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USAID PAANI PROGRAM:
FINAL SUMMARY

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TABLE OF CONTENTS

ABOUT PAANI

USAID's Program for Aquatic Natural Resources Improvement (PANI), known as Paani (Nepali for water) is a five-year (2016-2021) project, led by DAI and partners, that enhanced Nepal's ability to manage water resources for multiple uses and users through an integrated approach that promoted conservation of freshwater biodiversity in 12 priority watersheds of Nepal.

Photo Credit: Nabin Baral for USAID

STATEMENT FROM THE GOVERNMENT OF NEPAL

Photo Credit: Pushkar Khanal for USAID

Nepal is a country rich in water resources and biodiversity, yet we have not seen much success achieving substantial benefits from those resources. Rather than being well maintained, Nepal's water resources are being degraded and destroyed every day due to over-extraction and over-exploitation by people, and because of a lack of adequate knowledge and awareness about the values and importance of those resources, both in communities and by the government. Many also lack sufficient ideas, skills, and scientific techniques to properly manage the resources. Nevertheless, our valuable and important resources are at risk and the consequences in the near future will be dire without programs to control, conserve, and sustainably utilize them. This issue matters to the government of Nepal, as seen in Nepal's National Water Resource Policy, which mandates the protection, promotion, and environmentally friendly and sustainable use of natural resources, as does the present Constitution of Nepal.

The USAID Paani program has been working with the Water and Energy Commission Secretariat (WECS) for five years to help conserve water resources, manage watersheds, and protect aquatic biodiversity in the Karnali, Mahakali, and Rapti river basins. During this time, Paani has achieved a lot: from conducting studies on fish species and habitats and forming conservation communities; to preparing environmental and aquatic animal protection laws and support to promote fish and agriculture farming. Paani has balanced its conservation efforts with environmentally friendly development support, including the preparation of environmentally friendly rural road guidelines and financial and technical support for designing environmentally friendly infrastructure.

Thanks to Paani's efforts, local communities and governments now have a better understanding of their shared values and the importance of water resources and aquatic biodiversity. They also learned skills and techniques to better conserve those resources. Paani helped to create employment and research opportunities for local communities, NGOs, high-level experts, and institutions. New laws prepared by Paani can help protect and conserve water resources, watersheds, and aquatic biodiversity. Especially in far west Nepal, the program has been successful, and I have personally observed that stakeholders are quite happy and satisfied with Paani.

I see more opportunities to replicate this type of program in other areas of Nepal, such as the Gandaki and Koshi river basins, and for local and provincial governments to successfully take on ownership of the programs Paani has already started.

Many government and private sector institutions utilize water resources, but an urgent next step is to designate an institution—perhaps WECS—with the responsibility and authority to monitor, control, regulate, and conserve those resources (i.e. to ensure adherence to clause VII of article No. 51 of the Constitution.) The fundamental building blocks of such an institution would be the local community river conservation groups that Paani helped form through an inclusive process. The work Paani started shows the good that can come when government and development partners at all levels cooperate. I believe the seeds of this strong partnership will bring more positive changes to come, both in conservation and livelihoods, especially in western Nepal.

Another important action in continuing Paani's work is the formation of community river conservation groups through an inclusive process, as Paani demonstrated.

I am impressed with Paani and I can conclusively say that Paani has made a remarkable contribution to Nepal. I strongly recommend the extension and scaling of the program in the remaining parts of Karnali, and replication in the middle and eastern parts of Nepal, to continue raising awareness about the importance of conserving water resources and aquatic biodiversity. The knowledge, experiences, and findings Paani leaves behind are valuable assets for us in the government of Nepal, and we will try to incorporate and implement those results and that knowledge in our planning, policymaking, and implementation.

On behalf of WECS, the government counterpart for Paani, I would like to offer a special thanks to members of the Paani program team and to USAID Nepal, all of whom made great efforts and contributions to the success of the program. Similarly, I am very thankful to all the individuals, experts, communities, institutions, and local and provincial governments who have fully cooperated with and supported Paani and WECS. Lastly, I am very grateful to USAID for their continuous guidance and financial support.

Sincerely,

Mr. Sagar Kumar Rai
Secretary of Water and Energy Commission Secretariat (WECS)

KEY MILESTONES TO DATE

The Paani Program interlinks with two complementary USAID-funded projects, which include:

- **The USAID-funded Digo Jal Bikas (DJB) project (2016-2019), led by the International Water Management Institute (IWMI), supported applied research aimed at supporting sustainable, just, and productive water resources in Western Nepal; and**
- **Support from the U.S. Forest Service (USFS) for a variety of complementary activities, including trainings on environmentally sound rural road building, e-DNA research, and a Sustainable Hydropower Collaborative Learning Tour to the Columbia River Basin.**

April 2016
Paani program starts

September 2016
Paani selects **12 priority watersheds** in three river basins (Karnali, Mahakali, and West Rapti) and begins mapping the current status and most urgent aquatic biodiversity threats in each.

September 2016
Paani and International Finance Corporation (IFC) kick-off joint **Sustainable Hydropower Development** workshop series, starting with a dialogue on fish ladder passages between engineers and river biologists. The series also included an IWMI DJB-led discussion on environmental flows, the water required to sustain Nepal's freshwater ecosystems.

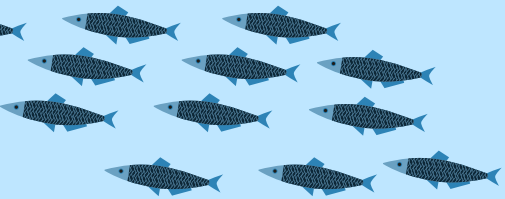
June 2017
Paani launches the **USD 4.8 million** grants program, funding **54 partners** to lead interventions that address priority watershed issues identified in profiles and health reports.

January 2018
Supporting Paani's effort to reduce the negative impacts of poor rural road construction on river systems, US Forest Service completes a set of three trainings on the **design, construction, and maintenance of low-volume roads** in Surkhet (April 2017), Gorkha (Sept. 2017), and Nepalgunj (January 2018).

June 2018
Paani helps develop and enact first local-level Aquatic Animals and Biodiversity Conservation Act (AABCA) in Dailekh District, Middle Karnali watershed—the legal instrument that pioneered river stretch co-management governance in Nepal. **In total, Paani helped 37 municipalities and rural municipalities develop and enact AABCAs to protect rivers, conserve aquatic species, and enhance river-dependent livelihoods**.

September 2018
Paani forms the first Community Aquatic Animal Conservation Group (CAACG) —a formal river conservation group of local champions to lead river stretch co-management in collaboration with local government—in Dailekh District, Middle Karnali watershed. **Paani helped form 101 CAACGS to date.**

October 2018
Kamalbazaar local government hands over the first river stretch (6.5 kilometers) for co-management to 'Belkhet-Saikhola' CAACG in Accham District, Middle Karnali watershed to manage, develop, and protect. By the end of 2020, **62 registered CAACGs co-managed 458 kms of river stretches in Nepal.**



September 2019
The Government of Nepal enacts the Federal Environmental Protection Act. The Act includes five Paani-drafted sections and it strives to protect the fundamental right of every citizen to live in clean and healthy environment and to minimize adverse environmental impacts on nature.

August 2020
Paani designs and establishes Nepal's first river conservation foundation, the **Karnali Basin Conservation Foundation (KBCF)** and an impact fund for watershed investment, the Karnali River Basin Conservation Fund (KRBCF).

November 2020
Paani and WWF consortium release three groundbreaking assessments—the first national level map of High Conservation Value Rivers; the Energy Options Assessment of least-cost pathways for Nepal's power system; and the System Scale Planning study on tradeoffs with hydropower development.

October 2020
The Government of Nepal enacts the Paani-supported **National Water Resources Policy**. The policy provides a vision for social transformation and economic prosperity with sustainable, equitable, and multifaceted development of water resources.

February 2021
Rara Lake Ramsar Site Management Plan is launched by Department of National Parks and Wildlife Conservation (DNPWC) to conserve and maintain the ecological integrity of Rara Lake Ramsar Site and to promote wise use of wetland resources.

June 2021
Freshwater Center of Excellence is established at Tribhuvan University Central Department of Environmental Science.

Paani program concludes.

March 2019
Paani co-funds and co-leads the **Third National River Summit** along with Nepal River Conservation Trust (NRCT) and Karnali Province Government, convening over 200 participants along the banks of the Karnali River. The Summit included multi-stakeholder dialogue and showcased tools, including IWMI-led DJB's Western Nepal Environmental Flow Calculator. The Summit resulted in the 19-point Karnali Declaration 2019 to support management of water and other resources by balancing development with overall conservation of Nepal's river systems.

November 2019
Paani grantee, Center for Molecular Dynamics Nepal (CMDN) and US Forest Service release findings from a **groundbreaking comparative study on the impact of hydropower construction on freshwater biodiversity** in the Karnali and Trishuli Rivers using innovative e-DNA sequencing. The study identified tenfold greater abundance of fish in in the Karnali (with no hydropower projects) versus Trishuli (seven active hydropower projects and seven more planned), confirming that hydropower has a significant impact on biodiversity.

THE PAANI APPROACH

The Paani program worked through an integrated, whole-of-river-basin approach with activities at the watershed, river basin, and national scales. Paani engaged a network of stakeholders in 12 priority watersheds in the Karnali, Mahakali and Rapti, River Basins to fill knowledge gaps, develop watershed management and conservation plans, and to enable legislation that helped communities sustainably support the development goals of multiple water users.

Paani's success is rooted in the following development hypothesis.

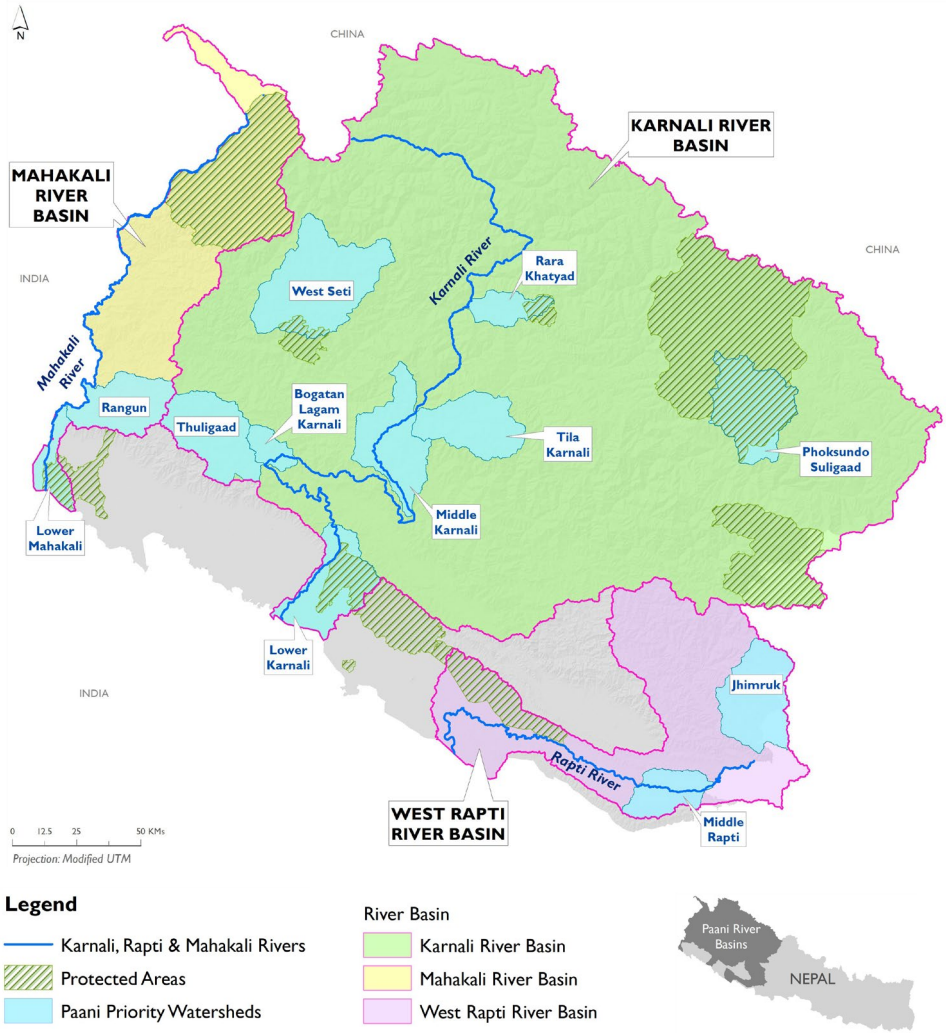
IF

- There is improved scientific information to inform decision making,
- Better capacity to manage freshwater resources,
- Effective governance,
- Local solutions that enhance resilient livelihoods and promote freshwater conservation, and
- A stronger policy and institutional enabling environment to coordinate the multiple uses of water.

THEN

The government and people of Nepal will:

- Conserve freshwater biodiversity,
- Adapt to climate change, and
- Maintain the natural resource base needed for sustainable economic growth.



Paani's Overall Lessons Learned

Champions at multiple levels can contribute to all aspects of holistic management and conservation of aquatic resources, from hands-on practices along the river, to policy development.

Elections created opportunities for newly elected leaders to include local voices in decision-making for freshwater biodiversity conservation. Given a mandate and opportunity, local governments and constituents were eager to demonstrate positive changes.

Hands-on experimentation with low-cost technologies often yielded immediate, practical lessons.

Local and provincial-level policy engagement resulted in buy-in and participation as they gained more autonomy. This provided building blocks for more significant institutional reform and restructuring needed across Nepal's river basin development portfolio.

Paani's participatory river conservation model

1. Collaborative multi-stakeholder analysis and inclusive knowledge gathering and learning on aquatic values, threats, and needs for 12 priority watersheds.
2. Worked with local governments to develop tailored conservation policies and laws
3. Helped form and register community-based conservation groups (CAACGs)
4. Supported river stretch delineation and handover to CAACGs for co-management with local governments
5. Built capacity of CAACG members to co-manage river stretches
6. CAACGs monitored and managed river stretch resources through patrolling, fish assessments, clean-up campaigns, etc.

PAANI RESULTS

Paani's Overall Lessons Learned

- Raising internal awareness of GESI values and benefits **led to more inclusive programming.**
- Paani's USD 4.8 million, flexible, pilot grants program **enabled innovation, collaboration, and stewardship to a critical mass** of partners and stakeholders.
- Linking river stretch conservation with income generating activities and **tangible benefits significantly improved local stakeholders' uptake** of new practices and market-led approaches.
- A **participatory multi-stakeholder approach** was fundamental to promoting a respectful exchange of ideas across disciplines that led to tailored and sustainable solutions.
- Effective **advocacy for sustainable hydropower required a strong coalition** of like-minded organizations, development partners, and academia at all levels as well as effective coordination.

THE PAANI STORY PART 1: IDENTIFYING AQUATIC VALUES, THREATS, AND NEEDS

Building an evidence base to inform interventions

Before getting started on river conservation activities, Paani first invested in gathering knowledge and engaging with communities to fully understand the areas with the greatest conservation needs. Paani collaborated with local governments, community groups, citizen scientists, and other stakeholders to identify the most pressing threats and needs for watersheds and river system health. This was done through extensive participatory stakeholder engagement and scientific research, including bioassessments, fish sampling, and collaborative watershed profiling and river health assessments. Paani's watershed profiling process built a common understanding of multiple stakeholders' current reality in each watershed; built consensus among multiple stakeholders on a vision for the future; and prioritized and tailored Paani support for each watershed. Research studies with Paani's partners identified biodiversity hotspots as well as appropriate sites to designate as fish sanctuaries.

Identified **212** unique fish species, including:

- **204** native fish
- **24** IUCN "Red List" fish
- **8** exotic fish
- **10** flagship fish
- **50** migratory fish
- **5** endemic species

Identified

- **128** fish spawning sites
- **136** nursing sites
- **180** fishing hotspots

Key finding

FROM THESE STUDIES, PAANI CONFIRMED THAT THE BIGGEST RISKS AND THREATS TO AQUATIC BIODIVERSITY WERE OVER-FISHING AND DESTRUCTIVE FISHING PRACTICES AS WELL AS HUMAN-INDUCED THREATS, SUCH AS DAMS, GRAVEL MINING IN RIVER BEDS, RURAL ROAD CONSTRUCTION, THE INTRODUCTION OF INVASIVE AQUATIC SPECIES, AND POLLUTION.

Paani trained young citizen scientists, like these in Karnali, on methods for measuring for watershed health, such as rapid bio-assessments.

Lessons learned from early engagement and knowledge gathering:

- **Engaging local stakeholders from the beginning to create watershed profiles strengthened inclusive, multi-disciplinary collaboration.** It also built trust among stakeholders and strengthened their understanding of the value of information and how it can be used. **Early findings from the watershed profiles helped Paani credibly engage with government, civil society, and academic institutions**, and informed grantee interventions to mitigate identified threats.
- **Paani's large-scale participatory approach to multi-stakeholder engagement and capacity building proved to be feasible and successful.** Paani worked with local stakeholders to identify social capital and potential champions, to engage and understand stakeholders' interests, and to involve them in decisions at all levels.

Enabling policy to drive conservation

Armed with knowledge on the most significant biological values and the most pressing threats and needs in each watershed, Paani's next step was to facilitate a legal framework to drive change towards sustainable river health, and to engage advisory committees at the national level around three studies: energy options, high conservation value rivers, and systems-scale planning. Paani supported local governments to draft and pass tailored conservation policies and laws, including Aquatic Animal and Biodiversity Conservation Bills, which, when enacted became Acts (AABCAs). Among its provisions, the Act aims to protect rivers, ponds, lakes, wetlands, and aquatic species; promote the sustainable use of freshwater biodiversity; enhance livelihoods of river-dependent communities; and provide local governments with the power to declare conservation areas or fish sanctuaries. Paani then supported river conservation groups and their respective local governments to implement and enforce the laws.

"WE ARE FACING SERIOUS DEGRADATION IN BIODIVERSITY RESULTING IN NATURAL DISASTERS AS WELL AS WATER SOURCE POLLUTION AND DEFORESTATION. TO AVOID AND CONTROL SUCH CATASTROPHES, WE ARE FORMULATING SUITABLE LAWS AND POLICIES WITH SUPPORT FROM USAID PAANI AND WECS,"

– Lal Bahadur Bista, Chairperson of Talkot Rural Municipality. (Expressed during consultation on Environment Protection Act.)

Photo Credit: Aura Creations for USAID

Members of the Rakam-Karnali CAACG read the AABCA, endorsed by their local government in 2018 with technical support from Paani.

Lessons learned on policy

- The AABC Acts provided an **enabling environment for new co-management structures and roles**. Their development was a **dynamic process**, in which the contents and scope of the bill improved and expanded over time and across watersheds, largely through the contributions of local stakeholders.

Policy support, in numbers:

Supported 40 local governments to develop AABC Bills and facilitated 37 local governments to enact AABC Acts.

Convened 62 stakeholders to provide feedback on national Fisheries Policy (not yet enacted) and convened 90 on the national Water Resources Policy (enacted by GON in October 2020).

Supported development of now-enacted Federal Environmental Protection Act, which includes 5 Paani-drafted sections.

Supported 14 local governments to develop local Environmental Protection Acts, 9 of which are enacted.

Photo Credit: Nabin Baral for USAID

Photo Credit: Aura Creations for USAID

THE PAANI STORY PART 2: PUTTING AQUATIC CONSERVATION AND MANAGEMENT INTO LOCAL HANDS

Locally-led, locally-empowered river stretch co-management

Since laws do not implement themselves, Paani pioneered a collaborative governance model through which local, inclusive community groups, called Community Aquatic Animal Conservation Groups (CAACGs) are given rights and responsibilities to sustainably manage, develop, and conserve local river stretches by their local governments.

Paani's innovative river stretch co-management model helped restore freshwater fish diversity and sustainably manage multiple uses and users of the river stretches. Through this model, stakeholders and local governments collaboratively managed aquatic resources, used the river stretch in an ecologically sustainable manner, and ensured equitable benefits arose from it for its multiple users.

"IN OUR CAACG, ONLY FIVE OUT OF 20 MEMBERS ARE MEN. WOMEN PATROL THE BANK OF THE RIVER DAY AND NIGHT. WE HAVE TO BE VIGILANT AND PROACTIVE. PEOPLE USED TO COME WITH VEHICLES AND GENERATORS. WE HAVE STOPPED ALL THESE ILLEGAL ACTS. FISH SPECIES THAT WERE ON THE VERGE OF EXTINCTION HAVE NOW SURVIVED DUE TO THE CONSERVATION WE STARTED UNDER PAANI"

– Kabita Chaudhary, Secretary of Baikha Fisher Group, Rawa CAACG

Photo Credit: Aura Creations for USAID

Lessons learned on co-management

- The handover of river stretches **helped groups develop a sense of responsibility, confidence, and commitment to their accompanying rights and responsibilities**. This commitment was as important as any other factor of capacity-building. Co-management skills were most effectively developed through active participation in decision-making.
- CAACG members who live close to the riverside **carried out co-management and conservation better** than those who reside farther from the river.

Photo Credit: Nabin Baral for USAID

101 Community Aquatic Animal Conservation Groups (CAACGs) formed and 62 registered, governing over 458 kms of river stretch in Nepal.

Of Paani's 321 trainings, 118 were targeted at CAACGs and other groups on watershed management, resource monitoring, advocacy, etc. reaching 1,009 group members.

Photo Credit: Suresh Waggle for USAID

THE PAANI STORY PART 3: BUILDING AQUATIC RESILIENCE AND LIVELIHOODS

To complement the creation of new ways to conserve aquatic resources by strengthening local governance, Paani explored innovative ways of using the aquatic environment to strengthen local economies and diversify livelihood opportunities. Paani developed a business case for aquatic resource conservation that reduced the threats of overexploitation, promoted sustainable fisheries, and built the resilience of river dependent communities through their stakes in fishery and alternative livelihoods, including aquaculture and ecotourism value chains, and development of their skill-based enterprises. For example, in 2019, Paani trained members of the indigenous Raji river community as rafting guides. One trainee who completed the program, 22-year-old Dhansari Raji, went on to obtain her guide license from the GON. She is now the first Raji woman assistant river guide.

Paani's business case identified supporting roles for government in policy development, the regulatory framework, infrastructure facilities and—with chambers of commerce and industry—training, extension, and cooperative development for CAACGs as new actors in fishery value chains. It highlighted private sector roles of middlemen, hotels and restaurants, and retail sellers in responding quickly and skillfully to changing market situations, while cautioning against government-managed near-market activities. Paani analyzed a range of products and services across the various actors in fishery and ecotourism value chains.

To further reduce pressure on wild fisheries, at the request of Ministry of Land Management, Agriculture and Cooperative (MoLMAC), Paani conducted a feasibility study of aquaculture and culture-based fisheries in Karnali Pradesh, which identified over 2,300 hectares of suitable land area for aquaculture development and 192 kms along 68 river stretches and natural lakes as potential sites to promote such fisheries. As a result, MoLMAC invested **NRs. 32 million (USD 271,000)** between 2018-2020 to establish and expand aquaculture.

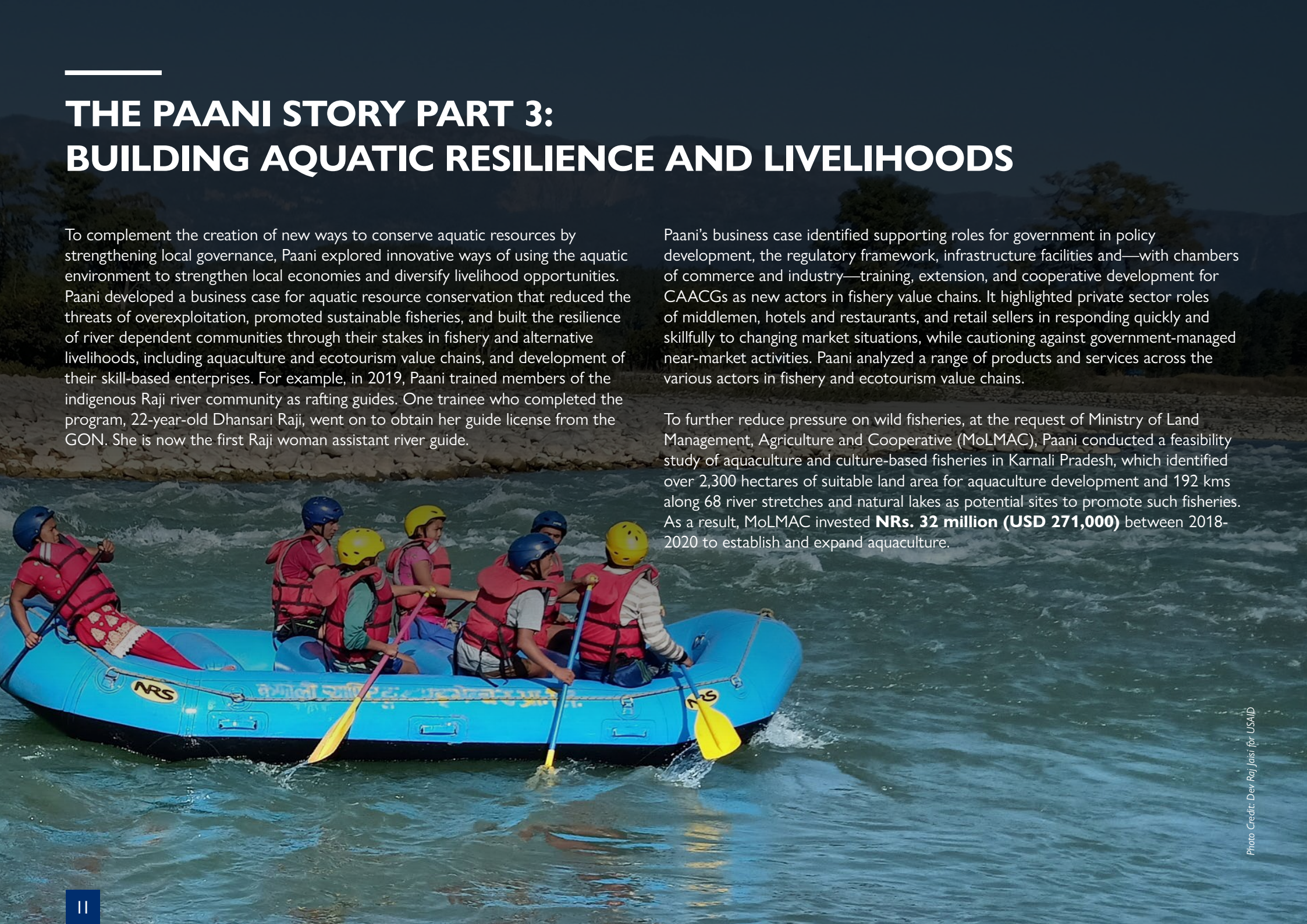


Photo Credit: Dev Raj Jaisi for USAID

In 2020, COVID-19 exacerbated pressures on Nepal's capture fisheries as river-based communities experienced increased unemployment, loss of income-generating activities, and an influx of returning migrant laborers. To help them cope with the unexpected shock of COVID-19, Paani pivoted USD 1.5 million of its resources towards meeting the immediate livelihood and food security needs of vulnerable river communities. Paani trained CAACGs and river resource dependent communities from nine watersheds in integrated fish farming that merges fish farming with livestock rearing in one system, as well as climate smart vegetable farming and irrigation management. Paani facilitated local government linkages to further support these activities.

To date, Paani constructed **123** tunnel and climate smart vegetable farms, **71** irrigation ponds, **68** integrated fish farms, and **57** livestock sheds to support local livelihoods (45% women-owned).

To date, Paani helped around **30,000** people (mostly vulnerable and/or minority) earn **NRs. 13.5 million** (USD 112,000) in income from livelihood activities.

"DUE TO THE IMPACT OF COVID-19, UNEMPLOYMENT INCREASED IN MY COMMUNITY AND PRESSURE ON THE RIVER FOR FISHING ALSO ESCALATED. PAANI SUPPORTED US WITH INTEGRATED FISH FARMING AND CLIMATE SMART VEGETABLE FARMING, WHICH BEGAN TO PAVE A PATHWAY FOR OUR ALTERNATIVE LIVELIHOOD, FOOD SECURITY, AND EMPLOYMENT—ESPECIALLY US WOMEN."

– Seema Gharti, Secretary of Rakasa Raha CAACG


Photo Credit: Suresh Wagle for USAID


Photo Credit: Suresh Wagle for USAID

Climate smart vegetable farming, along with integrated fish ponds and livestock sheds were part of Paani's livelihood support to more than 1,050 riverine households affected by COVID-19 starting in 2020.


Photo Credit: Binita Shrestha for USAID

IN THEIR WORDS: PAANI CHAMPIONS FROM ACROSS NEPAL

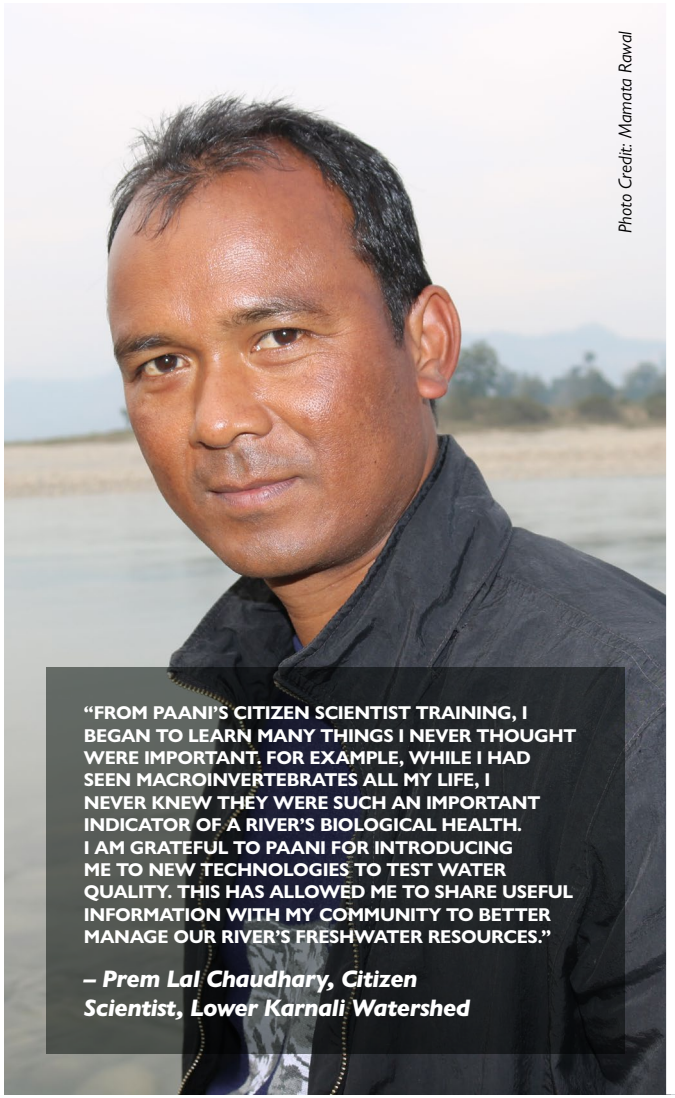


Photo Credit: Mamata Rawal

"FROM PAANI'S CITIZEN SCIENTIST TRAINING, I BEGAN TO LEARN MANY THINGS I NEVER THOUGHT WERE IMPORTANT. FOR EXAMPLE, WHILE I HAD SEEN MACROINVERTEBRATES ALL MY LIFE, I NEVER KNEW THEY WERE SUCH AN IMPORTANT INDICATOR OF A RIVER'S BIOLOGICAL HEALTH. I AM GRATEFUL TO PAANI FOR INTRODUCING ME TO NEW TECHNOLOGIES TO TEST WATER QUALITY. THIS HAS ALLOWED ME TO SHARE USEFUL INFORMATION WITH MY COMMUNITY TO BETTER MANAGE OUR RIVER'S FRESHWATER RESOURCES."

– Prem Lal Chaudhary, Citizen Scientist, Lower Karnali Watershed

Photo Credit: Mamata Rawal

"ENDORSING THE AQUATIC ANIMALS AND BIODIVERSITY CONSERVATION ACT HAS CREATED A CONSERVATION-FRIENDLY ENVIRONMENT HERE. WE HAVE IMPOSED RESTRICTIONS ON OVER-FISHING AND CONTROLLED DESTRUCTIVE FISHING PRACTICES, WHICH LED TO INCREASES IN FISH STOCK. THE LOCAL COMMUNITY HAS NOTICED AN IMPRESSIVE INCREASE IN THE NUMBER OF RIVER DOLPHINS IN 2020."

– Tapendra Rawal, Mayor of Tikapur Municipality, Lower Karnali Watershed

Photo Credit: Mamata Rawal

"HAPHAZARD EXCAVATION IN OUR AREA HAS LED TO DEGRADED CONDITIONS OF THE KARNALI AND MAHAKALI RIVERS. WITH SUPPORT FROM USAID'S PAANI PROGRAM, WE PROMOTED SUSTAINABLE GRAVEL MINING PRACTICES IN COLLABORATION WITH LOCAL GOVERNMENTS. WE ARE SENSITIZING COMMUNITIES AND STRENGTHENING THE LOCAL GOVERNMENT'S MONITORING MECHANISM FOR UNREGULATED MINING. NOW, ILLEGAL MINING IS SOMEWHAT CONTROLLED, AND THE LOCAL PEOPLE HAVE MORE CAPACITY TO MONITOR AND TAKE ACTION."

– Mamata Rawal, Treasurer, BAFER Nepal, Lower Karnali Watershed

Photo Credit: Jay Poudel

"OUR GROUP HAS BEEN ADVOCATING AGAINST DESTRUCTIVE FISHING PRACTICES AND WE CONDUCT REGULAR PATROLS IN THE RIVER TO TRY TO PREVENT DESTRUCTIVE FISHING. WITH TECHNICAL SUPPORT FROM PAANI, WE WORKED TOGETHER WITH OUR RURAL MUNICIPALITY TO FORMULATE A FISH CONSERVATION BILL THAT WE ARE NOW IMPLEMENTING. LOCAL GOVERNMENT AND POLICE OFFICIALS ARE SUPPORTING US TO MONITOR OUR RIVER STRETCHES. NOW DESTRUCTIVE FISHING PRACTICES ARE CONTROLLED AND THE FISH POPULATION AND SIZE HAS INCREASED."

– Dhan Kumari Chaudhary, Member of Rawa CAACG, Middle Rapti Watershed

Photo Credit: Jay Poudel

"THE COVID-19 LOCKDOWN LEFT ME WITHOUT WORK, LIVING HAND-TO-MOUTH. USAID'S PAANI PROGRAM SUPPORTED US AND PROVIDED US WITH TRAINING ON INTEGRATED FISH FARMING, WHICH INCLUDES LIVESTOCK AND VEGETABLES WITHIN ONE POND SYSTEM. THE TRAINING WAS SO ENCOURAGING THAT I COMMITTED MYSELF TO LEARN THE FARMING TECHNIQUES AND START UP AN AGRO-FARM HERE IN MY VILLAGE. THANKS TO PAANI FOR PROVIDING ECONOMIC SUPPORT TO FAMILIES IN CRISIS. I AM NO LONGER PLANNING TO RETURN TO INDIA FOR WORK."

– Suresh Bohora, Migrant returnee impacted by COVID-19, Aalitaal Rural Municipality

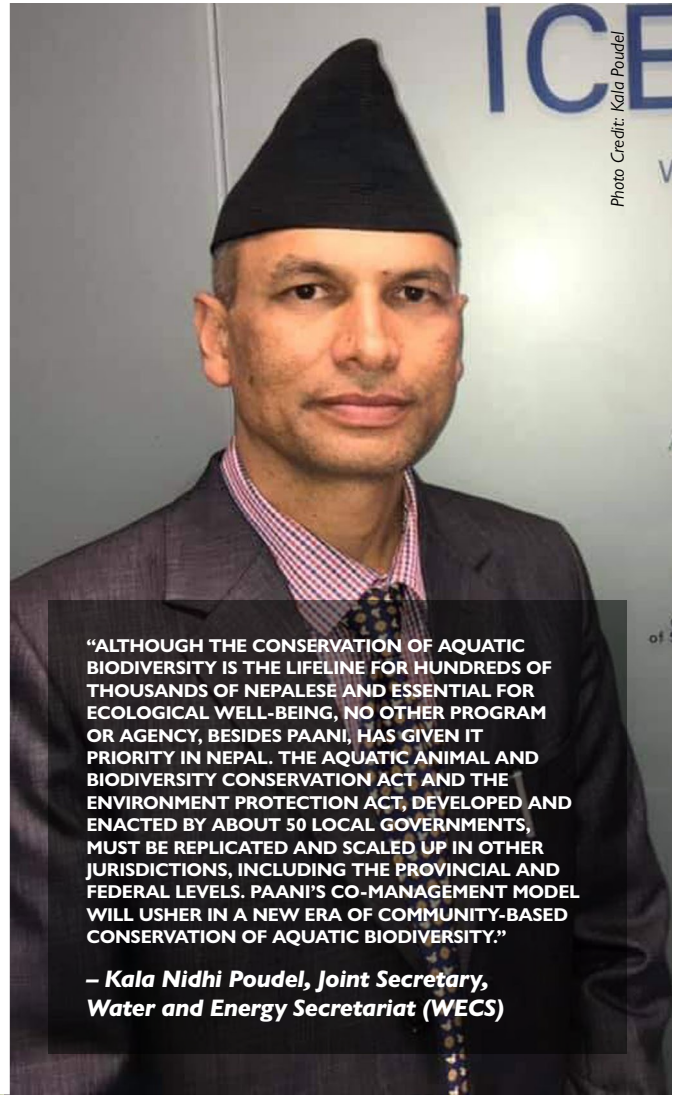


Photo Credit: Kala Poudel

"ALTHOUGH THE CONSERVATION OF AQUATIC BIODIVERSITY IS THE LIFELINE FOR HUNDREDS OF THOUSANDS OF NEPALESE AND ESSENTIAL FOR ECOLOGICAL WELL-BEING, NO OTHER PROGRAM OR AGENCY, BESIDES PAANI, HAS GIVEN IT PRIORITY IN NEPAL. THE AQUATIC ANIMAL AND BIODIVERSITY CONSERVATION ACT AND THE ENVIRONMENT PROTECTION ACT, DEVELOPED AND ENACTED BY ABOUT 50 LOCAL GOVERNMENTS, MUST BE REPLICATED AND SCALED UP IN OTHER JURISDICTIONS, INCLUDING THE PROVINCIAL AND FEDERAL LEVELS. PAANI'S CO-MANAGEMENT MODEL WILL USHER IN A NEW ERA OF COMMUNITY-BASED CONSERVATION OF AQUATIC BIODIVERSITY."

– Kala Nidhi Poudel, Joint Secretary, Water and Energy Secretariat (WECS)

PAANI'S LEGACY

- **Freshwater Center of Excellence established:** Paani established the first-ever Freshwater Center of Excellence in Nepal (FWCoE) at Tribhuvan University's Central Department of Environment Science (TU-CDES), to be launched by June 2021. The FWCoE will serve as a digital repository for freshwater biodiversity research and data to inform river basin planning and decision-making. It will be integrated within TU's existing GoN-funded IT system, **ensuring the information remains accessible to the public long after the Paani program ends.**

- **Designed and established Nepal's first river conservation foundation and impact fund:** The Karnali River Basin Conservation Fund (KRBCF) offers long-term financing for conservation-based enterprise development in the Karnali Basin area. The registered Karnali Basin Conservation Foundation (KBCF) enhances livelihoods and helps build entrepreneurial ecosystems in tandem with KRBCF. A registered consortium of advisors is **raising awareness on both entities among provincial governments and entrepreneurs and has identified a pipeline of investment-worthy projects.**

- **Rara Lake Ramsar Site Management Plan developed:** This plan will help conserve and maintain the ecological integrity of Rara Lake—Nepal's largest lake and a fish biodiversity hotspot—and will promote the wise use of wetland resources. Developed in collaboration with the GoN, the management plan **provides a framework for the long-term management of the lake's natural resources.**

- **Groundbreaking eDNA study on aquatic biodiversity conducted:** Paani, along with USFS and Center for Molecular Dynamics Nepal (CMDN) **conducted a first-of-its kind study that used e-DNA technology to determine fish abundance and species** in the Karnali and Trishuli river systems. CMDN developed a comprehensive genetic database for identified fish species collected from 15 strategic points of Karnali and recorded 50 fish species through sample fish tissues and e-DNA.

- **Conducted three pioneering studies to inform river basin planning:** Through a research consortium led by WWF, Paani conducted a **System Scale Planning (SSP) assessment** that highlighted how hydropower planning and development can be balanced with other energy options and conservation goals; an **Energy Options Assessment (EOA)** that produced least-cost pathways for Nepal's power system over the next 20 years; and a report that identified **High Conservation Value Rivers (HCVR)** of Nepal.

- **A series of capture fisheries assessments:** Led by SNV, the first phase of these studies assessed fisheries value chains resulting in the **first document on the value and market nexus of capture fisheries of Nepal.** In the second phase, Paani developed a Fisheries Conservation Governance Framework and Market Development Strategy, which **informed fisheries policy and developed a log frame to guide investment.** The third phase included a catch analysis and business cases that helps lay the foundation for sustainable capture fisheries in Nepal.

- **Ecotourism study in and around Karnali River Basin:** To boost ecotourism around Karnali, this Paani-led study resulted in recommendations to integrate existing itineraries with tour operators; prepare land use plans for protected areas; develop minimum standards for tourism; and improve administrative and regulatory framework for tourism concessions in protected areas. **The report contributed to a Tourism Master Plan developed by the Karnali Province government.**

- **NRCT-led expedition of the Karnali River:** A 44-day expedition on the Karnali River organized by the Nepal River Conservation with Paani's support **resulted in a Karnali River Corridor Management Framework** that can be used to ensure water resources and lands are managed to maintain important social and environmental values. The expedition also resulted in the development of The Strategic Considerations for River Conservation Legislation in Nepal, which advocates to permanently protect designated segments of the Karnali River.

COMPLEMENTING THE PAANI PROGRAM: THE DIGO JAL BIKAS PROJECT

About: The Digo Jal Bikas project ("Sustainable Water Development"), or DJB, supported the Paani Program by generating research towards an inclusive vision of water resources development in Western Nepal. Implemented by the International Water Management Institute (IWMI) from 2016-2019, it conducted multidisciplinary studies with numerous stakeholders and produced knowledge and tools aimed at helping decision-makers develop policies and plans that balance economic growth, social justice, and healthy ecosystems. IWMI, along with partners, Duke University, Kathmandu University, and the Nepal Water Conservation Foundation (NWCF), worked in three river basins in Karnali and Sudurpaschim provinces of Nepal: the Karnali, Mohana, and Mahakali river basins.

Photo Credit: ALuna Bharati/IWMI

"SETTING E-FLOWS IS A COMPROMISE BETWEEN RIVER DEVELOPMENT AND PROTECTION. IT'S A WAY TO NAVIGATE GROUPS THAT ADVOCATE FOR OR AGAINST DAMS AND A WAY TO NEGOTIATE BETWEEN VARIOUS WATER USERS, INCLUDING FISH AND PLANT LIFE THRIVING IN RIVERS."

– Luna Bharati, Principle Researcher at IWMI)

Photo by Andrew Reckers/IWMI.

Climate smart vegetable farming, along with integrated fish ponds and livestock sheds were part of Paani's livelihood support to more than 1,050 riverine households affected by COVID-19 starting in 2020.

DJB lessons learned:

Livelihoods
Improving water management in agriculture and rural livelihoods requires mitigating and preventing land degradation, which is often driven by a complex socio-political and economic context. Smallholder agricultural systems with nature-based watershed and water conservation techniques are important intervention activities to mitigate land degradation activities.

Gender equality and social inclusion (GESI)
GESI must be integrated into water sector policies and practices, as opposed to technocratic "fixes." River basin planning, including hydropower and irrigation development, requires informed and accountable decision-making with close involvement of key stakeholders across scales and sectors, including the diverse views of local communities.

Bio-physical assessment
Water management must factor in a basin's diverse agro-ecological zones, which have different bio-physical characteristics. Precipitation, for example, ranges from less than 500 mm in the Trans-Himalayas to over 2,000 mm in the mountain and hill regions.

Preparing for the future climate
Average temperatures and rainfall variability are both projected to increase with climate change. These changes should be incorporated into strategies and future plans for disaster risk reduction, infrastructure development, and livelihood improvement, with plans to reduce agriculture's dependency on rainfall and an emphasis on integrated measures to increase natural and artificial recharge and storage of water.

Explore trade-offs and synergies through hydro-economic models
Large-scale hydropower plants generate more power and revenue than small ones designed for domestic demand, but there is a trade-off between exporting energy to India versus using water for irrigation in Nepal's Terai region. A better understanding of economic and environmental trade-offs will enable more transparent development dialogues across sectors and regions.

Environmental flows assessment
E-flows, which are designed to mimic the natural flow of the river across all seasons, must be incorporated in the development and management of hydropower and irrigation infrastructure to sustain river biodiversity, ecosystem services, and livelihoods.

COMPLEMENTING THE PAANI PROGRAM: US FOREST SERVICE

About:

The US Forest Service (USFS) contributed technical assistance towards Paani's efforts to improve Nepal's freshwater biodiversity and water resources management. USFS's assistance focused on managing healthy watersheds, the sustainable use of hydropower, and community engagement at the ground level. USFS and Paani collaborated on a first-of-its kind comparative environmental DNA (eDNA) study to determine aquatic biodiversity populations in two rivers—each with varying levels of hydropower development. USFS also helped build Nepal's capacity on sustainable hydropower development through a U.S. study tour for high-level government officials and champions in river conservation.

Under the Paani program, USFS helped build Nepal's capacity at three levels to construct and manage environmentally friendly roads, which minimize harm to living river systems:

1. Through technical training to Nepali engineers on the design, construction, and maintenance of low-volume rural roads;
2. By helping to create a "Green Engineering" curriculum for Nepal's Mid-Western University (MWU);
3. Through direct work with municipalities and MWU to allocate fiscal year road funding and to provide a "learning lab" for Nepali students to gain knowledge and experience.

Results

- USFS prepared "Assessment of Water Resources Management & Freshwater Biodiversity in Nepal" for USAID Nepal (September 2014), providing the framework for the design of the Paani program.
- USFS joins together with Paani grantee, Center for Molecular Dynamics Nepal (CMDN) to conduct a groundbreaking study that tested the use of e-DNA to determine aquatic biodiversity populations in the Karnali and Trishuli Rivers. The study confirmed the significant impact of hydropower construction on freshwater biodiversity, finding tenfold more fish present in the Karnali River (with no hydropower projects) versus the Trishuli River (seven active hydropower projects and seven more planned).
- Supporting Paani's effort to reduce the negative impacts of poor rural road construction on river systems, USFS conducts a series of three training workshops on the design, construction, and maintenance of low-volume rural roads in Surkhet (April 2017), Gorkha (Sept. 2017), and Nepalgunj (January 2018).
- USFS and Paani collaborated on a USFS-led international workshop on watershed management typically held in the U.S. but brought to Nepal to help build the watershed management capacity of Paani stakeholders, including participants from Water and Energy Commission Secretariat (WECS)—Paani's GON counterpart—as well as National Trust for Nature Conservation (NRCT), among others.
- In July 2016, USFS led a Hydropower Study Tour to the Pacific Northwest, USA for high-level Nepali government officials and champions in river conservation to share learnings from hydropower development in the Pacific Northwest to be considered for the development of sustainable hydropower in Nepal.

Photo Credit: Mark Weinhold/USFS

Photo Credit: Mark Weinhold/USFS

USFS supported Paani with three technical trainings for engineers on low volume rural road construction; Paani, through USFS, assessed the impact of hydropower on aquatic biodiversity.

"I HAVE BEEN REGULARLY ADVOCATING FOR AN ENVIRONMENTALLY FRIENDLY WAY OF RURAL ROAD CONSTRUCTION WITH CONCERNED STAKEHOLDERS AND THE LOCAL GOVERNMENT TO REDUCE THE HIGH RISK OF EROSION, LANDSLIDE, AND FLASH FLOODS. NOW, LOCAL AUTHORITIES ARE PAYING ATTENTION TO RURAL ROAD CONSTRUCTION."

– Ravindra Roka, early adopter and champion of environmentally friendly road construction, Airawati Rural Municipality

Photo Credit: Basanta Pratap Singh for USAID

Photo Credit: Mark Weinhold/USFS

Photo Credit: Manoj Choudhary for USAID

USFS helped build local capacity to survey and design environmentally friendly rural road, like this stretch in Rakam Karnali; poorly designed and constructed roads lead to landslides and contribute to watershed degradation.

Key Lessons Learned

- USFS's research suggested that **only 25% of built local roads in Nepal are functional; the rest are unacceptable**. Many roads are built without the funds to plans to maintain them properly. There is a major gap in Nepal for investment in safe, functional, and sustainable rural road construction.
- Roads construction and development standards on sound engineering practices do exist (Nepal Rural Road Standards 2055), but compliance remains a challenge. **Nepal would benefit from governance committees to monitor and withhold payments for non-compliant road work**, in addition to raising citizen awareness on acceptable road standards.
- Helping to mitigate problems from poor road construction is important but preventing the next bad road and **shifting the mindset and practice to environmentally friendly road construction is most beneficial.**
- **The e-DNA tool proved to be a powerful and efficient means for assessing and monitoring aquatic biodiversity.** The use of the tool in the pilot study fostered cutting-edge research and improved the understanding of aquatic biodiversity in Nepal. The use of student interns from local universities and local fishers for the eDNA study to collect samples and support analyses proved to be successful, both for the students who gained hands-on experience in cutting-edge research and for CMDN, who benefitted from indigenous knowledge and hired several interns.
- Paani and USFS's trainings on low-volume roads engineering and watershed management **showed high impact and synergies with other USAID programs**. The most success with the application of lessons learned came when participants included younger professionals and non-engineers, rather than only senior district engineers in managerial positions.
- Shortly after Paani and USFS's 2016 Hydropower Study Tour to the Pacific Northwest, USA, the Nepali government participants either transferred to different positions within the GON or retired, and none could directly apply their sustainable hydropower learnings to their positions as envisaged. **Future study tours may focus on young leaders and bureaucrats to ensure more sustainable contributions of knowledge gained.**

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