participative planning and some history of what has and hasn't worked in initiatives to improve WEFE infrastructure decision making, this final section summarises some other previous attempts. This allows considering how the proposed process is different from other WEFE planning methods, and what lessons has been drawn from these other initiatives.

Integrated Dam Assessment Model (IDAM)

The IDAM Model was built by an interdisciplinary group of academics including economists, anthropologists and engineers at Oregon State University. It involves a stakeholder process and computer model to assess dams' impacts. Such features suggest similarity with the FutureDAMS project. However, IDAM's scope is significantly different. It has two principal processes, as shown in figure 7. This process, answering the call of the World Commission on Dams for the assessment of more options, attempts to produce visualisations of the various impacts different dam projects can have. It attempts to do this holistically, through the use of quantitative and qualitative assessment, but also by including a wide range of stakeholders in its procedures.

There are a number of gaps in the IDAMs approach, however. Their outlined stakeholder methodology is limited, with no reference to the extensive literature concerning the risks of participatory processes. (It can be accused of being a 'technicise' and ignoring power relations/politics). For instance, there is no apparent consideration of power within discussions, nor of the potential of *conveners* to manipulate it. The number of stakeholder groups outlined (NGOs, academics, the hydropower industry and government) assumes that this will capture the range of relevant opinions and interests. This is problematic, given that academics and NGOs do not necessarily involve and capture the perspectives of rural livelihoods and cultures, or represent the potentially marginalised people typically affected by dams. Further, Kirchherr and Charles assert that the model is limited because it does not directly include downstream affects, a significant oversight.[44] Additionally, its authors acknowledge difficulty in the confusing nature of the categorisation of the pre-decided impact factors. Furthermore, they acknowledge problems with the quality and application of data, and in the ability for participants to discern cumulative impacts accurately. While some of these issues are specific to IDAMs, they also demonstrate some of the wider risks to modelling approaches. The simulation-based modelling approach of FutureDAMS addresses some of these risks.

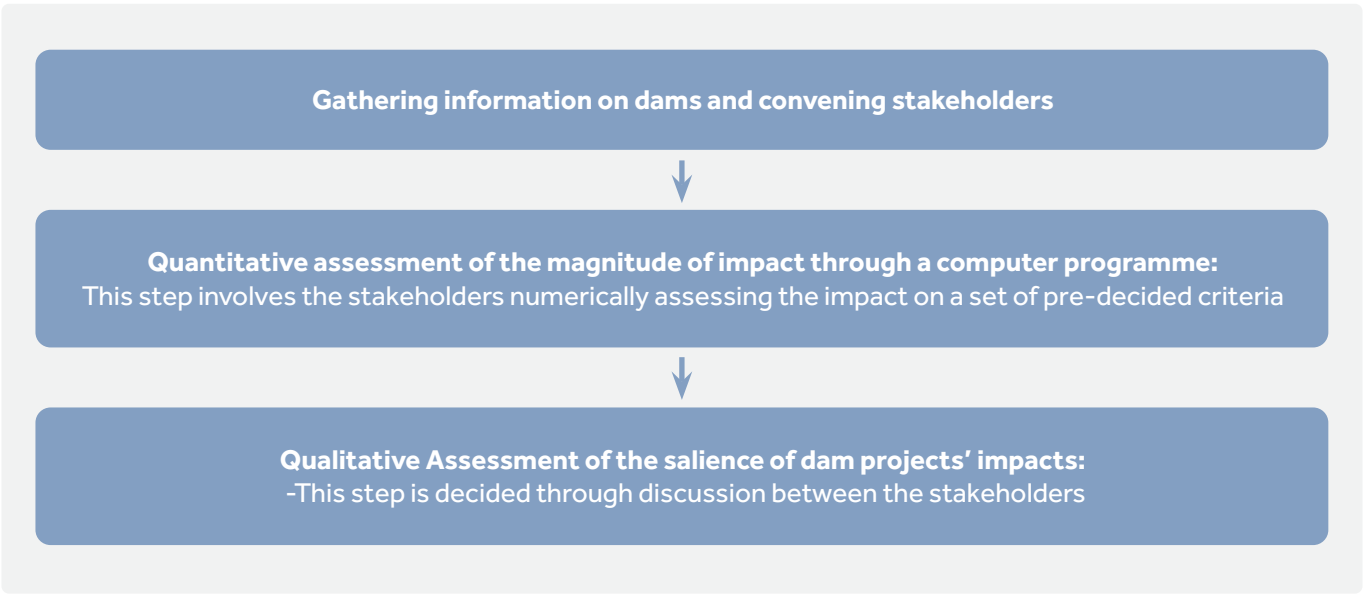

Figure 7: Depicting The Idam Model's Process

[44] Kirchherr and Charles, 'The Social Impacts of Dams'.

Hydropower Assessment Framework Protocol (HSAP)

The most widely used dam assessment tool is the Hydropower Sustainability Assessment Protocol, applied 24 times since 2011 to different dam projects (Figure 8).[45] It was developed by the International Hydropower Association, an industry-funded group which has developed tools to reform the sector. Its quantitative assessment process creates a rose diagram whose ranks include 25 topics, including downstream flows, project benefits, displacement, compensation for affected peoples, safety, economic viability and demonstrated need.[46]

Figure 8: Example of a HSAP rose diagram

[45] Kirchherr and Charles.
[46] See http://www.hydrosustainability.org/Protocol/Scoring-and-Structure.aspx.

The comprehensiveness of the process and the list of measured variables goes some way to fulfilling elements of the World Commission of Dams proposals, which called for a more holistic, critically engaged process of dam building. However, Skinner and Haas point to a number of shortcomings in this approach.[47] They include limited consideration of the bio-physical system, the web of connections between the functioning of the river, its ecology and the livelihoods that depend on it. In addition, while considering 'governance', there is not a score ranking the degree to which affected communities and positively and negatively affected citizens are empowered in the decision-making process. Compared to the World Commission on Dams' proposals, the HSAP also lacks assessment of potential legally binding promises for the displaced, either in terms of their consent for the project, or of compensation and benefit sharing.

Participative Modelling Exercises in the USA

Both the IDAMs and HSAP are primarily aimed at assessing individual projects or a connected set of infrastructure construction. They both rely on existing data on impacts being readily available. This differs from the FutureDAMS Approach, which acts as a tool to combine existing data sets in a novel way to reveal the benefits and impacts of combinations of interventions. This approach has greater similarity to initiatives in the US and Greater Mekong region.

Dams in the US have come under increasing attack over time as their environmental impacts, particularly downstream and on fish populations, have played out. Anti-dam activism, and a re-evaluation of dams' economic costs and benefits, has resulted in a growing number of decommissioning projects.[48] It has also led the large dam bureaucracies, namely the Bureau of Reclamation and US Army Corps of Engineering, to engage with affected people, activists, NGOs and academics critical of dams. This has resulted in substantive attempts at creating stakeholder decision-making processes that often include a participative modelling process to aid decision making. A prominent example of such modelling exercises has been undertaken by academics at Washington State University[49] Their tools have been used to repurpose existing infrastructure, model the impact of climate change and conduct future planning. Another instance of future planning is the Susquehanna River Basin Commission, which conducted a planning process around future basin water use. This process demonstrated the significant trade-offs associated with an existing dam and recommended repurposing old, and building new, infrastructure with a number of aims, including an increase in water supply to Baltimore city.

The authors of these stakeholder modelling processes have discussed the challenges in undertaking them. Partly, these relate to the risks outlined elsewhere. For instance, Creighton and Lorie note the difficulties created by the different personalities and perceptions of modellers and facilitators.[50] Stephenson and Shabman report the financial cost and time-intensiveness of such processes,[51] as well as the difficulty of gaining trust in the facilitator. Langsdale et al additionally assert problems with participants' varying understandings of computer modelling.[52]

[47] Skinner and Haas, Watered Down?
[48] Lowry, Dam Politics.
[49] Washington State University, 'Collaborative Modelling for Descion Support in Water Resources: Principles and Best Practice'.
[50] Creighton and Lorie, 'Differences in How Modellers and Facilitators Approach Computer–Aided Dispute Resolution'.
[51] Stephenson and Shabman, 'Bringing CADRe to Contemporary Water Policy-Some Challenges'.
[52] Langsdale et al., 'Collaborative Modeling for Decision Support in Water Resources'.

The Challenge-and-Reconstruct Learning (ChaRL) Approach in the Greater Mekong

This approach, led by Smajgl and Ward,[53] aims to improve decision making in river basins through a process that learns from scientific evidence. It involves taking a spectrum of stakeholders through five steps:

1. defining scope, objective and context for the study;
2. setting out desired visions for the future;
3. discussion and definition of beliefs about development, and presentation of commissioned scientific evidence;
4. analysing, in light of beliefs and science, how to get to the stated future vision;
5. deciding on specific policy actions.

This approach is different from the others outlined here as it explicitly embraces a ***learning approach***, the idea of systematically considering evidence and its relationship to the proposed policy processes. It is also outcome orientated, working back from stated future visions, rather than starting with specific infrastructure proposals. This latter approach is also proposed by FutureDAMS.

However, it also differs in the extent of its participatory ambition. The authors state that its primary purpose is to influence key decision makers in the basin.[54] There is therefore limited engagement with the literature on participation and particularly with critiques of the participatory process. Thus, many of the questions posed about the IDAMs model above (eg about understanding how power shapes discussions) are also relevant here. Consequently, ChaRL largely overlooks the benefits of and issues with a broader participatory process that attempts to include those negatively impacted and empower those who are marginalised from decision making about infrastructure. This leads to the ChaRL approach having limited representation of those affected by infrastructure, with only NGOs and decision-influencers included. The perspective and experience of the people who live in the Mekong valley is partly represented by scientists, rather than by the people themselves. Experts predict their behaviour through agent-based modelling and infer facts about Mekong resident's livelihoods and environmental connections through surveys. This contrasts with the participatory development literature, which argues that such externally driven research is likely to miss important elements of the livelihoods, culture and values of the people they are claiming to represent. ChaRL also decided to exclude indigenous knowledge from the presentation of scientific data. Indeed, science is here interpreted as quantitative, including agent-based modelling, survey statistics and hydrology, climate and river-system models. Indigenous expertise might appear as 'beliefs' in the outline approach, if stakeholders holding such knowledge are present in discussions. Overall then, ChaRL, with its focus on getting key decision makers to engage in more outcome-orientated, evidence-based decision making, does not take a conventionally participatory approach.

[53] Smajgl and Ward, 'A Framework to Bridge Science and Policy in Complex Decision Making Arenas'; Smajgl et al., 'Visions, Beliefs, and Transformation'.
[54] Smajgl and Ward, 'A Framework to Bridge Science and Policy in Complex Decision Making Arenas'.

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Future DAMS

Design and Assessment of
water-energy-food-environment
Mega-Systems