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ADVOCACY FOR HEALTHY RIVERS

A GUIDE FOR CIVIL SOCIETY ORGANIZATIONS IN NEPAL

CONTENTS

FOREWORD

American sociologist, Phil Brown, says environmental movements require a "citizen-science alliance" to be successful. That is, citizens must be able to understand the science of an environmental issue to create the necessary or desired change. By the same token, the science must also explain to citizens why and how these issues can affect their lives.
Rivers are not just flowing waters. They are complex ecosystems where thousands of organisms survive, breed, and thrive, and, most importantly, help sustain the environment on which we depend for food, irrigation, hydro-energy, and drinking water. Moreover, rivers exist in a multi-layered environment of governance that can be difficult to navigate. Who bears what responsibility for our rivers at the local level? The provincial level? The federal level? The answers to these questions are important.
Proper development of freshwater resources will be a key factor for future economic growth and social transformation in Nepal. Road connectivity, irrigation and hydropower will play a central role in this process but we must also know the environmental costs associated with that development. Economic growth today may have future expenses that our children and grandchildren would be forced to bear. For example, allowing wide-scale hydropower on free-flowing rivers will add much power to the national grid, but could also decimate, if not eradicate, important fish species and other aquatic life. We must find a balance that addresses short-term needs with a long-term view to the future.
This is why I am so pleased to endorse the USAID Paani Program's civil society guidelines for healthy rivers in Nepal. In simple language and graphics, they explain very complex ideas about citizen rights, environmental science, and infrastructure development and its impact on ecosystems. The more understanding we have about these ideas in the general public, the more productive conversations we can have about biodiversity conservation and sustainable development in Nepal.
As rivers carry fish and vital ecosystem services up and downstream, I hope these guidelines will be shared far and wide – in schools, in government, in civil society organizations and beyond. We must act now to keep our rivers healthy and productive for all aquatic life.
I want to thank Paani for their dedication in pursuit of these principles and for their hard work to develop this important publication.

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ABBREVIATIONS

CBAPU	Community-Based Anti-Poaching Unit
CFUG	Community Forest User Group
CSO	Civil Society Organization
DoLI	Department of Local Infrastructure
DoR	Department of Roads
EFRC	Environment-Friendly Road Construction
EIA	Environmental Impact Assessment
FECOFUN	Federation of Community Forest Users, Nepal
FEDWASUN	Federation of Drinking Water and Sanitation Users, Nepal
IDD	Infrastructure Development Directorate
IDO	Irrigation Division Offices
IEE	Initial Environmental Examination

MoFALD	Ministry of Federal Affairs and Local Development
MoID	Ministry of Infrastructure Development
MoPIT	Ministry of Physical Infrastructure and Transport
MoEWRI	Ministry of Energy, Water Resources, and Irrigation
NFIWUAN	National Federation of Irrigation Water Users, Nepal
NGO	Non-Governmental Organization
NPR	Nepali Rupees
RDBO	Road Division Building Office
RoW	Right of Way
ToR	Terms of Reference
USD	US Dollars
WUA	Water Users Association

SUMMARY

This book is an informational guide for Nepali citizens and civil society organizations (CSOs) that wish to know more about sustainable infrastructure to ensure healthy rivers and rich biodiversity. The information contained in this guide will strengthen their voices in policy discussions at the local, provincial and federal levels of government.

This text draws from numerous sources including the important work done by *Jalshrot Vikas Sanstha* (JVS), a Nepali member of the Global Water Partnership, an international network dedicated to improving water resource management (www.gwp.org).

STRUCTURE OF THE BOOK

To begin, we cover the ***basics*** of sustainability and infrastructure, focusing on roads, irrigation and hydropower. We provide key terms and concepts so that citizens and CSOs understand the language commonly used in these areas. Readers will also have a quick reference guide to the various government offices that are responsible for infrastructure development at the local, provincial, and federal levels.[1]

Then we turn to the ***threats*** posed by each of these forms of infrastructure, informing readers about the potential harmful impacts that can occur as a result of irresponsible road building, irrigation, and hydropower.

Finally, we focus on the ***opportunities*** for ordinary citizens and CSOs to effect positive change in their communities.

We begin by taking readers step by step through the advocacy process, starting with defining the problem and moving through subsequent stages of generating solutions, building networks, and executing an action plan.

In total, we believe this text will provide any interested person with the essential information for understanding the virtues of sustainable infrastructure and how to negotiate with the complex institutions that manage infrastructure development in Nepal.

In the end, we hope this book will contribute to strengthening civil society in Nepal, not only for issues of sustainability and riverine health, but also for deepening the appreciation for democratic processes in all areas of public life.

1. At the time of publication, some issues regarding infrastructure development, in particular the responsibilities of each level of government, had yet to be decided. Readers should keep this in mind, especially for sections referring to government offices.

Introduction

What Is Sustainable Infrastructure?

KEY DEFINITIONS AND KEY QUESTIONS ABOUT SUSTAINABILITY

To begin, let's clarify some key definitions of words that will appear repeatedly in this book.

What is sustainability?

Using natural resources in such a way to ensure their long-term availability and to maintain ecological balance.

What is infrastructure?

The basic physical structures and facilities needed for the operation of a society (e.g., roads, water supply, power supply).

What is sustainable infrastructure?

Designing, building and operating infrastructure in ways that do not diminish the social, economic, and ecological processes required to maintain the functioning of environmental systems.

In other words, infrastructure provides basic needs for daily living, but it should be constructed in a way that does not negatively affect natural resources such as water, forests, and animal life.

Why infrastructure matters

Infrastructure forms the basic building blocks of an economy. Roads enable trade and travel with other cities. Water supply supports homes and agriculture. Hydropower provides electricity and water for irrigation.

How infrastructure can affect biodiversity and freshwater services

If not built properly, infrastructure can impact the environment in negative ways. Road building may increase landslides that destroy water sources or contaminate fish habitats in the river. Hydropower can interrupt a river's flow and block migrating fish. Therefore, communities must know how infrastructure can affect their access to clean water and other resources they need for daily living.

Infrastructure becomes part of the environment, so it must be constructed in a way that creates harmony with nature.

SECTION I

The Basics

CHAPTER 1

PRINCIPLES OF FRESHWATER SERVICES AND BIODIVERSITY CONSERVATION

This chapter lists the specific ways that ponds, lakes and rivers provide benefits to a community, aquatic life, and the natural resources in the area.

In terms of freshwater, rivers and other bodies of water provide four types of services: support, provision, regulation, and culture.

Rivers provide ***support services*** by cycling nutrients through the ecosystem and providing living spaces for fish, plants and other aquatic life.

Rivers offer ***provisioning services*** in terms of food and water for irrigation and for consumption by local communities.

Rivers deliver ***regulating services*** by filtering water of contamination and buffering against floods and soil erosion.

Rivers are important sites of ***cultural services*** in Nepal, commonly used for religious and recreational purposes.

Photo: Credit name here

What do we mean by biodiversity conservation?

Biodiversity is the total variety of species on the planet – including the myriad genes and ecosystems of which these species are a part. Biodiversity is more than a sum of its parts – the interactions between species and resources "structure" a community and make ecosystems work.

We conserve biodiversity because *all species possess a value that contribute to the good of other species, and vice versa*. Losing species to extinction weakens the chains that link us all together.

Calls to action

The importance of freshwater and biodiversity conservation in the face of growing human pressures on natural resources call for us to:

- Conserve endangered species
- Maintain special habitats
- Maintain patterns of landscape diversity
- Maintain key ecosystem processes
- Use natural resources sustainably

Your rights before the law

Many times, people do not understand what rights they have to demand better protection of the environment.

Nepal's legal procedures have changed dramatically in recent years to allow ordinary citizens the ability bring claims before the court at local, provincial, and federal levels.

In this section, we highlight some key pieces of legislation that enable ordinary citizens to take a stand against environmental degradation.

Epistolary jurisdiction

In some cases, a letter to the editor of a newspaper can inspire a court proceeding related to the environment. If a citizen writes a complaint about water use that he or she feels is unfair, the court may read that letter and decide to hear the case in court.

Section 91 of the Civil Procedure Code

Section 91 of the civil procedure code provides every citizen the right to approach the District Court with any matter they feel is related to public interest or public concern or the interest or concern of the Government of Nepal, Provincial Government or Local Level.

Article 131 of the Constitution of Nepal

The Supreme Court has the extraordinary power to issue necessary and appropriate orders, provide appropriate remedies for the settlement of any constitutional or legal question involved in any dispute of public interest or concern. Any citizen can approach the Supreme Court requesting to address the public interest, which include construction of environment friendly infrastructure.

Constitutional rights

The Constitution of Nepal includes three articles that are especially important to environmental protection:

Article 16 states every citizen has a fundamental right to live with dignity. This passage can be interpreted to include the right to have access to clean air and clean water.

Article 30 provides for every citizen's right to a clean and healthy environment. The key word is healthy, which allows for citizens to make claims for the value of biodiversity and land use conservation. All infrastructure that negatively impacts the environment can be challenged if found to be violating this fundamental right.

It also guarantees the right for a victim to obtain compensation, in accordance with law, for any injury caused from environmental pollution or degradation.

Article 51 (sub-clause G) addresses "policies related to protection, promotion, and use of natural resources." These policies require the State to take numerous steps toward ensuring a healthy environment, such as:

- Sustainable use of resources
- Multi-purpose development of water
- Reliable and affordable supply of renewable energy
- Sustainable irrigation
- Where there is negative effect or likely to be a negative effect on nature, environment or biological diversity, take appropriate measures to eliminate or minimize negative effects, pursue principles of polluter pays, precautionary principle and ecologically sustainable development

Environmental assessment of infrastructure

It is important to know that before any type of infrastructure project, the developers are required to conduct an assessment of the impact the infrastructure may have on the environment.

Smaller projects require an **Initial Environmental Examination (IEE)**, which is a preliminary study of the potential environmental issues related to a project and ways these effects may be lessened.

Larger projects require an **Environmental Impact Assessment (EIA)**, which is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

CHAPTER 2

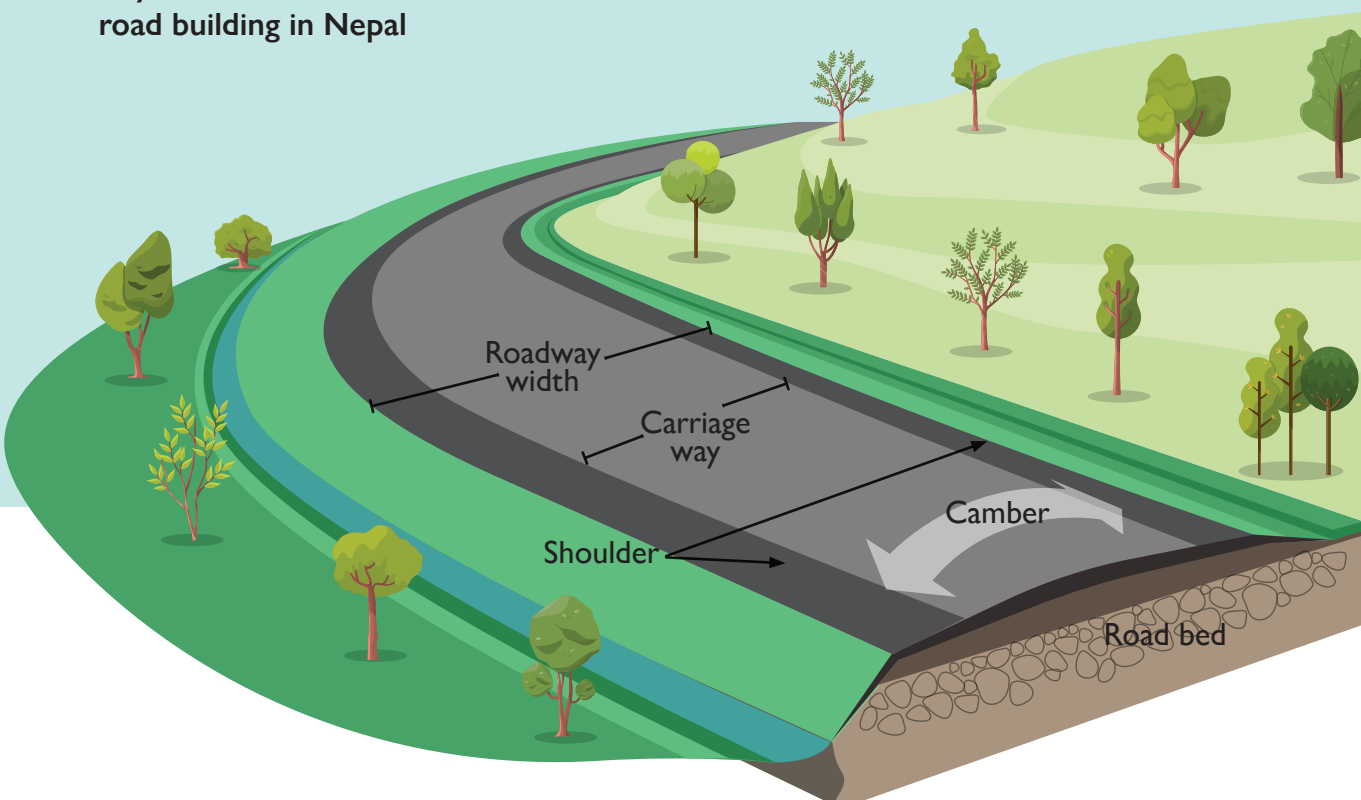
ROAD CONSTRUCTION

Roads are essential for development. They bring food to our markets. They give us easy access to hospitals and other cities. But road building in Nepal is difficult. Our many hills and mountains make road building a challenging task.

A sustainable road allows basic needs of individuals to be met safely and in a manner consistent with human and ecosystem health.

Sustainable roads are the result of **environment-friendly road construction (EFRC)**, which accounts for all potential environmental impacts prior to, during, and after construction of a road.

Key terms for road building in Nepal



Camber – the upward curved surface of a road that facilitates drainage

Carriage way – the central part of the road intended for vehicle traffic; may be paved or covered with gravel

District core road – road that connects a gaunpalika (rural municipality) or nagarpalika (municipality) with a district center or nearest economic center.

Hairpin curve – a bend in the road that changes the flow of traffic

Gradient (or slope) – the slope of a road

Road bed – the built-up foundation that supports a road

Roadway width – the sum of the widths of the carriage way and the shoulders on either side

Shoulder – the part of the road on either side of the carriage way; may be used for non-motorized travel and allows vehicles more room to maneuver; measured from the edge of carriage way to the edge of the road bed

Village road – all smaller roads that do not qualify as a district road

The Government of Nepal has standards for carriage, shoulder and roadway width. Even private contractors are required to follow these standards.

		Carriage width (m)	Shoulder width (m)	Roadway width (m)
District road core network	Hill	3.0 (less than 100 vehicles per day)	0.75	4.5
		3.75 (100-400 vehicles per day)	0.75	5.25
		5.5 (more than 400 vehicles per day)	0.75	7.0
	Terai	3.0 (less than 100 vehicles per day)	1.5	6
		3.75 (100-400 vehicles per day)	1.5	6.75
		5.5 (more than 400 vehicles per day)	1.0	7.5
Village road network	Hill	3	0.5	4
	Terai	3	0.75	4.5

Source: MoFALD (2012) (second amendment 2014)

Right of way

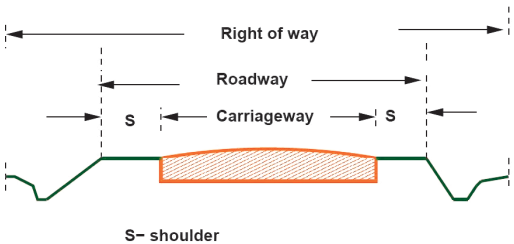
Right of way (RoW) refers to the road bed and the total width of the foundation for a road. The width of the right of way is determined by the local government based on its current transportation levels and future development.

	Total width (m)	Building minimum setback distance from RoW (m)	Comment
District road	20	6	Center line of road should sit exactly at 10m
Village road	15	4	Center line of road should sit exactly at 10m

Source: MoFALD (2012)

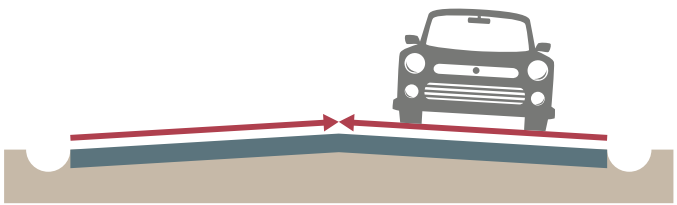
Not obeying these distances creates two issues – possible safety issues for those living near the road and potential weakening of the road bed, which could lead to increased erosion and landslides.

Also, any structure (residential or commercial) built on RoW paths will not be reimbursed by the Government if they should use this land in the future.



Camber cross slope

The camber of a road is the rounding at center of a road that allows for rain to drain away to the shoulder. While a minimum level of camber is necessary to ensure safe driving on the roads, too much camber may funnel excess water too quickly into the shoulder and increase the likelihood of landslides.



Camber		District road		Village road	
		Hill	Terai	Hill	Terai
Carriageway cross slope (%)	Earthen	5	5	5	5
	Gavel	4	4	4	4
	Paved	3	3	-	-

Source: MoFALD -2012
(second amendment 2014)

Forms of road construction in Nepal

Earthen roads – roads constructed by flatting the ground (earth) by hand or by machine

Graveled roads – earthen roads topped with gravel to enable better traction and some drainage

Black-topped or sealed roads – are paved with asphalt to hold the base of the road together and offer improved traction and durability to the road

Classification of roads by type and function in Nepal

Road types in Nepal fall into one of four categories (from the Department of Roads):

National highways are main roads connecting East to West and North to South. These roads serve directly the greater portion of the longer distance travel, provide consistently higher level of service in terms of travel speeds, and bear the inter-community mobility. These roads shall be the main arterial routes passing through the length and breadth of the country as a whole. They are designated by the letter H followed by a two-digit number.

Feeder roads are more local and serve the community's wide interest and connect district headquarters, major economic centers, and tourism centers to national highways or other feeder roads. They are designated by the letter F followed by a 3-digit number.

District roads run within a single district and serve areas of production and markets, and connect with other district roads or main highways.

Urban roads run within an urban municipality.

In Nepal, management responsibility for national highways and feeder roads falls under the Department of Roads and these roads are collectively referred to as the Strategic Road Network. District and Urban roads comprise the Local Road Network, and are managed by the Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR).

Technical classifications of roads

Roads in Nepal are classified from 1 to 4 depending on how much weight and usage a road can safely bear. Class 1 roads are the highest grade and class 4 roads the lowest. Class 1 roads are graded for the highest rates of vehicle speed – 120 km/hour – whereas the highest rate of speed for a class 4 road is 60 km/hour.

Which government offices are associated with road building?

Decisions about roads are made by different offices depending on the level of government, and each of these offices is assigned a different set of responsibilities. Currently, the federal government is developing a five-year road plan that focuses on connecting rural areas with larger road networks. Understanding which offices are responsible for which duties can help you know who to talk to when you foresee a problem.

Federal government

Office	Responsibilities
Ministry of Physical Infrastructure and Transport (MoPIT)	• Develop policy, rules, and regulations for roads • Distribute funds for roads according to budgets
Department of Roads (DoR)	• Give approval to road projects and budgets
Road Division Building Offices (RDBO)	• Prepare documents inviting contractors to bid on a road project (tender documents) • Oversee the contractors responsible for road projects • Form and supervise road maintenance crews
Department of Local Infrastructure (DoLI)	• Prepare documents inviting contractors to bid on a road project (tender documents) • Prepare and disseminate the technical guidelines for road building • Oversee the contractors responsible for road projects • Form and supervise the road maintenance crew

Which government offices are associated with road building?

Provincial government

Office	Responsibilities
Ministry of Physical Infrastructure Development (MoPID)	• Develop policy, rules, and regulations for roads • Distribute funds for roads according to budgets
Infrastructure Development Directorate (IDD)	• Prepare documents inviting contractors to bid on a road project (tender documents) • Oversee the contractors responsible for road projects
Road Division Building Offices (RDBO)	• Prepare documents inviting contractors to bid on a road project (tender document) • Oversee the contractors responsible for road projects (under Department of Road) • Form and supervise the road maintenance crew

Which government offices are associated with road building?

Local government (gaunpalika/nagarpalika)

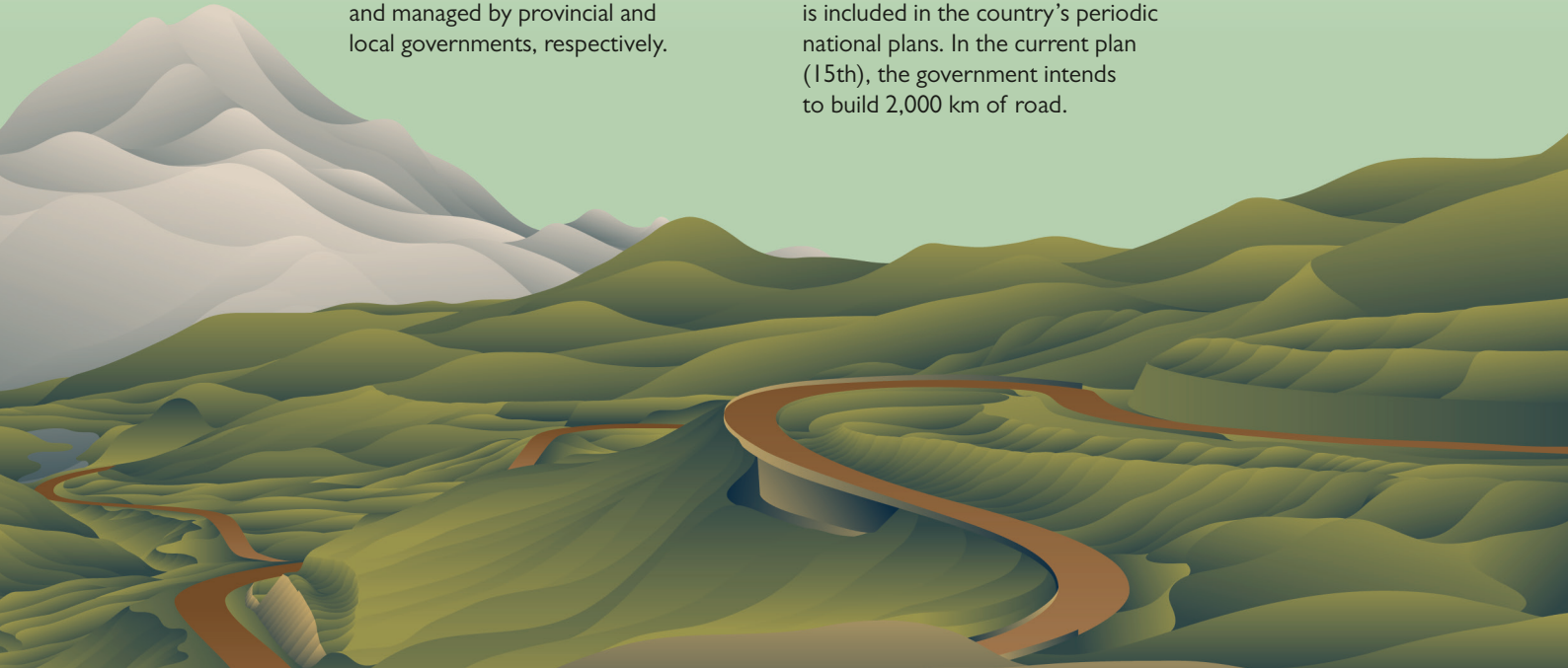
Office	Responsibilities
Municipal executive	• Approve road projects and budgets
Planning section	• Plan and implement projects through tender documents and supervising road user groups
Physical Infrastructure section	• Prepare documents inviting contractors to bid on a road project (tender document) • Provide technical advice to planning section

What is the process for building a road in Nepal?

Roads are built and managed depending on the location they serve. National highways are the responsibility of the federal government, while provincial roads and local roads are planned and managed by provincial and local governments, respectively.

At the local level, roads that extend from one community to another require a joint effort between those local governments.

At the federal level, road planning is included in the country's periodic national plans. In the current plan (15th), the government intends to build 2,000 km of road.



Under the **Local Government Operations Act 2017**, local governments have a broad range of responsibility for road planning and construction. These responsibilities include,

1. Formulating, implementing, monitoring, and regulating policy, law, standards and plan relating to local, rural and agricultural roads;
2. Constructing, operating and maintaining road systems;
3. Managing and regulating transport safety; and
4. Managing all other work related to local roads.

Every planned road in Nepal is required to go through a public process of tendering. With tendering, the government accepts bids from construction companies to undertake the work.

In the bidding process, construction companies must explain the materials and techniques they will use to build the road, and describe the steps they will take to minimize the impact on the environment.

While larger, more experienced contractors typically bid for federal projects, local roads tend to be sought after by local contractors who often lack the ability to build roads according to environmental regulations.

This is one reason why public participation in this process is important. Citizens and CSOs can provide an important check on these processes and ensure that the best contractors are hired.

Important questions to ask regarding road building

1. What are the most important policies and legislation related to road building?

The Public Roads Act 1974 contains information on the proper processes for planning and building roads across Nepal. However, this act does not address conservation, except to say that contractors need to plant trees on either side of the road.

All local governments draft a road master plan that should be available in your local government office.

Environmental protections require an Initial Environmental Examination (IEE) for roads with budgets between 0-250 million Nepali rupees (NPR). Contractors must conduct an Environmental Impact Assessment (EIA) prior to construction for roads with budgets above 250 million NPR. Larger and longer roads are often contracted and sub-contracted out to different builders. These builders do not coordinate among each other regarding consistent environmental mitigation in the road construction process. This lack of coordination is a fundamental barrier to more effective environment-friendly road construction.

The government is currently reviewing and revising the draft of the Environmental Protection Regulations that will be included in the forthcoming Environmental Protections Act 2019.

2. Where can I get more information about road building in my area?

The best place to start is your local government office. They are required to have an Annual Planning Book on file which includes all projects completed during the last year and those projects planned for the coming year.

You can also choose to participate in the public auditing of any road project. Contractors are required to allow your participation according the **Public Audit Guidelines 2010**.

Audits are organized by the head of the contracting group, who leads a group of citizens through all the details of the project. The invitation to the audit must be posted seven days in advance. A second public audit is held after the completion of the project to inform citizens about the details of construction and which environmental issues to monitor going forward.

3. What can I do when I have a complaint about a road project?

If a road project is causing environmental damage in your community, it is best to take your complaint directly to the nearest local government offices or Ward Office and register that complaint with the ward chair.

Second, you can deliver your complaint to the vice-chair of the local government, as this person is the head of the monitoring committee – the group responsible for overseeing infrastructure projects.

Third, connect with the road user committee. This committee is formed prior to road construction for the purpose of overseeing construction and ensuring that local people are hired for available work.

Finally, you can take your complaints to the public hearings and public audits that contractors are required to hold as part of the construction process.

If damage being caused to the environment is not stopped or controlled even after lodging complaint with the aforementioned offices, you should not hesitate to approach the District Court as per section 91 of the Civil Procedure (Code) Act 2074 (2018).

4. How can I participate in the road building process? Which groups in my area can I connect with?

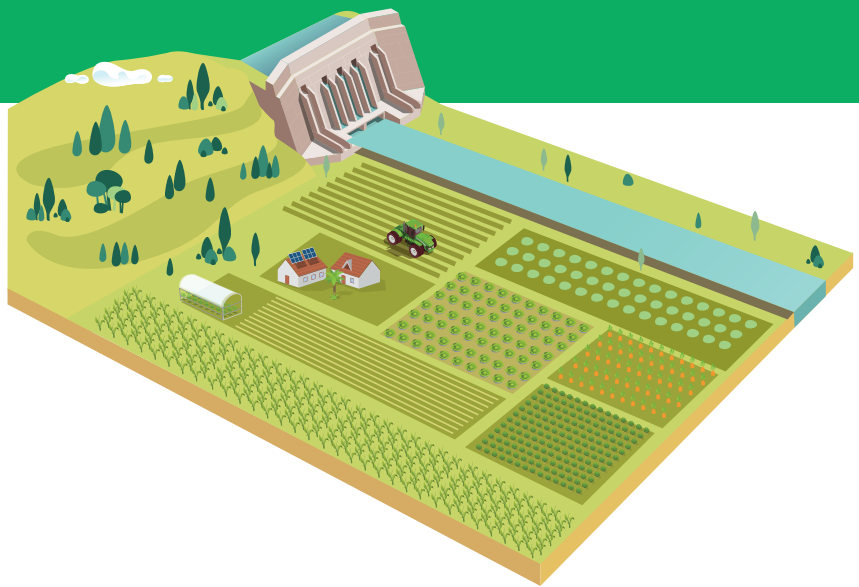
For each road project, there is a **road building group or user group,** which consists of those families who live within 1.5 kms of the construction area. This group can help you understand the process and give you direction when you wish to make a complaint about environmental impacts of road building.

Each road project also has a **user committee (or user group)** who serve as the management committee of the road building group. The user committee monitors the road construction and the hiring process for local employment.

Separately, locals form a **maintenance** committee which begins work after road construction has been completed. They perform regular repair work on the new road and monitor the possible environmental impacts.

CHAPTER 3

IRRIGATION CONSTRUCTION



Irrigation reduces the burden of hauling and moving water for agriculture and household consumption. Irrigation also enables more equitable sharing of available water from rivers or through rainfall.

Key terms for irrigation construction

Alignment – center line of the canal to be followed for excavation or profiling

Apron – floor to protect the surface from erosion

Breast wall – vertical wall immediately above the face of the orifice or gate

Catchment area – area from which rainfall flows into a drainage line

Cropping pattern – crop planting sequence and crop mix throughout a year

Cross drainage works – structure necessary to cross the irrigation canal over the natural drainage

Desilting basin – structure to create a pool of water to allow suspended sediment to settle

Embankment – earthwork raised above the natural ground to protect against flood water

Headwork – combination of structures at the diversion point of the river

Intake – structure to divert water from the source to the canal system

Lining – method of sealing a section of canal to prevent seepage

Main canal – canal that takes off-water from the headwork or from the intake

Percolation – flow of water in sub-soil due to the force of gravity or head pressure

Pitching – covering of the sloping surface with stone, concrete blocks, or bricks to retain soil

Retaining wall – vertical wall to retain soil mass

Runoff – part of rainfall that reaches the stream, drain from the catchment

Scour – removal of material from the bed of the channel by flowing water

Sediment – non-floating material transported by water (sand, silt, gravel and clay)

Seepage – percolation of water into the soil underneath the structure

Side slope – sloping distance of a canal section

Silt – water-borne sediment consisting of fine earth, sand or mud

Weep-holes – horizontal holes on the walls to allow seepage water to flow through it and avoid canal overflow

Weir – barrier built across the river to raise the water level upstream

Wing wall – splayed extension of an abutment wall of the culvert

Source: Design Manual for Small-Scale Irrigation (2014), Nepal Ministry of Federal Affairs and Local Development

Forms of irrigation construction

Sustainable irrigation allows basic water needs of individuals and communities to be met safely and in a manner consistent with available water and ecosystem health.

To begin, let's review the **forms of irrigation** that are most common in Nepal.

Surface irrigation spreads water across the surface of the land, channeled through fields by a network of canals (earthen or concrete). Surface systems ensure that sufficient water is stored at root depth. They have low water run-off, which reduces soil erosion.

Sprinkler irrigation moves water in small pipes from larger sources and sprays water onto the soil, keeping the root zone wet. Sprinkler systems allow crops to be grown in salty soil. They also provide the most efficient water use and reduce water-logging the soil. Sprinkler systems are typically small-scale – either household or community.

Drip irrigation uses small pipes that run along plant rows and drip water into the root zone. Like sprinklers systems, drip systems enable crops to be grown over salty soil, and they also have efficient water use, which reduces soil erosion. Like sprinkler systems, drip systems are typically small-scale – either household or community.

Which government offices are associated with irrigation construction?

Decisions about irrigation are made by different offices depending on the capacity of the system. Larger systems are governed at the provincial levels, and smaller systems at the local level.

Understanding which offices are responsible for which duties can help you know who to talk to when you have a question or concern about irrigation in your community.

Federal government

Office	Responsibilities
Ministry of Energy, Water Resources and Irrigation (MoEWRI)	• Develop policy, rules and regulations • Distribute funds for irrigation projects based on budget requests
Department of Irrigation (DoI)	• Review and approve irrigation project proposals
Irrigation Division Offices (IDO)	• Prepare documents inviting contractors to bid on an irrigation project (tender document) • Oversee the contractors and user groups responsible for irrigation projects

Which government offices are associated with irrigation construction?

Provincial government

Office	Responsibilities
Ministry of Physical Infrastructure Development (MoPID)	• Develop policy, rules and regulations • Distribute funds for irrigation projects based on budget requests
Infrastructure Development Directorate (IDD)	• Prepare documents inviting contractors to bid on an irrigation project (tender document) • Monitor and evaluate on-going irrigation projects
Irrigation, Energy and Drinking Water Supply, Division Offices	• Prepare documents inviting contractors to bid on an irrigation project (tender document) • Begin construction through contractor • Form and supervise irrigation user groups

Which government offices are associated with irrigation construction?

Local government (gaunpalika/nagarpalika)

Office	Responsibilities
Municipal executive	• Review and approve irrigation proposals and budgets
Planning Section	• Prepare documents inviting contractors to bid on an irrigation project (tender document) • Plan and initiate irrigation projects and oversee work of irrigation user groups
Physical Infrastructure Section	• Prepare documents inviting contractors to bid on an irrigation project (tender document) • Provide technical advice to planning section

What is the process for building irrigation schemes in Nepal?

Irrigation systems are built and managed depending on the location they serve. Typically, they are the responsibility of the provincial and local governments.

At the local level, irrigation that extends from one community to another requires a joint effort between those local governments.

Under the **Local Government Operations Act 2017**, local governments have a broad range of responsibility for irrigation planning and construction. These responsibilities include,

1. Formulation, implementation, monitoring, and regulation of policy, law, standards and plan relating to irrigation;
2. Constructing, operating and maintaining irrigation systems
3. Managing and regulating transport safety
4. Managing all other work related to local irrigation.

Every planned irrigation system in Nepal is required to go through a public process of tendering. With tendering, the government accepts bids from construction companies to undertake the work.

In the bidding process, construction companies must explain the materials and techniques they will use to build the irrigation project, and describe the steps they will take to minimize the impact on the environment.

Local systems tend to be sought after by local contractors who often lack the ability to build irrigation according to environmental regulations.

This is one reason why public participation in this process is important. Citizens and CSOs can provide an important check on these processes and ensure that the best contractors are hired.

Important questions to ask about irrigation construction

1. What are the most important policies and legislation related to irrigation?

Requirements and policies for irrigation are included in the **Water Resources Act 1992**. The Act includes several provisions related to fair use of water and equitable distribution of benefits among stakeholders.

Key provisions (and the corresponding sections) include the following:

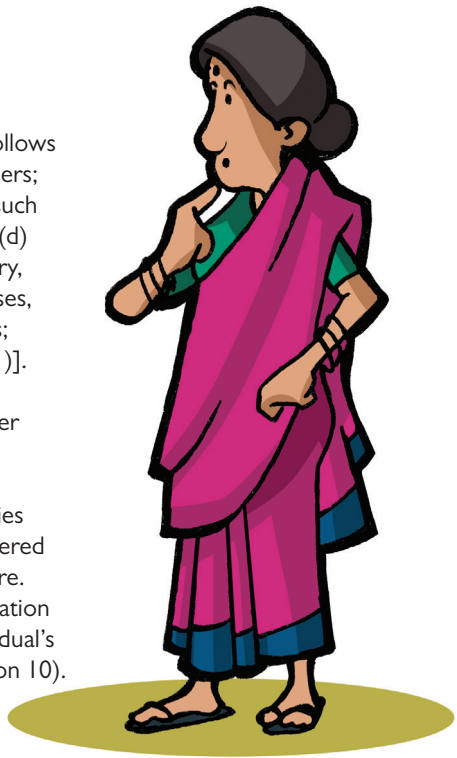
All water resources are owned by the State (section 3).

All water use other than domestic is regulated by means of licenses (sections 4 and 8).

The government will establish priorities for water use (section 7).

The priorities for water use is as follows (a) drinking water and domestic users; (b) irrigation; (c) agricultural uses such as animal husbandry and fisheries; (d) hydroelectricity; (e) cottage industry, industrial enterprises and mining uses, (f) navigation; (g) recreational uses; and (h) other uses. (2) [section 7(1)].

The government may develop water resources and acquire related land through payment of compensation to those individuals and communities affected. Compensation is only offered for land, buildings, and infrastructure. There is no provision for compensation when water resources on an individual's land are utilized by the state (section 10).



Water user associations (WUA) can be formed for the purpose of utilizing water resources for collective benefit on an institutional basis. This authority includes the right to levy fees on members for water use (section 5).

Water-related projects developed by the government may be handed over to WUAs, who then become the "owners" of those projects (section 11). Project developers (either private or governmental) are obliged to conduct an environmental study and report before licensing can be granted (section 8).

The government prohibits pollution of water resources beyond certain limits as published in the Nepal Gazette (section 19).

Water resources users are to avoid significant adverse impact on the environment including by way of floods, landsides, soil erosion or similar other causes (section 20).

2. Where can I get more information about irrigation in my area?

The best place to start is your local government office. They are required to have an Annual Planning Book on file which includes all irrigation projects completed last year and those projects planned for the coming year.

All projects are required to have an EIA or IEE prior to construction. You may consult those reports for information about the impact an irrigation project will have on your community.

You can also choose to participate in the public auditing of any irrigation project. Contractors are required to allow your participation according the **Public Audit Guidelines 2010.**

3. How can I participate in the irrigation process? Which groups in my area can I connect with?

The irrigation users group is the best place to start. They are selected to oversee irrigation construction and have excellent knowledge of the process.

4. What can I do when I have a complaint about an irrigation project?

If an irrigation project is causing environmental damage in your community, it is best to take your complaint directly to the nearest local government offices and register that complaint with the ward chair.

Second, you can deliver your complaint to the vice-chair of the local government, as this person is the head of the monitoring committee – the group responsible for overseeing infrastructure projects, such as irrigation.

Third, connect with the irrigation users committee. This committee is formed prior to irrigation construction for the purpose of overseeing construction and ensuring that local people are hired for available work, and that water is equitable distributed among beneficiaries.

Finally, you can take your complaints to the public hearings and public audits that contractors are required to hold as part of the irrigation construction process.

When you have exhausted all these avenues and still no remedy is provided, then you should not hesitate to approach court. Section 91 of the Civil Procedure (Code) Act 2074 (2018) provides every citizen the right to approach the District Court with any matter they feel is related to public interest or public concern. Depending on the category of the irrigation project, such as if the irrigation project is a large irrigation project, rather than moving to the District Court, you should better approach the Supreme Court.

CHAPTER 4

HYDROPOWER CONSTRUCTION

Sustainable hydropower allows basic needs for electricity to be met safely and in a manner consistent with human and ecosystem health. In other words, sustainable hydropower generation does not negatively affect fish habitats, water quality, and water availability.

Key terms for hydropower construction

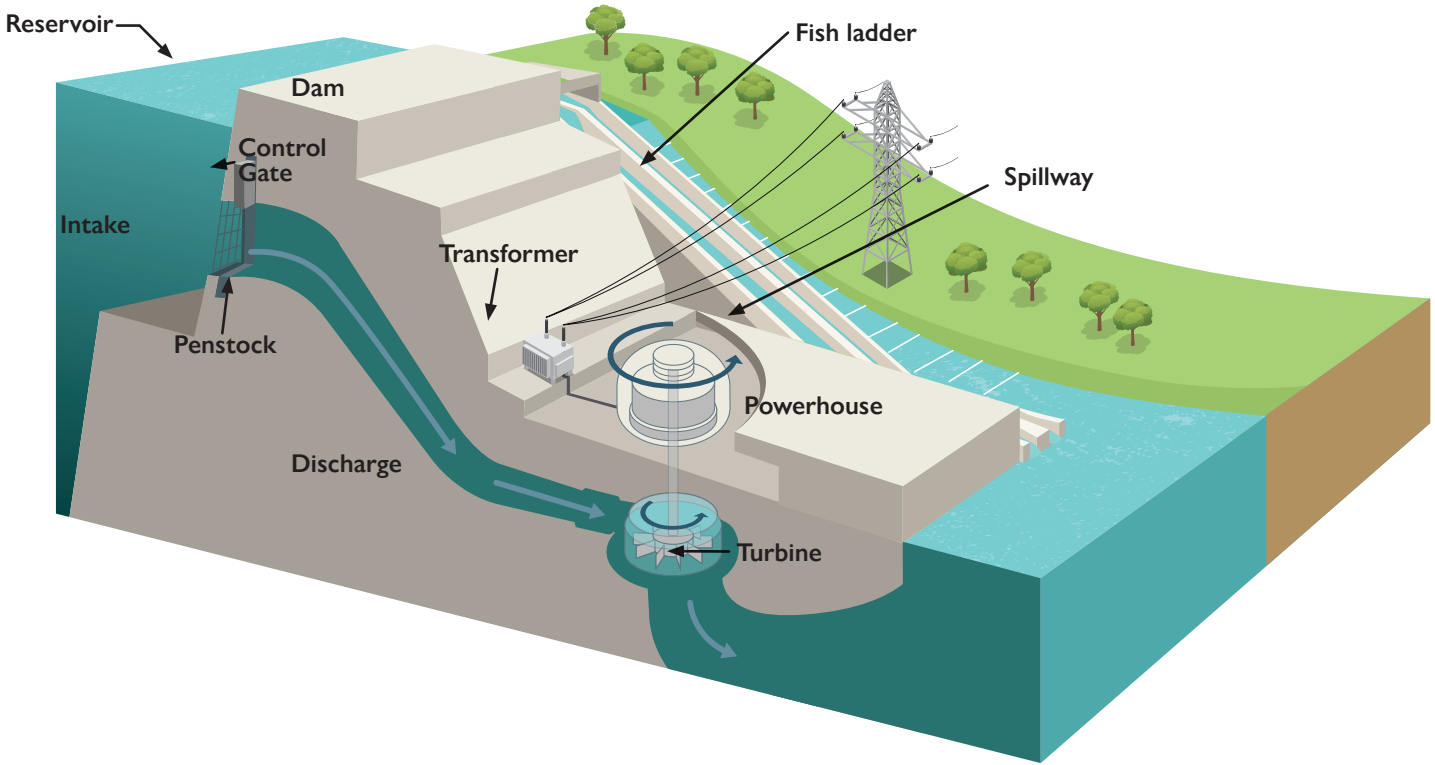
In order to discuss hydropower plans with local government officials and private sector representatives, it is important to have strong knowledge of the key terms that are used in describing a hydropower project.

Area of influence – Area that a proposed hydropower project will affect with direct and indirect impacts.

Base load – The amount of electricity continuously produced throughout the day.

Benefit sharing – Process of hydropower operation wherein local residents own a part of the project and earn a percentage of the profits from electricity sales. Royalties from the sale of electricity are guaranteed to the gaunpalika or nagarpalika which hosts the hydropower project.

Construction period – Time required to construct a hydropower project from the initial site preparation to the start of operation.


Reservoir
Dam
Fish ladder
Control Gate
Spillway
Intake
Transformer
Penstock
Powerhouse
Discharge
Turbine

Dam – Concrete or earthen barrier constructed across a river and designed to control water flow or create a reservoir.

Discharge – The water diverted through a dam to rotate the turbines. It is measured in cubic meters per second (m3/s).

Fish ladder – Structure built along dam reservoirs or impound ponds (stored water) that simulate rushing water to facilitate fish movement upriver.

Environmental flow – The quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems.

Flushing gates – Gates used for draining the reservoir and used in case of emergency or significant maintenance issue.

Head – The pressure created by the difference in elevation between the water intake and the turbines.

Installed capacity – The potential electrical output of a hydropower project when operating at full capacity.

Intake structure – Structure that allows water to be moved from the reservoir and delivered to the penstock and turbines.

Peak load – The amount of electricity produced to meet the highest demand in a day.

Penstock – Pipes that ensure uniform flow of water from reservoir or diversion to the turbines.

Powerhouse – Building that houses the turbines and control equipment.

Reservoir (head-pond) – Area of land inundated for the storage of water within the river channel or as a pondage outside of the main river channel.

Spillway – Structure to pass surplus and flood waters downstream to prevent flooding over the top of the dam.

Storage capacity – Storage volume of water stored in the reservoir; used for power generation.

Tailrace – Canal that carries water away from the powerhouse after electricity generation to discharge into a natural stream.

Tunnel or headrace channel – Channel designed to maintain the head between the intake and powerhouse to divert water to the penstock.

Turbines – Engine in a powerhouse that rotates with the force of falling water to generate electricity.

Weir – Dam on a river to stop and raise the water level for the purpose of conveying the water to a mill or forming a fish pond.

Forms of hydropower schemes

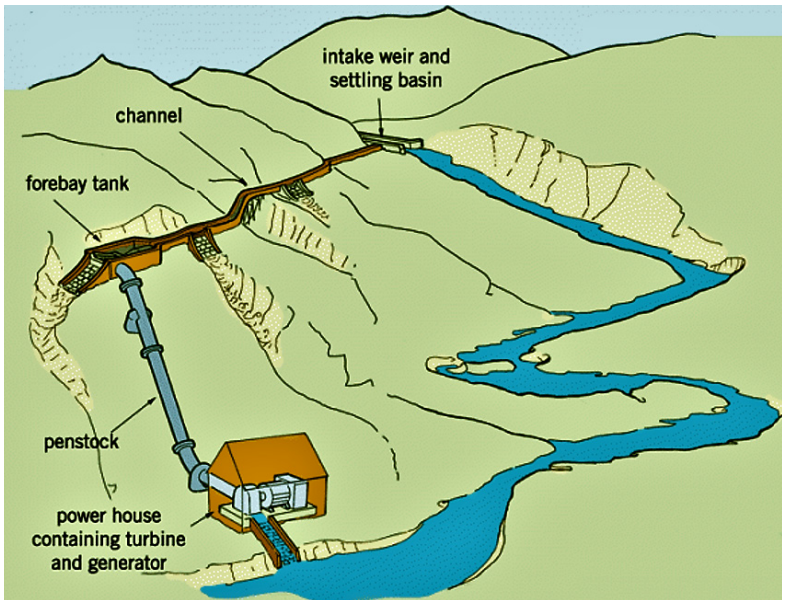
Hydropower plants come in many different shapes and sizes depending on 1) the area in which it is built, and 2) the amount of power to be generated. Each type of plant has a unique environmental footprint that must be monitored during construction and operation.

Storage reservoir hydropower plant

A storage reservoir plant involves the construction of a dam to store a large amount of water that can be withheld and released as needed to generate electricity. These plants retain water in the wet season and release water in dry season. They can also be constructed as multipurpose to assist with irrigation.

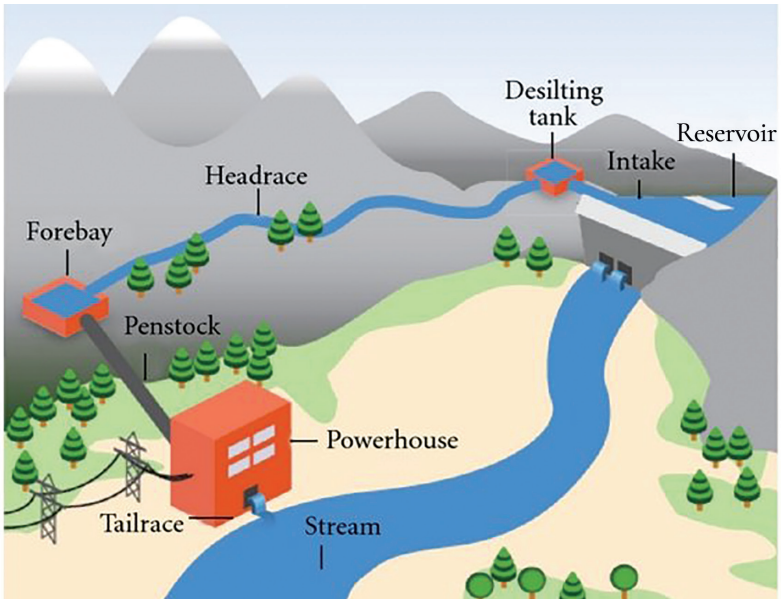
Run of river hydropower plant

Run of river plants consist of a relatively small weir, a penstock, and a downstream powerhouse. The weir is generally lower in height and retains far less water upstream than a storage plant. Run of river plants are typically for base load electricity only. Water diverted by the weir flows over the turbines and rejoins the river through the tailrace. In this scheme, the river section between the weir and powerhouse is deprived of its natural flow.



Peaking run of river reservoir hydropower plant

Run of river reservoir creates a large storage area upstream from the weir to create significant head and power potential. The upstream reservoir can usually hold water supply for several hours or days. Like traditional run of river plants, the river section between the weir and powerhouse is deprived of its natural flow.



Which government offices are associated with hydropower construction?

Government decisions and activities related to hydropower are confined to federal level agencies. Understanding which offices are responsible for which duties can help you know who to talk to when you have a question or concern about irrigation in your community.

Federal government

Office	Responsibilities
Ministry of Physical Infrastructure and Transport (MoPIT)	• Conducts research on water resources in Nepal • Promotes development of hydropower for energy • Formulates hydropower policy
Department of Electricity Development (DoED)	• Implements government policies related to energy sector • Facilitates private sector development of hydropower with permitting and regulations • Reviews hydropower development proposals and provide input to MoEWRI
Ministry of Forests and Environment (MoFE)	• Implements and enforce regulations related to forests and the environment • Provides input to EIAs and IEEs for hydropower development
Department of Environment (DoENV)	• Monitors and evaluates EIAs and IEEs for hydropower development
Water and Energy Commission Secretariat (WECS)	• Advises MoEWRI and other government energy agencies on policy and implementation for medium to large-size hydropower projects

What is the process for building hydropower projects in Nepal?

Typically, hydropower plants are constructed in **five separate phases**, which we describe in the following pages:

1. Pre-construction
2. Construction
3. Commissioning
4. Operation
5. Decommission and rehabilitation

Each of these phases requires a unique set of observations and investigation to ensure that environmental safeguards are being employed.

During the **pre-construction phase**, four objectives are accomplished:

- Engineers determine the feasibility of the site for hydropower;
- Scientists conduct geological and hydrological studies of the site to determine suitability;
- Local communities are consulted and informed about benefit sharing and potential land acquisition and resettlement of affected families; and
- Scientists conduct an **environmental impact assessment** (EIA) to determine potential impacts to the ecosystem and biodiversity.

The **construction phase** follows three major steps:

- Site is prepared with removal of topsoil and extensive tunneling to build the foundation;
- Major components of the dam are built and installed; and
- A construction workers' camp, access roads, and water treatment facility are established.

The **commissioning phase** marks the shift from construction to operation:

- Testing conducted to ensure safety of the reservoir and powerhouse, and the functionality of the fish ladders
- If this project contains a reservoir, it will be filled at this time and nearby land and structures may be inundated.

The **operation phase** is the stage when electricity is generated and transmitted to users:

- Electricity production begins, including regular release of water and operation of turbines in the powerhouse.
- Maintaining minimum environmental flows at this point is key

The **decommission and rehabilitative phase*** signifies the end of a dam's operation and includes deconstructing the dam and restoring the environment to its original state:

- Dams typically operate 50-100 years. At the end of this period, they taken out of service according to a plan that should be established prior to construction.
- The powerhouse, weirs, and penstock are demolished and removed.
- The goal of this phase is to return the river as close as possible to its original state.

* Nepal has only two dams in operation for more than 40 years, but this stage will become more relevant as hydropower development continues.

Important questions to ask about hydropower construction

1. **What percentage of hydropower profits go to local people living the affected areas?**

Currently the practice is for 10% of equity share to be distributed among local people. If the hydropower project makes money, local residents will share those profits by holding these shares.

2. **What are the most important policies and legislation to know related to hydropower?**

The **Electricity Act 1992** is the most relevant piece of legislation to hydropower production, but it contains few specific provisions on environmental concerns. The Act only says that hydropower projects should not pollute nor create adverse environmental effects.

Key provisions (and the corresponding sections) include the following:

The survey, generation, transmission, or distribution of electricity without obtaining a license is prohibited (section 3). However, a license is not required for projects that are 1 mega watt or less. These projects require an application and IEE filed with the appropriate office (section 4).

Hydropower projects are forbidden to have negative impacts on the environment, such as floods, landslides and soil erosion, at any phase of its construction and operation (section 24).

The **Electricity Regulatory Commission** has the authority to regulate conditions that are defined within hydropower contracts. This authority can extend to environmental issues, if the commission chooses to do so.

3. What user groups are associated with hydropower construction and what do they do?

Each hydropower project may include a voluntary concerned citizens committee that meets to discuss local concerns about construction, including environmental impact, benefit sharing, and issues of local employment.

4. Where can I get more information about a hydropower project being constructed in my area?

This answer depends on the size of the hydropower project. If it is a larger project funded by the World Bank or International Finance Corporation, the developer is required to have a public information office and a public information officer for local communities to consult with questions.

Smaller projects tend to have a public relations officer (PRO), a person hired by the developer to address local concerns about construction and operation of the hydropower project.

CHAPTER 5

ENVIRONMENTAL ASSESSMENTS OF INFRASTRUCTURE AND BENEFIT SHARING, AND STAKEHOLDER ENGAGEMENT

Environmental assessments, benefit sharing and stakeholder engagement are three important concepts for all citizens to know.

Environmental assessments (which come in three forms) involve identifying, estimating, and evaluating anticipated impacts of existing and proposed infrastructure on the land and water, flora and fauna. They are carried out to mitigate the relevant negative effects prior to making decisions and commitments. These include: 1) **Brief Environmental Study (BES)**, 2) I**nitial Environmental Examination (IEE)**, and 3) **Environmental Impact Assessment (EIA)**. Details are provided further below.

Environmental study report means a report prepared with respect to the BES, IEE and EIA.

Benefit sharing refers to the distribution of both services and the assets (or goods) delivered by infrastructure. For roads it refers to which communities have easiest access to the road and which communities are most impacted by the construction. For irrigation, benefit sharing describes how, where and when water will be distributed for use. In hydropower, benefit sharing refers not only to reception of electricity, but in the case of larger projects, enjoying a share of the profits from the sale of that electricity.

Stakeholder engagement is a key concept for developing infrastructure that is sustainable and responsive to local needs by allowing community participation in the planning and construction processes to ensure their concerns are addressed and due consideration is given to their aspirations.

Environmental assessment of infrastructure

It is important to know that infrastructure development projects or industries that are listed under Schedule 1, Schedule 2, and Schedule 3 of the Environment Protection Regulations 2020, respectively, require BESs, IEEs and EIAs. Those projects or proposals that are not listed in one of these three Schedules do not require an environmental study.

Section 3 sub-section (1) of the Environment Protection Act requires the proponent (developers or construction companies) to prepare an environmental assessment report of prescribed proposals. Section 8 of the Environment Protection Act prohibits implementation of any proposal without having it approved in accordance with the Act.

Small projects require a **Brief Environmental Study (BES)**, which is a study of the potential environmental issues related to a project and ways these effects may be lessened.

Project that are larger require an **Initial Environmental Examination (IEE)**. As per the Environment Protection Act 2019, an IEE is an analytical study or evaluation aimed at determining whether a proposed project will have significant adverse impacts on the environment, and what measures are needed to avoid or mitigate such impacts.
Even larger projects require an Environmental Impact Assessment (EIA), which is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse, and recommending measures to avoid or mitigate adverse impacts.

Even larger projects require an **Environmental Impact Assessment (EIA)**, which is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse, and recommending measures to avoid or mitigate adverse impacts.

BESs, IEEs and EIAs are part of a key process as they determine the potential impact of the road, irrigation scheme, or hydropower dam to local freshwater, biodiversity, and ecosystem services. They are public documents and infrastructure companies are required to make them available in their public information offices located near the project construction sites.

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An EIA is a long and detailed process that requires significant interaction with local communities. Some of the key steps include:

Proponents must publish a 15-day notice informing local communities about the EIA process and invite their participation in public forums. These field studies and consultations are used to establish a scoping document and terms of reference (ToR), which the hydropower company submits to the government for approval.

For any proposal requiring an EIA, the proponent must publish a 7-day notice in any national level newspaper, requesting the local level government, stakeholders, community members or organizations to provide their concerns and suggestions regarding the possible environmental impacts. The proponent must then develop a scoping report based on the concerns and suggestions indicating the environmental impacts that are likely to result from the project. The specific steps are as follows:

1. An independent company is hired to conduct the EIA, which includes a comprehensive assessment of potential impacts to the environment and local communities, including information about the need for resettling and compensating local families, if necessary.

2. While developing the environmental assessment report, the proponent is required to organize a public hearing in the area that is likely to be impacted by the implementation of the project. Depending on the project's geographical area, public hearings will be held in more than one location or site. The proponent then uses local media (newspaper, radio, etc.) to publicize the date, time, venue, and information about the project, and affix a notice in the ward office and a public place in the project area. The notice will also be published in a national level newspaper and on the proponent's website. The proponent must develop the EIA report based on the suggestions received during the public hearing.

3. The proponent is then required to develop the EIA report based on the approved scoping document, terms of reference and the suggestions received from the public hearing. While developing this EIA report, the proponent is further required to affix a 7-day notice requesting the local stakeholders (including academic institutions, hospitals, health posts) to offer their suggestions on the draft EIA report. If the notice is in relation to preparation of a BES or IEE, the proponent must publish a 7-day notice in any local newspaper, whereas if it is for an EIA, the notice is to be published in a national level newspaper and on the proponent's website.

4. When the environmental study report is received by the concerned government agency, the concerned body must make an inquiry into the report. The concerned agency may form a committee comprising of representatives of that agency and relevant stakeholders and subject experts, to inquire into the environmental study report and provide advice and suggestions. The committee may conduct on-site monitoring and supervision by visiting the project implementation area to collect data and provide suggestions.

5. When the EIA report is submitted to the concerned government agency, it must publish a 7-day notice in a national newspaper for public review. It must also make the report public by making arrangements to download the report from the website of the concerned government agency.

6. Revisions to the EIA are made based on government and public feedback.

If a resident is aware that this process has not been followed, that person can file a complaint with the Ministry of Forests and Environment (MoFE), and even the Court of Law. Additionally, they need to review whether the proponent has complied with the provincial and local level environment protection laws.

Benefit sharing and stakeholder engagement

Benefit sharing refers to the efforts made by the project supporters (the developer and government) to benefit local communities affected by hydropower investments.

For locally affected communities, these benefits can take the form of 1) investment shares offered to residents at an affordable rate; 2) appropriate compensation for resettlement and rehabilitation if displaced by a project; 3) preferential consideration for job opportunities associated with the project; or 4) corporate social responsibility programs that provide support to health and educational needs in the affected area

Benefit sharing on road construction

As we mentioned above, benefit sharing – and what constitutes benefits – will differ depending on the type of construction.

For roads, benefits take the form of road access and proximity to a new road which would allow easier transport to markets, larger cities, schools, and health clinics.

Road construction and development process accrues some significant benefits. Road construction essentially delivers both direct and indirect benefits. For example, a low volume road construction process using labor-based technology delivers direct benefits in the form of waged labor employment opportunities to the local people residing in the road corridor that help reduce poverty at local level and supplies cash injects to local business, including hotels and restaurants. In case of fair-weather road building, a labor-based approach to benefit sharing could take the form of 70 to 80 percent of road construction costs going to labor payments. Even with machine-based approach, there are certain employment opportunities available for the local workforce in addition to the benefits that the local contractors and entrepreneurs would get from the construction business. The indirect and long-term benefits that the road generates are reductions in transportation cost both for passengers and freight. In addition, reduced transportation cost and ease in mobility would promote economic activities in the road corridor. Similarly, transportation facilities also improved access to basic services in the realms of health, education, thereby enhancing quality of life.

For irrigation, benefits include access to water, as well as the work completed to strengthen river banks and canals. To ensure equitable benefit sharing, there may be provision for charging less user fee for single woman headed households and the poorest of the poor, and/or giving more access to irrigation water to such households. Where labor needs to be provided by the users of the command area, such households may be required to contribute less labor compared to relatively well-off households.

Because of its potential scope, size, and impact, benefit sharing for hydropower is more complex. For projects over a certain size, benefit sharing refers to the distribution of profits that are reserved for government uses after the hydropower company and investors have taken their shares. The current benefit sharing percentages reserve 50 percent of profits for the central government, while the provincial and local governments receive 25 percent a piece. In some cases, local residents may be given the opportunity to buy shares in the hydropower project which would pay them a portion of the profits in the future.

In line with the Act for Intergovernmental Fiscal Arrangement, the federal government receives 50 percent of the royalties from hydropower while the provincial and local governments receive 25 percent each. Out of the funds set aside for the local governments, the National Natural Resources and Fiscal Commission has fixed the hydropower royalty sharing mechanism, taking into consideration the project location (50 percent), affected areas (25 percent) and affected population (25 percent).

Stakeholder engagement activities

During the course of infrastructure planning and construction, citizens and CSOs have many opportunities to participate in the planning processes.

We refer to these opportunities as **stakeholder engagement activities**. In the following tables, we list the events at which you and your group may participate.

Project phase	Stakeholder activities
Screening	• Provide detailed information listing all potentially impacted people • Inform all stakeholders of the details and extent of impact • Prepare stakeholder engagement plan • Provide 15-day public notice about the project in national newspaper, inviting the public to participate in the EIA • Develop policies and protocols for the project based on stakeholder feedback • Establish a procedure for collecting and responding to public grievances and complaints • Establish public information office to allow stakeholder feedback and make available information related to the project (large projects only)
Scoping	• Identify key stakeholders and groups who may be impacted by the project • Provide an opportunity for public engagement in determining the factors to be assessed • Hold meetings with government authorities and agencies about the purpose and scope of the infrastructure project • Provide an opportunity to local stakeholder agencies, individuals and/or organizations where the project is to be implemented to provide their suggestions concerning to the possible impact on the environment.

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Stakeholder engagement activities

Project phase	Stakeholder activities
BES, IEE or EIA	• Prepare the baseline information for theBES, IEE or EIA, including socio-economic data, impact projection reports, and preliminary mitigation strategies • Hold a public hearing program following the initial draft of the BES, IEE or EIA • Offer opportunity to local government and concerned thematic office to either provide a letter recommending the environmental assessment study or reject it by not issuing the recommendation letters • Provide 7-day public notification requesting public feedback to the EIA • Initiate negotiations for land acquisition and compensation (if that is necessary to complete the infrastructure)
Operation and after	• Establish schedule for regular consultations with the user committee to keep them informed of project progress and operation • Ensure implementation of environmental management plan to mitigate adverse environmental impacts in the course of project construction, and ensure that the mitigation measures are in place to be implemented after the completion, or in the course of implementation of the project. • Continue to monitor grievances submitted by stakeholders

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SECTION II

The Threats

Chapter 6

POTENTIAL ENVIRONMENTAL IMPACTS FROM INFRASTRUCTURE

In the previous section, we focused on the basics of roads, irrigation and hydropower, providing the key terms and processes for planning and construction. However, our focus in this book is safeguarding against the environmental impacts that could negatively impact local freshwater and biodiversity.

In this next section, we focus on the human-induced and climate-induced **threats** that are unique to each form of infrastructure to provide you with conditions to watch for when roads, irrigation and hydropower projects begin in your communities.

Threats from road building

Improperly constructed roads pose significant threats to **communities and freshwater sources**:

- Roads tend to be built in areas disproportionately populated by marginalized groups (Dalits, Janajatis). They tend to be most acutely affected by the impact of road building;
- Pose threats to human settlements and other infrastructure (e.g., irrigation, water supply systems);
- Increase soil erosion and sedimentation that can lead to increased road accidents;
- Precipitate landslides;
- Can increase rates of water runoff and road washout; and
- Water sources decimated and swept away

Roads can also affect **local fish and plant populations:**

- Sediment pollutes and destroys aquatic habitats;
- Fish migration impeded – when channels cut through sediment blockages, increased velocity of water impedes fish movement; and
- Fish spawning ground compromised and polluted.

Threats from irrigation system construction

Irrigation systems take water from one area and deliver it to another area. Sometimes, system use poorly constructed canals. This movement of water can have negative impacts on **communities and water availability**. Irrigation systems should be planned with participation from the community to ensure minimum impact to its citizens.

- Irrigation systems can disrupt existing flow regimes;
- Potential to create conflict between users; reduced water downstream;
- Competition for declining water availability;
- Groundwater depletion; and
- Without proper drainage of irrigation, waterlogging and soil salination can occur.

By moving water, irrigation can also affect **local biodiversity**:

- Diversion of water for irrigation can degrade aquatic habitats and disrupt migration patterns; and
- If chemical pesticides in use, irrigation may increase run-off into nearby waterways.

Threats from hydropower

Above a certain size, **hydropower schemes** can transform landscapes and alter many environmental services as currently enjoyed by local communities. Careful monitoring of hydropower development processes is required to ward off the following potential dangers:

- Water impounding and diversion can limit water needed for other uses;
- Methane generation from impounded water contaminates fresh air;
- Water release during flood events can inundate downstream communities; and
- On rivers that originate in glaciers, glacial lake outburst floods (GLOF) can cause dam breaches, endangering downstream communities.

As hydropower affects local water, it also impacts local animal and plant life:

- Water impound and diversion can disrupt fish migration and affect aquatic habitats;
- Water temperature can change from above and below the reservoir, affecting aquatic habitats; and
- Diminished water flow and water levels between the dam and powerhouse will degrade aquatic life and affect local livelihoods, including agriculture.

SECTION III

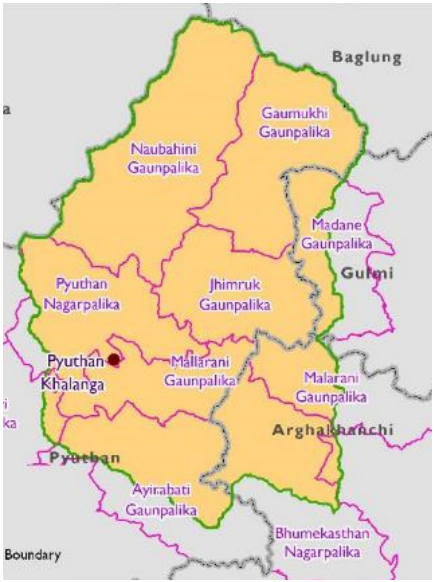
The Opportunities

CHAPTER 7

SIX CASE STUDIES FOR SUCCESS

In this section, we present six case studies from civil society groups (CSOs) who worked to develop sustainable infrastructure in their communities. Each of these groups has many years of experience working with local residents, business, and the government. From each of these case studies, we highlight how and why these groups were successful in developing safe roads, efficient irrigation, and responsible hydropower.

Case study #1: Green roads in Pyuthan



Residents living in Pyuthan near the Jhimruk River would like more roads to link the community to larger cities and larger markets where they can sell their crops and spices. However, rapid road building can sometimes produce roads that cause environmental damage by inducing landslides and removing valuable trees and plants.

The Federation of Community Forest Users, Nepal (FECOFUN) organized a 21-member committee including residents and members of the local Red Cross chapter to discuss the importance of green roads. They found that communities like the idea of "green" infrastructure but lacked knowledge about what it meant in practice.

Together, FECOFUN and Red Cross produced an informational video that was distributed throughout the area to inform communities about the need to monitor road construction and consult with local government representatives to ensure roads follow environmental-friendly guidelines. The video was shown at 35 different locations throughout the district and specific showings were held for audiences of women, marginalized groups, and local government representatives.

FECOFUN reports that their efforts in Pyuthan were effective in bringing more women into road building discussions.

Key lessons

- Inform the public about the value of green infrastructure.
- Collaborate with other local CSOs to combine resources and reach more people for?

Contact: Prabesh Kakshyapati

Case study #2: Finishing the roads in Bhaktapur

Road construction in one section of Bhaktapur dragged on for more than two years. Dust was everywhere on the unfinished roads. Parents complained that their children suffered repeated respiratory problems because of the dust. The construction also removed many local water sources that people used for drinking and cooking.

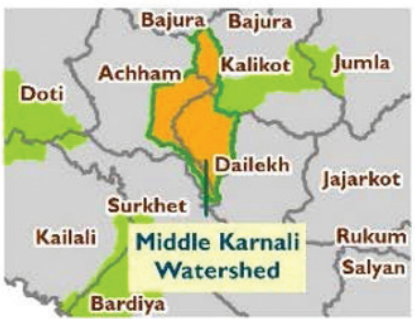
Local residents tried to put pressure on the contractor to finish the job, but he used political connections to dismiss their requests. Then they staged a protest to block local tourist traffic, but that did not work because local shopkeepers lost business.

Finally, the residents contacted representatives from the National Federation of Irrigation Water Users Nepal (NFIWUAN) for advice. NFIWUAN suggested filing a legal case in court and offered to lead the process. They formed a plaintiff group that included road users group and drinking water users group.

The response has been positive. The court has ordered the contractor to resume work and finish the job within 12 months. The contractor instead gave the project back to the government, which is now soliciting new bids and has ensured the community they will take necessary steps to have speedy completion of the road.

Key lessons:

- Consider legal action rather than taking matters into your own hands
- Look to collaborate with civil society groups who have experience with the Nepali court system to register complaints



Case study #3: Green demonstration road sites in Middle Karnali

In the Dailekh district within the Middle Karnali watershed, residents expressed interest in bio-engineering solutions to reduce soil erosion, preserve water sources, and reduce sedimentation in the local rivers.

To meet this demand, the central FECOFUN office directed local FECOFUN representatives to work with local governments to create a demonstration site in the Chilayatra community forest in Chamunda Bindasaini Rural Municipality. In an area near ongoing road construction, residents learned how to make bamboo check dams to minimize soil erosion. Because bamboo has a deep root structure and grows quickly, it is a well-suited species for this purpose. FECOFUN provided the seedlings and other materials, while local residents provided the labor.

Since the demonstration site appeared, local authorities have also banned open grazing in the area to allow maximum plant growth. Residents say the bamboo and many other species have flourished in the area and soil erosion has declined significantly. Also, local residents have begun harvesting some of the grass now growing in the area, which they can sell for additional income.

Key lessons:

- Show, don't tell, how people can make a difference
- Work with local governments for extra support
- Promote the results of your success for others to appreciate and share with other communities

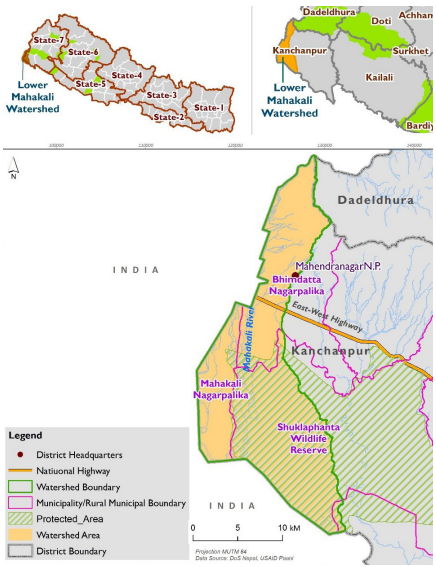
Case study #4: Rehabilitating the land around Jhimruk hydropower

The Jhimruk hydropower project began operation in 1994, long before contractors were required to exercise appropriate environmental mitigation efforts. As a result, soil erosion and landslides in the area were significant. Local residents complained to the concerned citizens committee that debris removed during construction was still sitting alongside the roads and intensifying soil erosion in that area.

The concerned citizens committee and local community forest user groups (CFUG) in Jhimruk came together and requested the hydropower company to replant 1,000 trees in all the affected areas. The hydropower company agreed and replanted more than 1,000 trees to compensate for the damage. The CFUGs were so inspired by their success, they formed a separate organization strictly for the purpose of monitoring the work and impacts of the hydropower plant. Now all mitigation efforts related to the hydropower project are managed by this organization.

Key lessons:

- There is power in numbers. Find who shares your concerns and work together.



Case study #5: Benefit sharing in Pancheswor

Residents living in Pancheswor are concerned that hydropower projects on the Mahakali River are delivering more benefits to people living on the Indian side of the river than the Nepali side. And they believe that more Nepali households will be displaced than Indian. However, residents were at a loss as what to do because negotiations on this river were handled high government levels.

The Nepal National Social Welfare Agency consulted the South Asian Foundation and Oxfam for assistance. These organizations have a long history of working with government officials in Kathmandu and could provide access for the people living in Pancheswor.

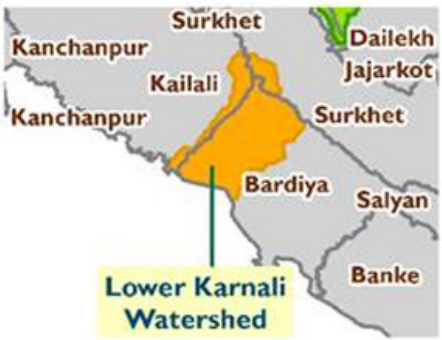
Key lessons:

- Consult local NGOs to link up with larger organizations to find access to government offices
- Follow up and keep in contact with local politicians

Case study #6: Creating irrigation and wildlife harmony

In Lumke, irrigation canals were affecting local wildlife. Some animals were falling into the canals, unable to get out on their own. Other animals could not migrate to grazing areas because they could not cross the canals. Usually, these animals were patrolled by community-based anti-poaching units (CBAPUs). But the problem had grown so large, additional help was needed.

To address this problems, BAFER Nepal connected with local community forests to increase patrols around irrigation areas. The area included 52 CFUGs that were divided into 9 clusters. They agreed to make regular visits to irrigation areas as part of their daily routine to rescue animals that had fallen into the canals.



Key lessons:

- Be creative. Find local groups that might be willing to contribute some work to your efforts.
- Be willing to delegate and share responsibilities with other groups.

SECTION IV

Courses of Action and Best Practices

CHAPTER 8
WHAT IS ADVOCACY?

Having read some excellent examples of community work, we will now dive more deeply into the individual elements of advocacy and what it means to advocate for environmental improvements in your community. We will discuss how to advocate and provide ideas for strengthening your network.

Advocacy is a set of actions directed at decision-makers (e.g., government or the private sector) in support of a specific policy matter. Advocacy is a tool for citizen participation.

Advocacy networks are groups of organizations and individuals working together to achieve changes in law, policy, or programs.

An **advocacy action plan** is a planned and agreed upon, usually written, strategy for how different elements and activities work together to achieve a desired goal. An advocacy action plan is comprised of multiple components. These are explained below.

Five forms of advocacy

Generally, there are five forms of advocacy to choose from:

1. **Lobbying** – face-to-face efforts to persuade undecided people and decision-makers to favor your solution. Normally, **lobbying** requires direct visits with key actors.

2. **Organizing** – building your network of concerned people and groups through meetings with community leaders and other groups. Over time, you may expand your group to a broad coalition that shares an interest in your mission and solution. Some examples of **organizing** include leadership workshops and coordination meetings.

3. **Education** – using informational meetings to raise awareness the nature of the problems you are trying to address and how this problem relates to the community. Some examples of advocacy **education** include workshops, seminars, and publications.

4. **Press work** – distributing key messages to the media in an effort to target key actors (e.g., politicians) and specific groups of people (e.g., women, international agencies). Some examples of **press work** include press conferences, paid advertisements, and letters to the editor.

5. **Mobilization** – physical actions intended to draw attention from the media and key actors. Ideally, these actions will put pressure on decision-makers to consider your solution. Some examples of **mobilization** include strikes, marches, and vigils.

Why engage in advocacy?

- To solve specific problems
- To strengthen and protect your community
- To promote civic participation in government

Successful advocacy requires…

- a willingness to interact with government
- a willingness to build alliances
- basic knowledge of government offices
- taking advantage of educational opportunities
- a willingness to listen and
- a willingness to speak!

Successful CSOs need to…

- be democratic within their organizations
- be willing to work with the government
- seek to build alliances with individuals and other CSOs
- have a short-term and long-term vision
- follow a clear mission statement to meet their goals

CSOs can gain strength from…

- maintaining good relationships with the community
- a solid understanding of the current situation
- a clear organization of roles and purpose
- good leadership
- bringing together people across divisions (e.g., caste, ethnicity)

Policy advocacy within Nepal's new government

With Nepal's shift to federalism, community members have an opportunity to have greater influence over policy making through advocating to local elected officials as well as communicating with national parliamentarians.

Policy advocacy includes asking for:

- The repeal of harmful policy
- Revisions to strengthen policy
- Development of new policy
- Allocating or distributing resources in a budget to support implementation
- Adopting local policy enabled by the national government
- Enforcing a policy
- Oversight of proper policy implementation

CSO's often receive international donor funds or national grant funds. These grants may restrict lobbying prohibiting or limiting the percentage of time allowed for communicating directly to the parliament on specific legislation or laws. When undertaking lobbying activities, it is important to understand your grant contracts. Additionally, lobbying is only once tactic available to you. You can communicate to law makers directly if it is considered educational.

CHAPTER 9

IDENTIFYING PROBLEMS AND ANALYZING CAUSES AND CONSEQUENCES

Successful advocacy requires that you and your group have a solid understanding of the problem in your community, including what has caused this problem and what the consequences will be if the problem is not addressed.

But this process can be more difficult than it seems. Here are some ideas to help your CSO through this process.

Identify the problems

Your group shares a common interest to improve the environment of your community. But there may not be agreement on the exact problem facing your community. A brainstorming session and vote can be one useful method for determining the most pressing problems.

1. Read the mission statement to your group to remind them of your goals.
2. Pass out cards to each member. Each member writes a problem on that card and brings it forward.
3. The problems are read aloud and members ask questions to clarify their understanding of each problem.
4. Eliminate or combine duplicate problems.

Rank the problems

Now that your group has agreed upon a set of problems facing your community, you may need to establish some priority for the problems. In other words, how do you decide which problems are the most urgent?

1. Remind the group of the importance of addressing problems that fall within the group's mission statement.
2. Ask the group which problems are most technically and politically feasible. In other words, which problems do we think can be realistically addressed?
3. Ask the group which problems are felt most deeply by the community.
4. Ask the group to vote on the problems and rank each problem by the number of votes it receives.

Analyze causes and consequences

Now that your group has a list of problems you want to address, you will need to make sure the group has a shared understanding of where these problems come from. That is, your group knows there is a problem, but now you need to understand why it is a problem.

1. Take the top problem on the list
2. Ask your group to list consequences of this problem. That is, if the problem is not addressed, what effects will it have on your community?
3. Next, ask the group to list the potential causes of this problem.
4. Look at the list of consequences, and discuss which consequences are most severe.
5. Look at the list of potential causes and discuss which causes are the most important.
6. Once your group has identified a primary cause, discuss the contributing factors to that cause.

After completing the steps on the previous page, you should be able to identify the following:

1. What is your selected problem?
2. What are the consequences of this problem?
3. What is the main cause of this problem?
4. What factors contribute to this problem?

CHAPTER 10

SOLVING YOUR PROBLEM

Now that you have identified your problem, it's time for your group to brainstorm possible ways to solve that problem.

As before, this step will require participation from the whole group.

To begin, brainstorm a group of solutions. Once you have a set of agreed upon ideas, you will need to test them with a series of questions.

Considering your first possible solution, now ask the group:

1. Would it solve our problem?
2. Is it feasible?
3. Would our group become stronger as a result?
4. Who would benefit from this solution?
5. What don't we know if we use this solution?

From these questions, take a vote and narrow your list to the three top solutions.

Now test your solutions:

1. Would it generate a positive opinion in the community?
2. Do you have data or information to support your solution?
3. Can it be achieved in the short- or long term?
4. Do we know who the decision makers for this solutions are?
5. Is it technically feasible?
6. Would it stimulate alliances with other groups in the community?

For each question, rate the solution on a scale from 1-5 and total the scores to compare.

Example score sheet

Here is an example score sheet for your solutions:

	Solution #1	Solution #2	Solution #3
Would it generate a positive opinion in the community?			
Do you have data or information to support your solution?			
Can it be achieved in the short- or long term?			
Do we know who are the decision makers for this solution?			
Is it technically feasible?			
Would it stimulate alliances with other groups in the community?			
Total			

CHAPTER 11

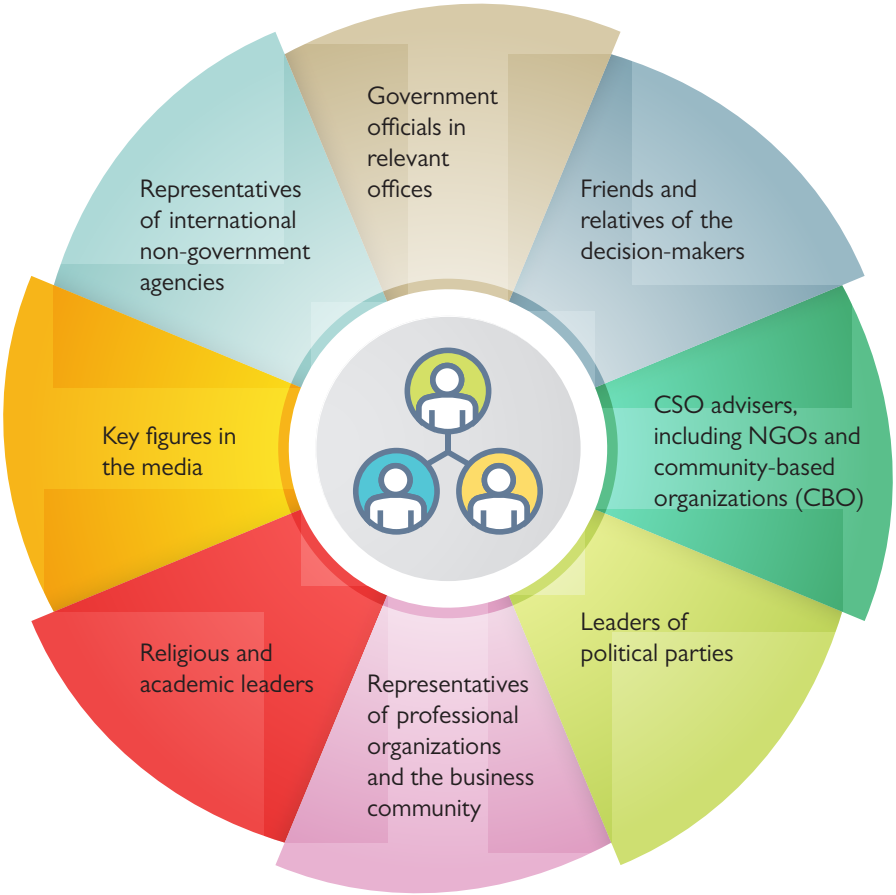
IDENTIFYING KEY ACTORS AND BUILDING YOUR NETWORK

Now that you've identified your best solutions, it's time to build your network. That work will require understanding who will be friendly to your idea and who will not.

With assistance from your group, you can isolate the best network of people and organizations to help you spread your message.

Identifying key actors

With your group, create a list of people who may be interested in your solutions. These people may include:



Once you have your list, the group should discuss, "Why would this person support our solution?" If you can determine a reason, mark this person as an ally. Sort your list of people into the following categories:

Person	Ally	Opponent	Undecided
Government official in relevant office			
Friend or relative of the decision-makers			
CSO adviser			
Leader of political party			
Representative of professional organization			
Religious or academic leader			
Key figure in the media			
Representative of international non-government agency			

For each of your allies and undecided, the group should ask: "Can this person influence the decision-maker?"

Having located your allies, now we will rank them in order of their interest in your solution and their ability to influence the decision-maker.

This is just an example:

1. CSO adviser (ally)
2. Religious figure (ally)
3. Leader of political party (ally)
4. Relative of decision-maker (ally)
5. Government official in relevant office (undecided)
6. Key figure it the media (undecided)
7. Representative of international non-government agency (opponent)

This list gives you an idea of who you should consult for promoting your solution.

Assessing our capacity for advocacy

Now we know our allies, but what do we know about ourselves? What do we know about our group? What are our strengths? What are our weaknesses? A group analysis can be helpful before your group sets a concrete plan of action.

In the short-term, a self-analysis will help you take advantage of your strengths and avoid setbacks through your weaknesses.

In the long-term, self-analysis will also help your group address your weaknesses over time by developing your members' individual capacities.

For advocacy, a simple self-analysis may look like this. With your group, discuss the following questions and then decide if this is a strength or weakness.

For advocacy, a simple self-analysis may look like this. With your group, discuss the following questions and then decide if this is a strength or weakness.

Aspect	Strength?	Weakness?
What is our knowledge of the issue?		
Can we bring people and other groups together for meetings or action?		
Do we have high levels of agreement about our mission?		
What is our relationship with local and regional media outlets?		
What technical ability do we have within our group?		
Are we good at planning strategy for future action?		

As an example, let us say your group's analysis chart appears as follows:

Aspect	Strength?	Weakness?
What is our knowledge of the issue?	X	
Can we bring people and other groups together for meetings or action?		X
Do we have high levels of agreement about our mission?	X	
What is our relationship with local and regional media outlets?	X	
What technical ability do we have within our group?		X
Are we good at planning strategy for future action?		X

For the strengths listed, your group should discuss:

1. How do we use these strengths to our advantage?
2. How can these strengths be used to influence decision-makers?

For the weaknesses, your group should discuss:

1. What is the cause of this weakness?
2. What would happen to our group if we did not address this weakness?
3. Who do we know that could help us address this weakness? What are possible solutions?

CHAPTER 12

SELECTING AN ADVOCACY STRATEGY AND ACTION PLAN

At this point, your group has…

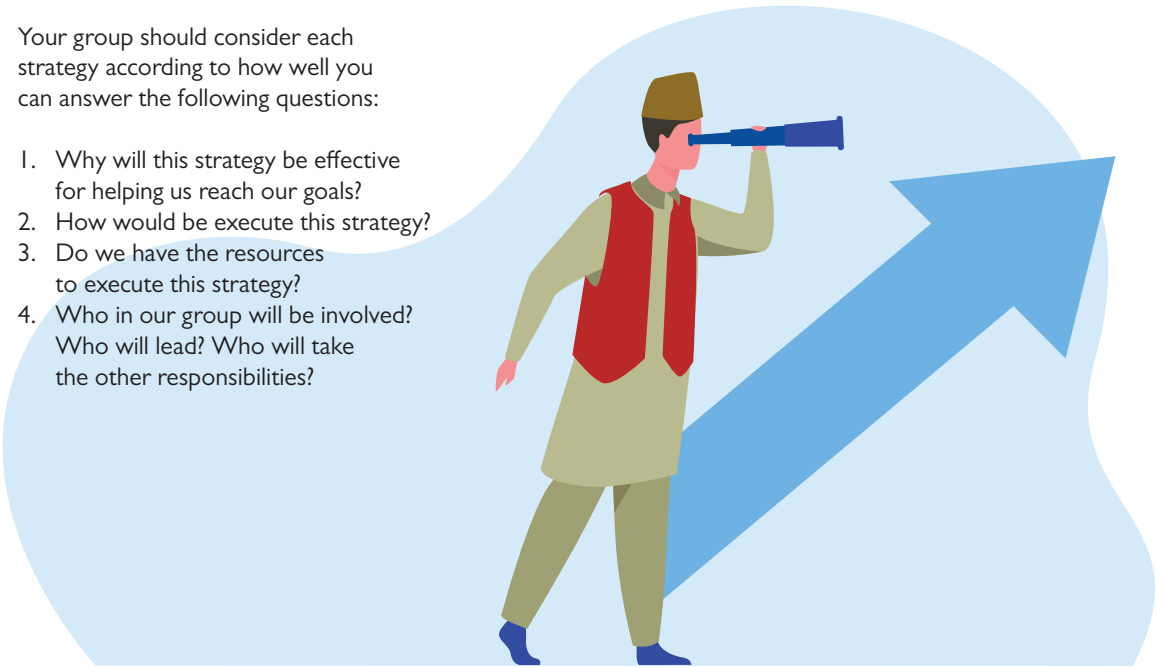
1. Generated a list of solutions for your problem
2. Created a list of key actors who can help solve your problem
3. Identified your group's strengths that can help you going forward.

At this point, your group will need to choose a course of action for influencing decision-makers to implement your solution.

Choosing your form of advocacy

Your group should consider each strategy according to how well you can answer the following questions:

1. Why will this strategy be effective for helping us reach our goals?
2. How would be execute this strategy?
3. Do we have the resources to execute this strategy?
4. Who in our group will be involved? Who will lead? Who will take the other responsibilities?



Creating a sample action plan

Having selected a strategy, your group should create an action plan to follow. Here is an example based on lobbying against a road project in your community.

Activity	Desired outcome	Responsible person from our group	Date
Meeting with Mr. Shahi at the Road Division office	Stronger monitoring of environmental impact of road building	Ms. Awal	Sept 1
Meeting with Mr. Shrestha at the Ministry of Physical Infrastructure and Transport	More transparency for tendering process	Ms. Upreti	Sept 7
Meeting with Mr. Kakshapati at the Department of Local Infrastructure	More resources for the road maintenance user groups	Ms. Biswokarma	Sept 6
Meeting with Ms. Magar at the Infrastructure Development Directorate	More community participation in road planning	Ms. Bhandari	Sept 4
Meeting with Mr. Basnet, the Municipal executive	More community participation in road planning	Ms. Awal	Sept 5

Evaluating your accomplishments and lessons learned

Advocacy is an on-going process. It does not stop with the completion of your planned activity. Rather, those moments are just one point on a journey to your next step, your next goal.

However, before you can move forward to your next activity, it's best to take time to evaluate your progress and see what may be learned from your most recent experience.

First let's evaluate your plan. We'll use the earlier road building example again:

Desired outcome	Was it achieved?	Reason for the achievement or lack of achievement of this outcome?	What adjustments are needed?
Stronger monitoring of environmental impact of road building	Yes	Ms. Awal used strong base of supporters to convince Mr. Shahi to allocate more funding to monitoring efforts.	None for now.
More transparency for tendering process	No	Ms. Upreti was not able to get a meeting time with Mr. Shrestha.	Reach out to Mr. Shrestha's colleagues or send a male representative of our group.
More resources for the road maintenance user groups	No	Mr. Kakshapati said there was no more available funding to support road maintenance groups.	Note the start of the next budget planning process and speak with Mr. Kakshapati again at that time.
More community participation in road planning	Yes	Ms. Bhandari and Ms. Magar had previously worked together in a women's political group. They are both dedicated to community participation.	None for now.
More community participation in road planning	Yes	Ms. Awal was very persuasive in her presentation to Mr. Basnet, who agreed that community participation would lead to better roads. He vowed to advertise future road planning sessions in the paper and on the radio.	None for now.

The adjustments column (far right) is perhaps the most important to your group. You should celebrate your accomplishments, but also learn from your failures. As we said, advocacy is an on-going process. All your failures are only lessons to be applied in the future.

Looking at our example, we can see that our group has learned two things:

1. They need to be conscious of the fact that some offices may not be friendly to women. In general, for lobbying efforts, the group will need to think about who is the best representative to send.
2. They need to be more aware of the official schedules of government. In our example, Mr. Kakshapati indicated there might be more funding for road maintenance, but that decision needs to be made at the start of a funding cycle when budgets are made.

CONCLUSION

Advocacy is a process that requires equal amounts of information and personal skill. On one hand, you need information to guide your assessment of a problem and to develop possible solutions to that problem. On the other hand, you need personal skills (individual and group) to persuade and motivate decision-makers and others in your community to adopt your solution to the problem.

In this book, we have tried to equip the reader with basic knowledge of common infrastructure in rural Nepal (roads, irrigation, hydropower) including the terminology of infrastructure and the potential problems that can arise with each. In addition, we have described the government landscape that oversees infrastructure development so that you know where to go when problems arise and advocacy is needed.

We have also provided a step-by-step journey through the advocacy process, from identifying the problem to generating solutions and selecting the most effective form of advocacy for your group.

Finally, we have attempted to give the reader a larger perspective on the need for advocacy to preserve the crucial balance that is needed between development and environmental health. Roads, irrigation and hydropower will be key to Nepal's social and economic development in the coming years, but the benefits of these constructions cannot come at the expense of local biodiversity and freshwater conservation. Advocacy is needed to ensure that development is equitable and sustainable.

AFTERWORD

If there is magic on this planet, it is contained in water.
- Loren Eiseley

Nepal is blessed with remarkable rivers that support abundant aquatic and terrestrial biodiversity, provide ecosystem functions like groundwater recharge and flood abatement, and offer socio-economic opportunity through livelihoods, recreation, tourism, natural beauty and cultural identity. However, despite the country's historic leadership in creating protected areas from the mountains to the Terai, there are no specific measures in place to protect our incredible river systems.

From 2016, the USAID Paani Program has promoted an integrated, multi-user approach to freshwater management and biodiversity conservation, recognizing that managing sustainable development requires many voices to inform important decisions about infrastructure that impact riverine and human health and well-being. Successful sustainable development requires that we understand and define the threats associated with infrastructure but also identify and seize upon the opportunities before us to enable us to make critical contributions to the livelihoods and life support systems for all Nepalis. That process starts with information and democratic exchange of ideas among all relevant stakeholders.

This book seeks to inform Nepali citizens and civil society about sustainability by explaining the technical aspects of infrastructure while also providing citizens with ideas and tools for gathering information and engaging in the development process by identifying avenues for making their voices heard.

With Nepal's recent switch to federal governance and the concurrent push for infrastructure development, citizens need to be more informed and actively and continuously engaged to ensure community values are not compromised. This CSO Guide to Healthy Rivers serves to advise Nepali citizens and CSOs on how they can support sustainable infrastructure to ensure healthy rivers and rich biodiversity in their communities. The intention is to enhance relations between citizens and government by providing clear technical information about infrastructure along with the laws and government offices that are responsible for overseeing this infrastructure.

Our work in Paani has focused on helping all tiers of the Government of Nepal make informed decisions about national policies and strategic plans regarding water resources management and governance. However, based on our Paani experience, moving a country in directions that empower responsible freshwater governance, support robust biodiversity conservation, and enable socio-economic development can only happen through an informed and actively engaged citizenry that realizes the costs of restoration. As the saying goes, "An ounce of prevention is worth more than a pound of cure."

The time is now to protect Nepal's magic!

Nilu P. Basnyat
Chief of Party
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KEY ADVICE FROM EXPERIENCED COMMUNITY ADVOCATES

In this section, we asked several experts for their recommendations for successful advocacy. Each of these people have achieved some success in their communities for a wide range of environmental topics.

"Consult with local residents before going to the government for possible policy interventions." – Sita Aryal (FECOFUN)

"Use community discussions to guide the way forward." – Damodar Khadha (NFIWUAN)

"Evaluate your progress and learn from your mistakes." – Santi Sonaha (Sonaha Bikas Samaj)

"Advocate for change by linking with women's groups and cooperatives." – Ram Moti Chaudhary (Human Welfare and Environmental Protection Centre, Rapti)

"Be clear on what legal measures may apply to your project. These will help you negotiate with the government." – Bhoj Raj Basnet (Pyuthan Jhimruk Hydropower)

"Strive for inclusiveness at all steps of the process. Make everyone feel valued." – Amar Rasmi Magar (Airawati Municipality)

"Effective programs start from the local level and then move up." – Himalaya Thapa (Nepal National Social Welfare Association)

"When meeting with your group, look to facilitate rather than lead." – Prabesh Kakshapati (Mallarani Rural Development Concern Centre)

"Advocacy must have a plan to follow and have regular meetings to stay on task." – Sushila Shrestha (Karnali Integrated Rural Development and Research Centre, Surkhet)