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Impact Study Report

Trail Bridge Sub-Sector Programme (TBSSP)

July 2024

Assignment Title: Impact Study of the Trail Bridge Sub-Sector Programme (TBSSP) in Nepal
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Cover Page Photo: Kaliraha Bridge, Lamjung (Scott Wilson Nepal, 2023)

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ACRONYMS

ADTC	Average Daily Traffic Count
APR	Annual Project Report
BBLL	Bridge Building at Local Level
BCR	Benefit – Cost Ratio
CAO	Chief Administration Officer
CAPI	Computer Assisted Personal Interview
CEDAW	Convention on the Elimination of all forms of Discrimination Against Women
CSO	Civil Society Organization
DAG	Disadvantaged Group
DDC	District Development Committee
DMBT	Demonstration Model Bridge Training
DTO	District Technical Office
FGD	Focus Group Discussion
GESI	Gender Equity and Social Inclusion
GoN	Government of Nepal
HH	Household
IDEMU	Infrastructure Development and Environment Management Unit
IDO	Infrastructure Development Office
IoE	Institute of Engineering
IRR	Internal Rate of Return
KII	Key Informant Interview
LBS	Local Bridge Section
LIDP	Local Infrastructure Development Policy
LIDPO	Local Infrastructure Development Project Office
LPG	Liquid Petroleum Gas
LSTB	Long Span Trail Bridge
MoF	Ministry of Finance
MoFAGA	Ministry of Federal Affairs and General Administration
MoPID	Ministry of Physical Infrastructure Development
MoPIT	Ministry of Physical Infrastructure and Transport
MoUD	Ministry of Urban Development
NPR	Nepali Rupee
NPV	Net Present Value
OHS	Occupational Health and Safety
PA	Public Audit
PBBA	Post Bridge Building Assessment
PCU	Project Coordination Unit
PE	Political Economy
PH	Public Hearing
PTAP	Provincial Technical Assistance Providers
PwD	Persons with Disabilities
RCA	Reality Check Approach
RTAP	Regional Technical Assistance Providers
SATA	Swiss Association from Technical Assistance

SBD	Suspension Bridge Division
SCF	Standard Conversion Factor
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SEIA	Socio-Economic Impact Assessment
SSTB	Short Span Trail Bridge
SWAp	Sector Wide Approach
SWN	Scott Wilson Nepal
TA	Technical Assistance
TB	Trail Bridge
TBCCM	Trail Bridge Coordination Committee Meetings
TBS	Trail Bridge Strategy
TBSSP	Trail Bridge Sub-Sector Program
TBSU	Trail Bridge Support Unit
TO	Technical Officer
ToR	Terms of Reference
UC	User Committee
USD	United States Dollar
TID	Transport Infrastructure Directorate
VSL	Value of a Statistical Life

GLOSSARY

Benefit – Cost Ratio (BCR): The benefit – cost ratio is a profitability indicator that compares a project's relative benefits with its costs. If the BCR is greater than 1, the project is likely to deliver positive net present value to the project stakeholders. If the BCR is less than 1, the project's benefit is lower than its cost, and therefore should be reconsidered.

Disadvantaged Group (DAG): The disadvantaged groups are defined as economically poor (income of less than United States Dollar (USD) 1.25 per day per person or food sufficiency below 6 months) and socially discriminated because of gender, the caste system or ethnic origin. (Source: Swiss Cooperation Programme Nepal 2023-2026)

Internal Rate of Return (IRR): The internal rate of return is a metric used to measure the profitability and rate of return of a potential investment or project. The following is a simple example: a Nepali Rupee (NPR) 200,000 investment with a 10% IRR would generate NPR 20,000 in profit.

Long Span Trail Bridge (LSTB): A Long Span Trail Bridge spans a length of 120 meters or more and is constructed by using steel cables. (Source: Trail Bridge Strategy, 2006)

Net Present Value (NPV): The net present value (NPV) is defined as the financial worth of an investment or a project throughout its lifetime, discounted to today's value. A positive NPV indicates that a project could be profitable whereas a negative NPV indicates that a project might be unprofitable.

Short Span Trail Bridge (SSTB): A Short Span Trail Bridge spans a length of up to 120 metres and is constructed by using steel cables. (Source: Trail Bridge Strategy, 2006)

Sector Wide Approach (SWAp): An approach introduced by the Government of Nepal in 2009 in the trail bridge sector to harmonize the trail bridge building process through one-window technical assistance provided through Helvetas Nepal on behalf of the Government of Switzerland.

EXECUTIVE SUMMARY

Trail Bridge building in Nepal has a long and dignified history; one that is inextricably linked with dedicated championing and sustained financial and technical support by the Swiss Agency for Development and Cooperation (SDC) of the Government of Switzerland. Swiss support in the trail bridge sector has transformed the sector into a locally led, government-owned system of trail bridge building, with improved levels of coordination, cooperation and collaboration between the different spheres of the Government of Nepal. The construction of 10,413 trail bridges over the span of six decades, and the achievement of a record annual delivery of 744 trail bridges in fiscal year (FY) 2022/2023, are the clear testaments to the strength of partnership between the Governments of Nepal and Switzerland.

The first trail bridges in Nepal were imported from Scotland between 1846 and 1950, as Nepal's rural transport infrastructure sector was still in its infancy. A series of momentous shifts occurred in the sector beginning in 1964 with the initiation of a systematic approach to trail bridge building through the establishment of the Suspension Bridge Division (SBD) by the Government of Nepal (GoN) with the support of the Swiss Association for Technical Assistance (SATA). Since then, with sustained Swiss cooperation with the Government of Nepal, Nepal's trail bridge sector has evolved over different phases with key policy and programmatic planning interventions as follows:

1. Development and standardization of trail bridge technology (for example, short span, long span and complex/signature trail bridges) and norms and standards in 1984.
2. Piloting of the "community approach" in Trail Bridge building in 1989.
3. Devolution of bridge building through the Trail Bridge Sub-Sector Project (TBSSP, 2001 – 2009) in line with the Local Infrastructure Development Policy 2006 and Trail Bridge Strategy 2006 and Local Governments (LGs) leading the planning and implementation.
4. Introduction of the Trail Bridge Sector Wide Approach (TB SWAp) in 2009 with full ownership of the government assuring adequate funds for scaling up trail bridges across the country including in Karnali and Terai Plains
5. Federalization of the trail bridge program (2009 – 2023) by re-defining the roles for the three spheres of the government in Trail Bridge building.
6. Swiss support has resulted in institutionalized and technically-driven trail bridge building and today, trail bridge building is fully funded by the Government of Nepal. In addition, the lives and livelihoods of communities have been transformed, including that of the most disadvantaged populations.

This report documents the findings of the longitudinal Impact Study of the Trail Bridge Sub-Sector Project (TBSSP) conducted from March 2022 to February 2024. More specifically, the objectives of the Study are: to assess the socio-economic and environmental outcomes and impacts of trail bridges on the lives and livelihood of communities, including disadvantaged groups (DAGs); review the effectiveness of Swiss support in strengthening the capacity of stakeholders in communities, government and educational institutions in the new Federalized Nepal; and examine the sustainability of the sector after the exit of Swiss technical assistance. This report includes evidence identified by the Study, and offers analysis and recommendations on the effectiveness, efficiency and sustainability of the long-term partnership between the governments of Nepal and Switzerland in the trail bridge sub-sector. In addition, the report provides institutional memory with historical milestones and process associated with the evolution of Trail Bridge building in Nepal.

The Impact Study (hereinafter referred to as the Study) is the result of seven key studies that assessed i) the immediate outcomes that can be attributed to trail bridges and ii) the medium to long-term impacts of trail bridges on people's lives and livelihoods. To assess and understand the immediate outcomes that can be attributed to trail bridges, the Study carried out baseline (2022) and endline (2023) studies in 263 Trail Bridges; and two traffic count studies in 14 trail bridges, one during monsoon 2022 and the other during non-monsoon 2023, in 14 Trail Bridges. To assess and understand the medium to long-term impacts of trail bridges on people's lives and livelihoods, the Study carried out an impact study (2023) of 50 trail bridges that have been functional for at least five years; and a qualitative immersive study (2023), carried out by an external specialized team, to obtain a historical and comprehensive understanding on the impacts of bridges built more than 40 years ago on the lives and livelihoods of local communities and on state-citizen relations in households. In addition, an economic analysis was carried out by calculating the benefit-cost ratio (BCR), the internal rate of return (IRR) and net-present value (NPV) of trail bridges. Key impacts identified by the Study in different assessment areas relating to trail bridge development in Nepal are as follows:

A. Changes in Lives and Livelihood

Trail bridges (TBs) have become a symbol of accessibility and prosperity in Nepal, as Nepali people take this infrastructure to be an integral part of their community's infrastructure fabric. Trail bridges have consistently brought impactful, visible and multi-dimensional improvements in their areas of influence. For many Nepalis, particularly the disadvantaged groups (DAG) and people living in remote areas, life and livelihood without trail bridges would be unimaginable as trail bridges have continued to save lives; improve access to schools, markets and health facilities; and create new income-generating sources. For these individuals and many like them across the country, trail bridges have provided significant positive impacts, as highlighted by the points below:

Trail bridges have led to safer river crossings. No one has died while crossing rivers after trail bridge construction. This is a notable achievement from at least 7 people who lost their lives trying to cross rivers in the sampled trail bridges before their construction (SWN, 2023).

Trail bridges continue to save significant time by improving access to facilities and services. Trail bridges saved 39 minutes for a two-way journey to access services. Users of trail bridges in Hills save 60 minutes as compared to 32 minutes in Terai. (SWN, 2023).

1.15 million people use trail bridges each day. The average daily traffic count (ADTC) per bridge across the country during monsoon and heavy rains was 110 compared to 90 in the non-monsoon period. Trail bridges have been part of regular access for most people irrespective of seasonal variations.

Trail bridges reduce daily drudgery and afford dignity while carrying out household chores, especially for women. Women said that trail bridges enabled them to devote time both to their households and to new income-generating activities as markets became closer. This has earned them renewed respect in their community.

Schools recorded an 8.5 percent increase in student attendance as demonstrated by the increased number of days students attended schools in the academic year 2021/2022, and improvement in student academic performance in the past 5 years, partly contributed by trail bridge construction. The teachers the Study spoke with over KIIs shared their assessment that student academic performance increasingly improved subsequent to trail bridge construction. One of the main reasons for this increase is increased connectivity in the vicinity. The students were spending less time to reach and return from school. Trail

bridge construction has connected new settlements to school, health facilities and markets. As a result, households that previously did not have access to schools are now brought within an hour distance from schools, and this has encouraged many parents to enrol their children.

Trail bridge construction has contributed to more people being able to purchase a wider variety of goods in their local markets, particularly due to availability of goods in the market and due to improved connection of villages to the external markets. The percentage of people able to purchase fuel, e.g. petrol, and construction materials in their local markets increased by 81.8% after trail bridge construction.

B. Institutionalization of Trail Bridge Building within Government Systems:

The government systems within Nepal's different spheres of Government have the knowledge, capacity and motivation to direct the trail bridge sector after Swiss TA exit, but each individual entity has their own important areas for improvements. The following findings and analyses reflect on how the government policies, agencies and private sector entities, e.g. government institutions, technical assistance providers, contractors and consultants are prepared in taking the full responsibilities of the trail bridge building process after the exit of Swiss Technical Assistance (TA).

Government Policies and Institutions (Local, Provincial and Federal)

- **The Trail Bridge Sector Wide Approach (SWAp) has revolutionized infrastructure development in Nepal by inculcating and promoting a systematic, government-owned and multi-donor funding for trail bridge planning, construction, maintenance and monitoring.** The Government of Nepal (GoN) initiated the Trail Bridge (TB) SWAp framework in 2009 and the framework has since been implemented in three phases, with the final phase ending in 2023. During this period, annual trail bridge outputs has increased significantly from 196 in fiscal year (FY) 2009/2010 to 744 in FY 2022/2023, demonstrating increased capacity of Local Governments (LGs) and user committees (UCs) to take-up the mantle of trail bridge building.
- **Local governments (LGs) have matured and are achieving sustained annual delivery of new trail bridges to their constituencies.** This reflects the LGs' ability to assume responsibilities and their improved capacity to implement trail bridge projects as per the chapter 3, sub-clause 11 and chapter 6, clause 24 of the Local Governance Operations Act 2074 BS (LGOA 2017) and their Constitutional mandate. Their strength and capacity are evidenced by the fact that i) 72% of all trail bridges across Nepal are built through LGs, ii) trail bridge planning is incorporated into LG's periodic and annual plans and passed by the LG councils and iii) LGs are demonstrated capacities in procuring non-governmental organization (NGO) services for short span trail bridge (SSTB) construction and some have also procured contractor services for long span trail bridge (LSTB) implementation. However, there are a number of areas where Local Governments need to assign additional resources including that for routine maintenance and continued monitoring of trail bridge quality and safety status. Many trail bridges are aging and require maintenance. Studies show that out of 10,413 trail bridges, only 17% (Annual Project Report, Fiscal Year (FY) 2022/2023) are undergoing routine maintenance and only 40 trail bridges underwent major maintenance in 2023.
- **Provincial governments (PGs) have taken ownership of trail bridge program.** Three Provinces (Koshi, Bagmati and Gandaki) have promulgated their own Provincial Trail Bridge Strategies while the four remaining are in the process of designing their own. In addition, the Provinces are financing their own trail bridges, and the share of funds from their internal sources for trail bridge building has significantly increased from 76% in fiscal year (FY) 2019/2020 to 95% in FY 2022/2023. The PGs have an important role to play to coordinate and support local governments in procurement, storage and delivery of materials, technical services, which they are doing through outsourced Provincial Technical Assistance Providers (PTAP). What remains to be strengthened is the

PG's level of coordination with the LGs and FG for the sustainability of the PTAPs, maintenance and smooth management of procurement of bridge building materials.

- **The Federal Government (FG), through the Local Bridge Section of the Department of Local Infrastructure (DoLI), has taken the lead in facilitating trail bridge building process across the country.** This is illustrated by their initiative to update the National Trail Bridge Strategy (NTBS) as well as assuming the role of Member Secretary for the Steering Committee Meetings and their ongoing coordination with the provinces. Furthermore, DoLI has been instrumental in supporting procurement of trail bridge materials as needed, and spearheading signature trail bridges to take trail bridges to the next level of design and utility. However, understandably, there are a number of areas for improvements. First and foremost is the priority for FG to streamline the institutional set-up at the federal level. Currently, there are three federal institutions that cover trail bridge development, e.g. the Local Bridge Section at DoLI, the Local Infrastructure Development Project Office (LIDPO) and the Suspension Bridge Division (SBD). All these offices are supporting the trail bridge development process. This could result in duplication of work, and encroachment of duties, including that of Provincial and Local governments. It is desirable that the federal government take a "one window approach," where TB-related activities are led and implemented by a single entity.

Technical Assistance Providers (Local, Provincial and Federal)

- **Non-Government Organizations (NGOs) are the backbone of SSTB trail bridge construction and are one of the key reasons for the TBSSP achieving record annual trail bridge delivery.** NGOs have provided technical assistance (TA) to 85% of all trail bridges constructed in Nepal.
- **Swiss support in the trail bridge sector has helped mainstream gender, social equality and inclusion across government agencies and community organisations, including NGO.** The prioritization criteria for trail bridge selection have enabled the trail bridges to impact more disadvantaged groups (DAGs) as evidenced by the fact that the DAG percentage amongst the trail bridge beneficiaries has increased by 27 percentage points, from 33 percent in FY 2007/2008 to 60 percent in FY 2022/2023. Similarly, studies have shown that women's engagement in user committees (UCs) has steadily increased from 24 percent in FY 2006/2007 to 50 percent in FY 2022/2023 since the inclusion of the provisions in the Trail Bridge Strategy 2006**.**
- **The Provincial Technical Assistance Providers (PTAP) have been effective and successful in providing TA to LGs and PGs for trail bridge construction, as demonstrated by increasing level of annual trail bridge delivery of good quality.** While PTAP service model has been effective, there are issues on their sustainability as the funding levels are often considered inadequate and this might be further constrained in the context of Swiss TA exit.
- **The Trail Bridge Support Unit (TBSU) within Helvetas was established by Swiss Agency for Development and Cooperation (SDC) played a pivotal role in providing technical assistance (TA) to the trail bridge program in all three spheres of the federalized Governments of Nepal.** TBSU, with its primary mandates, has effectively coordinated trail bridge related planning, budgeting, technical, social, financial and managerial activities; has provided quality assurance, monitoring and inspection of trail bridges; has transferred knowledge and competencies to Local, Provincial and Federal government institutions and has developed capacities in the private sector as well. It leaves behind a strong legacy of spearheading and institutionalizing trail bridge building in Nepal as it discontinues its services from 2023.
- **The private sector fabricators have played an important role by manufacturing steel parts for the sector, and the industry has come a long way in terms of progress since the beginning of Swiss contribution.** There are currently 22 fabricators that are capable of manufacturing steel parts for the sector in the country. Among these, 50% have started automated production leading to higher quality and efficient production process.

C. Conclusions

Swiss assistance to Nepal in the trail bridge development sector has transformed the sector into a locally led, government-owned system capable of leading a sustainable trail bridge building process. Trail bridges have consistently brought impactful, visible, beautiful and multi-dimensional improvements in their areas of influence. For many Nepalis, particularly the most disadvantaged and those living in remote areas of the country, life and livelihood without trail bridges is almost unimaginable as trail bridges continue to save lives; improve access to key facilities; and create new income-generating opportunities. As Government of Nepal institutions proceed with owning and leading the Trail Bridge Sub-Sector, there are evident strengths to move forward as well as challenges to overcome for the growth and progress of the sub-sector to achieve additional trail bridge requirements both from qualitative and quantitative perspectives.

1. INTRODUCTION

1.1. Background and Objective of the Assignment

The Government of Switzerland (hereinafter referred to as Swiss government) has supported the Government of Nepal (GoN) since 1964 in building trail bridges. This has resulted in an institutionalized, technically robust and mature trail bridge sub-sector in Nepal.

In the early days, Swiss support was organised through the Swiss Association for Technical Assistance (SATA) that engaged Swiss engineers to support the GoN to construct trail bridges and develop norms and standards[1]. The Swiss support to trail bridge building was later carried out through Helvetas Nepal, which has led to the growth and development of Nepal's trail bridge sub-sector as Helvetas Nepal has provided high quality technical and social support in overall planning, design improvements and advisory services.

The Swiss engagement in the sector covered a range of institutional, technical, social and sustainability priorities. Most importantly, the Swiss ensured that the disadvantaged groups (DAGs), including women, poor and those living in remote areas were prioritized in accessing trail bridge benefits. This emphasis on and commitment to social and environmental safeguards and good governance practices have positively impacted people's lives and livelihood.

As of the end of 2023, 10,413 trail bridges were constructed throughout Nepal. Cumulatively, these trail bridges span 72,162 kilometres (km), with an average span of 69.3 metres per bridge (National Bridge Record, TBSU, 2023). Table 1 presents key trail bridges figures by ecological regions.

Table 1: Trail Bridge Figures with Geographic Distribution

	Mountain	Hill	Terai
Number of trail bridges	1,978	7,598	833
Average span of trail bridges (metres)	68.7	68.7	76.3
Density of trail bridges (numbers per square kilometres)	0.038	0.123	0.024
Geographic distribution (%)	19	73	8

Geographically, the Hills have the highest number of trail bridges (73%) and also the highest density at 0.123 trail bridges per square kilometre, showing that the Hills are the most developed in the trail bridge infrastructure compared to the other two regions. This is mainly due to rugged terrain; extensive river networks, which are often glacier-fed and have year-round sustained flows which make river crossings risky and difficult; high population density, i.e. 40.3% of Nepal's population reside in the Hill; along with the historically higher demands for safer river crossings.

Meanwhile, the trail bridge infrastructure is relatively less developed in the Terai region, i.e. southern flatlands, with lower numbers (8%) and density, i.e. 0.024 trail bridge per square kilometre, despite the region having the highest population (53.66%, Nepal Census 2021). One of the reasons for this is because Terai has meandering rivers which largely originate in the Mahabharat and Sivalik hills and thus have seasonal flows. Moreover, Terai has relatively high road density with the best motorable access in Nepal with 90% of road length in Nepal located in the

[1] Helvetas (2007). Trail Bridge Building in the Himalayas: Enhanced Access, Improved Livelihoods. Helvetas: Experience and Learning in International Cooperation. Brochure No. 5.

Terai. Table 2 presents information on the average span of trail bridges, percentage of SSTB and LSTB, the district with the highest number of trail bridges and the distribution of trail bridges by Province.

Table 2: Distribution of Trail Bridges by Province

	Koshi	Madhesh	Bagmati	Gandaki	Lumbini	Karnali	Sudurpaschim
Number of TBs	1,991 (21%)	201 (2%)	1,704 (18%)	2,064 (22%)	1,323 (14%)	1,132 (12%)	1,147 (12%)
Average span (metres)	65.7	61.7	70.6	63.9	67.2	66.8	63.7
Percentage of SSTB /LSTB	93% / 7%	92% / 8%	89% / 11%	92% / 8%	98% / 2%	94% / 6%	93% / 7%
District with the highest number of TBs	Taplejung (194 TBs)	Sarlahi (29 TBs)	Nuwakot (224 TBs)	Baglung (457 TBs)	Rolpa (253 TBs)	Dolpa (102 TBs)	Baitadi (170 TBs)

(Source: National Bridge Record, TBSU, 2023)

At the Provincial level, Gandaki has the highest number of trail bridges and within the Province, Baglung (a district that is credited with the indigenous 'Baglung model' of trail bridges) has the highest number of trail bridges (457). Madhesh has the lowest number of trail bridges due to large number of motorable bridges in the area. In terms of technology, 93% of bridges constructed in Nepal are Short Span Trail Bridges (SSTB), i.e. <120 m, indicating that river crossings over smaller rivers have been the priority across the country. See table 2 for details.

Historically, the chain bridges, on which the SSTB technology is based, originated from Baglung (Source: TBSU) and one can infer that the high demand of safer bridge crossings was one of the reasons for the development of the indigenous technology and later construction of bridges using improved designs.

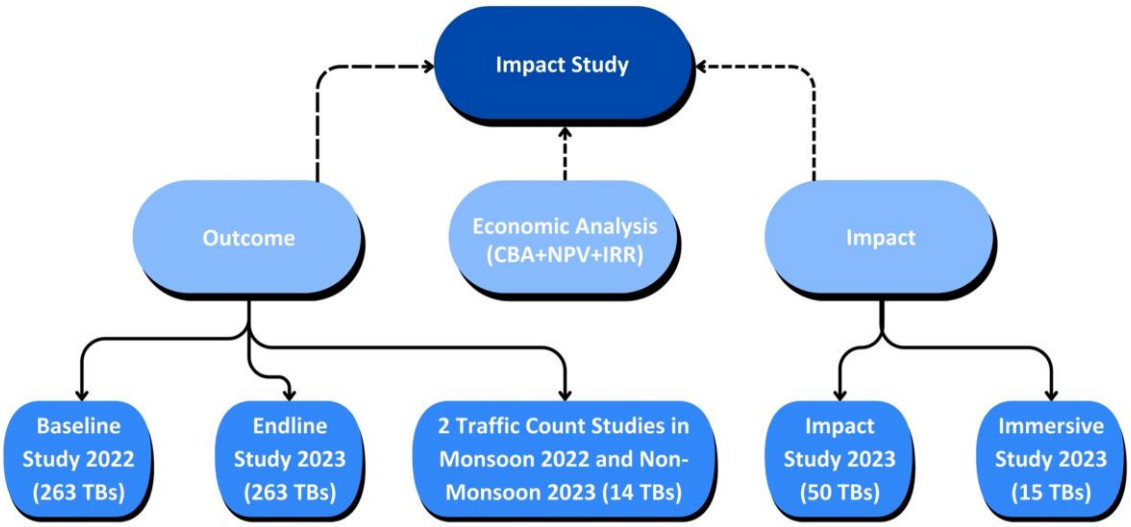
This Study report documents the findings of the Impact Study of the Swiss government funded Trail Bridge Sub-Sector Project (TBSSP) carried out by Scott Wilson Nepal (SWN) for the Swiss Agency for Development and Cooperation (SDC). The Study objective was to assess the impact of trail bridges on the lives and livelihood of local beneficiaries, especially those from the disadvantaged groups, and to review the enhanced capacities of stakeholders to construct and maintain trail bridges. This report includes the evidence identified by the Study, and offers analysis and recommendations on the effectiveness, efficiency and sustainability of the long-term partnership between the governments of Nepal and Switzerland in the trail bridge sub-sector. In addition, this report serves as an institutional memory with historical milestones and process associated with the evolution of Trail Bridge building in Nepal. The specific objectives of the Study were:

1. To assess the socio-economic and environmental outcomes and impacts of trail bridges on the lives of local communities, including disadvantaged groups (DAG).
2. To review the effectiveness and sustainability of Swiss support in strengthening the capacities of stakeholders in communities, government bodies, educational institutions and the private sector in the new federal context.
3. To calculate the benefit-cost ratio (BCR), net present value (NPV) and internal rate of return (IRR) of trail bridges.

1.2. Approach and Methodology

The Impact Study (hereinafter referred to as the Study) is the result of seven key studies that assessed i) the immediate outcomes that can be attributed to trail bridges and ii) the medium to long-term impacts of trail bridges on people's lives and livelihoods. Figure 1 presents a diagrammatic representation of the Study approach and methodology.

Figure 1: Impact Study Approach and Methodology



A. Outcome analysis: To assess and understand the immediate outcomes that can be attributed to trail bridges, the Study carried out baseline (2022) and endline (2023) studies in 263 trail bridges; two traffic count studies in 14 trail bridges; 50 focus group discussion (FGDs) and 50 key informant interviews (KIIs).

i. Baseline (2022) and Endline (2023) Studies in 263 Trail Bridges:

The Study carried out a baseline study in 2022 and an endline study in 2023 in 263 stratified and randomly sampled trail bridges. The trail bridges were stratified based on topography to ensure that a proportionate number of trail bridges from Terai, Hill and Mountain were sampled as per the distribution in the country. From these trail bridges, a total of 5,260 households were surveyed. While selecting the households too, a stratified random sampling method was applied to ensure that the selected households were proportionate to the beneficiary composition of each specific bridge site. [2]

In addition, the 263 trail bridges were divided into 221 treatment and 42 control trail bridges to provide a standard for difference-in-difference analysis and to isolate the distinct changes brought about by trail bridges. Assessment using treatment and control trail bridges was introduced by this Study. Treatment trail bridges were under construction during baseline (2022) and were completed during endline (2023). Control trail bridges were under

[2] Beneficiary composition of each bridge site is available in the Trail Bridge Strategy Information Monitoring System

construction during baseline (2022) and were not completed during endline (2023). The Study employed mixed-methods approach with quantitative and qualitative research for primary data collection, as follows:

Table 3: Distribution of Stratified Randomly Sampled Trail Bridges

Ecology	Province							
	Koshi	**Madhesh**	**Bagmati**	**Gandaki**	**Lumbini**	**Karnali**	**Sudurpaschim**	**Total**
Mountain	13	0	12	15	0	7	8	62
Hill	36	0	35	43	22	22	22	182
Terai	4	5	4	4	10	0	2	18
Total	**53**	**5**	**50**	**62**	**32**	**29**	**32**	**263**

ii. Two traffic count studies in 14 trail bridges, one in monsoon (2022) and one in non-monsoon (2023), to calculate the average daily traffic count (ADTC) on each bridge.

The traffic counts were carried out in 14 trail bridges representing different ecological regions, administrative areas and bridge types, e.g. Long-Span Trail Bridge (LSTB) and Short-Span Trail Bridge (SSTB). The traffic count studies collected information for one week (this included weekdays, weekends, market and non-market days) on the usage of trail bridges and the purpose of crossing in monsoon and non-monsoon, disaggregated by gender, age, Province and ecological region.

iii. Qualitative research

Qualitative research: The Study employed two qualitative methods for data collection, namely: focus group discussion (FGD) and key informant interview (KII). A total of 50 FGDs were carried out with a purposive mix of health and school management committees, bridge user committees, women and disadvantaged groups (DAGs). Likewise, a total of 50 KIIs were completed with staff from Provincial Technical Assistance Providers (PTAPs), Ministry of Physical Infrastructure Development (MoPID), the Transport Infrastructure Directorate (TID), fabricators, Infrastructure Development and Environment Management Unit (IDEMU), local businesses and non-government organizations (NGOs). The FGD and KII instruments are presented in annex 3.

B. Impact analysis: To assess and understand the medium to long-term impacts of trail bridges on people's lives and livelihood, the Study carried out an impact study (2023) of 50 trail bridges that have been functional for at least five years; FGDs; KIIs and a qualitative immersive study (2023), carried out by an external specialized team, to obtain a historical and comprehensive understanding on the impacts of bridges built more than 40 years ago.

i. Impact Study in 2023:

The Study carried out a separate Impact Study on 50 trail bridges[3] that were functional for at least five years. These bridges were selected from the internal Post Bridge Building Assessment (PBBA) that had been conducted by TBSU/Helvetas since 2010. The main reason was to compare the changes over 3 time periods – the baseline, PBBA (taken as midline) and an endline in 2023. A total of 1,000 households were surveyed from the selected from the 50 trail bridges (20 household surveys in each trail bridge).

[3] A total of 241 trail bridges had been sampled for the PBBAs by TBSU/Helvetas, but only 66 amongst them had datasets that were disaggregated by bridge sites (for the remaining only cumulative figures for districts were available). Consequently , out of 66, 50 trail bridge sites were selected keeping in mind the topographical distribution.

ii. Qualitative research:

The study employed two qualitative methods for data collection, namely: focus group discussion (FGD) and key informant interview (KII). The study completed 10 FGDs with health and school management committees, bridge user committees, women and disadvantaged groups (DAGs). Likewise, the study completed 10 KIIs with bridge wardens and staff from Wards, Local Governments (LGs), NGOs and local businesses.

iii. Immersive study in 2023:

The immersive study[4] was carried out using the Reality Check Approach (RCA) – a household inquiry methodology that is designed to understand people's perspectives. This involved living with the poorest households in the communities to feel and deeply understand their family dynamics and insights into their everyday lives. In total 15 trail bridge sites were selected, amongst them 11 were completed between 1970s – 2000s, and the remaining 4 were under-construction. The latter were selected to gain a more nuanced understanding of the trail bridge construction processes, particularly the engagement of women and discriminated groups in the user committee (UC). At each bridge site, two researchers immersed themselves in prior identified households (termed as host households) for a minimum of 3 days, often in DAG households that are the beneficiaries of the Study. In addition, they also met and conversed with other community members to gain a wider perspective and triangulate information from the host households. Cumulatively, this led to over 420 hours of in-depth conversations with 30 host households.

C. Economic analysis:

The economic analysis calculated the benefit-cost ratio (BCR), net present value (NPV) and internal rate of return (IRR) of the trail bridges. The Study evaluated various factors, namely: improvements in the socio-economic conditions, convenience, mortality reduction and time saved. Accordingly, findings from baseline and endline studies were used to inform the economic analysis.

The trail bridge construction in rural areas is primarily meant to save the lives of the people and livestock while crossing the rivers, and, in doing so, to uplift the living standards of the rural population through increased economic activities and income. This Study has shown that these incremental economic activities, and thereby an increase in income, arising from trail bridge construction, are mainly realized by saving the time required to cross the river by the pedestrians, porters and livestock. This helped to increase the access to markets thereby triggering additional production of marketable goods, and by avoiding risk of accidents (fatalities and injuries) as well as by sustaining least possible impact on the environment. This Study, therefore, considered these avoided costs as benefits of the trail bridge.

On the other hand, the Study also took into account the cost of construction and annual maintenance as the cost of trail bridges. These costs measured at market prices (financial price) were converted into economic prices. For the use of physical inputs in the construction process and/or maintenance, their financial prices were multiplied by a standard conversion factor (SCF). The SCF converts the prices of non-traded goods into broader world prices. For the use of different types of labour (skilled, semi-skilled and unskilled), their market wage rate was converted into the shadow wage rate. An appropriate standard conversion factor (for economic valuation of materials) and shadow wage rate (for labour) suitable to the local context was used after reviewing scholarly literature, guidelines and

[4] Shod (2023). Immersive Study on the Impacts of Trail Bridges in Nepal. Kathmandu, Nepal.

reports on an economic analysis by multilateral agencies and taking expert advice. For discounting future benefits and costs, the discount rate of 9 percent was used.

2. EVOLUTION OF TRAIL BRIDGE BUILDING APPROACH AND PROJECTS

The construction of trail bridges in Nepal has a long history. This section details the Government of Nepal's key programmatic evolution in trail bridge development and its achievements. This section provides context and reference for further analysis in the later sections of this report. Figure 2 presents the evolutionary history of trail bridges in Nepal.

Figure 2: Evolutionary History of Trail Bridges

	Suspension Bridge Division (SBD) – Led Bridge Building	Bridge Building at Local Level (BBLL)	TB Sub-Sector Project (TBSSP)	TBSSP/ TB SWAp Framework I	TBSSP/ TB SWAp Framework II	TBSSP/ TB SWAp Framework III
Timeframe	1960 – 1990	1990 – 2001	2001 – 2009	2009 – 2014	2014 – 2019	2019 – 2023
Political Governance	Monarchy-era centralized planning	Newfound openness of multi-party democracy	Strength of local institutions amidst 'insurgency'	Strengthening localized governance	Federalized governance takes shape	Federalized institutions strengthened with SWAp
Theme	Centralized Planning	Community-based approach to TB building. Defined and strengthened localization	Decentralized bridge building	Formulation and development of TB SWAp	Federalization of the TB SWAp Framework	Maturity of SWAp and preparedness for Swiss TA exit
Financial Contribution	Swiss: 89%; GoN: 11%	Swiss: 64%; GoN: 36%	Swiss:44%; GoN: 56%	Swiss: 18%; GoN: 82%	Swiss: 10%; GoN: 90%	Swiss: 5%; GoN: 95%
TBs/Year	25	184	200	284	460	594
Main Highlights	• Centralized planning, focused on strategic trade locations. • Toni Hagan identified the need for safer crossings as key barrier to Nepal's development, 1950. • SBD is established with support from SATA. • Suspension Bridge Project (SBP) begins in 1972. • Helvetas Nepal study on Main Trails and Local Trails, 1985	• Increased demand of TBs, consequence of democratization and decentralization • Helvetas Nepal introduction of BBLL standard in early 1990s. • BBLL, now called the Short Span TB (SSTB), optimized the use of local skills and local materials for TB building; developed the Baglung Local Chain Bridge design. • The BBLL design is cost-effective; technologically simpler; adapted to meet local needs, capacities and materials; more easily fabricated, transported and constructed. • Introduction of steel walkway decks and galvanization of steel parts in 1995 by Helvetas Nepal.	• Launch of the TBSSP, with the merger of SBP and BBLL. • Helvetas Nepal provides TA to TBSSP. • TBSSP incorporates the "community approach" within government systems and coincided with the wider decentralization development agenda. • Proliferation local NGOs aides TB building. • GoN endorses the TB Strategy with the national target of – no citizen has to walk a detour of more than 1 hour in absence of safe river crossing. • Demarcation of TB approaches into SSTB and LSTB.	• Helvetas Nepal, in coordination with the GoN, initiates the Sector Wide Approach (SWAp) framework based on the principles of the Paris Declaration on Aid Effectiveness in 2009. • Demarcated responsibilities for the GoN, NGOs, UCs, TA, and consultants. • Contribution towards poverty reduction through improvement of access to social and basic services by building TBs. • TBSU is established under Helvetas Nepal for providing TA. • 1,420 TBs were built by the end of the phase.	• The TB SWAp Framework II from 2014 to 2019, where 2,300 additional TBs were constructed. • LG - The main bodies for TB construction as per new Constitutional mandate. • The TB Steering Committee Meeting of 2018 unpacks and clarifies the roles and responsibilities of all three tiers of the Government. • RTAPs is introduced in all 5 development regions, through joint ventures of NGOs and consulting firms, as extensions of the TBSU, Helvetas Nepal. • By end of 2019, over 8,000 TBs constructed across Nepal. • Reduction of time to access services by 2.3 hours for a two-way journey.	• The identification of additional demand for TBs and GoN request to SDC, implementation of final phase of Swiss TA with TB SWAp Framework III • Main objective: Capacitate stakeholders and handover roles and responsibilities solely to the Government of Nepal. • Institutionalization and strengthening of the capacities of the PTAPs • PTAP services co-financed by the PG, the FG and SDC. • The Swiss TA efforts mainly focused on strengthening the technical know-how of bridge building that matured over time and different models of implementation.

2.1. Before 1960: Limited Bridges along Strategic Locations

Nepal's rugged terrain, with 70% of its land mass occupied by hills and mountains, has always been a constraint to its development. The first generation of trail bridges were timber footbridges and steel chain-based trail bridges built with indigenous technologies developed in the hills of Nepal. Understandably, these were localized and highly limited in number.

To mitigate the acute shortage of trail bridges, the GoN sought international support, which started to arrive through gradual political opening of Nepal's regimes to international aid. The first trail bridge in Nepal is said to be imported from Aberdeen, Scotland in the year 1907 during the Rana regime and installed in Khurkot over the Sunkoshi River[5], between Sindhuli and Ramechhap districts, east of Kathmandu (Chitrakar and Joshi, Himal South Asia, 1989). The GoN began adding trail bridges along major trade and *Hulaki Marg* (postal) routes which includedan addition of 29 steel bridges imported from Aberdeen, Scotland (Helvetas, 2007). Construction and maintenance of the trail bridges followed the hierarchical order of the then feudal system, which on the authority of *Bada Hakims* (regional administrative chiefs) and village *Mukhiyas* (chiefs) mobilized local communities to construct bridges (Immersive Study, 2023).

The realization of the depth of the problem presented by river crossings across Nepal and the potential for organised, systematic and extended support for the trail bridge sub-sector was possible when Tony Hagen, a Swiss geologist, articulated the scope for trail bridge development in Nepal during his extensive travel across Nepal between the years 1953 and 1959. This eventually contributed to the arrival of Swiss aid for Nepal's trail bridge sub-sector and the subsequent evolution of organised trail bridge construction process in Nepal.

2.2. Suspension Bridge Division (SBD) Led Trail Bridge Building: Centralized Planning (1960 – 1990)

Trail bridge planning and construction were centralized and allocated to only specific and strategic trade locations. Tony Hagen's visit to and journeys across Nepal, as mentioned above, resulted in his recommendations for institutional and technical process to systematically develop Trail Bridge sub-sector in Nepal. Accordingly, the Government of Nepal established the Suspension Bridge Division (SBD) with financial and technical support from the Swiss Government through Swiss Association for Technical Assistance (SATA). SATA was later restructured, and the responsibility to implement trail bridge programmes was assumed by Helvetas Nepal.

Understandably, the pace of trail bridge delivery in the initial years was slow, with only 10 to 25 trail bridges built annually. Each trail bridge had to be designed individually and set up at the respective site, and the construction of each trail bridge took around 3 years then, compared to less than 18 months today (Helvetas, 2007:17).

Helvetas Nepal led the improvement and documentation of trail bridge design, norms and standards into comprehensive design and construction manuals and in the year 1972, the Suspension Bridge Project (SBP) was established with strengthened Swiss support.

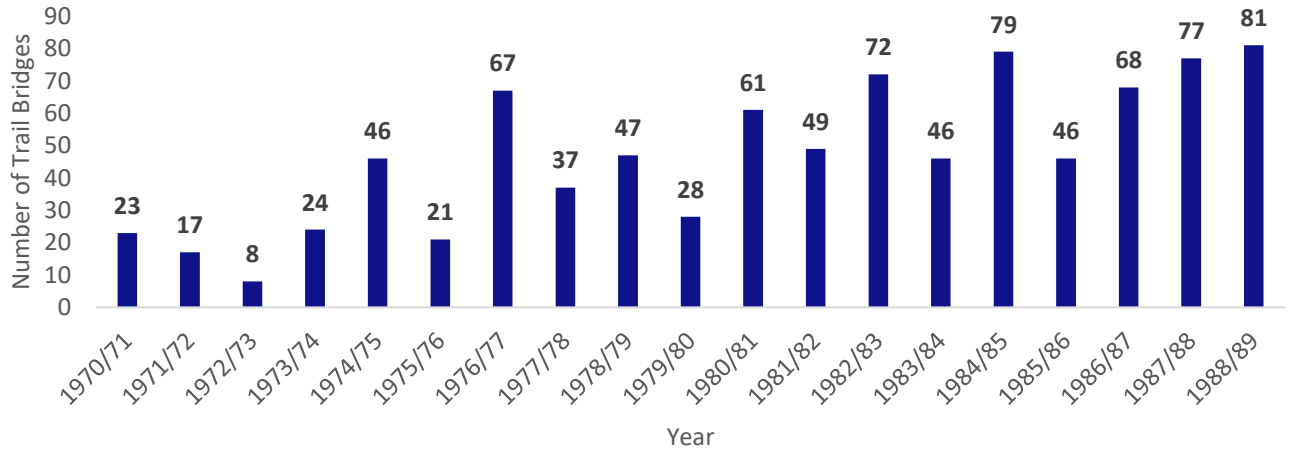
[5] The flood of 1985 destroyed this bridge.

The rapidly increasing demands for trail bridges put pressure on SBD to undergo a strategic planning process. Therefore, in 1985, Helvetas Nepal started country-wide research to identify and map trail networks across Nepal. The trails linking important and strategic places and markets were categorized as main trails and the trails linking places of lesser importance were categorized as local trails. These initiatives mapped trails and identified areas of high human and mule/horse mobility across Nepal and were used in prioritizing bridge requests. Table 4 presents a summary of the TBSSP outcomes, total trail bridge outputs, programme expenditure and Swiss financial contribution and figure 3 presents the trail bridge outputs between the years 1970 and 1989.

Table 4: Summary Information 1970 - 1989

Outcomes	Beneficiaries: NA; Employment Generated: NA
Outputs	988 new TB constructions
Programme Expenditure	NPR 6.3 billion
Swiss Contribution (Construction and TA)	NPR 5.6 billion (89%)

Figure 3: Trail Bridge Outputs 1970 - 1989



2.3. Bridge Building at Local Level: Community-Based Approach to Trail Bridge Building (1990 – 1999)

The move towards decentralization began after the establishment of the people's elected government and the Constitutional Monarchy in 1990. Accordingly, in the early 1990s, the GoN adopted and promoted a decentralized, community-based trail bridge building approach in Nepal's trail bridge sub-sector and this was institutionalized through a new project called Bridge Building at Local Level (BBLL).

The BBLL integrated indigenous local skills with modern engineering design and material strengths and optimized the construction of cable bridges with considerations to indigenous technologies. In addition, this new design and implementation process formed and engaged User's Committees (UCs) and enabled wider use of improved engineering designs. Collectively, these led to increased trail bridge delivery across the country.

BBLL was developed as a programme that incorporated a standard that helped to optimize the use of local skills and local materials for trail bridge building. In doing so, BBLL incorporated local skills and materials and adapted the

Baglung local chain-based bridge design to short span trail bridges (SSTBs) with a length of up to 120 meters. This helped to reduce the cost of building SSTBs by 50% (Source: National Bridge Record, TBSU, 2023).

The BBLL contributed to strengthening the local institutions, e.g. village development committees, district development committees, and communities taking more ownership of and being more engaged in the localized bridge building process. The programme saw the communities organizing themselves to build new wire rope bridges that met the established engineering standards, norms and technological requirements. By the end of 1995, BBLL had established a branch in all five Development Regions of Nepal.

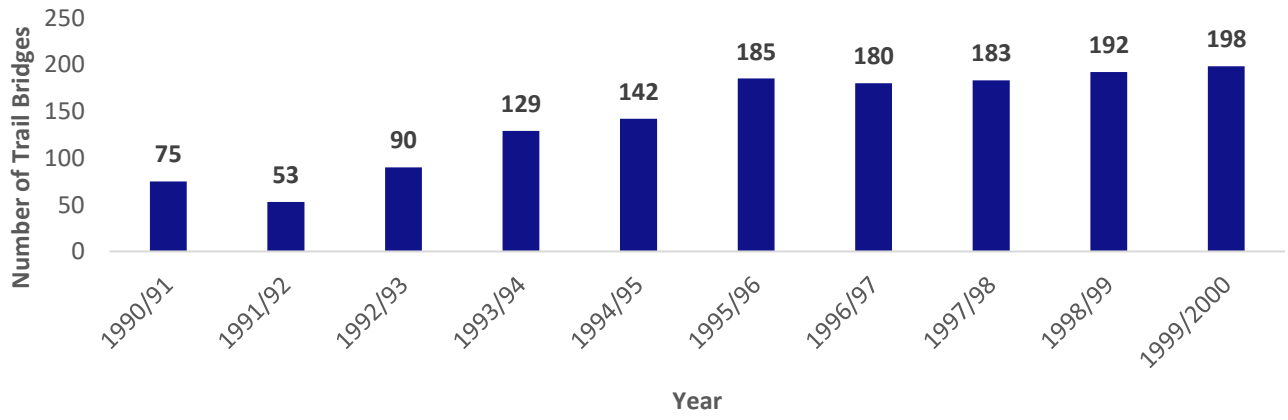
The BBLL provided organizational training and technical support to the local Non-Governmental Organizations (NGOs) and the then District Development Committees (DDCs). In turn, the NGOs provided organizational support; facilitated local resources; and helped form the UCs while the DDC provided financial support to the UCs. In the evolving community approach model, the UC was made responsible for planning, managing, constructing and maintaining the trail bridges. The introduction of the BBLL standards enabled significant increase in annual bridge delivery, i.e. increase from 50 to around 150 trail bridges per year; development of standardized design of short span trail bridges (SSTBs); and resulted in an increased use of the BBLL standards covering nearly 85% of trail bridges being constructed in Nepal.

A key innovation during this period was the replacement of wooden walkway decks of trail bridges by steel walkway decks and the galvanization of steel parts. This was consistent with increasing environmental awareness to save trees and forests. The introduction by Helvetas Nepal/SDC of galvanization of all steel parts and steel walkway decks in 1995 resulted in significant decrease in the maintenance costs as this replaced use of primer, paint and/or enamel and wood that withered away quickly and needed frequent maintenance to avoid rusting. This also helped save a lot of trees. Table 5 presents the TBSSP outcomes, total trail bridge outputs, programme expenditure and Swiss financial contributions and figure 4 presents the trail bridge outputs between the years 1990 and 2000.

Table 5: Summary Information 1990 - 2000

Outcomes	Beneficiaries: NA; Employment Generated: NA
Outputs	1,427 new TB constructions
Programme Expenditure	NPR 6.098 billion
Swiss Contribution (Construction and TA)	NPR 3.920 billion (64%)

Figure 4: Trail Bridge Outputs 1990 - 2000



2.4. Trail Bridge Sub-Sector Project (TBSSP): Decentralized Bridge Building (2000 – 2009)

The Trail Bridge Sub-Sector Project (TBSSP) was launched in 2001 by merging the Suspension Bridge Programme (SBP) and the BBLL, while Helvetas Nepal continued to provide technical assistance (TA) to TBSSP. The project aligned and coordinated closely with the GoN systems to strengthen the "community-based approach," and to increase the number and capacity of NGOs and UCs (GoN, SDC and Helvetas 2004 – 2011).

The community-based approach coincided with Nepal's evolving and increasingly prioritized decentralization of development process. The approach contributed to increased delivery of trail bridges in line with and address the significantly heightened development expectations of local institutions such as District Development Committees (DDC)/District Technical Offices. The TBSSP was at the core of trail bridge implementation process, covering planning, budgeting, procurement, monitoring and maintenance works. The central government provided conditional grants for construction and the project was preparing itself to meet expectations on increased rate of delivery and quality of works.

During this period, there was an emergence and proliferation of local NGOs, primarily due to prioritized funding by SDC to strengthen NGO capacities, which consequently promoted the institutionalization of the localized approach. These changes led to increased annual Trail Bridge outputs from 200 to 250 trail bridges. By 2004, more than 3,000 trail bridges had been built, which included 2,230 trail bridges with a total bridge length of more than 180 kilometres supported by Swiss funding (SDC-East Asia Division, 2006).

In 2006, the Government of Nepal (GoN), in line with the Local Infrastructure Development Policy (LIDP) 2006, endorsed the Trail Bridge Strategy (TBS) that set a target that 'no citizen has to walk a detour of more than 1 hour in absence of a safe crossing to access public services.' Trail bridge building approaches were defined for Short Span Trail Bridges (SSTBs) to be constructed using BBLL-led localized approach through the UCs while the Long Span Trail Bridges (LSTBs) to adopt SBD-led centralized approach and constructed through consultants and contractors using site-responsive designs. This helped to achieve increasing level of uniformity in trail bridge designs, norms, standards, and specifications and these learnings and evolving knowledge were incorporated into increasingly rich and focused technical manuals and guidelines for the trail bridge development. An attractive range of technical designs, implementing modalities, handbooks and manuals that were developed through Swiss support in the early 2000s included:

a. SSTB manuals published in three volumes and LSTB manuals published in four volumes, and
b. Handbooks and manuals for Demonstration Model Bridge Training (DMBT) to train local bridge craft persons.

The SSTB and LSTB manuals are used by engineers, sub-engineers and assistant sub-engineers for bridge building. These manuals and technical standards have also been used in other countries in Asia, Africa and Latin America, where there are similar topographies and cost-benefit considerations.

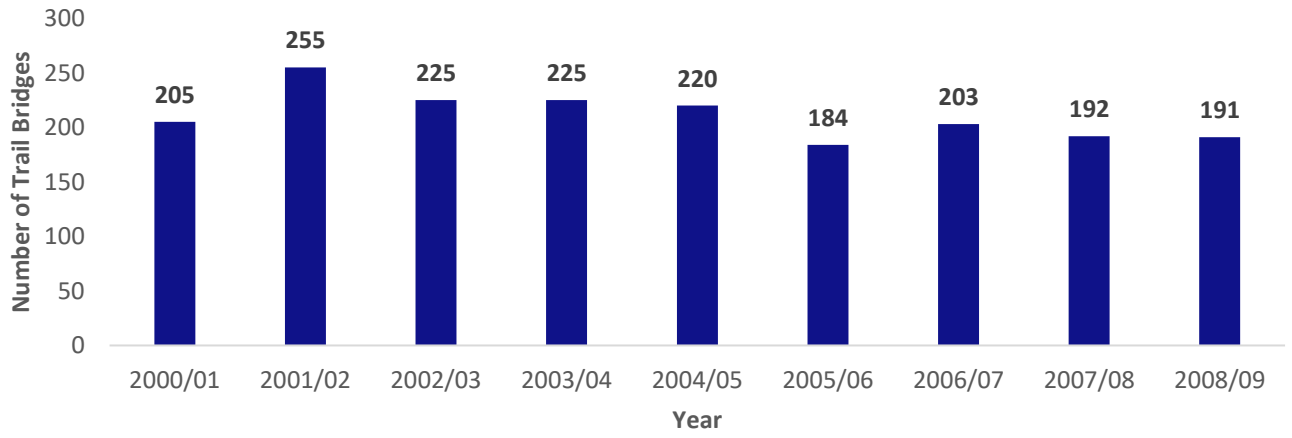
A "priority criteria" for bridge selection and planning was also introduced. Higher weightage was provided to bridges that impacted larger populations, more of discriminated groups, and covered dangerous crossings, saved more detour time and over a river that is not fordable for most part of the year. These criteria allowed more bridges to reach the settlements with more Disadvantaged Groups (DAGs) using them and to gradually deflect politically motivated bridge demands.

By the end of 2006, approximately 4,000 trail bridges had been constructed in Nepal but there was a lot more to cover. In order to develop an updated inventory of potential priority areas to cover, Helvetas Nepal carried out an extensive survey across the country in 2007 resulting in a "Long List of Trail Bridge Demand" in 2008/2009. The survey showed that over 6,000 trail bridges were still needed to be built to meet the policy target of Trail Bridge Strategy 2006. Accordingly, to meet the gap, and to do so more effectively, a sector-wide approach (SWAp) was conceived in line with Paris Declaration on Aid Effectiveness 2005. Table 6 presents the TBSSP outcomes, total trail bridge outputs, programme expenditure and Swiss financial contributions and figure 5 presents the trail bridge outputs between the years 2000 and 2009.

Table 6: Summary Information 2000 - 2009

Outcomes	Beneficiaries: 5.1 million (41%); employment generated: 4.7 million person-days
Outputs	1,900 new TB constructions
Programme Expenditure	NPR 5.208 billion
Swiss Contributions (Construction and TA)	NPR 2.308 billion (44%)

Figure 5: Trail Bridge Outputs 2000 - 2009



2.5. TBSSP/ Introduction of Trail Bridge Sector – Wide Approach Framework I (2009 – 2014)

The GoN made the decision to move away from a project approach to a Sector Wide Approach (SWAp) in 2009.

Accordingly, the SWAp replaced the earlier practice of Development Partner led planning, funding and project implementation with a framework that adopts a harmonized process of one-window technical assistance supported by the SDC/Helvetas Nepal and led by the Government of Nepal.

The GoN initiated the trail bridge SWAP framework development process with technical support from SDC. The Trail Bridge SWAP framework (TB-SWAp) that was then developed, harmonized and assigned specific roles and responsibilities for GoN, NGOs, UC and TA providers and the private sector entities, including consulting organizations.

The TB-SWAp was framed with an overarching objective to contribute to poverty reduction initiatives through improved access to market services and economic resources; and through increased opportunities for income-generating activities for local people by building trail bridges to bring the journey within one hour detour. Additionally, the framework clarified implementing modalities, determined the community and civil society organization (CSO) contributions including strategies on how they would be engaged. The framework set the target of building 2,500 trail bridges for its first Framework and established Trail Bridge Support Unit (TBSU) within Helvetas Nepal, funded by the SDC, for provision of required technical support services. The framework stipulated the trail bridges to be constructed and maintained by the then DDCs with participation and contribution of local communities.

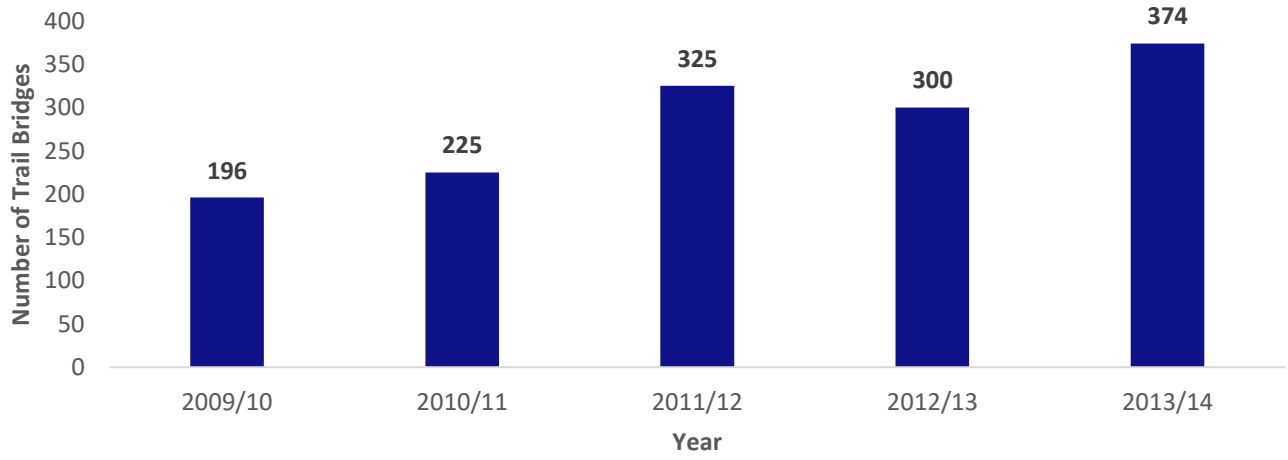
By the end of TB-SWAp Framework I in 2014, GoN had built 1,420 trail bridges across the country, bringing the total number of trail bridges constructed to 5,735 and achieving an annual delivery of nearly 374 trail bridges in 2014. Two primary reasons for the consistently high annual trail bridge delivery are: i) improved capacity at the local level to implement trail bridge building and ii) monitoring of the entire process, including technical assistance, from TBSU.

TB-SWAP Framework I was reviewed and assessed to have contributed significantly to the improved access for a large number of the rural population with trail bridges, especially in the remote areas that are marginalized." (COMAT, 2013). The review also noted that MoFALD/DoLIDAR (the then line Ministry and Department) had high level of institutional capacity and resources to drive the process. TB-SWAp Framework I then continued to the TB-SWAp Framework II. Table 7 presents the TBSSP outcomes, total trail bridge outputs, programme expenditure and Swiss financial contributions and figure 6 presents the trail bridge outputs between the years 2009 and 2014.

Table 7: Summary Information 2009 - 2014

Outcomes	Beneficiaries: 3.2 million (59% DAG); Employment generated: 3.3 million person-days (65% DAG)
Outputs	1,420 new TB constructions; 616 major TB maintenance; 4,125 routine TB maintenance at the end of FY 2013/2014
Programme Expenditure	NPR 5.926 billion
Swiss Contributions (TA and materials)	NPR 1.049 billion (18%)

Figure 6: Trail Bridge Outputs 2009 - 2014



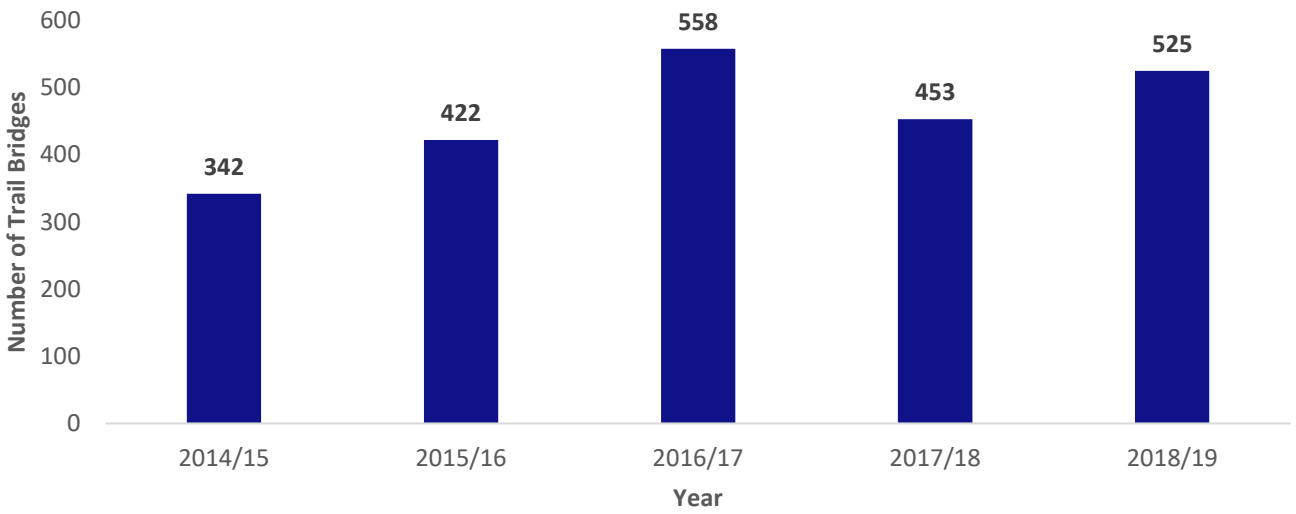
2.6. TBSSP/ Trail Bridge Sector – Wide Approach Framework II: Federalization of the Trail Bridge Programme (2014 – 2019)

During the TB-SWAp Framework II (2014 – 2019), the GoN built 2,300 additional trail bridges, and the annual trail bridge delivery rate increased by 61%, from 374 to 460 trail bridges built per year. Table 8 presents the TBSSP outcomes, total trail bridge outputs, programme expenditure and Swiss financial contribution between the years 2014 and 2019.

Table 8: Summary Information 2014 - 2019

Outcomes	Beneficiaries: 4.2 million people (55% DAG); Employment generated: 6.0 million person days (65% DAG)
Outputs	2,300 new TB construction; 637 major TB maintenance; 5,257 routine TB maintenance by the end of FY 2018/2019
Programme Expenditure	NPR 11.880 billion
Swiss Contributions (TA and materials)	NPR 1.190 billion (10%)

Figure 7: Trail Bridge Outputs 2014 - 2019



This period saw the promulgation of new Constitution in 2015, and the restructuring of the Nepal's Governance structure into federalized governance. Accordingly, the need for the Trail Bridge Program to adjust its working modalities in line with the newly established government entities was identified early on and the change process was implemented with additional implementation considerations as described below.

Gaunpalika and Nagarpalika at Local Level (Local Governments/LG) are the main bodies responsible for trail bridge construction reflecting their new constitutional mandate as per the Local Governance Operation Act (LoGOA) promulgated in 2017. The Trail Bridge Steering Committee Meeting in 2018 further elaborated the roles and responsibilities of the Local Governments, and other key actors including Provincial and Federal Governments.

On the other hand, the Provincial Governments (PG) were made responsible for the management of store and distribution of external materials such as cables, steel wires and bulldog grips while the Federal Government (FG)

was given the role to cover policy formulation works and construct strategic bridges such as those at international borders.

TB-SWAp Framework II introduced Regional Technical Assistance Provider (RTAP) in each of the then five development regions, as the extended arm of TBSU/Helvetas and funded by the SDC to provide necessary technical assistance services. RTAP was designed as a joint venture (JV) partnership of NGOs and consulting firms and evolved to primarily to meet the increased Trail Bridge delivery volume and strengthen national capacities. The RTAP would also smoothen the process for eventual seamless exit of Swiss technical assistance to the sub-sector.

By the end of 2019, over 8,000 bridges had been constructed. Its review later noted that the Framework II implementation was able to reduce time to access services by 2.3 hours in a two-way journey using a trail bridge.

2.7. TBSSP/ Trail Bridge Sector-Wide Approach Framework III: Strengthening Federalism through Trail Bridge Programme (2019 – 2023)

As Framework II was closing, there was still a high demand for trail bridges in Nepal. Consequently, the Government of Nepal requested SDC for a final and conclusive phase of Swiss TA, which resulted in the implementation of TB-SWAp Framework-III.

TB-SWAp Framework III was designed with two primary focuses: i) to capacitate trail bridge stakeholders, particularly the newly formed LGs and the re-organized private sector-led TA providers at the Provincial level and ii) to enable smooth handover of full responsibilities of executing trail bridge construction in Nepal, including that assumed by the Swiss Government, to the Government of Nepal.

The activities in this framework included the institutionalization and strengthening of the Provincial Technical Assistance Providers (PTAPs), the successors to the previous RTAPs, under the purview of the Provinces. Their services were co-financed by the Provincial and Federal governments and the SDC. The Framework III had provisions of time-bound reduced SDC contribution and an increasing Government of Nepal contributions for the PTAPs towards the conclusion of Framework III.

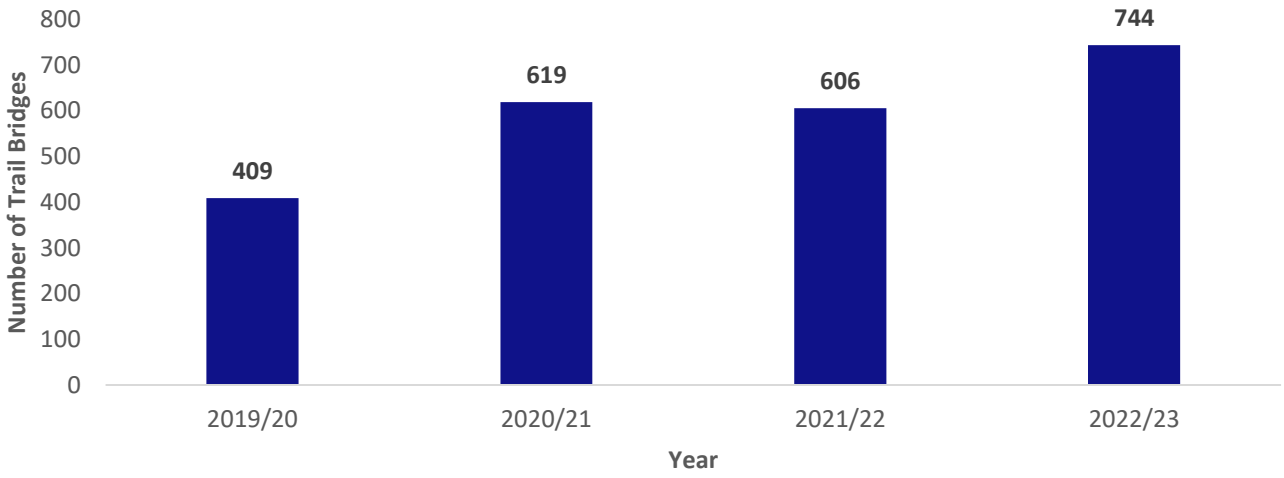
Framework III saw construction of additional 2,738 trail bridges and the highest annual delivery of trail bridges in the final fiscal year of 2022/2023.

Table 9 presents the TBBSSP outcomes, total trail bridge outputs, programme expenditure and Swiss financial contribution and figure 8 presents the total trail bridge outputs between the years 2019 and 2023.

Table 9: Summary Information 2019 - 2023

Outcomes	Beneficiaries: 4.2 million (53% DAG); employment generated: 5.9 million person days (65% DAG)
Output	2,378 new TB construction; 40 major TB maintenance; 1,737 routine TB maintenance by the end of FY 2022/2023
Programme Expenditure	NPR 19.846 billion
Swiss Contributions (TA and materials)	NPR 0.980 billion (5%)

Figure 8: Trail Bridge Outputs 2019 - 2023



3. KEY ACHIEVEMENTS OF TRAIL BRIDGE BUILDING INITIATIVES AND EXISTING GAPS

TBSSP was designed to respond to increasing need for safe and reliable river crossings over rugged terrain as this posed to be significant impediment in safely accessing much needed basic services provided by schools, administrative centres, markets and health facilities. This is particularly important as the deficit of trail bridges has always been critical in remote areas and for those in the DAG communities, particularly where the voices are not heard and communities still cross dangerous rivers without trail bridges.

TBSSP promoted institutionalization of social and technical tools and priorities and helped evolve the trail bridge building system into a much robust and developed process. As a result, the TBSSP is credited to have achieved four key outcomes:

- Significant time savings and safer river crossings with increased delivery of trail bridges.
- Improved access to basic services such as schools, health facilities and markets have contributed to increased standards of living and have helped to reduce poverty.
- TBSSP has built capacity of all three spheres of governments to plan and build bridges meeting high technical and social standards, and
- The trail bridge building process has engaged and benefited marginalized groups and local UCs.

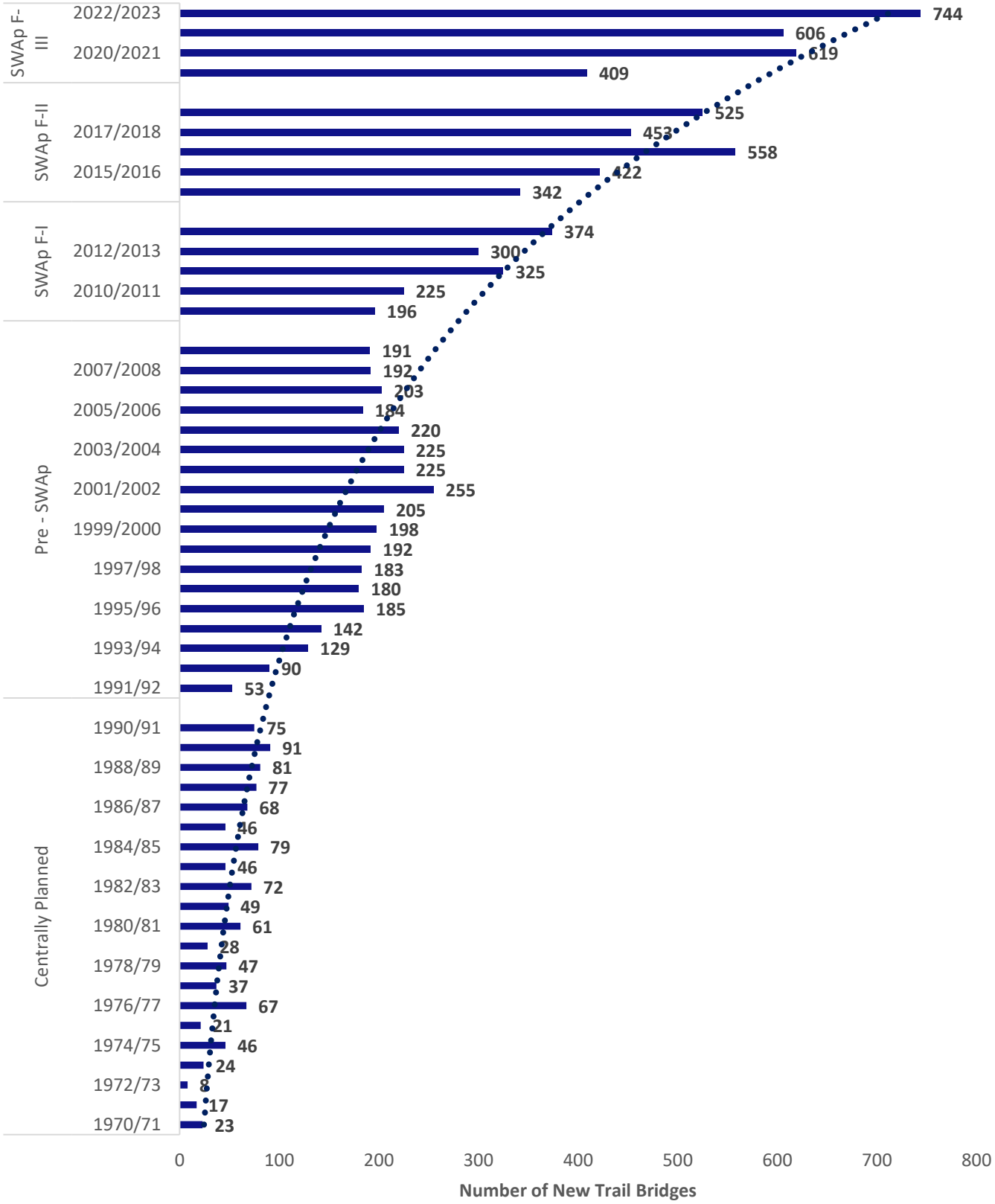
Section 2 summarized the programmatic evolution and achievements of the trail bridge building process in Nepal over 60 years. While there have been notable achievements as summarized above, some gaps and prospects for improvements also exist. Section 3 collectively analyses key areas of achievements; the gaps; and the ways to mitigate those gaps.

3.1. Growth in Annual Trail Bridge Delivery

Trail Bridge outputs have drastically increased over the span of five decades since 1970. Figure 9 presents the number of new trail bridges built each year from 1970 to 2023, clearly showing how annual delivery has increased from 23 new constructions in FY 1970/1971 to 744 in FY 2022/2023. A careful analysis of the curves and the milestone years in figure 9 shows that the increase in the annual delivery is the result of significant strategic changes and resulting programmatic interventions.

For example, notable change is seen in the years 1991 to 2009, and this period is characterized by the introduction of Bridge Building at Local Level (BBLL) programme standards and subsequent emergence of the trail bridge sub-sector project (TBSSP) interventions that introduced and institutionalized locally led trail bridge building along with development of supporting manuals and handbooks (section 2.3). Similarly, even sharper increase in the annual delivery is noted from 2009 onwards until the final reporting year of FY 2022/2023, where exponential growth has been possible largely due to effective implementation SWAp Frameworks I to III coinciding with capacity building measures and support services (section 2.5 – section 2.7).

Figure 9: New Trail Bridge Outputs (1970 – 2023)



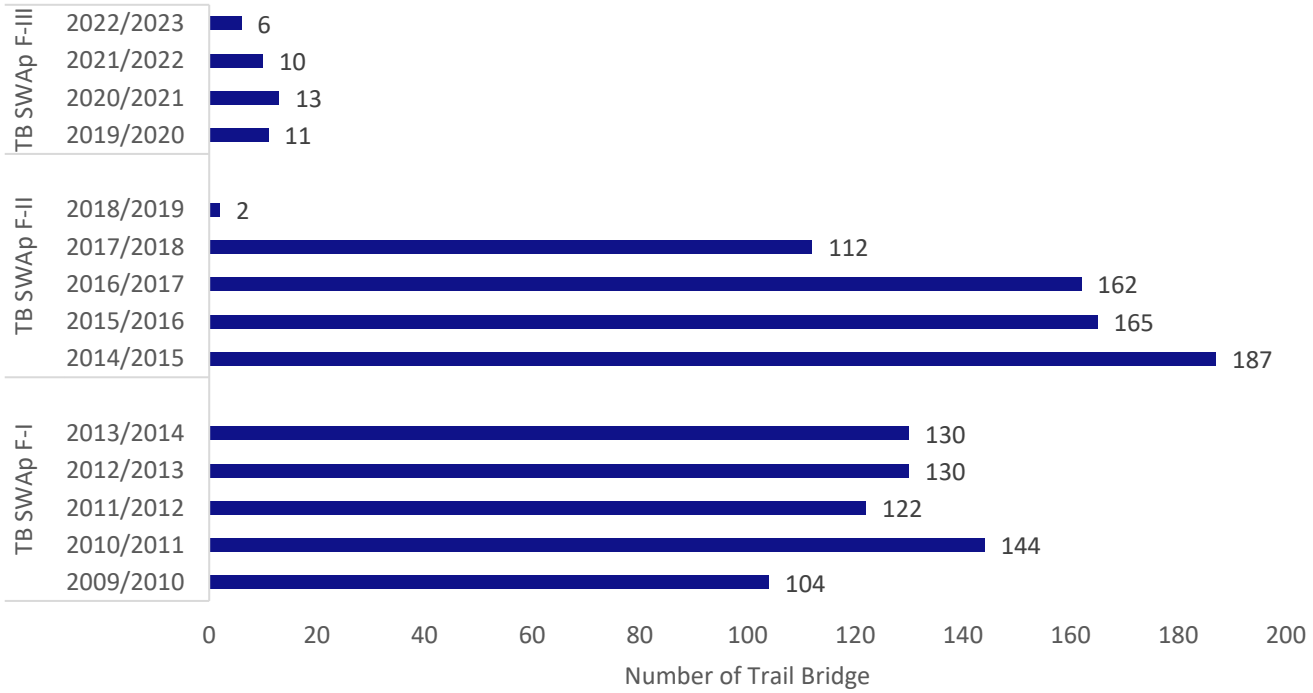
3.2. Reduced Focus on Maintenance, Safety and Sustainability of Trail Bridges

Maintenance of existing infrastructure assets are often given low priority for funding in Nepal, and unfortunately, trail bridges are no exceptions. Data for fiscal year (FY) 2019/2020 to FY 2022/2023 shows that fewer trail bridges underwent major and routine maintenance after federalization (figure 10 and figure 11)

In the pre-federalized context, there was a stronger culture for trail bridge maintenance which helped institutionalize the process and provision funds. For routine maintenance, grants were directly provided by the central government, through the then District Development Committees (DDCs) to bridge wardens, who were appointed at each complete site. As a result, the then DDCs and VDCs were clearer about their roles and responsibilities and they prioritized trail bridge maintenance. As presented in figure 10, major maintenance outputs peaked in fiscal year (FY) 2014/2015 at 187 trail bridges, after which the numbers began to fall.

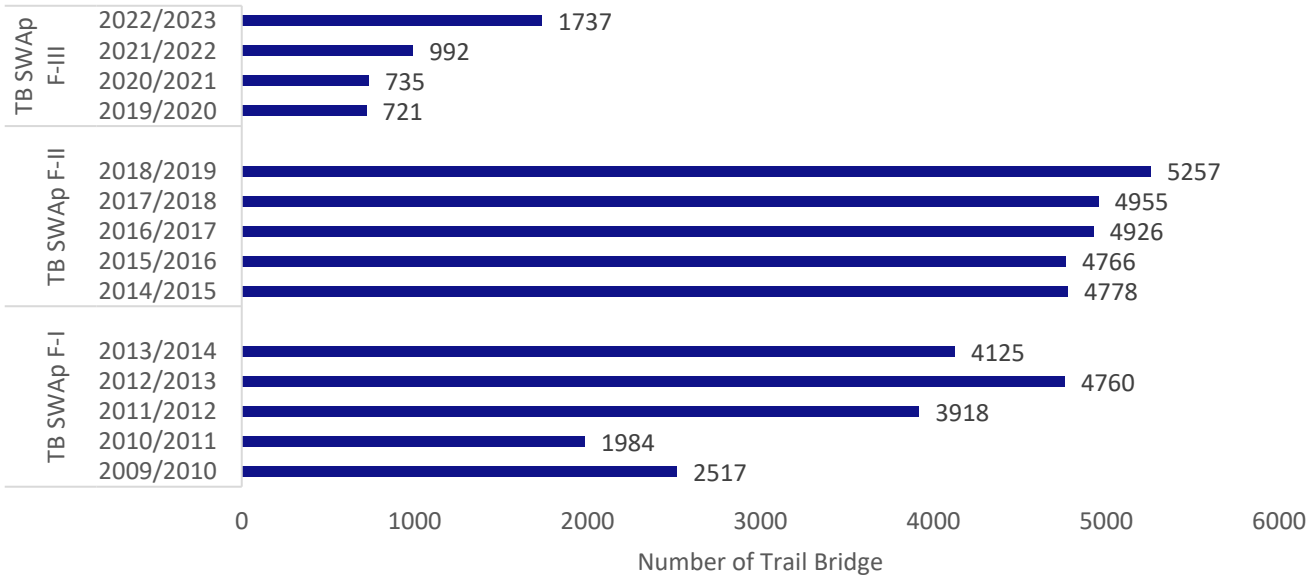
In comparison, the Provincial and Local Governments are now relatively less responsive to major and routine maintenance requirements, because the culture of maintenance has not yet been institutionalized in the relatively young government agencies. According to KIIs with Provincial and Local Governments, respondents cited political pressure to build new trail bridges leading to low resource allocation for routine and major maintenance.

Figure 10: Major Maintenance Outputs (2009 – 2023)



As a result, only 6 trail bridges underwent major maintenance in FY 2022/2023 and as presented in figure 11, only 1,737 trail bridges had routine maintenance in FY 2022/2023. Understandably, lack of maintenance means lower level of serviceability and increased risk of accidents, putting the lives of users at risk.

Figure 11: Routine Maintenance Outputs (2009 – 2023)



Case Box 1: Looking at the Environmental Impacts and Safety Concerns from Trail Bridges.

Building Trail Bridges has generally been associated with low environmental and climatic impacts particularly with meticulous care taken in site selection, construction process and choice of materials. Nonetheless, the trail bridge building has been noted to have some isolated environmental impacts as described below:

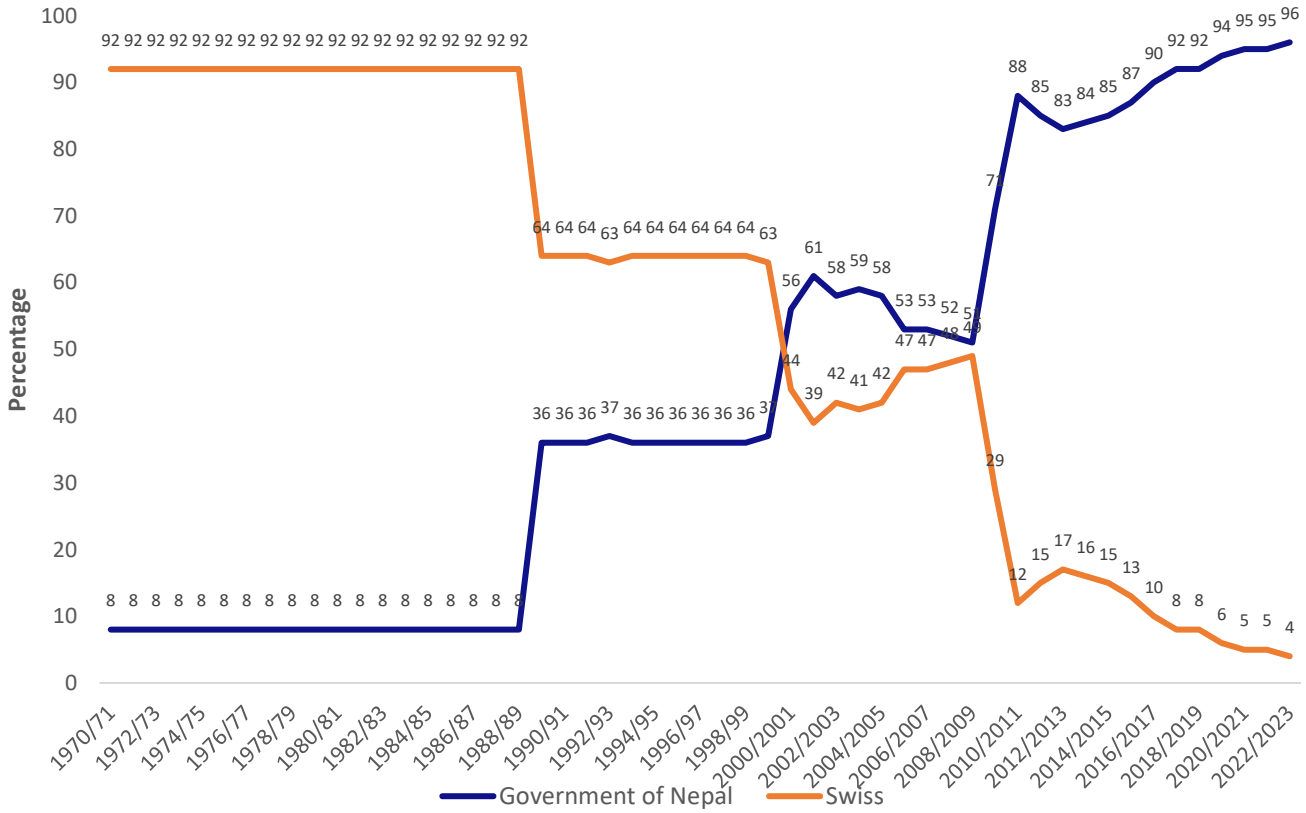
- Selection of some sites for trail bridges are in poorly located areas, and are therefore noted to have triggered landslides, or perpetuate existing landslide area, e.g. Thuldhunga Trail Bridge, Okhaldhunga. This often happens when political priorities for locating a trail bridge overwhelms the technical priorities, or when the competency of the site selection team is not adequate. Similarly, due considerations are essential when carrying and laying the trail bridge components, a process which may require cutting of trees and clearing of vegetation to prepare access tracks. Possible impacts also arise when setting-up labour camps for trail bridge construction where worker accommodation and meal preparation often involve firewood collection, waste production and clearing land for camping.
- Occupational Health and Safety (OHS) provisions are critically important in the trail bridge building process, and are often not adequately considered in the construction process. The absence of use of safety gears, particularly among the workers engaged in steel deck fixing process at dangerous heights, are documented in public domain to have been carried out without any safety gears.
- Safety risks are also evident during the useful life of the trail bridges. A number of trail bridges have snapped during festival periods leading to fatalities due to overloading of the trail bridges when people have used the trail bridges to view the festivals or enjoy a swing in large numbers, unaware of the load limitations. Similarly, absence of regular maintenance, or absence of a swift repair action even after a defect has been noted, has led to accidents.
- The number of redundant trail bridges, i.e. bridges that have been constructed but have not been used by the locals for various reasons over an extended period are increasing. A recent study (DoLI, 2023) put the estimated figure to around 198, but suggests that it could be more. More redundancy is expected as more motorable bridges are being built adjacent to or to replace trail bridges. These would, over time, pose environmental risk and also safety hazard if they are not mitigated in due care.

3.3. Increasing Government Share of Overall Budget for Trail Bridge Development

The Government of Nepal's proportion of financial contribution to the overall basket for trail bridge sub-sector has significantly increased in the past 60 years, from 8% in FY 1970/1971 to 96% in FY 2022/2023. On the other hand, the Swiss government's direct financial contribution in trail bridge construction in Nepal has decreased, from 92% in FY 1970/1971 to 4% in FY 2022/2023.

Understandably, the gradual shift in financial contributions was carefully planned and designed. The Swiss government provided sustained and high levels of investment to building trail bridges from 1971 to 1989, and then from FY 1990/1991 onwards, the proportion of Swiss government contribution began to drop. The drop in the Swiss support was absorbed by the Government of Nepal as it took the responsibility of Suspension Bridge Division (SBD) with the increased levels of funding. Later in 2000, GoN share of funding increased further and equalled to that of the Swiss government. In subsequent years, the funding contributions were agreed to further reduce for the Swiss government, as the Swiss support was to focus on TA only, while the Government of Nepal would increase the envelope, particularly after SWAp. Figure 12 shows that after the implementation of SWAp in 2009, GoN financing further increased to 71% of the total contribution, and by 2023 it had amounted to 96% of the total contribution. Figure 12 presents the Government of Nepal and Swiss contribution to trail bridge building each year from 1970 to 2023 illustrating a good example of how the Government of Nepal can assume full responsibility and sustain the growth of a fully developed and government-owned infrastructure development programme.

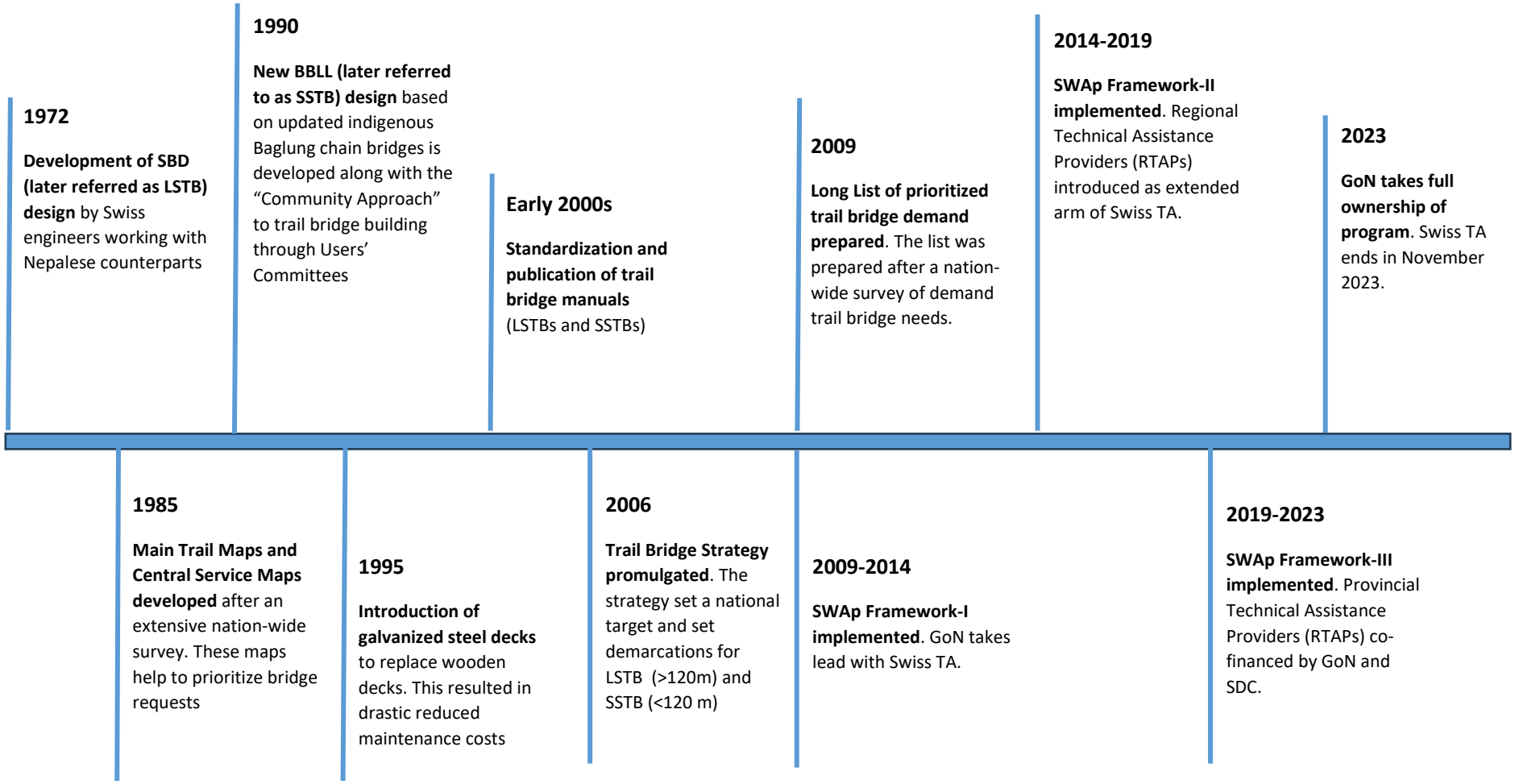
Figure 12: Government of Nepal and Swiss Contribution (in %) between 1970 and 2023



3.4. Triggers for change and innovation in trail bridge building

Innovations in trail bridge building have acted as positive triggers to propel the trail bridge sector forward in achieving high quality results, sometimes way beyond what was expected. These triggers have included, inter alia, innovations in strategic programmatic interventions, adoption of new technologies as well as the key technological innovations as detailed in the figure below. Further details on the triggers is presented in section 2. Figure 13 presents a few of the main triggers. Details on the triggers are discussed in section 2.

Figure 13: Triggers for Change and Innovation in Trail Bridge Building



4. CHANGES IN LIVES AND LIVELIHOODS FROM TRAIL BRIDGES

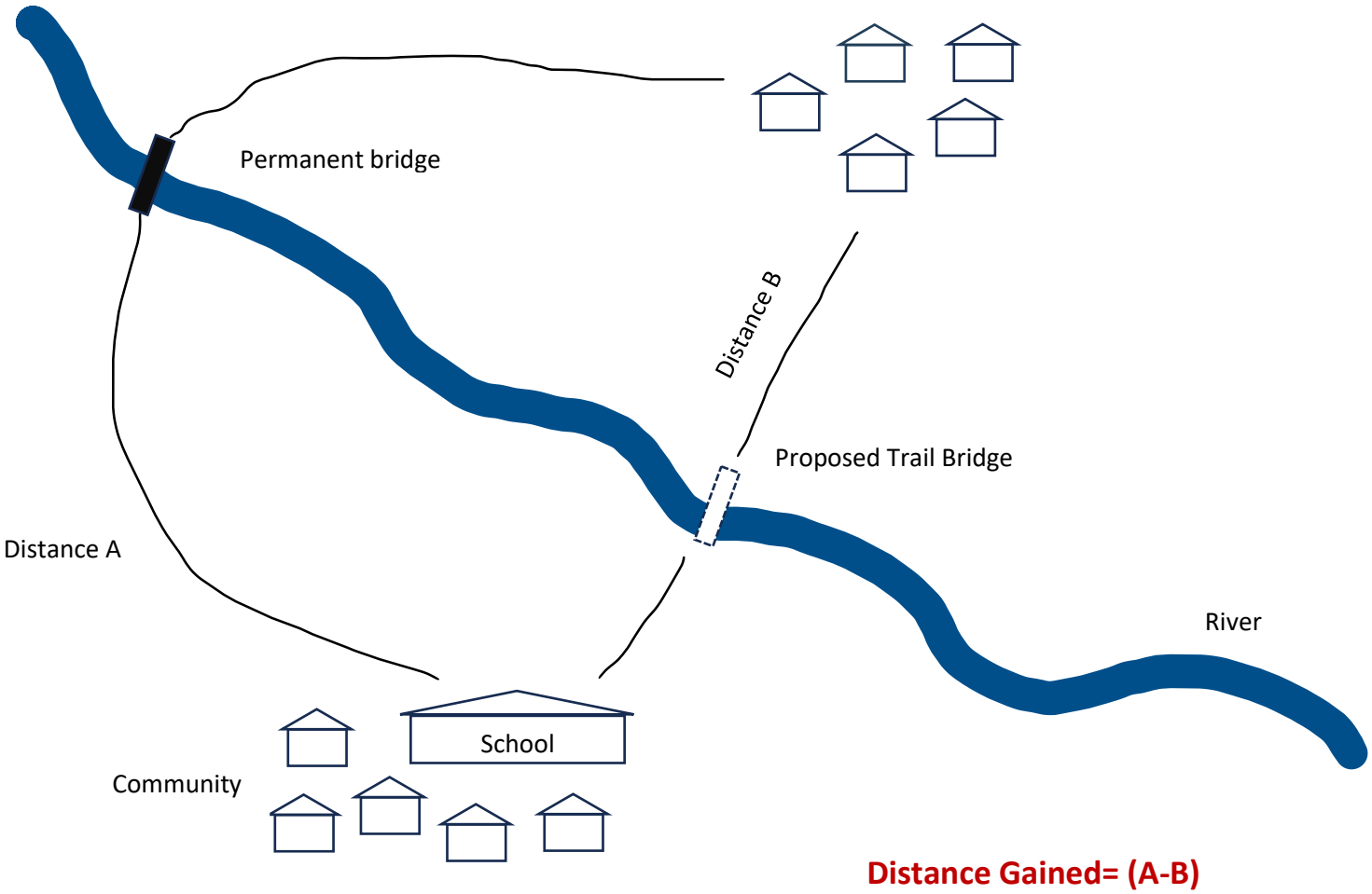
This section details the changes in the lives and livelihoods of trail bridge beneficiaries at three different timelines:

a. The immediate changes seen after a trail bridge is built
b. Mid-term outcomes after 5 to 10 years, and
c. Long-term changes or impacts noted over 25 years or more.

To understand the wide ranging and long-term changes, the Study collected information and insights from the household survey, traffic counts, qualitative immersive study and other secondary sources to develop a coherent narrative.

Figure 14 presents a diagram of travel distance that could be reduced in line with the TB SWAp Framework III objective of "Nepali citizen no longer have to take a detour of more than 1 hour to access services after construction of trail bridges."

Figure 14: A Diagram on Distance Gained and the Idea behind 1-Hour Detour of TB Strategy



4.1. Demography

The Study carried out a baseline in 2022 and an endline in 2023 in 263 randomly sampled trail bridges comprising 221 treatment and 42 control trail bridges. The analysis below is based on the household surveys, focus group discussions and key informant interviews in 221 treatment bridges during baseline and endline assessments.

During baseline, 62.0% of all respondents were male and 38.0% were female. During endline, 58.2% of all respondents were male and 41.8% were female as presented in Table 10.

Two reasons for the higher percentage of male respondents both during baseline and endline are: i) a large majority of household heads, with whom the survey spoke to, were male and ii) the female respondents were mostly out in the agriculture fields during the survey time.

Table 10: Respondents during Baseline and Endline by Gender and Province

Province	Baseline			Endline		
	Male	Female	Total	Male	Female	Total
Koshi	550 (67.1%)	270 (32.9%)	820	509 (62.1%)	311 (37.9%)	820
Madhesh	31 (51.9%)	29 (48.1%)	60	32 (53.1%)	28 (46.9%)	60
Bagmati	598 (71.2%)	242 (28.8%)	840	454 (54.0%)	386 (46.0%)	840
Gandaki	650 (62.5%)	390 (37.5%)	1,040	639 (61.4%)	401 (38.6%)	1,040
Lumbini	325 (58.0%)	235 (42.0%)	560	325 (58.1%)	235 (41.9%)	560
Karnali	277 (55.4%)	223 (44.6%)	500	267 (53.4%)	233 (46.6%)	500
Sudurpaschim	408 (68.0%)	192 (32.0%)	600	392 (65.4%)	208 (34.6%)	600
Total	**2,839 (62.0%)**	**1,581 (38.0%)**	**4,420**	**2,618 (58.2%)**	**1,802 (41.8%)**	**4,420**

Mountain has the highest proportion of female respondents, followed by Hill and Terai both during baseline and endline. Table 11 presents respondents during baseline and endline by gender and ecological regions.

Table 11: Respondents during Baseline and Endline by Gender and by Ecological Regions

Ecology	Baseline			Endline		
	Male	Female	Total	Male	Female	Total
Mountain	539 (61.2%)	341 (38.8%)	880	503 (57.2%)	377 (42.8%)	880
Hill	2,112 (64.0%)	1,188 (36.0%)	3,300	1,954 (59.2%)	1,346 (40.8%)	3,300
Terai	188 (78.4%)	52 (21.6%)	240	161 (67.0%)	79 (33.0%)	240
Total	**2,839**	**1,581**	**4,420**	**2,618**	**1,802**	**4,420**

In terms of ethnicity during baseline, 35.8% of all respondents belonged to Hill Brahmin/Chhetti/Thakuri/Sanyasi followed by Hill Janajati (30.2%), DAG (21.0%), Dalit (7.5%), Newari/Thakali (4.1%) and Terai Brahmin (1.5%). During endline, 34.0% of all respondents belonged to Hill Brahmin/Chhetri/Thakuri/Sanyasi followed by Hill Janajati (29.9%), DAG (18.5%), Newar/Thakali (7.3%), Dalit (5.3%) and Terai Brahmin (2.0%). Table 12 presents the percentage of respondents during baseline and endline by ethnicity and by Province.

Table 12: Percentage of Respondents during Baseline and Endline by Ethnicity and by Province

	Baseline						Endline					
	Hill Brahmin/ Chhetri/Thakuri/Sanyasi	Hill Janajati	Newari / Thakali	Terai Brahmin	Dalit	DAG	Hill Brahmin/ Chhetri/Thakuri/Sanyasi	Hill Janajati	Newari / Thakali	Terai Brahmin	Dalit	DAG
Koshi	3.5	7.5	0.4	0.2	1.2	5.8	3.1	7.7	0.6	0.4	1.0	5.8
Madhesh	0.0	0.2	0.1	0.7	0.1	0.3	0.1	0.3	0.2	0.3	0.1	0.4
Bagmati	6.1	7.0	1.8	0.0	1.0	3.1	5.7	6.0	3.0	0.2	0.4	3.7
Gandaki	7.8	6.2	0.5	0.3	2.0	6.7	7.1	6.5	1.2	0.5	0.9	7.3
Lumbini	3.2	5.8	0.4	0.2	1.7	1.4	3.0	5.7	1.0	0.3	1.4	1.3
Karnali	6.5	1.7	0.4	0.0	0.7	2.0	5.0	2.7	1.0	0.1	0.6	1.9
Sudurpaschim	8.7	1.8	0.5	0.1	0.8	1.7	10.0	1.0	0.4	0.2	0.9	1.1
Total	35.8	30.2	4.1	1.5	7.5	21.0	34.0	29.9	7.3	2.0	5.3	18.5

4.2. Immediate Outcomes of Trail Bridges

4.2.1. Saving of Lives

Key Findings

- Trail bridges have led to safer river crossings.
- No fatalities recorded while crossing rivers after trail bridge construction.
- The cases of non-fatal accidents while crossing rivers have decreased by 85%.

Trail bridges have led to safer river crossings since no one has died while crossing rivers after trail bridge construction. This is in contrast to at least seven people losing their lives while trying to cross rivers in 2022 and before trail bridge construction as presented in table 13.

Table 13: Number of Non-Fatal Accidents and Deaths during Baseline and Endline for Treatment and Control Trail Bridges

		Baseline	Endline
Treatment	**Non-fatal accident**	210	32
	Death	7	0
Control	**Non-fatal accident**	190	178
	Death	0	0

The cases of non-fatal accidents while crossing rivers have also decreased by 85%, from 210 cases before to only 32 cases after trail bridge construction. Trail bridges have a direct impact on safe river crossings as the cases of non-fatal accidents have decreased drastically during endline in treatment trail bridges while remaining almost the same in control trail bridges.

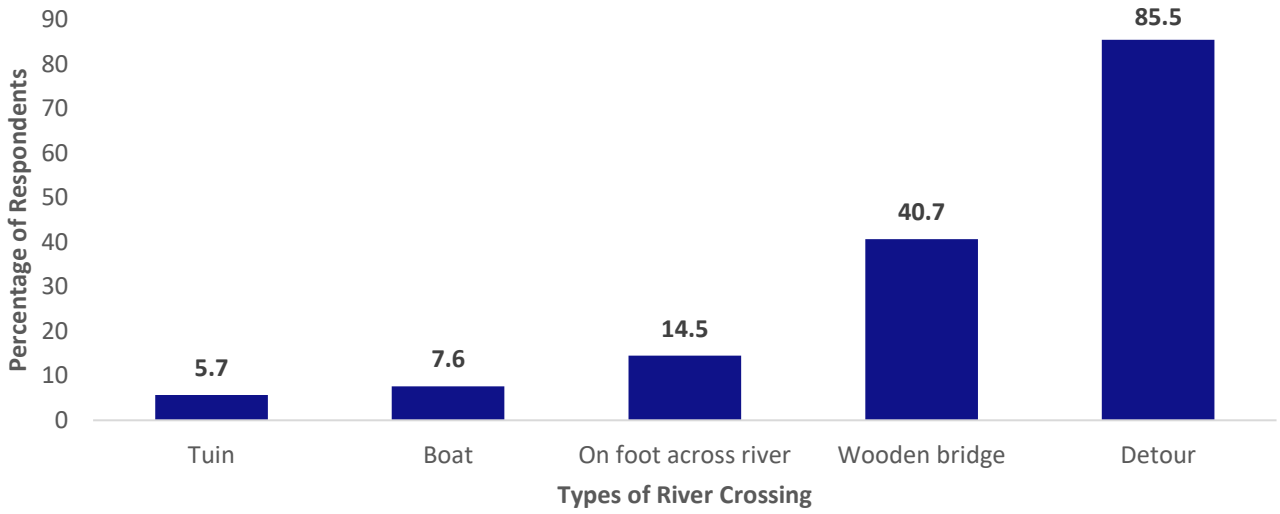
Out of the 400 non-fatal accidents while crossing rivers before trail bridge construction, 78% was in Hills followed by Terai (15%) and Mountain (7.0%). Moreover, 99.4% of all accidents happened while the individual was trying to cross through high water levels and only 0.6% through tuin mishaps, as presented in table 14.

Table 14: Reasons for Accidents and Injury While Crossing Rivers by Ecological Regions

	While trying to cross through high water levels	Tuin mishap	Total
Mountain	7%	0%	7%
Hill	77.4%	0.6%	78%
Terai	15%	0%	15%
Total	**99.4%**	**0.6%**	**100.0%**

Before trail bridge construction, people primarily crossed rivers through one of four ways as presented in Figure 15: i) on foot, ii) through wooden bridges, iii) hanging upside down on ropes across rivers; and iv) by Tuins or wooden logs. All of these methods were dangerous and often unreliable. However, after trail bridge construction, the percentage of locals using these dangerous crossings has decreased by 90%, while 10% are still using detours due to poor road conditions leading to trail bridges.

Figure 15: Types of River Crossing Before Trail Bridge Construction (Multiple-Response Question)



4.2.2. Saving of Time

Key findings

- People save 39 minutes in each two-way trip involving a trail bridge, indicating that the TB strategy goal of 1 hour detour is still valid.
- Time savings are highest in Hills due to deep gorges and ravines leading to long detour routes

People save 39 minutes in each two-way trip involving a trail bridge. Although significant, this figure is considerably lower than that presented in the TBSSP Annual Report FY 2022/2023 which reports a time saved of 2.1 hours in each two-way trip. This difference is primarily because of increased motorable bridge access in areas earlier served only by trail bridges.

The Study showed that time taken to carry out seven different activities (as presented in table 15) has decreased after trail bridge construction, with the largest decrease in accessing farmlands (39.4% decrease) followed by collecting water (36.2% decrease) and collecting fodder (30.5% decrease). Table 15 presents the comparison of average time saved to carry out listed activities before and after trail bridge construction.

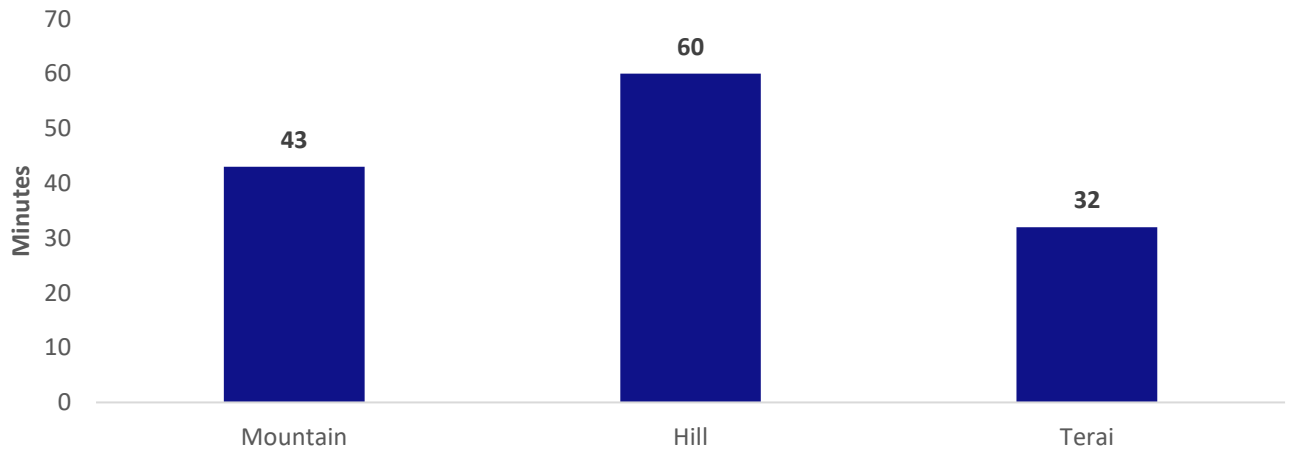
Table 15: Time Taken to Carry Out Various Activities Before and After Trail Bridge Construction

Activities	Time taken before TB construction (minutes)	Time taken after TB construction (minutes)	Time saved for two-way journey (minutes)	Percentage decrease
Accessing health facilities	93	71	44.0	**23.7**
Accessing markets	87.7	66.8	41.8	**23.8**

Activities	Time taken before TB construction (minutes)	Time taken after TB construction (minutes)	Time saved for two-way journey (minutes)	Percentage decrease
Accessing schools	58.9	45.1	27.6	**23.4**
Accessing farmlands	50.2	30.4	39.6	**39.4**
Collecting firewood	64.5	46.2	36.6	**28.4**
Collecting fodder	58.1	40.4	35.4	**30.5**
Collecting water	54.7	34.9	39.6	**36.2**

In terms of ecology, time saving is highest in the Hills (60 minutes for each two-way trip), followed by Mountain (43 minutes) and Terai (32 minutes). Time savings is higher in Hills than in Terai due to deep gorges and ravines in Hill areas adding detour routes. Figure 16 presents the average time saved each two-way trip after trail bridge construction by ecological regions.

Figure 16: Average Time Saved Each Trip after Trail Bridge Construction by Ecological Regions



The following are a few key examples from Nepal's three ecological regions that illustrate the time saving impacts in each region.

Mountain:

- Respondents in Taplejung, Koshi said they saved 90 minutes after trail bridge construction. Moreover, before bridge construction, locals built and used wooden bridges across rivers, which were often dangerous and required frequent maintenance. This is no longer required.

Hill:

- Locals in Belkotgadi Municipality, Nuwakot save one hour for each trip. As a result of saved time, locals have been able to devote more time and effort on their farms.
- Farmers in Jajarkot have been able to spend more time in their farmlands that are now more accessible.
- Women from Makawanpur, Bagmati stated during FGD that they save one hour each trip while collecting water, firewood and fodder, which they now use to perform other important household chores such as taking care of the elderly and cleaning. Interestingly, some women use saved time for income-generating activities. For example, one woman said that she uses this time to sell her cereal crops and vegetables products in the market, as she can reach markets quicker and more conveniently due to trail bridges.
- In some areas, time saving has directly translated to money saving. For example, the construction of Benighat trail bridge has saved locals at least NPR 275 in bus fares and one hour to reach the nearest market. As compared to a bus ride, using the trail connected to the trail bridge would take locals only 60 minutes to get to the district headquarters (Immersive Study 2023).

Terai:

- Women groups across all districts in Madhesh stated that they save an average of 40 minutes per trip as a result of trail bridge construction. Many use the saved time for income-generating activities like selling dairy products in nearby markets which has led to at least 10% increase in their annual household income.

4.2.3. Improved Access

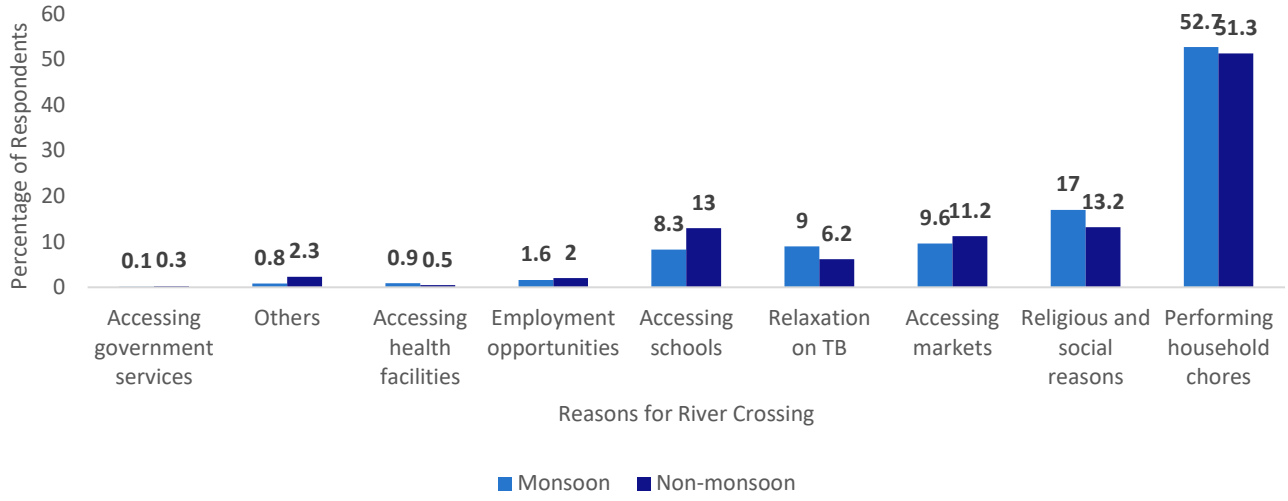
Key Findings

- Trail bridges have become an enabler for community and household growth and resilience as they provide safer crossings and save time.
- 1.15 million people use trail bridges each day.

Trail bridges have become an enabler for community and household growth and resilience as they provide safer crossings and save time. This contributes to "improved rural access," one of the pre-conditions for achieving the Sustainable Development Goals (SDG) related to food security, education, health and employment.

Nationwide, 1.15 million people use trail bridges each day during monsoon. Use of trail bridges is higher during monsoon than non-monsoon only by 18.3%, indicating that trail bridges are consistently used throughout the year. The reasons for travel during monsoon and non-monsoon across trail bridges is presented in figure 17.

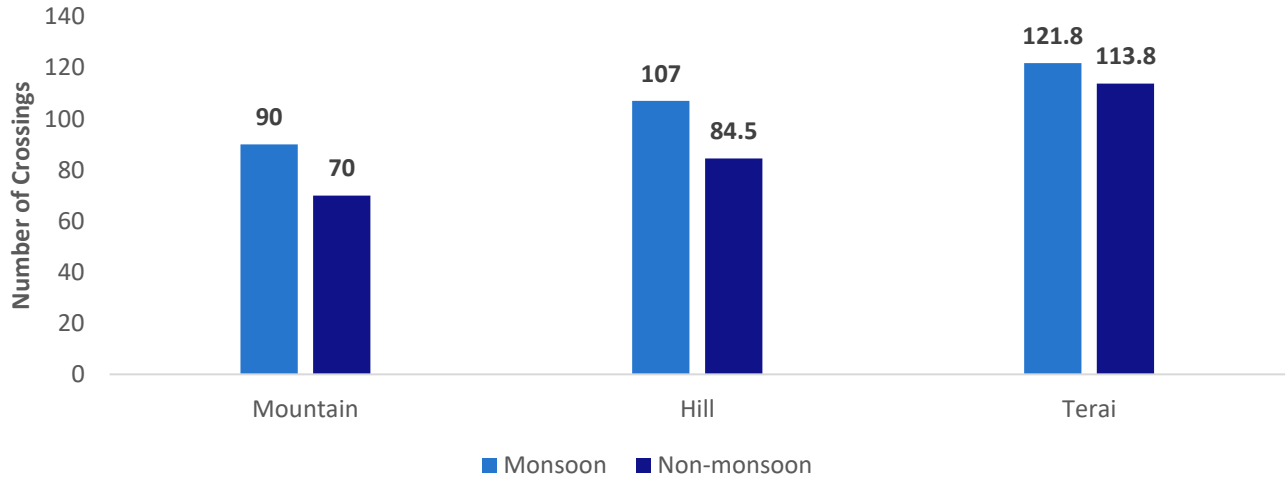
Figure 17: Reasons for Travel during Monsoon and Non-Monsoon across the TB



Performing household chores is easier because of trail bridges. The majority of the population use trail bridges to perform household chores, both during monsoon (52.7%) and non-monsoon (51.3%). This comprised women users at 67.0% compared to men at 33.0%. This finding illustrates wider use of trail bridges by women as it reduces their daily drudgery, especially during the collection of firewood and fodder, and saves people time.

Terai has the highest number of daily crossings per bridge, both during monsoon and non-monsoon. Two reasons for the higher number of daily crossings in Terai are i) larger population size of the region as a whole and ii) higher population density around trail bridges. Figure 18 presents the number river crossings during monsoon and non-monsoon in Mountain, Hill and Terai.

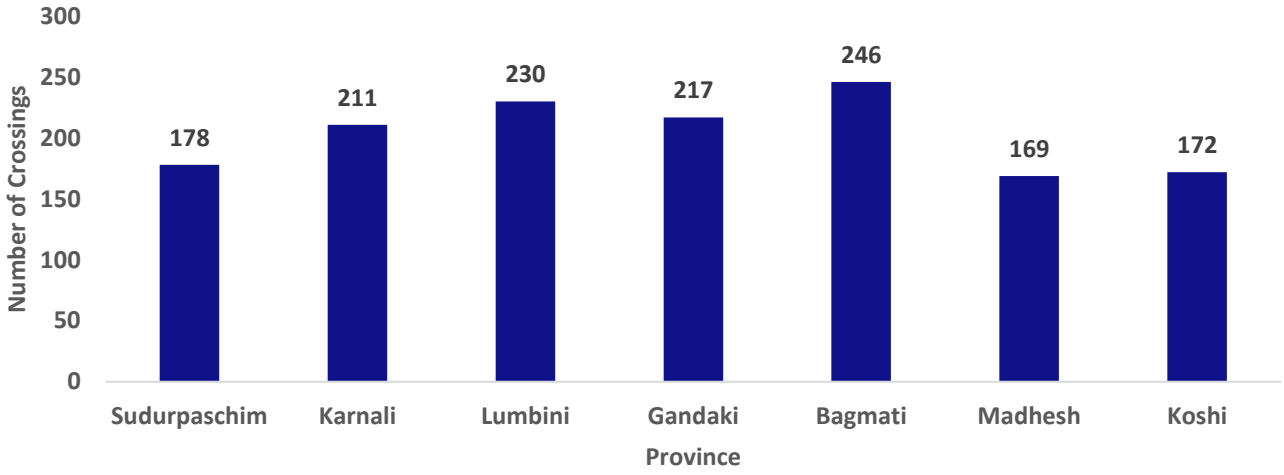
Figure 18: Number of Daily River Crossings during Monsoon and Non-Monsoon by Ecology



Bagmati Province has the highest number of daily crossings (246 crossings per bridge), followed by Lumbini (230), Gandaki (217), and Karnali (211). Two reasons for the higher daily crossings for Bagmati are higher population in Bagmati, i.e. 21% of total population of Nepal, (Nepal Census, 2021), and high relevancy of the trail bridges in the

northern region of the Province which is characterized by fragile and rugged terrain. According to FGDs with respondents in Bagmati, trail bridges are essential for accessing schools, markets, health facilities and for performing household chores. Figure 19 presents the number of daily crossings by Province.

Figure 19: Number of Daily River Crossings by Province



Trail bridges have become local landmarks attracting tourists. Using trail bridges as a gathering point, particularly to create content for posting on the popular social media platform, TikTok, was an interesting finding. During the monsoon, 9.0% (694, n=7,723) of all river crossings was for rendezvous and gathering purposes. Respondents indicated that they enjoyed spending time at the trail bridge, enjoying the scene and breeze.

4.2.4. Household Chores

Key Findings

- Trail bridges reduce daily drudgery while carrying out household chores, especially for women.
- Trail bridges have helped women have a more dignified life.

Trail bridges reduce daily drudgery while carrying out household chores, especially for women. Prior to trail bridge construction, women had to walk long distances with heavy loads of firewood and fodder on their backs. This was difficult and time consuming. However, after bridge construction, the time has decreased by at least half for 80% of respondents.

Trail bridges have helped women have a more dignified life. This finding is illustrated by an example from Amdhuraghat, Rautahat, Madhesh. A woman living near the under-construction trail bridge shared that for her, not having to travel publicly through her village in wet clothes sticking to her body after crossing a river while returning with fodder for livestock was more important and dignifying than the potential time saved by the bridge. Likewise in another case, women in Palpa stated that trail bridges have enabled them to devote time both to their households and to new income-generating activities, which has earned them renewed respect in their community.

One woman in particular indicated that the markets are almost 50% closer now and this has made it easy for her to sell dairy products in the market early in the morning and tend to household errands in the afternoon and evenings.

Case Box 2: Trail Bridges Leading to New Income-Generating Activities for Women in Kavrepalanchowk

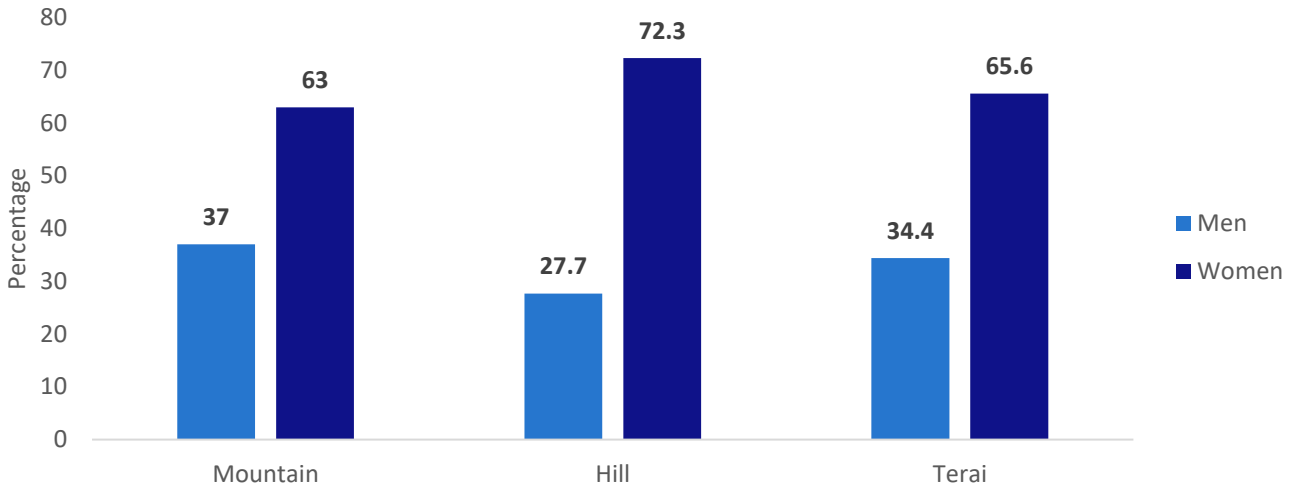
Women have been able to save significant amounts of time doing household chores, e.g. collecting fodder and firewood, as a result of trail bridges. In the picture on the right, a woman in Khahare Khola Dovan is carrying fodder from the nearby community forest. Before trail bridge construction, she used to walk for 4 hours two-way to collect fodder and firewood.

With household chores, taking care of her elderlies and her children, she barely had enough time to engage in income-generating activities. However, now, she has some spare time which she uses to sell her home-produced vegetables and milk in the nearby markets. She is very happy that Trail Bridge has allowed her valuable time to perform all of her duties as well as provide food and income for her family.

Source: FGD with women group in Khahare Khola Dovan, Kavrepalanchowk.

More women than men cross trail bridges to perform household chores. For instance in Hill, 72.3% of all average daily traffic to perform household chores is by women, followed by 65.6% in Terai and 63% in Mountain. One of the main reasons for higher number of women crossing trail bridges is because a majority of those carrying out household chores such as collecting firewood, collecting fodder and accessing water sources are women. Figure 20 presents a complete disaggregation of ADTC for women and men across all bridges disaggregated by ecological regions.

Figure 20: Average Number of Crossings to Perform Household Chores by Gender and by Ecology



4.2.5. Access to Schools

Key Findings

- Student attendance has increased by 8.5% after trail bridge construction.
- Trail bridges have prevented students from missing school, disproportionately helping students from poor economic backgrounds.

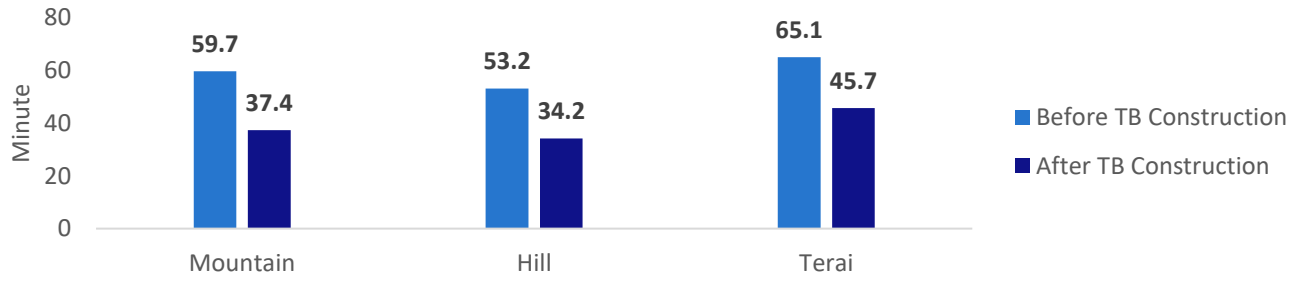
Student attendance has increased by 8.5% after trail bridge construction. For the purposes of this Study, attendance is defined as the total number of students enrolled in school during the end of any particular academic year**.** The teachers the Study spoke with over KIIs shared their assessment that student academic performance has improved subsequent to trail bridge construction due to increased accessibility, i.e. saved time, and because trail bridges have largely connected more than one settlements. Comparison between treatment and control bridges show that in treatment trail bridges, students' attendance has increased by 8.5% after trail bridge construction, with not much difference between girls (8.7% increase) and boys (8.3% increase). Meanwhile in control trail bridges, students' attendance has increased by only 0.8% during endline, i.e. a 0.5% increase in male attendance and a 1.1% increase in female attendance.

Students save 27.6 minutes each two-way trip while accessing schools after trail bridge construction, as presented in table 15.

Students in Mountain save the most time, as the time taken to reach the nearest school has decreased by 37.4% (from 59.7 minutes before construction to 37.4 minutes after). One of the main reasons for the highest time saving impacts in Mountain TBs may be due to the steep ravines that is common in the landscape, requiring students to take long detours for safety reasons, resulting in significantly low detour times for students, i.e. the detour time is 4 to 5 hours in Mountain trail bridges compared to 2 to 3 hours in Terai, where due to the flatlands, there are much more options for crossing rivers when the rivers are low. Terai trail bridges offer the lowest time saving impacts,

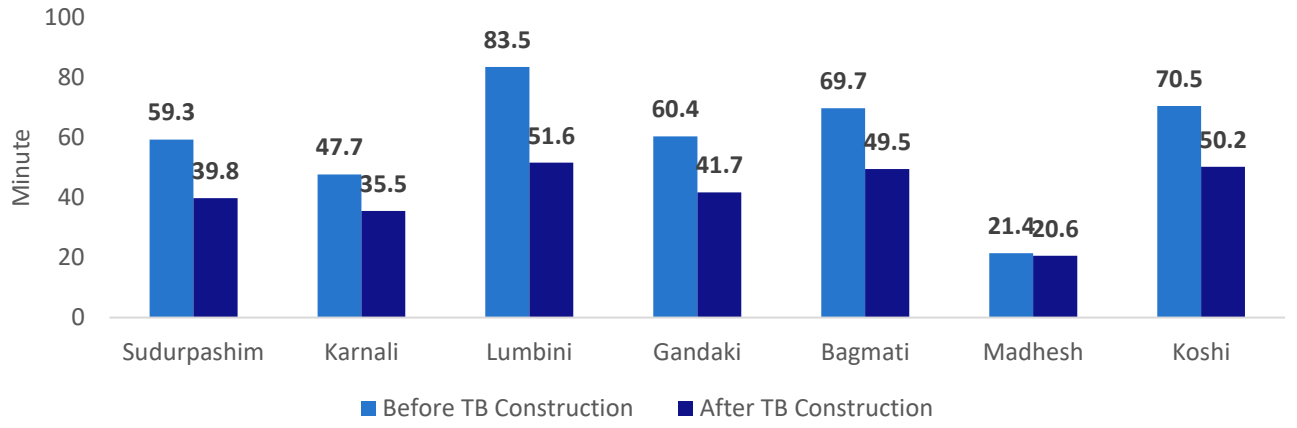
i.e. respondents take 29.8% less time, from 65.1 minutes before trail bridge construction to 45.7 minutes after TB construction. Figure 21 presents the time taken to reach the nearest school by ecology before and after trail bridge construction.

Figure 21: Time Taken to Reach the Nearest School by Ecology before and after TB Construction



Students in all Provinces have saved time after trail bridge construction, with highest time savings in Lumbini. Students in Lumbini take 38.2% less time to reach the nearest schools (51.6 minutes during endline compared to 83.5 minutes during baseline). For example, Chyama Trail Bridge (a D-type short span trail bridge in Banke, Lumbini) has significantly reduced the time taken to reach the nearest school. Before trail bridge construction, locals used a distant motorable bridge to reach the nearest school, which took them 60 minutes. After trail bridge construction, the time decreased by 50% to 30 minutes, as the trail bridge has allowed a direct route with the settlement and the school. Figure 22 presents information on the time taken to reach the nearest school by Province before and after trail bridge construction.

Figure 22: Time Taken to Reach the Nearest School by Province before and after TB Construction



Trail bridges have prevented students from missing schools, disproportionately helping students from poor economic backgrounds. According to FGDs with locals and KIIs with school teachers in Madhesh Province, poor students living near the Pattharbojhi ghat bridge consistently missed schools during monsoon due to high flood waters prior to the trail bridge construction. While students from wealthier households could afford to rent rooms near the school and wait for the floods to subside, students from poor households could not afford to take this approach. As a result, students missed schools, sometimes for up to four months. This inability to attend school inevitably affected their quality of education.

Case Box 3: Students reach school safely and quickly in Baglung

Students have notably benefitted from trail bridges. The picture in the right shows students walking from home to school in Galkot Municipality, Baglung. FGD with households and teachers in Baglung shows that prior to bridge construction, many students (around 10% each year) missed school during monsoon season, due to high and dangerous waters in the river.

However, after trail bridge construction, the attendance level is almost 100% during both monsoon and non-monsoon. Parents feel relieved that their children are safer. The bridge construction has led to safer river crossings, and the parents are less worried about their children going to school. The Bridge has reduced the time taken to reach the nearest school by 72%, from 73 minutes before trail bridge construction to 20 minutes after. As a result, students have more time in school and are less tired when they reach schools.

Source: FGD with villages and teachers in Baglung

4.2.6. Access to Health Facilities

Key Findings

- There has been a 31.4% increase in the number of patients seeking treatment at health facilities after trail bridge construction.
- The percentage of pregnant women accessing ante-natal care and safely delivering babies in formal health care facilities have increased by 15% after trail bridge construction.

There has been a 31.4% increase in the number of patients seeking treatment at health facilities after trail bridge construction. Prior to trail bridge construction, there were 110,500 monthly-visits to health facilities by patients. This number increased to 145,197 after trail bridge construction. Meanwhile, in the control trail bridges, there was only a 6.3% increase in monthly-visits by patients to health facilities during the same period, indicating that trail bridges have a direct impact on making health facilities more reachable.

The percentage of pregnant women accessing ante-natal care and safely delivering babies in formal health care facilities have increased by 15% after trail bridge construction. Prior to trail bridge construction, very few pregnant women were able to reach health facilities on time and safely due to a lack of safe river crossings. The Immersive Study 2023 illustrates how this unfolds in the villages by narrating the experience of one elderly lady in Regnil trail bridge, Kalikot, Karnali, who typifies the mobility patterns, who states: *"In the past, when there was no bridge here, it was very difficult for pregnant women and old people like us to go to the hospital in Manma (District Headquarters of Kalikot). It used to require family members to carry the expectant mother for two hours through an uphill trail in*

a doko – conical V-shaped hand-woven bamboo basket used for carrying goods. Now they go to the hospital in a jeep/vehicle or in an ambulance from the other side of the trail bridge."

People save 44 minutes each two-way trip while accessing health facilities after trail bridge construction, as presented in table 15.

People in the Mountain region save the most time to reach health facilities. Respondents take 25.6% less time to reach the nearest health facility, from 87 minutes before construction to 64.7 minutes after construction. Hill trail bridges offer the second highest time saving impacts (respondents take 23.2% less time) followed by Terai TBs (respondents take 20.6% less time). As mentioned earlier, one of the main reasons for high time saving impacts in Mountain and Hill TBs is due to the rugged terrain, which previously created physical difficulties for people to cross deep gorges and ravines compared to the flat plains of Terai.

People in all Provinces save time while accessing health facilities, but time saving is highest in Karnali. Respondents take 44.1% less time to reach the nearest health facility, from 62.4 minutes before TB construction to 34.9 minutes after TB construction. The following example from Karnali illustrates the time saving impacts of trail bridges: The Devstal Namra TB (an N-type long span trail bridge) has significantly reduced the time taken by people to reach the nearest health facility, from 3 hours before to 1 hour after trail bridge construction. In addition, people have gained a quicker access to a highway roadhead point, i.e. Jajarkot highway, from which they can access a bus to reach the nearest health facility. One of the main reasons for the high time saving impacts from trail bridges in Karnali is due to high relevancy of the bridges, where other options are not available. Respondents indicated that they would not be able to access health facilities at all if there were no bridges in the vicinity.

4.2.7. Access to Markets

Key Findings

- Prices of goods, particularly vegetables/fruits, dairy products and building materials, have decreased by 17% after trail bridge construction.
- Trail bridges have led to the emergence of new markets, as the number of shops in villages has increased by 15.6% after bridge construction
- Trail bridges are still very relevant, despite the increasing prevalence of motorable bridges, as people prioritize saving money over time and

Prices of goods, particularly vegetables/fruits, dairy products and building materials, have decreased by 17% after trail bridge construction. FGDs with respondents across trail bridges show that the price of vegetables/fruits, building and construction materials and dairy products have decreased by 17% after trail bridge construction. One of the main reasons for the decrease in price is due to reduced transportation costs after trail bridge construction.

Trail bridges have led to the emergence of new markets, as the number of shops in villages have increased by 15.6% after TB construction. The largest increase is in the Mountain region (21.3% increase), followed by Hill (13.1% increase) and Terai (10.0% increase). One of the main reasons for the larger increase in the Mountain region is because prior to bridge construction, there were relatively fewer markets, i.e. low market saturation. Bridge construction has connected many settlements and markets, and there is now growing demand for goods and services. For instance, a respondents in Narsing Khola Trail Bridge, Mustang, Gandaki (a D-type short span trail

bridge) stated that he opened a new grocery shop in his village as he is now able to access the larger markets. The respondent informed that there are many people in his village who have opened a new grocery shops as a result of trail bridge construction.

Case Box 3: Trail Bridge's Impact on Rice Mill Owner and Other Small Local Businesses

During baseline in 2022, a small-business owner of Kopche Chowki, Gurbakot, Surkhet was about to sell his rice mill. He was tired of waiting for customers from the nearby village whose visit to the mill was at the mercy of the river.

To get their rice winnowed, the customers either had to cross the dangerous river or had to travel for an hour on an auto-rickshaw for a hefty price of NPR 400. The owner, however, decided to continue the business because a trail bridge was about to get built. During endline study in 2023 after Trail Bridge construction, the Study Team spoke with the rice mill owner over a FGD and noted that the rice mill owner still owns his shop, and shared that this customer has increased by at least 10% and that his monthly income has increased by at least 15%.

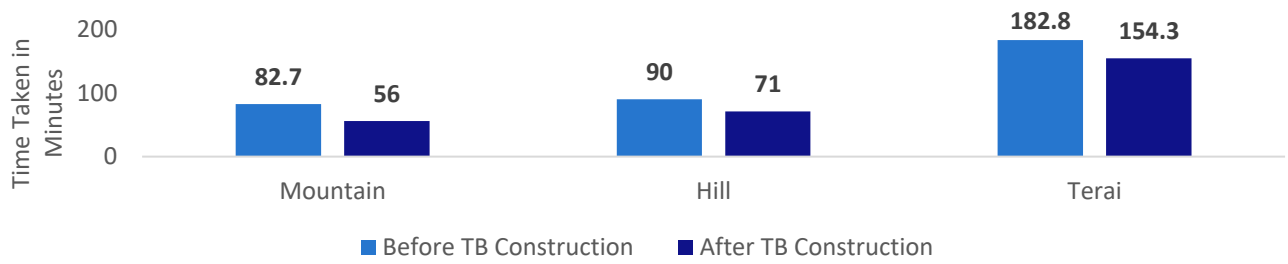
However, he mentioned that his number of customers would have been much higher, e.g. higher by about 40% had it not been for a new mill on the other side of the bridge. FGD with business owners indicates that the trail bridge has led to increase in small business owners in the area, e.g. rice mills, retail shops etc.

Trail bridges are still very relevant, despite the increasing prevalence of motorable bridges, as people prioritize saving money over time and convenience. The Immersive Study indicates that people prefer to use Trail Bridge to save on transport fares even when motorable vehicles are available. For example, at the Rengli trail bridge, villagers preferred to hike to Manma (District Headquarters of Kalikot) than taking a bus to save NPR 200 – NPR 300. Similar preferences were noted at the Benighat trail bridge, where villagers from the upper hills preferred using the trail bridge to reach Manthali (District Headquarter of Ramechhap) to save NPR 250 – NPR 300 on bus fare. For the villagers, bus fare saved was more important than time saved, as they could buy more items at the market.

People save 42 minutes each trip while accessing markets after trail bridge construction, as presented in table 14.

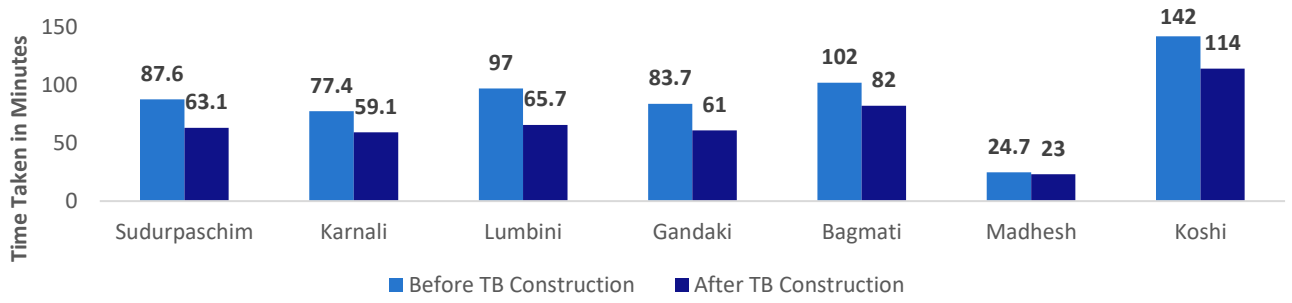
People in all ecological regions reach markets quicker after trail bridge construction, but the difference is highest in Mountain. Respondents take 32.3% less time to reach the nearest markets (82.7 minutes before TB construction compared to 56 minutes after TB construction) followed by 21.1% less time in Hills and 15.6% less time in Terai. Figure 23 presents the time taken to reach the nearest market by ecology before and after trail bridge construction.

Figure 23: Time Taken to Reach Nearest Market by Ecology before and After TB Construction



Likewise, people across all Provinces take less time to reach the nearest markets after trail bridge construction, with people in Lumbini experiencing the largest time saving impacts. Lumbini TBs have the highest time saving impacts (respondents take 32.3% less time to reach the nearest markets, from 97 minutes before TB construction compared to 65.7 minutes after TB construction). For example, Airawati Jhimruk TB (a D-type short span trail bridge in Arghakhanchi, Lumbini) has been highly relevant for the locals. To reach the nearest market before bridge construction, locals used to cross the river either on foot, by hanging on ropes or by using a distant bridge. It took locals 120 minutes to reach the nearest market. However, after TB construction, locals take 75% less time, i.e. from 120 minutes before TB construction to 30 minutes after TB construction, to reach the nearest market. Figure 24 presents the time taken to reach the nearest market by Province before and after trail bridge construction

Figure 24: Time Taken to Reach the Nearest Market by Province before and after TB Construction



Case Box 4: Local farmers diversifying their income sources after trail bridge construction

People have been able to diversify their income sources after trail bridge construction. The picture on the right shows a farmer in Airawati Jhimruk Bridge, Arghakhanchi carrying a milk jar from his village to the nearby market, made possible by the trail bridge. Prior to trail bridge construction, the markets were inaccessible during the monsoon season and it was impossible to sell milk in the market.

His annual income has increased by 43.4%, from around NPR 150,000 per year prior to bridge construction to NPR 215,000 after trail bridge construction. FGDs with farmer groups in Arghakhanchi showed that many farmers in the region have been able to sell vegetables and milk in the local market.

Source: FGD with Local Farmers in Airawati Jhimruk Bridge, Arghakhanchi.

4.2.8. Access to Farms

Key Findings

- Agricultural production has increased by 10% after trail bridge construction.
- An agrarian livelihood would be impossible without trail bridges.

Agricultural production has increased by 10% after trail bridge construction. One example from East Rukum, Lumbini illustrates how trail bridges have helped increase agricultural production. Farmers in Chippkhola Bridge (a D-type long span trail bridge in East Rukum, Lumbini) stated that the bridge has directly impacted the type of vegetables they grow and the quantity of their production. Since the bridge has connected them to their farm lands and to the local market, they are motivated to produce larger quantities of vegetables to sell in the local market. Moreover, the farmers shared that they can spend more time tending to their vegetables, i.e. mulching, pest control, watering, than before trail bridge construction. They estimated that their income has increased by at least 15.0% annually as a result of increased vegetable production, which they attributes to the trail bridge in their village.

Case Box 5: Farmer have been able to increase agricultural production as a direct result of trail bridges

Farmers have been able to reach their farm lands more easily. A farmer in Chhathar Jorpati Rural Municipality, Dhankuta, uses the bridge to carry a 15kg plough with him on the way to his farm land to prepare the land for potato plantation. Prior to bridge construction, it took him 90 minutes to reach his farm land.

However, after bridge construction, it takes him only 12 minutes to reach his farmlands. He has more energy to work and has saved more time to devote to growing potatoes. He estimates that his income from agricultural production has increased by at least 15%. He attributes at least some percentage of the increase in income to trail bridge construction, as it has made his farm lands more accessible to him.

Source: FGD with Farmers in Chhathar Jorpati Rural Municipality, Dhankuta

Additional factors contributing to increased production are increased accessibility of oxen to till their lands and availability of agricultural labour. As the Immersive Study reports, previously when there were no bridges, during the planting season which falls during the start of the monsoon season, villagers, such as the one near Mardi bridge in Lamjung, could not borrow/hire oxen from their neighbours to plough their lands nor obtain Parma (traditional exchange of labour), or hire daily wage labours. But now their circumstances have changed for the better. Not only do they have access, but for the others, the trail bridge have opened earning opportunities – farmers can now hire out their oxen for tilling, e.g. NPR 1,000 per day (approximately USD 7.5 at Mardi bridge) and poorer families can go further afield to hire out their labour, e.g. NPR 500 – NPR 600 per day (approximately USD 4.5) for paddy planting. The study noted that these types of arrangements were increasingly becoming more important, especially during the peak agricultural season, due to the shortage of labour due to out-migration of (mostly men) for employment abroad. The study notes "…local farming families of Rai Ghat cannot imagine the possibility of agriculture without the trail bridge."

An agrarian livelihood would be impossible without trail bridges. The Raighat TB in Khotang, from the Immersive Study 2023, is one important example that highlights the absolute necessity of trail bridges. Before In Raighat trail bridge, farmers who owned land on the other side of the river had to first risk their lives crossing the river, then wait for hours, sometimes days, for neighbouring farmers to finish their plantation, so that they could borrow their cattle for paddy plantation, i.e. since they could not take their own cattle due to risky river crossing. Likewise, farmers near Raighat TB continue to rely on parma – a system of reciprocal labour exchange. One local woman explained, "If I am to hire people for agricultural work, I cannot afford the cost. I cannot do farming without the existing labour exchange system." Parma would be very difficult, if not impossible, without the trail bridge.

People save 39.6 minutes each trip while accessing farm lands after trail bridge construction, as presented in table 14.

Mountain TBs have the highest time saving impacts, i.e. respondents take 59.7% less time to reach the nearest farmlands (26.9 minutes during endline compared to 66.8 minutes during baseline). For example, Narsing Khola Bridge (a D-type short span trail bridge in Mustang, Gandaki) has significantly reduced the time by 83.3% from 120 minutes to 20 minutes after TB construction.

Although there has been an increase in agricultural production, changes in cropping patterns are not yet measurable. However, farmers indicate that the cropping patterns might change in the coming years due to increased number of markets, slowing rate of out-migration and gradual increase in in-migration, and increased access to markets and settlements. For instance, a farmer in Myagdi indicated that he will begin potato farming starting the following year because the recently constructed trail bridge has improved access to local and regional markets and has connected multiple settlements in the region.

4.2.9. Increased Household Incomes and Improved Living Standards

Key Findings

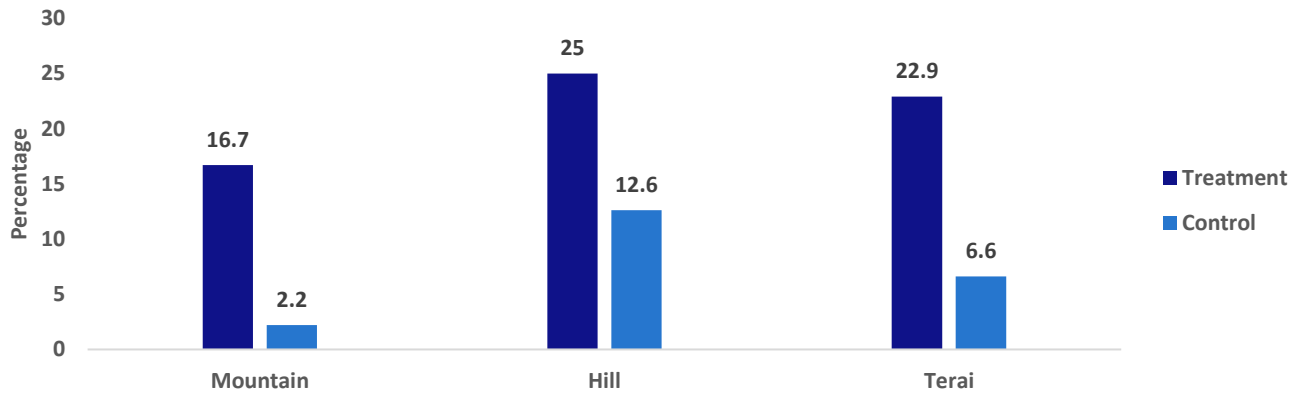
- Average household incomes have increased by 21.8% as a direct result of trail bridges.
- Trail bridges have led to people diversifying their income sources.

Average household incomes have increased by 21.8% as a direct result of trail bridges. In the treatment trail bridges, household income has increased by 21.8%, from NPR 210,542 per year per household before bridge construction to NPR 256,478 per year per household after construction. For the control group trail bridges, the average household income has increased by only 7.5%, from NPR 200,500 per year per household to NPR 215,500 per year per household after trail bridge construction. Figure 28 presents the percentage increase in household income in treatment and control bridges after trail bridge construction by ecological regions.

Trail bridges have led to people diversifying their income sources. In treatment bridges, the percentage of people having more than one income sources has increased by 27% after TB construction, i.e. a 20% point increase compared to only 7% increase in control trail bridges. For instance, agriculture was the only income source for many farmers in Rasuwa during baseline in 2022 as indicated by focus group discussion with farmers. However, after TB construction, farmers have been able to work as daily wage labourer as construction worker in the nearby markets and villages; have been able to sell milk in local markets; and some have started grocery shops; all in addition to growing vegetables.

In treatment groups, the percentage of respondents who have established their own grocery shops or business as a result of trail bridge construction is higher, i.e. 14.8%, compared to 3.4%. One of the main reasons is because of increased access to local and regional markets and farmers being motivated to establish retail shops. Consequently, there has been increased flow of people and goods, both in terms of quality, quantity and type of goods. FGD with farmer groups in Ramechhap indicated that locals have been opening grocery shops in the villages as a result of trail bridge construction. Figure 25 presents the percentage increase in household incomes in treatment and control bridges after trail bridge construction by ecological regions.

Figure 25: Percentage Increase in Household Income in Treatment and Control Bridges after TB Construction by Ecological Regions



4.2.10. Accessing Trail Bridge for Social Activities, Religious Rituals and Tourism

Key Findings

- Trail bridges have improved people's abilities to maintain social relationship, carry out religious rituals and complete recreational activities.
- Although trail bridges have provided safe and quick access, they are now increasingly being seen as tourist attractions as illustrated by Dodhara Chandni Bridge and the "Golden Bridge" in Baglung.

Trail bridges have improved people's abilities to maintain social relationships, carry out religious rituals and complete recreational activities. One particular example from Gulmi illustrates the importance of trail bridges in forming and maintaining social relationships. Prior to bridge construction, many families in the village had been reluctant to marry their daughters into families in the neighbouring villages, since the nearest village was at least 6 hours of walking distance away and with no alternative motorable access. However, after trail bridge construction, the two villages are only 90 minutes apart, and people have gradually begun transforming their preferences.

In addition, the average daily traffic count (ADTC), during both monsoon and non-monsoon but particularly during monsoon, indicates that a large percentage of people, i.e. second highest reason for crossing, use the trail bridge primarily to complete social and religious activities. For instance, out of 17.0% (1,312) of people who crossed the trail bridges for social and religious purposes, 33.5% (440) crossed to attend funerals/complete funeral proceedings followed by attending religious functions, i.e. 32.5% (426), meeting friends and families, i.e. 26.4% (346), and attending weddings, i.e. 7.6% (100).

Likewise, respondents in Lumbini informed that, without a bridge, they rarely visited the other side of the river due to the fear of dangerous river crossings. This caused stress in many families' relationships with their relatives, as families could not easily attend weddings and other social gatherings. However, after the construction of Trail Bridge in the area, this situation has improved. FGD with respondents indicate that the connection between the communities and families on either sides of the river is gradually improving, as people have been able to attend weddings, social gatherings and other religious rituals.

In Samrang, Dumrekharka Ward No. 3, Gorkha of Gandaki Province, the recent construction of a 380 metres trail bridge covering a massive gorge is expected to improve the local economy through increased tourism in the area. The area is known for its natural beauty and panorama of Mangbu, Arughat-1, and Ganga Jamuna Baseri, which is complemented by Gurung culture and pleasant climate all year round. The locals indicate the trail bridge itself could be a tourist destination.

4.3. Mid-Term Impacts of Trail Bridges

The following section provides findings on the impact on peoples' lives and livelihood from the trail bridges that have been in use for at least 5 years. The findings are based on revisiting 50 trail bridges across Nepal which already had a baseline and a Post Bridge Building Assessment (PBBA) to assess mid-term changes after the construction of trail bridges. Out of 50 trail bridges, 14% (7) are from Koshi followed by Madhes, i.e. 12% (6), Bagmati, i.e. 16% (8), Gandaki, i.e. 16% (8), Lumbini, i.e. 12% (6), Karnali, i.e. 16% (8) and Sudur Paschim, i.e. 14% (7). Disaggregated for ecological regions, 52% (26) are from Hill followed by Terai, i.e. 30% (15) and Mountain, i.e. 18% (9).

The Study to evaluate the mid-term outcomes of trail bridges was carried out with a total of 1,000 beneficiaries, i.e. 42.4% (424) female and 57.6% (576) male, across 50 trail bridges in Nepal. Table 16 presents a complete disaggregation by respondents' ethnicity.

Table 16: Ethnicity of Respondents

Ethnicity	Percentage of Respondents
Hill Brahmin/Thakuri/Chhettri/Sanyasi	37.3% (372)
Hill Janajati	34.7% (347)
Excluded caste/DAG	12.7% (127)
Dalit	7.0% (71)
Newari/Thakali	3.2% (33)
Total	**100.0% (1,000)**

4.3.1. Utility of Trail Bridges and Access to Services

Trail bridges are still very relevant, with more than 90% fully functional and in use. Life and livelihoods without trail bridges would be unimaginable as they have continued to provide access to schools, markets, farmlands and administrative offices for locals across Nepal. Out of 1,000 respondents, 90.0% (900) indicated that the bridges in their vicinity are fully functional whereas only 1.7% (17) indicated that the bridges are dysfunctional and the remaining 8.3% (83) indicated that the bridges need maintenance.

Trail bridges continue to save time, provide safer access and are still relevant, but the marginal utility of each trail bridge has decreased over time, particularly due to i) construction of motorable roads and bridges near existing trail bridges; ii) construction of a new trail bridge near the existing trail bridge and iii) proliferation of markets and other facilities on both sides of a river.

i. Access to education:

The time taken to reach the nearest school from any particular trail bridge has decreased by 28.2%, from 39 minutes before bridge construction to 28 minutes today. This is an average of 22 minutes time saved for a two-way journey to and from the nearest school, indicating the relevance of the trail bridges even after more than 5 years of construction.

Teachers inform of gradual increase in student attendance and improvement in student academic performance in the past 5 years. This finding is consistent across all ecological regions. When compared to the outcome survey, the findings of this Study indicates that the sustainable impacts of trail bridges on education are long-term and continue well after their construction. Overall, FGD with teachers further indicated that the number of both male

and female students in their schools have been increasing by at least 8% annually. One of the main reasons for this increase is increased connectivity in the vicinity. Trail bridge construction has connected new settlements to school, health facilities and markets. As a result, households that previously did not have access to schools are now within an hour away.

ii. Access to markets:

The time taken to reach the nearest market has decreased by 30.1%, from 93 minutes before bridge construction at least 5 years ago to 65 minutes today. This is an average of 56 minutes time saved for a two-way journey to and from the nearest market. One can infer that despite the expansion of road networks, there are still a significant proportion of the country which are still isolated and do not have road access to markets, as they are still reliant on trail bridges for their connectivity.

Trail bridge construction has contributed to more people having access to a wider variety of goods in their local markets. For instance, the percentage of people who have access to non-alcoholic beverages, e.g. juice, packaged coffee, has increased by 41.0%, from 611 to 867 people after trail bridge construction. Similarly, the percentage of people having access to fuel, e.g. petrol, diesel and kerosene has increased by 81.8%, from 374 to 680, after trail bridge construction. Two main reasons for the increased variety of goods in markets and easy access are ease of transporting goods from regional markets to local markets and increased connectivity to other transport infrastructure, like motorable bridges and roads.

iii. Access to health facilities

The time taken to reach the nearest health facility from any particular bridge has decreased by 34.1%, from 41 minutes before trail bridge construction and at least 5 years ago, to 27 minutes today. This is an average of 28 minutes saved for a two-way journey to and from the nearest health facility.

The practice of going to traditional faith-based healers is gradually decreasing, and some locals have indicated this is because of trail bridges, as medical health facilities are now more accessible. For instance, the percentage of people seeking formal medical treatment has increased by 58%, meanwhile the percentage of people who often visited traditional faith-based healers has decreased by 56%. For instance, FGD with locals in Chahare, Nuwakot indicate that it takes 95 minutes to reach the nearest faith-based healer while it only takes 20 minutes to reach the nearest health facility. As a results, locals prefer to go to the nearest health facility, as it saves them valuable time which they have been contributing to agricultural income-generating activities.

iv. Access to farm lands

The time taken to reach the nearest farm lands has decreased by 45.3%, from 86 minutes before trail bridge construction and at least 5 years ago to 47 minutes today. This is an average of 78 minutes saved for a two-way journey to and from the nearest farm lands.

Locals in Apthyaregaunda Trail Bridge (D-type short span trail bridge in Ilam, Koshi) indicated that their trail bridge has had significant impact on their lives and livelihood. Before the construction of trail bridge, locals had to take a detour of 2 hours to reach the nearest schools, markets and health facilities on the other side of the river. The detour route was long and sometime dangerous in terms of possibility of animal attacks. In addition, students needed to be accompanied by parents for travel to school, which took valuable time away from the parents which could have been used for productive purposes, e.g. farming, household chores, and income-generating activities

like handicraft. As a result of trail bridge construction, locals reach the nearest schools markets and health facilities in under 30 minutes, and the route is significantly safer.

4.3.2. Changes in Incomes and Living Standards

Many locals have been able to diversify their sources of income as areas that were previously inaccessible have come within their reach. Out of 1,000 respondents across all 50 trail bridges, 52% (520) indicated either a change or an increase in their number of income sources when compared to before and after trail bridge construction and the locals have attributed this change and/or increase as either a direct or an indirect impact of trail bridge construction. These changes have been the result of changes in greater rural-urban connectivity leading to market system development.

i. **Improved access to local and regional markets has led to new and diverse income generating activities and average annual income increase of around 15% for many local farmers across all three ecological regions.** In particular, local farmers in Chahare, Nuwakot (Likhu Khola Trail Bridge) mentioned that many households in the village started rearing buffalos, cows, goats and chicken in the past 3 years. Prior to bridge construction, the local market was a 3-hours walk away, and farmers were unable to sell fresh milk, and only 7 – 10% of the households had cattle. However, after the connectivity provided by Likhu Khola trail bridge to a local market, which is now reachable within 15 minutes' walk, from all three communities, many households have invested in cattle rearing, primarily for milk production, i.e. now at least 40% of the households have cattle. Farmers estimate that in the past five years, the average household income has increased by at least 15% annually as a result of milk sales in the local market.

ii. **Cropping patterns have gradually changed, as more people have started growing and selling cereal crops, particularly maize and millet.** Before bridge construction, only 43% of respondents grew and sold maize and millet respectively. The respondents who did not grow any cereal crops indicated that they had arable farmlands and were interested in growing and selling cereal crops, but they either did not have the labour force to engage in agriculture or did not consider large-scale agriculture to be economically viable due to the inaccessibility of their farmlands and local markets. However, those constraints were remedied by the access provided by trail bridges. Consequently, the number of households farming cereal crops has increased to 64%. FGD with respondents indicate three main reasons for the increase: farm lands are more accessible; local markets are more accessible and people, especially men, who had migrated out of their villages have returned and started engaging in their farm lands.

iii. **Cardamom farming has increased in Koshi Province, particularly in Panchthar**. Before the construction of the Bardanda Trail Bridge (a D-type short span trail bridge in Panchthar, Koshi), only 15% of respondents grew cardamom. Today, that number has doubled to 30%. Before, high transportation costs to the nearest local/regional market and shortages of labour were the two main reasons limiting production. But today, the time taken to reach the nearest market has decreased by 68%, from 104 minutes to 33 minutes today, which is a 142 minutes saved for a two-way journey. Farmers indicated that their transportation cost has decreased by almost 40% as a result of trail bridge construction.

iv. **People depending on remittance and selling firewood for their primary source of income have now option to produce vegetables and cereal crops, i.e. 35% (180, n=516).** Likewise, the people who are

engaged in livestock management has also increased, i.e. 15.0% (77, n=516). One of the main reasons for this change is easier access to farm lands and return of previously migrated individuals. FGD with respondents indicate that the trail bridges have improved access to farm lands, as it takes at least 30% less time now as compared to before trail bridge construction.

v. **Basic consumer goods, e.g. clothing, electronics, medicine, furniture, are more reliably available in the markets as compared to at least 5 years ago.** This case is the most prominent in the Hill and Mountain regions of Nepal. Farmers indicated that before the construction of trail bridges, there were limited variety of basic consumer goods in the markets, particularly during the winter season (October, November and December), as heavy rains during July, August and September would have halted all transport of goods in and out of the communities. Now, basic consumer goods are available year-round, as there is improved access to highways, local/regional markets and health facilities.

At one trail bridge site, a local household (with 3 individuals) in Tallo Dobhan Trail Bridge (an N-type short span trail bridge in Tehrathum, Koshi) shared that before trail bridge construction, they used to work in their own farm lands, producing cereal crops that would be barely adequate for their own household. Their primary source of household income was remittance (around NPR 30,000 annually) and senior citizen allowance (around NPR 15,000 annually) from the local government. However, after trail bridge construction, they can travel to the nearby market to sell their agricultural products (wheat, millet etc.); they now own cattle and sell milk and in the nearby market, and have been able to work as waged-labour worker for construction in the nearby market. As a result, the annual household income has increased by at least 40% to NPR 63,000 annually.

Trail Bridge near Benighat and Siddhalek Villages, Dhading, Source: Republica, 2018

4.4. Long-Term Impacts of Trail Bridges

This section presents the outcomes from the construction of trail bridges achieved over an extended period. The findings and insights are based on a complementary qualitative Immersive Study carried out in 2023by a separate independent team as part of the Impact Study[6]. The Study was carried out using the Reality Check Approach[7] (RCA), involving two researchers who stayed in prior identified villages, mostly those belonging to DAGs, for a minimum of three days[8]. The immersive study was carried out to cover 11 trail bridges[9] constructed at different periods between 1900 and 2000, and 4 trail bridges[10] that were under-construction at the time of the Immersive Study.

The Immersive Study objective was to gain insights into the daily lives of people and how it has changed because of the trail bridges over the years.[11] The key findings include the enduring significance of the bridges in the daily lives and how the bridges have shaped relations between the State and its citizens while improving the physical access.

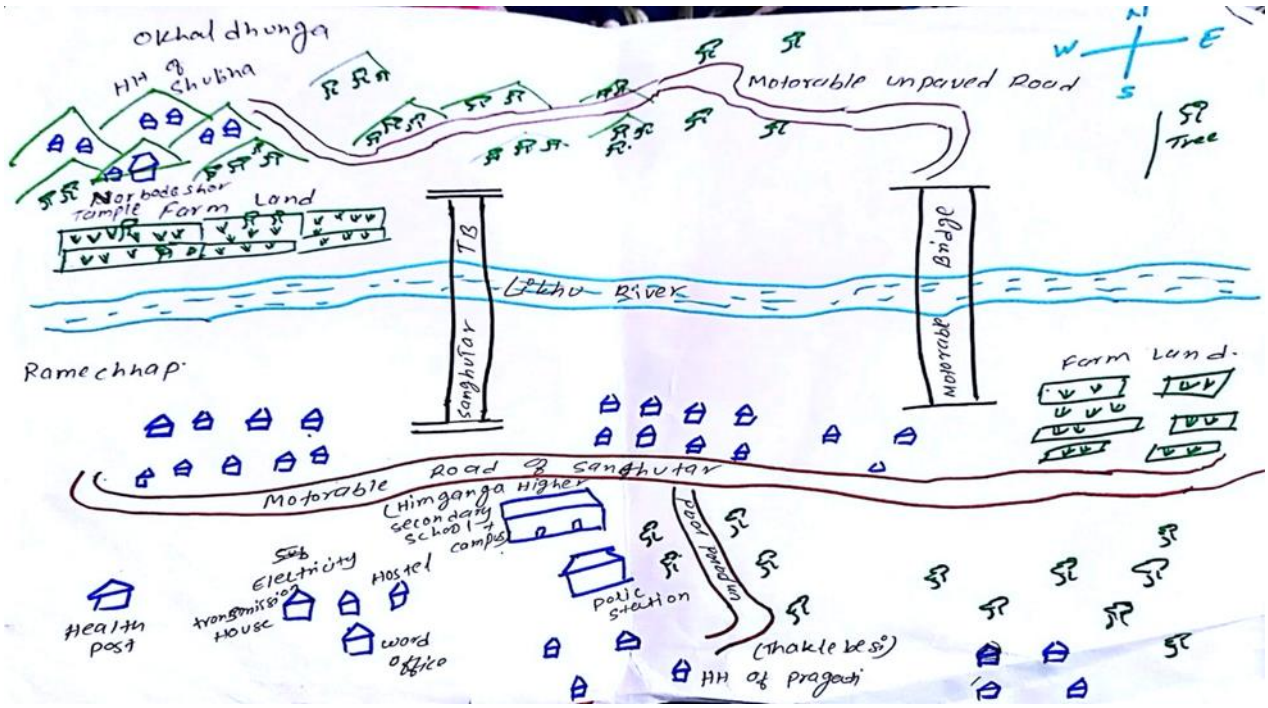
4.4.1. Trail Bridges as Catalyst for Economic Development and Improved Living Standards

The old bridges, such as Sanghutar Trail Bridge (built during the Rana rule before the 1950s) and those built during 1970s, were built along the old trade and and *Hulaki Marg* (postal service roads) that connected the capital with administrative centres in the east and the west. These locations were vital for the State to ensure connectivity and maintain its bureaucracy with the outlying administrative hubs in the country in the highly underdeveloped period of Nepal.

All were important transit hubs along porter routes e.g. Raighat Halesi trail bridge, Siktaghat Trail Bridge. This was a time when the most common means of crossings were either the boats or *Phadke Pul* (temporary wooden bridges) prior to the arrival of trail bridges e.g. Mardi TB and Rengil TB. At most of the sites, *Majhi* boatmen were engaged in transporting goods and people as this was their traditional occupation. The older generation recall that the boats would ferry 10 to 15 people at a time and they would only be operated during the daytime and dry seasons, e.g. Siktaghat, Tama Koshi Benighat.

It was only much later that bridge construction began. For example, locals at Siktaghat TB (Ramechhap and Sindhuli) Mulghat trail bridge site in Khotang remember how the construction of the bridge only began after boat accidents in the areas.

[6] For further details on the study, please refer to "Immersive Study on Impacts of Trail Bridges in Nepal 2023, TBSU, 2023"
[7] The RCA is a household inquiry methodology that is designed to understand people's perspectives. This involves living with the poorest households in the communities to feel and deeply understand their family dynamics and insights into their everyday lives.
[8] Cumulatively this led to over 420 hours of in-depth conversations with 30 host households.
[9] The completed TBs included Sanghutar TB (built in 1908 during the Rana regime); bridges built during the 1970s and 1980s; Raighat TB (1977/1978); Syange TB (1979/1980); bridges built during 1980 – 2000; Rengil TB (1996/1997); Satale TB (1982/1983); Mardi TB (1982/1983); Tama Koshi Benighat TB (1988/1989); Sikta ghat TB (1996/1997); Mulghat TB (1989/1990); TBs built during 2020s; Amatola TB (2023) and Majhuwaghat TB (2023).
[10] The under-construction TB were selected to understand the trail bridge building process. The bridges were: Gauri Khola TB, Khullekhola TB, Amdhuraghat TB and Sarantadi TB.
[11] To observe and obtain the insights, researchers had informal conversations while participating in daily household chores, accompanying the host household members to different service providers and spent leisure time discussing the lives of different generations.



The Sangutar Bridge was built along the postal route connecting Kathmandu to the Eastern Regions of Nepal

a. Emergence of thriving *Hiunde khelo* (seasonal economic activity): Increased incomes and availability of goods

The individual history of each trail bridge covering the periods between trail bridges becoming operational and the road networks linking the villages has been captured by the Immersive Study. Interestingly, this period is often of two decades for most villages, and most notable and important economic impacts from the trail bridges are noted to have happened in this period. Vibrant and thriving communities were developed near the bridges with high traffic of people, porters, cattle and transported goods. The bridges would become "trans-local" i.e. they connect not only villagers near the bridge, but also the people from across neighbouring districts and regions. For example, Raighat Trail Bridge, Khotang, was the transit for connecting the hill districts of Khotang, Okhaldhunga and Solukhumbhu to the Terai; Tama Koshi Benighat Trail Bridge (Ramechhap) connected Kavre, Kathmandu and Ramechhap; Satale TB in Lamjung was the main entry point to Manang district for northern Lamjung; Rengil TB (Kalikot) lies on an old pedestrian route used by people in Kalikot, Humla, Jumla, and Bajura to access the Terai markets in Bardia.

> *"In the past, Benighat was busy with crowds of people traveling from the eastern and western places. Many people, including porters, governmental officers, the king, the princess, and commoners used to walk through this route to reach the eastern, western, northern, and southern parts of Nepal for official visits, business, and other. It connected the area with the Tarai - the present-day, Bardibas, through Sindhuli. Before the road, we used to carry and bring the sacks of rice that the government (khadya sanstha) bought in the Tarai for the hill areas in eastern Nepal" (69-year-old, Majhi man, Raj guan).*

Elders recall that thriving bazaars developed, mostly during the winter, referred to as *Hiunde khelo* (seasonal economic activity), to cater to the flow of people. A "service economy" emerged as locals set up food stalls, lodges, and sold *Jaand* (local alcohol), snacks, cooked meat and daily items, e.g. rice, biscuits, cigarettes, candies, etc.

"Before the motorable road came to Sanghutar (2008), there used to be so many people walking through the trail, mostly in the wintertime. Some would stop at our shop for food, and snacks, and to rest in the evening. My wife and I would be busy, from the very morning to the evening. And, someday, we did not even have time to eat until late evening." (67-year-old Magar man, Narmedshwor, Okhaldunga)

Locals were able to take advantage of the *Hiunde Khelo*. During the study, a 50 year old Rai man, in government services, recounted how his widowed mother was able to educate him and his two other siblings by producing and selling home brewed alcohol to travellers passing through Raighat Trail Bridge. Similarly, women at Tama Koshi Benighat Trail Bridge, recall that they were making "good money" before the roads by selling snacks and alcohol and were enjoying the social life when weekly bazaars were held near the bridge site.

"At that time, we women used to sell jaand -chhyang and rakshi (local liquors) and earn money. There used to be a market at the ghat once a week……. We used to meet new people.....Villagers used to slaughter goats and buffaloes to sell the meat in the mela-haat. We used to eat meat and sell it to the porters. It used to be very ramailo (fun, entertaining). This slowly ended when the road came. Now we can't sell jaand-rakshi; the police won't allow us. But the hotels can sell it. Now, we do not meet new people. The old days were so good" (90-year-old woman, Seleghat)"

Conversations with the older generations indicate that locals, irrespective of their caste/ethnicity, were able to take advantage and establish shops and eateries, at relatively low investment costs, to take advantage of the *Huide Khelo*. However, in case of Syange TB (Lamjung), the villagers from Mipra were pushed out by wealthier people from neighboring districts (i.e. Manang) when tourism began to flourish along the Annapurna trekking circuit. The trail bridge also lies within the route and after its construction, the original inhabitants complained that the migrants with lots of money built lodges. They also developed political connections that they used during land cadastral survey that took place in 1994 and transferred land titles from people of Mipra village to those from Manang.

b. Trail bridges were blessings for traders and porters: Safer routes and increased earnings

Porters, such as Mr. Astangan Gurung (71 years, Lamjung) lovingly nicknamed as *Khachad Baje* (Mule Grandfather), were required to pay yearly cash contributions for the construction and upkeep of the *Phadke Puls* (temporary wooden bridges) along routes that they transported goods. In his case, Mr. Gurung recalls that he used a herd of 22 mules between Lamjung and Manang which required him andhis caravan to cross two *Phadke Puls*. These were risky to cross at the best of times and even more during the rains. Which is why, once the Satale and Sanye trail bridges were constructed between 1979 and 1983, their effect was immediate and substantial. Not only did he not have to pay the yearly bridge contribution costs, they felt much safe to cross with his herd and also saved time. He recalls that as a porter he was able to sustain his family livelihood and educate his 3 sons.

At Sanghutar TB (Ramechhap), traders were required to pay taxes for the use of the bridge to cross cattle (~NRs 5 paisa for an adult animal)[12]. It was targeted towards traders who transported large number of cattle from the Hills to sell in the Terai. But it was also enforced for non-traders who needed to take their cattle for grazing or ploughing fields. Unsurprisingly, the locals were not happy with the arrangement, but it was only much later in 1956, when King Mahendra[13] passed through Sanghutar en route to eastern Hills, that the tax was abolished at the request of locals.

[12] This was collected by a bridge caretaker (Heralu), who was appointed to control the movement of the cattle across the bridge.

[13] Locals also recount how King Mahendra refused to cross the Sanghutar TB, as it was built by the Rana regime with the support of the British Empire. This created a lot of pressure on the local Mukhiya, to build another temporary bridge immediately.

c. Connecting the hearths and farmlands: Access to lands, labour and inputs

Local farming households cannot imagine the possibility of agriculture without trail bridges. As the bridges do not only provide access to farmlands, but also for exchange and hiring of labour, cattle for ploughing, agricultural inputs, and markets to sell their produce. Before the trail bridges, families with lands across the river experienced severe challenges in timely cultivation of their farmlands, especially during the planting seasons. For example, before Raighat Trail Bridge was built, families from the Khotang side had to wait to plough and plant their lands which were located across the river in Rupatar. Even though they had their own oxen, they could not be transported across the river using the boats, and so had to wait for the locals of Rupatar to finish their plantations before they could hire/borrow their cattle for ploughing.

Families also shared how difficult it was to perform *Parma* (local practice of reciprocal exchange of labour) or hire labour during the rains due to the lack of a bridge. This was especially hard for Dalit families living near the Rengil trail bridge (Kalikot), who were reliant on wage-labour work (to mostly landed Shahi-Thakuri families) for their livelihoods. Currently, in Sanghutar (Ramechhap), agricultural wage labourers earn NRs 1000/day for ploughing farmlands, and NRs 500-600/day for paddy plantations, which for the poor households provides a good source of income.

Another Dalit family in Lamjung near the Mardi Trail Bridge shared how difficult it had been for his grandfather and father to hire out their oxen to plough other's farmlands, which was one of the few options available to them to earn income in the absence of their own land.

> *"Dherai gaarho thiyo pul nahuda, ali ali kamai khane kaam garna pani (When there was no bridge, it was difficult to get work and earn even some petty cash)". (Dalit man in his fifties, Sanghu, Lamjung)*

d. Shifting significance: From 'Trans local' to 'Saano Pul' (small bridge)

The trail bridges, when built were vital and the most reliable means to cross rivers for everyday connectivity and wider mobility, particularly during the monsoon. They were essential components of local daily life for:

- Farming, cattle raising, and other livelihood practices (wage labour works, tourism, trading, performing traditional music at weddings and cultural events)
- Assessing basic services – education (attending school), health services (going to health centers, pharmacies), banks (assessing pensions, social welfare allowances), public transportation (riding a bus/public transportation from the nearest road), and other services (government offices)
- Market (buying essentials and selling agricultural and other products)
- Going to the sacred shrines (cultural and religious needs)

Left: The Sangutar Trail Bridge built in 1907 is still used by locals to access services. Right: Students crossing the Mardi Trail Bridge built in 1982.

At many of the sites, locals shared that the bridges had "freed" them as the rivers were no longer physical barriers and that they had become integral part of their daily lives.

> *"Before the trail bridges, the boat controlled our mobility. With the bridge, we became freer. We can walk through it anytime we want and wish to." (50-year-old Chhetri man, Kumaltar, Raighat)*

Furthermore, the benefits of the bridges were "trans local" - widespread and encompassed villages from neighbouring districts and facilitated regional trade, commerce, circulation of commodities, and tourism (religion and trekking). But, over the decades, their influence (beyond the immediate locality) has shrunk. The main reason being – expansion of road networks and the availability of motorized transport in the last two-decades. This is not surprising and can be looked at as positive a sign of development, as connectivity transitions from pedestrian modes (trails and trail bridges) to roads and vehicular means. For the older generation the change is however striking – many nostalgically lamented that while before - hundreds of people from neighbouring districts used to use the bridges, e.g. travelers from 5 districts used to pass through Rengil trail bridge (Kalikot) to go down south - now it has become "Saano Pul" (small or ordinary bridge).

> *"The bridge was once the lifeline of five districts. When I said my village was close to the Rengil bridge, everyone would recognize the place. The bridge was really beautiful; it had amazingly huge towers…very beautiful…now it has turned into saano pul. (75-year-old Shahi Man, Badalkot village, Kalikot)*

However, despite advancements in transport, the utility of the bridges at the local level still persists and is intricately intertwined with the lives of the villagers.

> *"The bridge is our life-friend. How could we live without this bridge?" (50 years old Rai man, Raighat)*

Surprisingly, at some of the study sites, villagers continued to use pedestrian routes (and trail bridges) to travel despite the availability of roads and vehicular traffic. Unveiling a different perspective from the beneficiaries- who place a much higher values on "saving money", not matter how modest the amount is, compared to "saving time". Villagers living along the Sanni Trebeni walk to *Manma* (district headquarters of Kalikot) by crossing the Rengil trail bridge, despite the growth of road networks, to save money on the bus fares (equivalent to NRs 200-300). They informed the researchers that saving money (which they can use to buy items in Manma) is preferable to saving time. Similarly, villagers use the Tama Koshi Benighat trail bridge (Ramechhap) to reach Manthali instead of traveling by bus, as the distance is shorter (1-hour compared to 2 hours by bus) and they also save NRs 250-300. Meanwhile, for villagers near the Satale trail bridge (Lamjung), they have to use the pedestrian trails, and the trail bridges, every time, the Besisahar-Chame road gets blocked by landslides during the monsoon.

4.4.2. State-Citizen Relations: Changing Relations and Accumulation of Social and Political Capital

Nine trail bridges selected for the study were built before the 2000 AD. They were constructed during different political regimes, notably - the Rana Period (before the 1950s), the early Panchayat Rule during the 1960s - 1980s, and the multiparty democracy system (1990-2000) and the period of the state-Maoist's conflict after 1996. Tracing the historical biographies of these bridges show, the changing State-Citizen relations vis-à-vis changing development ideologies and practices in Nepal.

a. People's participation in bridge building: From *Jhara* system (obligatory free labour) to paid labour

The prevailing perception at the older trail bridges (Sanghutar, Raighat, Syange) is that, they were constructed by the State to largely facilitate and strengthen governance, administrative, and military presence so as to better exercise State power for governing, rather than to merely relieve citizens from hardships. Primarily because they were all built along the old trading and *Hulaki Marg* (postal routes).

The construction and maintenance of the bridges followed the hierarchical order and exercise of power and authority from the Palace to the *Bada Hakims* (regional administrative chiefs), and to the village *Mukhiyas* (chiefs), who mobilized the locals for free but obligatory labour contribution (Jhara). This 18th-century system of Jhara was used till the early 1980s to mobilize locals to carry bridge materials and construct the bridge without monetary compensation.

A 92-year-old Gurung man in Humdi village (Lamjung) recalls that one household member from 3 Panchayats were required to do Jhara for the construction of the Mardi trail bridge. He remembers that he had to carry bridge materials for 4 days from Seti Dovan. Another elderly man in Rengil, complained how painful it was to transport the cables and how they had been cheated out of wages for transportation.

> *"I still have scars on my right shoulder that I got by carrying the heavy iron cable. And, they did not pay us the money we were promised for carrying the lattha (cable)" (Elderly man, Rengil)*

Not being paid was a common complaint. As at Syange trail bridge (Lamjung) as well, locals shared how the Pradhan Panchas (elected head of the Panchayats) mobilized the men from two Panchayats to transport cables for 12 days in 1970s. For the first six days, they transported the cables for free, but, when they found out that the government had actually allocated funds for transportation and that the two Panchas had used the Jhara system to instead

appropriate the budget, they refused to complete the task until they were compensated. Which the Panchas did in the end. Each person was paid either NRs 25 or 3 Pathis (~ 9.5 kg) of rice as wage for the remaining days.

Though Sanghutar trail bridge and Syange trail bridges were built half-a-century apart, during different political systems, for locals at both sites participating in trail bridge construction was not a matter of "civic pride" but rather than an obligation that was required by the State, with very little or no compensation for their labour. But, the case of Syange labourers protesting against exploitation indicates that, citizens were not only cognizant of their rights, but also assert them.

Since then, times have changed, and with changes to the political systems (multi-party system from 1990s onwards) and institutionalization of labour payments within trail bridge program, local participation has evolved and accountability is expected from all sides. Primarily through the establishment of bridge Users' Committees, which provide a space for leadership to beneficiaries, particularly from discriminated groups.

b. Increased connectivity: leading to accumulation of Social Capital and Political influence

Trail bridges also contributed to accumulation of social and political capital by elites.

This was noted in particularly, at Sanghutar Trail Bridge in Ramechhap which was built in 1907[14]. The bridge was near a bazaar along strategically located trading and postal route connecting Kathmandu with the eastern region of Okhaldhunga, which was the most important administrative center in the east. This meant that powerful and high-ranking officials often passed through the bazaar. Over the years, strong ties were developed with the officials. Newar families recall their grandparents telling them how *Bada Hakims* would spend the nights in their houses, underlying their family's connection to State power in the past. As the ties strengthened, they were able to leverage their connections to bring government services into the area – such as schools, food depots, and government offices – much earlier than other parts of the country. These facilities, coupled with the economic growth due to high mobility of travellers, meant that Sanghutar bazaar became the economic, political and social hub in the region, with other villages in Okhaldhunga becoming dependent on the bazaar for services and supplies. A dependency that has remains to this day, with locals in Okhaldhunga coming to Sanghutar for higher education, larger markets and other services.

Meanwhile in Syange Trail Bridge in Lamjung, locals from Mipra village complained that the larger share of economic benefits from the greater mobility provided by the trail bridge was amassed by outsiders, who migrated into the Syange Bazaar from Manang. According to them, the 'outsiders' had more capital and were therefore able to invest in larger hotels in the area, as the route became a popular along the Annapurna trekking circuit. The land however belonged to those from Mipra village, but when a land cadastral survey was carried out in 1980s, the people from Manang, with greater economic power and political influence, were able to transfer the land titles to their names. Currently, all the big hotels are owned by those previously from Manang, while the indigenous people run small tea shops.

Changes in demographic patterns was found to be not uncommon at the bridge sites. Similar to Syange trail bridge, locals at the Rengil trail bridge, Sikta ghat trail bridge and Mardi trail bridge also shared how families from the upper hills migrated down and settled closer to the bridge sites.

> *"There was no Rengil gaun. It was an "Auwal Khestra (malarial land) (previously) we used to live in Badalkot (village on a hilltop on the north-eastern side of Rengil* trail bridge*) and used to come here to work on our*

[14] During this period, records indicate that there were only 29 modern permanent bridges (made from steel) in the country.

farms… (later) it was the bridge that attracted settlements. One by one, families from Badalkot built new houses on their farmlands, adjacent to their farmlands. Rengil ghat started becoming Rengil Gaum. Rengil pul le gaun basalyo (the bridge settled the village)" (83-year-old Shahi man, Rengil).

4.5. Unintended Outcomes of Trail Bridges

There have been a few unintended outcomes of Trail Bridge on the lives and livelihood of people. Unintended outcomes are defined as outcomes, both good and bad, that were not envisaged during programme design and were not necessarily present during the programme's periodic review.

The Majhi communities lost their livelihood source after the construction of the bridges. For as long as they could remember, Majhi men's traditional occupation was ferrying people on boats. However, once the boats were no longer needed to cross the bridges, their traditional occupation became redundant, resulting in the loss of livelihoods. Surprisingly, when the researchers talked with elderly Majhi men, who had rowed boats before the bridge, most expressed happiness on their changed state. They regarded their customary occupation as more of a "shackle" tying them down with no significant monetary rewards. So, for most, trail bridge construction actually "freed" them from "their destiny", allowing them to pursue other earning avenues.

"The trail bridge freed us from the hardship and wearisome duty of crossing people"

Ferrying people on boats to cross the river was a hard and tiring work. Each adult Majhi was destined to become a boat person; we did not focus on other occupations than rowing the boat. We all had our specific turn and days to work at the Ghat.

When my turn would come, I had to be in the river from morning to evening. Some days, I even did not get a chance to finish my food. I did not have time to focus on farming and other work. The money (a fee for using the boat) we collected from passengers was not enough.

When the bridges came, people could cross the river easily. We were also free from this traditional duty that brought us no good. Our children, who used to spend all day in the river or fishing, preparing to become boat persons, could now go to school and get an education. We could focus on farming or find work outside. (68-year-old Majhi man, Rajgau, Ramechhap).

The Majhi[15] women, however, had a different perspective. They were saddened by the construction of the bridge. The travellers no longer travelled down to the *ghats* (ferry stations) where they had set up shops to sell snacks and *Jaand-raksi* (alcohol). These were once lively places for social interactions and a means for earning additional income. Once the bridges were built, these economic and social opportunities slowly decreased and ended.

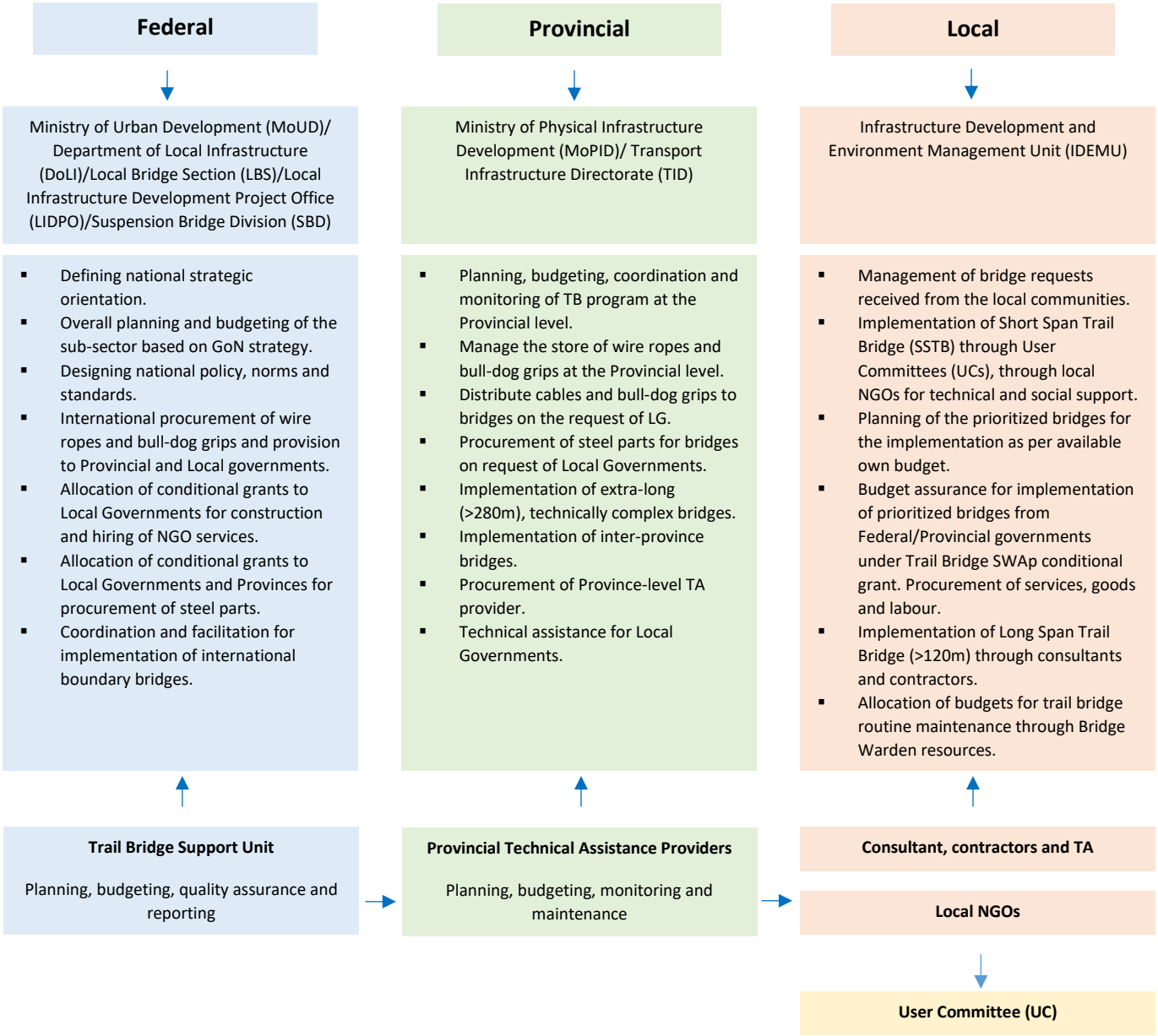
The use of Trail Bridge as a community meeting point was also an interesting finding. For instance, during monsoon, around 9.0% of all river crossing traffic (694, n=7,723), was for rendezvous and gathering purposes. Respondents narrated that they enjoyed hanging around at the trail bridges.

[15] Majhi are an indigenous group whose livelihood revolve around rivers, particularly by providing river crossing services (Rai and Majhi, 2014). Since the beginning of the Shah rule, the group were entrusted with the customary occupation for which they were granted land, right to cut trees for boat making and take nominal fee from passengers. Majhi of Nepal. Central Department of Anthropology/Sociology, Tribhuvan University.

5. INSTITUTIONAL OVERVIEW OF GOVERNMENT STAKEHOLDERS IN TRAIL BRIDGE SUB-SECTOR

Section 5 provides an overview of the capacities, within the wider political and federalized context, of the institutions within Nepal's three spheres of the federalized Governments and other key stakeholders that are a part of the ecosystem. This analysis considers government institutions assuming full responsibility of the trail bridge building process following the exit of Swiss support to the Nepal trail bridge sub-sector. Figure 26 presents the Federal, Provincial and Local Government institutions associated with trail bridge development and their mandated and practiced roles.

Figure 26: Federal, Provincial and Local Institutional Set Up for Trail Bridge Building



5.1. Government Institutions

5.1.1. Local Level

I. Local Governments/Infrastructure Development and Environment Management Unit (IDEMU)

Understandably, Local Governments (LG) and the political parties are conscious of the political support base and the voting base. As a result of this bias, funds often go for more 'visible' and financially attractive infrastructure options, leading to investment in either new infrastructures, or their significant upgrading. This is not necessarily bad as this often gets the budgets used, and infrastructure built, but the key issue is how much of these allocations reflect the agreed criteria, and priorities, including social and technical standards, and how it is implemented. Furthermore, maintenance works that are increasingly urgent and require more investment may be deprioritized and up keeping of the built assets are ignored. At the technical level, the political priorities should ideally be guided by good policies. In the case of trail bridge building, the Local Government Operation Act 2074 BS (2017 AD), Schedule 8, clearly mandates Local Governments for policy formulation, planning, implementation, monitoring and maintenance of trail bridges. In most cases, the bridges are an important and 'visible' sign of development, which they are keen to plan and implement.

Within Local Governments (LGs), the Transport Infrastructure Development (TID) unit under the Infrastructure Development and Environmental Management Section (IDEMU) is responsible for planning, monitoring and implementation of the trail bridge program within the Local Government. IDEMU is typically led by an engineer working together with two sub-engineers and an assistant executive. Figure 27 presents the organogram at the LG level.

Figure 27: Organogram at the Local Government Level

The framework for engagement in trail bridge development of the federalized institutions are guided by the Trail Bridge Sector Wide Approach (SWAp) Framework III. This stipulates that the LG's primary functions are, but not limited to, prioritization of bridge requests from the local communities; planning and implementation of the prioritized bridges from their own resources; budget assurance for implementation of prioritized bridges from

Federal and Provincial governments under Trail Bridge SWAp conditional grants; implementation of Short Span Trail Bridge (SSTB) through user committees with the help of NGOs and technical assistance; implementation of Long Span Trail Bridges through consultants and contractors; procurement of services, goods and works; allocation of budgets for trail bridge routine maintenance and execution through bridge warden resources; and execution of major maintenance/rehabilitation of worn-out bridge with sector grants from the Federal and Provincial Governments.

A majority of the trail bridges implemented by the Local Governments are funded through Federal SWAp grants, with remaining solely financed by the LGs using their internal resources, e.g. during the latest FY 2022/2023, this amounted to 2% of program expenditure. The provision is that for trail bridges funded through SWAp grants, LGs need to contribute 13% of the trail bridge cost. Fund scarcity is often an issue at the LG level. However, this is often due to their inability to plan and prioritize the projects and use the resources effectively. The capacity and willingness to plan and prioritize is critical for LGs to meet their obligations as well as to increase the safety level of the trail bridges through investment on routine major maintenance of trail bridges.

Key findings

While Local Governments (LGs) are increasingly learning and maturing, it is more likely in the coming years that they will align their activities to deliver new trail bridges to their constituencies as per the chapter 3, sub-clause 11 and chapter 6, clause 24 of the Local Governance Operations Act 2074 BS (2017). LG institutions are mandated to provide efficient services to their citizens, and this includes infrastructure services through their infrastructure development units. However, there are important capacity gaps in delivering these services, and these gaps have resulted in prioritising infrastructures, including trail bridges, largely on political grounds and through an unsystematic planning process. This has resulted in trail bridges becoming increasingly and quickly redundant, particularly if the trail bridge planning is not aligned with that for motorable bridge allocations. Moreover, the operations and maintenance are often overlooked while focus is on spreading out budget to new and disparate infrastructures. The LGs assume full responsibility for developing short span trail bridges working together with local institutions. However, as data shows, the Local Governments have increasingly deprioritized routine or major maintenance. For example, in FY 2022/2023, only 1,737 (i.e. 17%) of all trail bridges received routine maintenance. A detailed analyses of the Local Governments' functions and capabilities is presented in Annex 2. Some achievements and challenges of the Local Governments in delivering trail bridges include:

i. **Since the implementation of the TB SWAp Framework III, 85% of all trail bridges in the country (i.e. 1,651 trail bridges) were implemented through LGs (ARP FY 2019/2020 to 2022/2023).** This is a rise of 91% between 2019 and 2023, indicating that LGs have been strengthened (since their establishment) and can deliver trail bridge outputs. In addition, the majority (98%) of the trail bridges implemented were SSTBs (spans less than 120 metres), indicating the strength of LGs in SSTB construction. For LSTBs however, more support in terms of TA is required (refer Annex 2 for further details on the capacities of LGs).

ii. **LGs can absorb 80% of the Federal grants provided (APR FY 2022/2023).** These outputs are a remarkable achievement for LGs, considering the initial scepticism about their capacities when they were first established.

iii. **The LGs can plan and construct trail bridge as per the Trail Bridge Strategy 2006.** The TB planning is incorporated into LGs periodic and annual plans and passed by the LG councils and a majority of LGs follow the prioritization criteria as per the Trail Bridge Strategy 2006. However, the key issue is that in some cases, planning process can be weak and perfunctory at best.

iv. **Local Governments have not prioritized the Routine Maintenance (RM) of the trail bridges**. The records indicate that prior to federalization, the then District Development Committees (DDC) carried out routine maintenance of trail bridges. Then, the provision to appoint Bridge Wardens was effective, and 65% of the total bridges received routine maintenance (Annual Project Report (APR) FY 2018/2019). However, since Nepal's restructuring and handing over of responsibilities to LGs, routine maintenance was drastically reduced to 17% (APR FY 2022/2023). The Study has identified two reasons for low maintenance figures: a) there are LGs that are unaware of their responsibility to implement routine and major maintenance, and b) information collected from the field (also corroborated with the Immersive Study) suggests that LG representatives are largely interested in new trail bridges and do not prioritize funds for maintenance of old ones. "Local governments *do not want to allocate budget for the old and 'not so useful bridge'. (They say) the old bridge is only used by a few people for farming and fodder collection" (Women, Siktaghat, Ramata).*

v. **Communication and coordination between LGs and Provinces and Federal government needs to be strengthened with the establishment of focal persons to ensure the smooth functioning of the sub-sector as Swiss TA, which had fulfilled the role, is no longer available.**

5.1.2. Provincial Level

I. Ministry of Physical Infrastructure Development (MoPID)/Transport Infrastructure Directorate (TID)/ Infrastructure Development Offices (IDO)

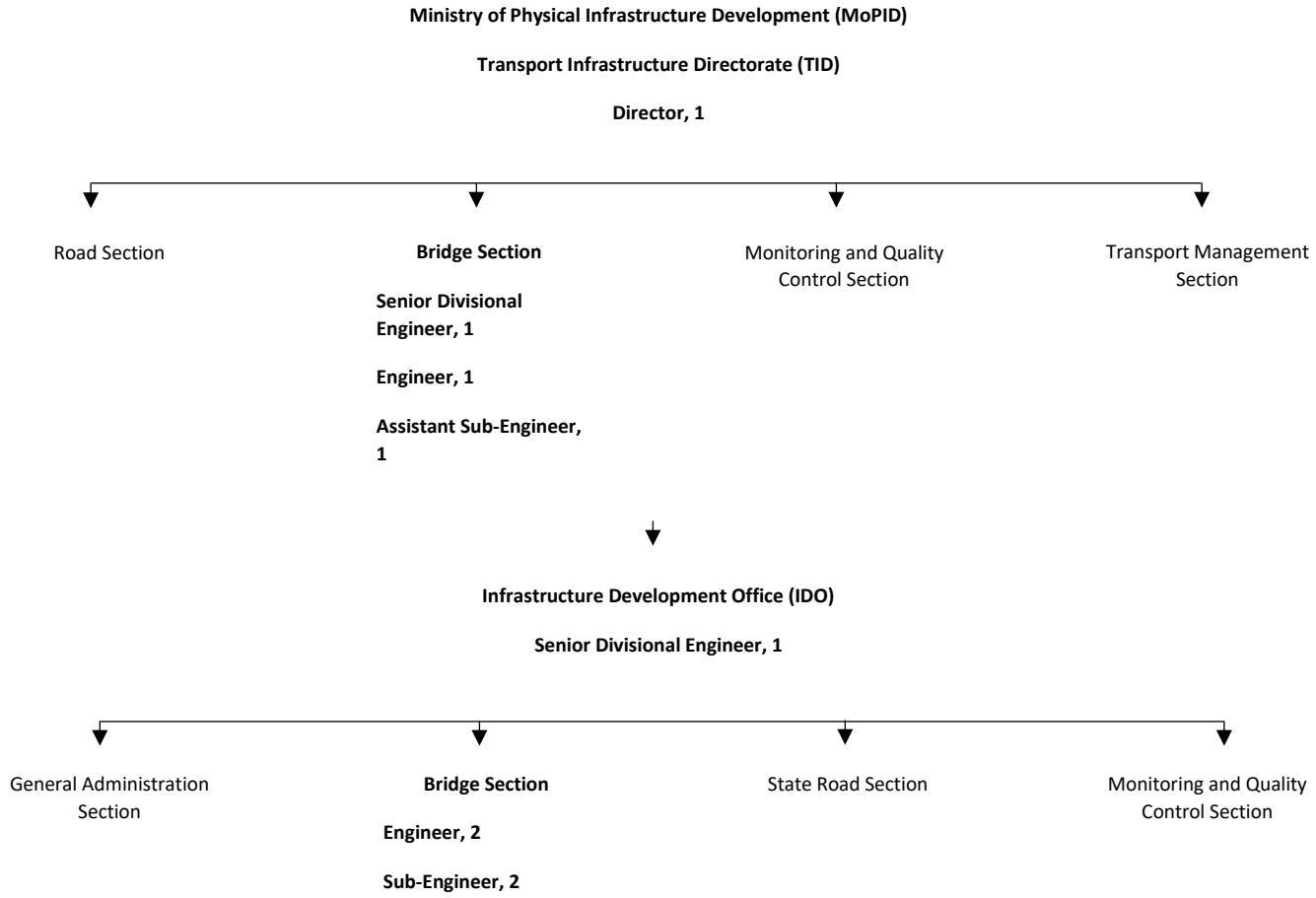
The Provincial Governments (PG) and their ministerial institutions are often working in a difficult situation where the assumed responsibilities are not matched with resources, both financial and human. Nonetheless, the PGs have clear and important mandates for infrastructure development, including trail bridge building. For example, Trail Bridge Coordination Committee Meetings (TBCCM), chaired by the Secretary of MoPID, provides a forum for steering the sector and addressing bottlenecks. This Study notes the TBCCM to be useful platforms for coordination amongst Provinces and LGs and for the overall guidance of the sector. MoPID and PTAP can work through TBCCMs to provide good coordination amongst stakeholders.

However, the PGs have a difficult political position. As a government in the middle of the federal and local government spheres, PGs are often sandwiched between the unwilling and self-assertive bureaucracies of the Local Governments and the resource constraint of the Federal Government. Interestingly, the trail bridges, too, stand somehow in a similar position i.e. there is universal acceptance that trail bridges are important infrastructures and are still much needed in the remote areas for safer crossings or for emerging new priorities in the peri-urban areas.

However, trail bridges may not be the most attractive local infrastructure that every politician would fight for. In between, the trail bridge will need to continue to be discussed, budgeted for, and passionately built for the good things it can do, particularly for the disadvantaged groups.

Figure 28 presents the organogram at the Provincial level

Figure 28: Organogram at the Provincial Level



MoPID is headed by the Secretary with a team of 4-5 engineers. TID/IDDs is headed by the Director- Senior Division Engineer, who is supported by 3-4 engineers. In addition, IDOs (1 covering either 1 or 2 districts) implement the trail bridge program with a team composed of 3-4 engineers and sub-engineers.

The primary responsibilities of MoPID is assumed by the Transport Infrastructure Directorate (TID) and includes planning, budgeting, coordination and monitoring of TB program at the Provincial level; undertaking bridge planning and budgeting within the Province using information received from LGs and budget assurance from Federal Government under TB SWAp conditional grant; procurement of PTAPs; planning and implementation of complex, inter-Provincial, multi-span trail bridges; procurement of steel parts for bridges on request of LGs; distribution of cables and bulldog-grips to bridges on request of LGs; and the management of stores.

Provincial Governments are utilizing both Federal SWAp Grants as well as funds from their internal resources for the trail bridge program. The former is used for trail bridge construction while the latter is used for co-financing of PTAP services. The proportion of Province internal funds for trail bridges have increased gradually from 76% (at the start of the framework during FY 2019/2020) to 95% at the end (FY 2022/2023).

Key findings

PGs have taken ownership of trail bridge program by promulgating Province-specific strategies, establishing functioning steering mechanisms, procuring TA services, and taking over store management and monitoring of the trail bridge quality and delivery. The challenge is now to ensure regular coordination with the FG and LG to continue the momentum of bridge building and procure new PTAP services. The key achievements and future considerations are presented below: A detailed analyses of the PG functions and capabilities is given in Annex 2.

i. **Provincial Governments are asserting their rights with the promulgation of the Provincial Trail Bridge Strategies.** The Provinces are developing their own Provincial Trail Bridge Strategies that align closely with the "Directive Principles, Policies and Obligations of the State" in the Constitution of Nepal. The new strategies have three overarching objectives, namely, build bridges with Provincial targets in priority areas with reduction of detour times to 30 minutes; carry out required maintenance of the trail bridges, and allocate TA for Provincial and Local trail bridge development works.
ii. ***PGs have built 340 trail bridges in the last five years***. The average annual outputs of trail bridges by Provincial Governments have increased from 8 bridges in FY 2018/2019 to 117 bridges by 2022/2023. This demonstrates the increasing confidence in trail bridge building through greater allocation of resources and technical expertise.
iii. **PGs have taken ownership and recognize the need for technical assistance through Provincial Technical Assistance Providers (PTAPs).** As another milestone in PG engagement is the procurement of PTAP services through co-financing. This process witnessed teething challenges in the initial phases and some delays in the procurement persists. It is imperative that the services of PTAPs be continued to fulfil the gaps following exit of Swiss TA, and to manage the large volume of bridges that are targeted to meet the policy provision of 30 to 45 minutes detour time as per the new Provincial Trail Bridge Strategies (i.e. in Koshi and Bagmati). In doing so, Provinces should ensure that TA services are provided to bridges implemented by Provinces as well as LGs.
iv. **It is imperative that Provinces monitor the functioning of PMIS and TBSIS (the monitoring systems)** to ensure proper data entry by PTAPs and use of the systems for planning, monitoring and reporting of new construction and maintenance.

5.1.3. Federal Level

At the federal level, there are three federal agencies inside the Department of Local Infrastructure (DoLI) with mandates to provide direction to the trail bridge sub-sector. These are:

a. Local Bridge Section (LBS)
b. Local Infrastructure Development Project Office (LIDPO)
c. Suspension Bridge Division (SBD)

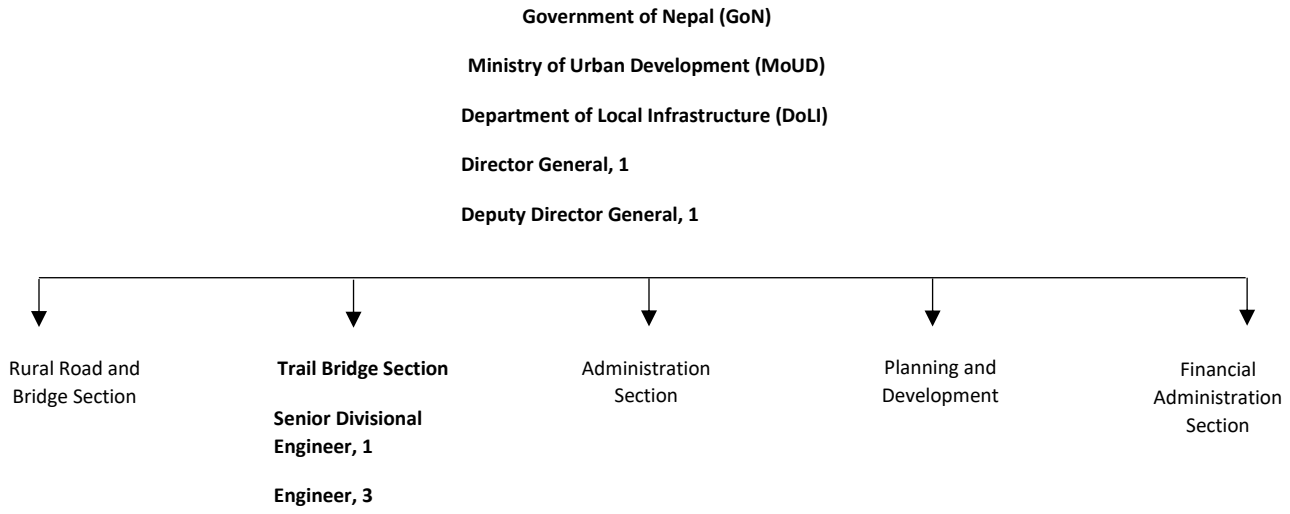
These federal agencies, to various degrees, share the following responsibilities: policy formulation; coordinating planning, securing and disbursing the TB SWAp grants to LGs and PGs; international procurement of wire-ropes and bull-dog grips; and undertake the construction of bridges that are complex, strategic, signatory in nature and connect the international boundaries.

There is significant scope for duplication of roles and responsibilities as they have shared responsibility, and this could result in none of them being singly responsible for the assigned responsibilities. In the context of this potential risk, a detailed assessment by DoLI of their capacities and analysis of roles and responsibilities would be useful. The mandates and practices of these institutions are briefly presented below:

I. Local Bridge Section/Department of Local Infrastructure

The Local Bridge Section (LBS) takes the lead in facilitating trail bridge building as demonstrated by their initiation to update the National Trail Bridge Strategy, act as member Secretary for the Steering Committee Meetings, procure wire-ropes as per the needs, implement signature and complex bridges, and coordinate with PGs and LGs for bridge planning and allocation of Federal grants. Figure 29 presents the organogram at the Federal level. Annex 2 presents a detailed analysis of the DoLI functions and capabilities.

Figure 29: Organogram at the Federal Level



The LBS is headed by a Senior Division Engineer (SDE), who is supported by two additional engineers. The SDE is a dedicated focal person to coordinate with PGs and LGs as well as coordinate Trail Bridge program planning, budgeting, implementation, monitoring and reporting.

Key findings

i. **As the member secretary, DoLI coordinates Steering Committee Meetings (SCM), which have been vital to guide the trail bridge sector.** The SCM, chaired by the Secretary of Ministry of Urban Development (MoUD), are conducted annually to approve annual plans, document progress and address bottlenecks. The SCM provides strategic guidance to the trail bridge sector, such as defining roles and responsibilities of the federalized agencies, and has therefore been integral to the effectiveness of the Trail Bridge program.

ii. **LBS/DoLI has been instrumental in coordinating bridge planning, budgeting, and procurement f wire-ropes, and co-financing of PTAP services.** TBSSP annual reports show that following the implementation of TB SWAP Framework-III, Federal TB SWAP grants accounted for around 88% of the total budget allocations, with the proportion of LBS/DoLI budget (including Local Infrastructure Development Project Office)

constituting 29% of the total budget (TBSSP Annual Reports FY 2019/2020 – FY 2021/2022). Overall, the GoN contribution equals to 95% of the total budget including internally sourced budgets from Provinces and Municipalities. In addition, DoLI has been solely responsible for the procurement of wire-ropes internationally to ensure adequate stock. At the time of the preparation of this report, the stock was calculated to be adequate to meet the requirements till FY 2023/2024.

iii. **DoLI needs to proactively coordinate with PGs and LGs for planning, budgeting, monitoring and implementation**. Previously, TBSU/Helvetas was acting as the bridge among the three spheres of the Government for coordinating, planning, budgeting and monitoring. But now with the phasing out of TBSU, it is inevitable that a gap will be created if DoLI and the other governments do not play a more proactive role to coordinate amongst each other. DoLI needs to communicate with PGs over consultative workshops and meetings in all PGs for specific functions such as revising the National Trail Bridge Strategy, and these interactions need to be regular.

iv. **Furthermore, it is imperative that LBS/DoLI have the sufficient human resources and arrangements for the smooth transition, especially for strengthened planning and coordination with and among the different government spheres.** The shifting of DoLI to the Ministry of Urban Development (MoUD) from the Ministry of Federal Affairs and General Administration (MoFAGA) has meant that DoLI will need to engage more and coordinate with the Provincial and Local Governments that execute the local infrastructures for which it is mandated to support with policy, standards and technical instruments.

v. **In addition, during FY 2002/2003, LGs complained that due to the untimely disbursement of budget grants, trail bridge construction was delayed, including delayed payments to labourers.** The contractors also stated that the price of materials fluctuate, which makes it difficult for them to fulfil their contractual obligations. These issues need to be addressed by DoLI.

vi. **DoLI is in the process of updating the National Trail Bridge Strategy.** The LBS initiated the processes for updating of the National Trail Bridge Strategy 2006 (at the time of this report's preparation) to align with changes as per the federal structures and needs assessment at the national level. While updating the strategy, incorporating past "good practices," ensuring SSTBs are implemented through the "community approach," social inclusion and governance measures would ensure that achievements of the past are continued for the future.

II. Suspension Bridge Division

The Suspension Bridge Division (SBD) is under the Department of Local Infrastructure (DoLI) of the Ministry of Urban Development (MoUD) and is led by a Project Chief and Senior Divisional Engineers.

SBD was established as a project in 1964 but is without a permanent status in DoLI. In the earlier years, i.e. 1964 – 2006, the division was technically and financially supported by the Swiss government to develop and construct trail bridges. During this period, SBD standards for long span bridges, now referred to as LSTB designs were developed, as SBD piloted and worked on different designs as it built the trail bridges in different terrain conditions.

Key findings

i. **The SBD's delivery of trail bridges has been steadily increasing since 2009**, from an annual average of 10 bridges during SWAp Framework I (2009 -2014) to 50 bridges during SWAp Framework II (2014-2019) and up to 83 bridges during SWAp Framework III (2019 -2023). Since the implementation of TB SWAp Framework III, SBD has constructed 590 trail bridges, i.e. 9.6% (TBBSP Annual Reports, FY 2009/2010 and FY 2022/2023).

ii. **SBD has led the sub-sector in new and complex bridge building.** In doing so, SBD has moved forward, over the past decade, with longer and higher trail bridges and multi-linkage bridges, i.e. "triages" or "three-mouthed (tinmukhe)" bridges. Some of the higher and longer bridges have been constructed for recreational and tourism use, including for bungee jumping, and have been noted to attract and impact positively on the local accessibility and income generation for the local communities. The construction of "signature" bridges demonstrates the need for SBD to develop itself as a "centre of excellence" for complex and innovative bridges, leaving the standard LSTBs to Provinces and LGs, to make greater efficiency of SBD expertise and prevent duplication of trail bridges.

iii. **The Study notes that SBD needs to consider at more depth the sustainability and quality of the trail bridge network, and its maintenance and future investments.** These considerations are not always given the required level of priority by SBD in making its investments and support in capacity development of the associated agencies. As a consequence, the safety of the constructed trail bridges are often questioned with increasing state of disrepair.

iv. **A key challenge for SBD is how it transforms itself to assume the responsibilities for trail bridge development in the new context of working in the sub-sector without Swiss support** and how it engages in developing a robust and single-window system with DoLI to maintain increased level of trail bridge delivery that meets required quality and safety standards and rate of delivery.

III. Local Infrastructure Development Project Offices (LIDPO)

The Local Infrastructure Development Project Office (LIDPO) is a federal structure that was established in FY 2020/21 as project offices in all 7 Provinces to implement infrastructure projects. The main mandates assigned to LIDPO are to lead capacity development in the Provincial and Local governments; execute the construction and maintenance of rural access infrastructure (including motorable and trail bridges); and facilitate the disbursement of foreign aid for infrastructure projects.

Key findings

i. **LIDPO constructed 40 new trail bridges during FY 2022/2023 in comparison to none during the previous year.** Which is not that surprising considering that the officer were recently established and that trail bridges require on average a two-year construction cycle.

ii. **There are concerns that the establishment of LIDPO has the potential to facilitate federalization by leading capacity development in the Provincial and Local governments.** However, there are concerns that the establishment of LIDPO is an encroachment on the mandates of the federalized Local and Provincial Governments. Considering that the Province TID/IDOs and the Local Governments already have the mandate for trail bridge construction, LIDPO implementing trail bridges presents duplication of resources, mainly using the Federal grants that could be diverted to LIDPO instead of LGs with the mandate for trail bridge building as per the Local Governance Operations Act 2074 BS.

5.2. Technical Assistance Providers

5.2.1. Local Level

I. Non-Government Organizations (NGOs)

NGOs are the backbone of SSTB trail bridge construction, assigned to provide TA to UCs, and are one of the main reasons for TBBSP achieving large scale delivery of trail bridges with ensured social inclusion and transparency in trail bridge building process. Most NGOs in each district have a good understanding of the trail bridge program and are keen to be involved in trail bridge building process.

As per the Trail Bridge Strategy 2006, NGOs are responsible for providing technical services including design, preparation of Detailed Project Reports, construction supervision to Users' Committees, social mobilization, reporting and maintenance of the SSTB bridges. They select and prioritize beneficiaries, plan and budget TB and facilitate the construction and management of trail. Bridges. Within the TB SWAp Framework III, the NGOs have a crucial role in providing TA and mobilizing local TB beneficiaries.

Generally, there is one NGO per district to provide TA for bridge building. Each NGO has a dedicated trail bridge focal person with skills to support trail bridge building. National Trail Bridge Strategy provides that each NGOs service costs is equivalent to around 6% of the total trail bridge costs.

Key findings

i. **NGOs have provided technical assistance (TA) to 85% of all trail bridges constructed in Nepal**. This fact illustrates their role and importance in the sector. NGOs are vital to ensuring social inclusion in the UCs and during employment opportunities) and to ensuring that UCs manage Trail Bridge building effectively and in a transparent manner. Field insights indicate that NGOs are dedicated and provide timely inputs. In addition, the Study found NGOs to be responsive to UCs need and they take ownership of trail bridge building. The Study notes that technical assistance through NGO has helped to consistently maintain the scale and quality of trail bridge building.

ii. **NGOs raise awareness, support UCs and ensure social inclusion and good governance with trail bridge building.** The NGOs have proved to be instrumental in ensuring social inclusion of UCs and implementation of governance tools. In addition, NGOs are deeply engaged in raising awareness and achieving higher community engagement through UCs to manage trail bridge construction.

iii. **It is critical that NGOs capacities are strengthened** in the future so that they are able to maintain and strengthen the skills, know-how and capacities associated with trail bridge building within their teams. They already face a key challenge of not being able to retain their capable staff members.

Table 17 highlights key achievements and challenges that some NGOs in the seven Provinces experience during, before and after the trail bridge construction process.

Table 17: Key Achievements or Challenges of NGOs During, Before and After TB Construction

Province	District	NGO	Key Achievements or Challenges
Koshi	Sankhuwasabha	Society Development Centre	▪ The NGO involvement in the trail bridge building process is very important for two reasons: in many cases, NGOs are able to provide more dedicated time for trail bridge building than Local Governments and NGOs are better at community engagement. ▪ NGO involvement in Trail Bridge building in Khandbari Municipality led to the early completion of the project by at least 6 months. Firstly, the NGO office was very close to the construction area – making travel to the bridge easy and cost-effective. Second, the NGO was very well established in the area, making community engagement relatively easy. Thirdly, the communication and coordination between the Local Government and the NGO was clear and regular, and the LG was prompt at disbursing budget.
Madhesh	Rautahat	Creative Groups of Nepal	▪ Close coordination between NGO and Local Government is very important for effective trail bridge building, according to the Manager of Creative Groups of Nepal NGO in Rautahat. For instance, the construction of a trail bridge in Rautahat is taking more time than anticipated. All materials have been purchased, PTAP have provided their assistance and the UC has implemented the bridge construction with only fitting remaining. However, the Local Government in Rautahat has not prioritized this trail bridge, which has resulted in delays. The solution to this problem could be engaging the community to convince the Local Government to prioritize trail bridge building.
Bagmati	Kavrepalanchok	CIVIC Forum	▪ The NGO involvement in the trail bridge building process is very important for the project's effectiveness, for two primary reasons: in many cases, NGOs are able to provide more dedicated time for trail bridge building than Local Governments can and NGOs are better at community engagement like awareness raising, transparency events etc.
Gandaki	Baglung	BYC	▪ According to the Manager of BYC NGO, NGOs have a big responsibility to provide technical assistance and community engagement for bridge building, but with these responsibilities there are bigger challenges. For instance, poor communication with the Local Government has increased the burden on NGOs and has delayed the bridge building process. Particularly in Dhorpatan Municipality, the Local Government is slow and reluctant to provide 13% contribution to the trail bridge budget, causing disputes and trouble. As a result, the NGO is unable to take forward their work. ▪ High staff turnover is also a key challenge. The NGO invests significant amount of time and effort to capacitate and inform a Local Government officials. If a new officer takes the title of the previous individual, the NGO has to spend valuable time and effort again to explain all the intricacies of their communication. This process is redundant and counter-productive.

Province	District	NGO	Key Achievements or Challenges
Lumbini	Palpa	Indreni Samaaj Kendra Nepal	▪ In Ribdighat Rural Municipality, Palpa, people recognize this NGO as "the organization that gave them the trail bridge." The NGO played a major role in providing technical assistance and community engagement assistance. For TA, the NGO provided heavy assistance in DPR preparation and in capacitating workers throughout the construction process. The NGO also invested heavily in awareness raising about the trail bridge construction process; UC contribution to trail bridge building; LG contribution to trail bridge building. In addition, the NGO held transparency hearings in the community to inform the people on how the budget was about to be utilized.
Karnali	Jajarkot	Rural Development Service Center (RDSC)	▪ This NGO has played a major role in trail bridge building in Jajarkot and Dailekh. Although PTAP is integral part of the trail bridge program, they are unable to travel to each and every bridge. This gap is often filled by NGOs. The PTAP and Local Governments rely on RDSC to provide technical assistance and community engagement services. ▪ One of the main challenges is high staff turnover in Local Government. The high staff turnover has been the cause of miscommunication, delay in bridge building process and arguments between the RDSC and Local Governments.
Sudur paschim	Baitadi	Triveni	▪ Triveni focus on marginalized population engagement during trail bridge building. For instance, Triveni encouraged participation from women in user committee decision making. The NGO has also helped marginalized population build retail shops around the trail bridge by providing technical assistance in building design and construction. ▪ The NGO often face challenges of maintaining regular communication with Local Governments.

II. Consultants

Consultants, both individual and institutional, represent knowledge and management capability to provide expert services to the trail bridge building process. TBSSP works with consultants for the designing and construction of LSTBs. Most are located in Kathmandu, but have been providing their services for trail bridges constructed throughout the country. Their services are procured by SBD/DoLI, Provinces and LGs. Most consultants are competent, with their capacity strengthened through trainings provided by TBSU/Helvetas and DoLI over the decades. However, they also face a high turnover of their staff members, resulting in need to keep capacitating new arrivals periodically.

III. Contractors

There are over 25 contractors currently engaged in trail bridge building nation-wide. Consultations with different stakeholders indicate that their quality level varies widely with weaknesses often noted in their inability to assign supervisors with good supervisory technical skills and to prepare timely and quality progress reports.

5.2.2. Provincial Level

I. Provincial Technical Assistance Providers (PTAPs):

During implementation of Framework III, the Provincial Governments procured the services of PTAPs, co-financed by the Federal Government and SDC. With the exit of Swiss support for trail bridges, PTAP services are to be procured solely by the Provincial and Federal Governments.

All seven Provincial Governments engage PTAP services. Each PTAP team often comprises one Program Coordinator, one Technical Coordinator and technical team consisting of Technical Officers (TO). Generally, one TO is responsible for two districts.

Key findings

i. **The arrangement of PTAPs to provide TA to LGs and Provinces for bridge construction has been an effective and successful approach for delivering trail bridges in terms of quantity and quality.** This arrangement is considered an excellent exit strategy considering the new context of working without Swiss support. The PTAPs communicate with, collect information for and support the LGs and PGs to plan, prioritize bridge needs, review DPRs and monitor construction cycle. The PTAPs have also supported LGs to procure services (NGO), works (contractors) and goods (steel parts) by orienting and supporting them in the documentation processes. A joint assessment of their performances by MoPID and TBSU found them to be ranging from good to satisfactory (Table 18). All PTAPs were assessed to be able to independently support for SSTB construction, but not fully capable on LSTB construction, indicating the need for additional support from the DoLI.

ii. **PTAPs have supported Provincial Governments to prepare strategies and steer the sector**. PTAP support to Provincial Governments have enabled them to develop their own strategies. These trail bridge strategies must meet the distinct requirement of that Province and should not be generalized. Moreover, the PTAP must focus on a participatory approach to identifying priorities while building trail bridges.

iii. **The PTAPs are well-capacitated and capable of providing trainings on SSTBs to LGs and routine maintenance to bridge wardens.** The PTAPs, with the support of TBSU, conducted periodical trainings and orientations to different stakeholders, e.g. technical trainings to engineers and sub-engineers from LGs and routine maintenance trainings to bridge wardens. PTAPs have also strengthened the capacities of trainee engineers, sub-engineers and assistant sub-engineers through traineeships and on-the-job trainings to develop skilled human resources for the market.

iv. **The PTAPs have contributed towards the institutionalization of social inclusion and implementation of governance tools**. Social inclusion, in UCs and targeting of employment opportunities, and governance tools have been institutionalized. The PTAPs, along with NGOs, have played a key role in ensuring that the provisions are monitored and adhered to. Considering the importance of these initiatives, the PTAP contracts enable the continuation of social inclusions and governance measures within trail bridge building. Moreover, in order to prevent the prioritization of only technical aspects of trail bridge building, the social inclusion and governance measures must be monitored.

v. A key challenge facing PTAPs is their sustainability after Swiss TA exit. During the Study's conversation with the Provincial governments, most had a good impression of PTAP performance (Table 18), and at the time of preparing this report, all seven Provinces had allocated budget for PTAP procurement (with

co-financing from the Federal government), which is a positive indication. Within the organization itself, there is also the challenge to retain the capacitated staff as interviews with the management have revealed that there is difficulty in hiring and retaining staff in the absence of attractive pay packages.

Table 18 presents the main points highlighted during the detailed PTAP evaluations conducted by Provinces and TBSU.

Table 18: Challenges and Areas of Improvements of PTAPs and PTAP Evaluation by TBSU and MoPID in 2023

Province	PTAP	Challenges and Areas of Improvement	Performance Assessment
Koshi	North Star, Miteri, SITARA JV	▪ High demand for trail bridges but limited budget, leading to delayed payment to staff and delayed work. ▪ Needs training on project management and planning to implement trail bridge activities. ▪ Inefficiency in areas of information management, e.g. lack of technical capacity, and documentation, e.g. system for documentation.	Good
Madhesh	SAKHUWA, SEBAC, Everest JV	▪ Communication between Local Government and PTAP needs improvement, as lack of adequate communication is leading to confusion and delay in work. ▪ Difficulty in procuring steel parts upon request from the Local Governments due to delays from the Federal Government.	Satisfactory – Good
Bagmati	SAKHUWA, RIDC, CARD JV	▪ Communication between Local Government and PTAP needs improvement, as lack of adequate communication is leading to confusion and delay in work. ▪ Inadequate human resource and high staff turnover has affected effective functioning of the PTAP. ▪ PTAP reported difficulties in retaining staff in absence of attractive pay packages and difficulty in hiring and retaining competent candidates. ▪ Due to high demand and a limited number of staff, PTAP is unable to routinely monitor TBs and unable to provide DMBT on time.	Good
Gandaki	SILT, INCLUSIVE, GLOBAL JV	▪ In adequate human resource and high staff turnover has affected effective functioning of the PTAP. ▪ PTAP reported difficulties in retaining staff in absence of attractive pay packages and difficulty in hiring and retaining competent candidates.	Good
Lumbini	INCLUSIVE, GLOBAL, DECOS JV	▪ Communication between Local Governments and PTAP needs improvement, as lack of adequate communication is leading to confusion and delay in work. ▪ PTAP reported difficulties in retaining staff in absence of attractive pay packages and difficulty in hiring and retaining competent candidates. ▪ Inefficiency in areas of information management, e.g. lack of technical capacity, and documentation, e.g. lack of system for documentation.	Good
Karnali	HURENDEC, SEBAC Nepal JV	▪ Communication between Local Governments and PTAP needs improvement as lack of adequate communication is leading to confusion and delay in work. ▪ PTAP reported difficulty in retaining staff in absence of attractive pay packages and difficulty in hiring and retaining competent candidates. The high turnover, in turn, affects the multi-venture nature of the PTAP	Good

Province	PTAP	Challenges and Areas of Improvement	Performance Assessment
		team composition where frequent changes in team members and the changing nature of staff ability affect the workings of PTAP.	
Sudur Paschim	APIPOINT, SEBAC, HURENDEC JV	▪ Inefficiency in areas of information management, e.g. lack of technical capacity, and documentation, e.g. lack of a system for documentation. ▪ PTAP reported difficulties in retaining staff and absence of attractive pay packages and difficulty in hiring and retaining competent candidates ▪ Delays in carrying out DMBT due to lack of human resources and delayed disbursement of funds.	Satisfactory

5.2.3. Federal Level

I. Trail Bridge Support Unit/Helvetas:

Overview:

The Trail Bridge Support Unit (TBSU) of Helvetas was established to provide technical assistance (TA) to TBSSP on behalf of SDC, as per the bi-lateral agreement between the governments of Nepal and Switzerland.

TBSU carries the mantle of trail bridge building in Nepal with its rich history and sustained capacity building services it provided to a range of stakeholders associated with the continued provision of TA to trail bridge building initiatives in Nepal over the decades.

TBSU/Helvetas comprised a central Project Coordination Unit and Provincial offices in all the 7 Provinces. At the time of closing, TBSU consisted of 44 staff members.

In the federalized context, TBSU provided TA to Federal, Provincial and Local Governments and other relevant stakeholders to deliver their functions to implement the TBSSP. In doing so, post-federalization, TBSU swiftly also re-structured its own human resources, with the establishment of Provincial Offices, and modified working modalities, including updated formats and guidelines to reflect the federalization of Nepal. In those critical moments, TBSU itself became the bridge between the Federal and Provincial Governments for coordinating the trail bridge program.

In this role, the TBSU assumed the following responsibilities:

a. Federal level: Assist in the updating of trail bridge strategy and updating of manuals; support LBS/DoLI prepare annual plans and budgets for TB SWAp sector conditional grants; support LBS/DoLI for procurement of wire-ropes and bull-dog grips through international competitive bidding; administration of monitoring systems and reporting; and support DoLI in Research & Development.
b. Provincial level: Support Provincial governments to design trail bridge related strategies as a part of the province's transportation master plan; assist Provincial governments to procure services of PTAPs, including co-financing arrangements on behalf of SDC; coordinate for bridge planning, prioritization, implementation and monitoring of bridges; and enhance the capacities of PTAPs and other stakeholders. Undertake and capacitate PTAPs on quality assurance, monitoring and inspection.

c. Local level: Assist Local Governments to enhance the capacities of their technical units and private sector entities for bridge planning, budgeting, procurement of TA services and monitoring.
d. Private sector: Develop the capacities of consultants, contractors and fabricators.

Key achievement

a. **TBSU has been able to achieve substantial impacts in the institutionalization of optimal delivery of trail bridges across the country, and is in a good position to hand its responsibilities equipped with a robust and institutionalized trail bridge building structure of the Government of Nepal**. This process has been more remarkable since the adoption of sector approach, i.e. Sector Wide Approach (SWAp), to trail bridge development process. For example, over the execution of the first trail bridge SWAp framework I (2009 – 2014), the annual delivery rate of trail bridges increased from 180 trail bridges at base period to over 450 trail bridges by 2018. Overall, 85% (5,185) of all trail bridges in Nepal were constructed after SWAp was – through TBSU TA. This TA has been essential to ensure the quality of the trail bridges.
b. **TBSU has the institutional understanding and recognition to provide TA to the government for updating and drafting strategies related to trail bridge building**. The TBSU provided sustained support to DoLI to update the National Trail Bridge Strategy through provisions of its technical assistance services and coordinating consultative Provincial meetings. The TBSU also supported the Provincial Governments to draft their Provincial strategies. In the case of the national strategy, it was a milestone in the sub-sector as it set a national goal, demarcated standards and implementation approaches leading the acceleration of trail bridge outputs and institutionalization of the sub-sector.
c. **TBSU adopted a multi-strategic approach for quality assurance which was assessed to be effective.** This included the review of designs; enhancing technical know-how; carrying out joint inspections with PTAPs to fabricators; lab testing; local testing of a sample number of bridges. The result of all of these approaches have been consistent delivery of good quality trail bridges. For example, according to the annual programme report, 98% of the trail bridges which were sampled for load testing passed, with only 2% requiring minor rectification.
d. **TBSU heavily invested in enhancing the capacities of stakeholders covering different governance systems.** The effectiveness of these trainings will resonate over many years even after the departure of TBSU support. The trainings primarily focused on technical aspects within LGs, and imparted to engineers, sub-engineers and NGO representatives, with stakeholders covered from throughout the country.

   In the case for capacitating PTAPs, TBSU adopted the approach of “accompanied capacity building” – which is to say that TBSU staff provided backstopping support to PTAP staff during implementation of the program. The high outputs of annual trail bridges demonstrated that this was effective along with the acceptance by GoN and other stakeholders of PTAP arrangements.

   TBSU built capacity of the consultants, contractors and fabricators through regular feedback on their quality of works. A notable achievement included the automation processes now adopted by 50% of fabricators at the recommendation of TBSU. The TBSU also invested in providing traineeships and on the job trainings to engineers, sub-engineers and assistant sub-engineers to increase the pool of trail bridge expertise. Knowledge centres at all the Provincial Government offices were also established in the Provinces with the support of TBSU. This primarily included the re-printing of manuals, guidelines and formats so that they were easily accessible.

II. Fabricators

There are 22 fabricators that are capable of manufacturing steel parts for the sector. Among these, 50% have started automated production to further enhance quality and make the process more efficient. There are fabricators in each Province, but the majority are in Butwal, Lumbini Province.

Fabricators often cite the following as their main challenges:

i. Absence of timely payments by LGs (which in turn are dependent on the release of SWAp Federal grants),
ii. LGs and PG inflexibility to adjust increased price of materials, delays in lab testing of raw materials, difficulties in delivering materials to remote areas and the inability of UCs and LGs to identify materials upon delivery.
iii. Risks of delayed payment are also cited by many stakeholders as a prime reason for reduce competition in procurement bidding that affects the quality-of-service providers.
iv. Absence of testing labs in each Province has meant long delays in the time it takes for testing in Kathmandu, which in turn affects the supply process.

5.3. Local Beneficiaries

5.3.1. Trail Bridge Users' Committees

Users' Committees are temporary committees that are formed after the signing of the "Community Agreement" with LGs for the duration of SSTB construction cycle. UCs are responsible for the day-to-day management of trail bridge construction. This includes following the directions of NGOs on construction, managing labourers and their payments, keeping records of income and expenditure liaising with LGs, NGOs and Provinces for the delivery of wire-ropes and other bridge parts, storage and keeping records in the "project book" amongst others.

UCs are supported by NGOs, and PTAPs, who need to be present during different construction milestones. As per the National Trail Bridge Strategy 2006 and TB SWAp Framework-III, all UCs need to be proportionately representative of the beneficiary population, 50% women members, and having an individual from a discriminated group in an executive position (details on social inclusion are presented in section 6). During any given fiscal year, there may be 700 to 1,000 UCs throughout Nepal that manage SSTB construction.

Key findings

i. Most UCs are performing their roles well and have good linkages with LGs and NGOs.
ii. Delays in the release of resources by LGs, which in turn causes delays in payment to labourers, was cited to be the most significant challenges faced by UCs in performing their roles. This creates social and economic pressure, leading to the stress and loss of motivation amongst members. In a few cases, UCs reported to have taken loans to pay labourers and buy materials to ensure the construction of the trail bridges, when LGs did not release payments in time.

5.4. Educational Institutions

Trail Bridge is an elective course in major engineering colleges and has been continued at the Institute of Engineering (IoE), with around 100 graduate engineers in five years, i.e. 15 to 20 students annually. The case for sub-engineers and assistant sub-engineers is however more encouraging as trail bridge curriculum is in-built to their courses and constitute the main pool from which NGOs recruit technical officers.

Key findings

i. For most graduate engineering students, trail bridge building is not seen as an attractive sector as they do not see full career in trail bridge building. This is reflected in the low number of students who pass out with trail bridge know-how. Consequently, there are less human resources in the market.

ii. The sub-sector is more attractive to Sub-Engineers and Assistance Sub-Engineers, who in addition to their theoretical knowledge, require further practical experience. For this, the traineeships and on-the-job training provided by TBSU was useful to impart the know-how and develop human resources. Such types of programmes should be continued in the future. Currently, a number of Nepali technicians provide technical design and oversight services in different countries in Africa and Asia.

6. GENDER EQUITY AND SOCIAL INCLUSION (GESI) AND GOVERNANCE IN TRAIL BRIDGE BUILDING

Section 6 provides an analysis of the approaches, achievements, and challenges of mainstreaming GESI and governance within Trail Bridge building in Nepal. The following analysis uses secondary sources, including past studies, published articles and information collected from interviews and focus group discussions to feed to the analysis.

6.1. Policy Provisions

The Trail Bridge Strategy 2006 and program documents for TB-SWAp Framework-I, II, and III, which guide the sub-sector, stipulate GESI and governance-related provisions as core principles that drive the trail bridge sub-sector. They are primarily focused on Short Span Trail Bridge (SSTB) building - where prioritization, construction, and maintenance processes prioritize the engagement of women and disadvantaged groups in the entire process of trail bridge construction, including meaningful participation in selection of trail bridge location, management of User's Committee (UC) and award of employment opportunities. Table 19 summarizes the GESI-related provisions of Trail Bridge Strategy and the Trail Bridge Sector Wide Approach Framework III.

Table 19: The Provisions within Trail Bridge Strategy and Trail Bridge Sector Wide Approach Framework III

Provisions	Trail Bridge Strategy 2006	Trail Bridge Sector Wide Approach Framework-III (2019-2023)
Planning and targeting	Prioritization criteria for TBs includes higher weightage for potential bridges which benefit larger segments of disadvantaged groups	Continued with the prioritization criteria similar to Trail Bridge Strategy 2006
Inclusive UCs:	Target for at least 30% women	Target for at least 50% women
		Target for women in at least one executive position
		Target for UC composition to be proportionately representative of beneficiary population
Employment opportunities:	Equal pay for same work for men and women	Equal work for equal pay for men and women
		Target for at least 50% of the employment opportunities for disadvantaged groups
		Target for at least 30% of the employment opportunities for women
Transparency	All operations will be carried out in a transparent manner	Conduct Public Hearing and Public Audit at all the bridge sites

These provisions are aligned with international conventions, such as Convention on the Elimination of all forms of Discrimination against Women (CEDAW) and are aligned to support the Sustainable Development Goals (SDGs), particularly Target 5.5. "*…to ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life*".

A paper – "*Mainstreaming gender in the Trail Bridge Sub-Sector in Nepal: Tracing the development of policy changes*[16]" examined how these GESI provisions have evolved over the past decades, with the study concluding that the provisions were more "readily accepted" and were institutionalized into government systems due to the *incremental changes* that were introduced along with tangible achievements seen at the sites. For example, the paper describes how Government officials were at first reluctant to incorporate quotas for women in the UCs as they considered trail bridge building to be a "purely technical and male activity" and accepted to consider inclusive approach after SDC shared successful examples of women managing trail bridge construction in the Swiss supported Bridge Building at Local Level (BBLL) project. Similar trajectories were also traced for provisions regarding targeting women in executive positions within UCs, and employment opportunities.

Additional studies[17] have also assessed the provisions along the Gender Continuum – i.e. from Gender Exploitative[18] – Gender Blind[19] – Gender Aware[20] – Gender Responsive[21] – and finally Gender Transformative[22]. They have concluded that the provisions in the program documents were broadly "gender responsive**"** as the program has sought to understand the challenges and opportunities faced especially by disadvantaged groups due to societal (i.e. gender, caste/ethnicity) and historical contexts and sought to address them through various programmatic measures.

This Study has also looked into various GESI and governance provisions and practices and how these have evolved into each successive program document (especially the SWAp Frameworks) reflects an understanding of the deep rooted historical and social exclusion that women and specific caste/ethnic groups have faced in participating in trail bridge programmes and may equally be applicable in other infrastructure development activities including local roads. Accordingly, it seeks to assess how this has contributed to increased space and opportunities to take leadership roles, have greater agency, and control over resources.

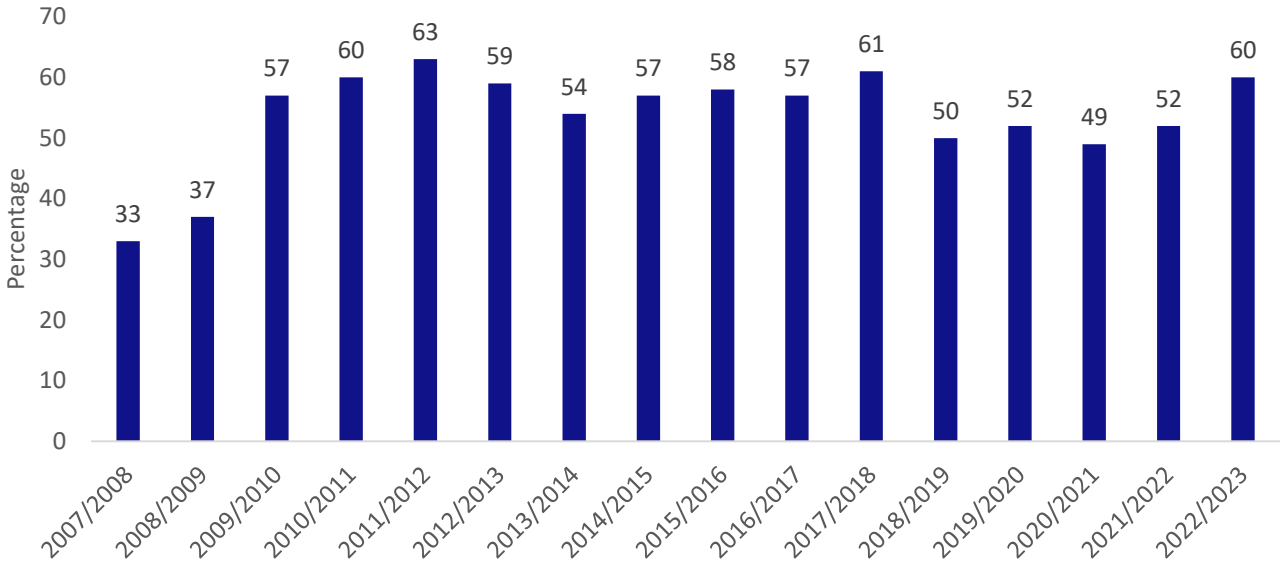
[16] Tumbahangfe, A (2021). Mainstreaming gender in the Trail Bridge Sub-Sector in Nepal: Tracing the development of policy change. Transport and Communications Bulletin for Asia and the Pacific. Vol 91.
[17] Helvetas (2017). Transforming gender relations in the trail bridge program in Nepal: An analysis of policies and practices.
[18] Taking advantage of rigid gender norms/power imbalances to achieve program objectives.
[19] No prior consideration of how gender norms and unequal power relations affect program objectives and how they impact men and women differently.
[20] Consciously addresses gender constraints and opportunities.
[21] Acknowledges role of gender norms and inequalities and seeks to develop actions to adjust and compensate for them.
[22] Encourages critical awareness of gender roles among men and women to promote the position of women, challenge distribution of resources and power between men and women.

6.2. Institutionalization of GESI at Operations Level

a. Bridge selection during planning

The prioritization criteria for bridge selection have largely succeeded in ensuring that bridges that have higher potential to benefit more disadvantaged groups are selected for bridge construction. Figure 30 presents the percentage of DAGs amongst the trail bridge beneficiaries each year from 2007 to 2023.

Figure 30: Percentage of DAGs amongst Beneficiaries



Source: Trail Bridge Support Unit (TBSU), 2023

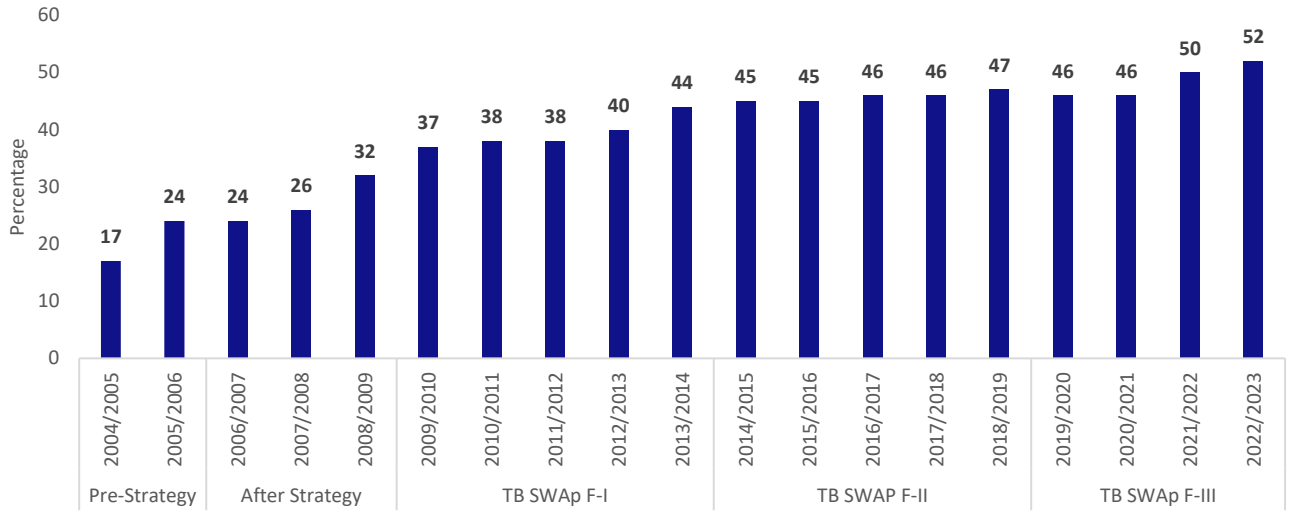
Data show that the adoption of the prioritization approach given in the Trail Bridge Strategy 2006 has led to increased proportion of disadvantaged groups and has remained largely consistent between 50-60% of the total beneficiaries. This is quite significant and demonstrates that the GESI has been largely mainstreamed in the trail bridge development process.

However, this Study and many others have shown that local political influence can still lead to bridges being selected that are beyond the prioritization criteria. For example, during the Baseline, locals in a remote settlement in Jajarkot shared that they had to wait for over 30 years for a trail bridges, while neighbouring villages with lower priorities had bridges constructed much earlier.

b. Inclusion in Users' Committee

The mandatory allocations for women and discriminated groups in the Users' Committees are institutionalized, with most at the field level being aware of the requirements. Records indicate that the percentage of women in the UCs has steadily risen since the inclusion of the provisions in the Strategy from 2006 onwards, with the target of 50% achieved in the FY 2022/2023 (Figure 31).

Figure 31: Percentage of Women Representation in UC



Source: Trail Bridge Support Unit (TBSU), 2023

The translation of the provisions for empowerment were found to be mixed. The findings of this Study and others in the past show that having women or Dalits, for example, in the UCs have necessarily meant that they are exercising greater agency or their voices are being heard.

Rather, what was noted to be important was the degree to which women in the UCs are supported by their family members and received NGO facilitation. The Immersive study 2023 findings indicate that committees "appreciated the positive role played by the NGOs in facilitating the formation of the users' committees". For example, when tensions rose about the formation of the UCs at one site in Saptari, the swift intervention and guidance by the NGO was helpful.

> *"When the user committee was being formed, people from nearby village wanted to be in the committee and wanted the position of the chairperson of the user committee. We said that we only want the bridge and they can take whatever position they wanted but the bridge has to be built. TBSU and the local NGO helped us with the formation and explained that the user committee needs to have the involvement of the people most impacted by the bridge and able to contribute time and labour as required for bridge construction process. The user committee also needed to abide by the guideline. After that the conflict was resolved and we were able to form the committee according to the rules and regulations." - Middle aged male user committee member Saptati (Immersive Study 2023:80)*

Once the committees are formed, they are oriented on the trail bridge construction cycle and management. NGOs play a crucial role in supporting the members to navigate the processes. However, there are criticisms that NGOs focus more on construction than on strengthening the members' agency. All past studies recognize that one of the main limiting factors for women in actively participating in community development projects, including trail bridge construction, is due to women's unpaid care work of household chores. This is the reason that makes women supported by their family members in carrying out regular household work are often the ones who are actively participating and exercising control over the construction process.

A number of positive cases of women expressing satisfaction of the transparent and open procedures and the opportunities to participate fully have been heard by this Study. For example, the Majhuwaghat UC was re-formed

with an all women committee, due to an internal discord within the previous committee comprising both women and men. The Chairperson noted that women were motivated to demonstrate their ability to undertake responsibilities and challenge societal stereotypes.

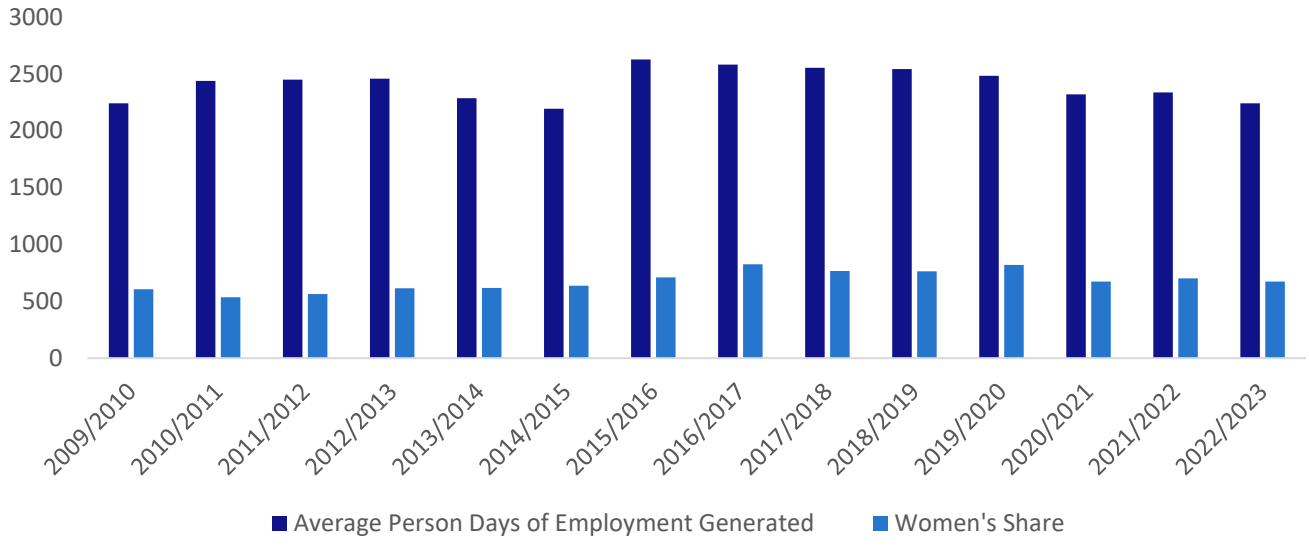
> *"Earlier, we used to get very frightened when people shouted at us. But with time, we learned how to deal with it. Even when people come at us haranguing, we would not lose our mind, we would stay calm, banter with them, and make them realize their mistakes." – President, Majhuwaghat UC (Immersive Study 2023:81)*

c. Income earning opportunities

Trail bridge programme provides the users, both men and women, with opportunities to increase their financial assets in two ways: directly through wage labour; and indirectly, through improved access to markets and jobs once the trail bridge is completed. With respect to the former, for at least 50% of employment opportunities are prioritized for disadvantaged groups, including 30% women. In addition, it is mandatory that all are paid on an "equal pay for equal work" basis and that all work at the site be insured during the construction period. Generally, the construction period for one trail bridge is for 1 year and on average approximately 2,500 person-days of employment is created when constructing a trail bridge (APR FY 2022/2023).

A review by this Study of the Trail Bridge technical documents or norms showed employment opportunity is the highest during concreting of foundation, when 15-20 workers are required, and lowest during masonry work of foundation block, when 6 workers are enough. The Study found widespread awareness of the requirement for women and men to be paid equally for equal work and, the principle was respected at the sites. In overall, records show that the percentage of women engaged in trail bridge building has been broadly around 30% of the total employment generated at the bridge sites. Figure 32 presents the total person-days of employment generated through Trail Bridge building each year from 2009 to 2023.

Figure 32: Employment Generated at Trail Bridge from 2009 - 2023



Source: Trail Bridge Support Unit (TBSU), 2023

Women often are found to use the wages to pay off loans, educate children and buy household essentials. For those who are living in difficult financial circumstances, earning from development projects such as bridges, become

significant sources which helps families to overcome difficult periods. Which is why timely payments are extremely important. However, there are often delays in the release of funds from the Local Governments to UCs and this in turn delays labour payments at some of the bridge sites, which in some cases has led to UCs or the families taking out loans to tie them over until the next release of payments.

The preference of Local Governments to appoint Women and individuals from poorer households as Bridge Wardens for routine maintenance (RM) is positive. Conversations at the sites indicate that this is helpful as it provides a steady, though relatively low level of income, at around NPR 6,000 to NPR 10,000 per year, to those employed for carrying out tasks such as removing vegetation near the bridge sites, fixing lose screws, holes in the wire-mesh.

6.3. Governance Measures

Public Hearings (PH) prior to the start of construction and later Public Audits (PA) are conducted at all Short Span Trail Bridges sites according to program documents. The consultative interviews with beneficiaries, Users' Committees, beneficiaries indicate that they are useful as transparency tools to inform the general public about trail bridge building, including how much money was available for the trail bridge construction and how it was used.

The TBSSP has been able to develop and maintain good governance practices within the local institutions, including CSO, UCs and NGOs. In other contexts, the User Committees are largely reported to be politically and financially motivated, but the incidents of UCs engaged in trail bridge development with such motives have not been reported or experienced by the stakeholders. This has been possible through sustained provisions for capacity building, practicing of transparency tools, assigning responsibilities and monitoring of deliveries, and allocations of trail bridges where they the most needed.

7. COST-BENEFIT OF TRAIL BRIDGES

This section outlines the economic analysis of trail bridges that was constructed in the years 2022-2023. The tools used are net present value (NPV), benefit cost ratio (BCR) and the internal rate of return (IRR). The NPV is an absolute value criterion to decide whether investment should be made. The benefit cost ratio (BCR) yields the return on each rupee spent on the project. The internal rate of return (IRR) yields the average earning power of the money used in the project over the life of the project. Given these, this exercise is an ex-post economic analysis carried out to assess if the investments made are both financially and economically viable.

Results

Table 20 presents the travelling benefits from major economic and non-activities. The travelling benefits are shown in terms of travel time saved as well as the distance saved.

Table 20: Value of time and distance saved from the trail bridges construction

Activities	Time saved in two-way journey (minute)	Distance saved in two-way journey (kilometre)				Travelling benefits per crossing per Trail Bridge (NPR)			
	Total	Terai	Hill	Mountain	Total	Terai	Hill	Mountain	Total
Economic activities									
Market	41.8	2	2	2	2	33	34	35	34
Farmland	39.6	2	1	3	1	30	30	49	28
Firewood	36.6	2	1	1	1	33	25	21	26
Fodder	35.4	2	1	1	1	33	25	22	26
Drinking water	39.6	2	1	3	2	38	30	56	33
Non-economic activity									
School	27.6	2	2	1	2	30	34	21	33
Health facilities	44	1	1	2	1	23	30	28	30

*Assumed 4 kilometres distance by walking in an hour

For economic activities, time saved is the highest when visiting markets (almost 41.8 minutes is saved by a user during a two-way trip using trail bridges) followed by farmland (39.6 minutes) and drinking water source (39.6 minutes). For non-economic activities, time saving is the highest when accessing health facilities (44 minutes in a two-way journey) followed by school (27.6 minutes).

Easy access to markets due to the presence of trail bridges have an important effect on the economic activities in the local communities. On the other hand, improved access to school and health facilities further contribute to human capital development in terms of higher educational attainment and improved productivity.

Table 21 shows that there also have been savings through the cost that is avoided from incurring expenses on health by reducing the cases of injuries and fatalities due to unsafe crossing practices. There is a saving of almost (Nepali Rupee) NPR 2,000 per year per household on average. Likewise, about NPR 1.2 million is saved each year by avoiding fatalities while crossing the river using unsafe means. Similarly, environmental benefits worth NPR 27.2 million is gained by not using wooden boats and bridges. These benefits are higher in the Hills and the Mountains.

Table 21: Value of the costs avoided by using trail bridges

Accidents and deaths avoided (in NRs)	Terai	Hill	Mountain	Total
Health expenses saved (average)	0	1504	1250	1929
Value of a Statistical Life (VSL), i.e. Life-saving expenditure	0	0	1,200,000	1,200,000
Environmental Benefits (in NRs)				
Cost of wooden boat saved (Total)	1,810,000	2,963,000	0	4,773,000
Cost of wooden bridge saved (Total)	2,372,000	14,800,000	5,267,357	22,439,357

Note: For accidents and deaths avoided and the environmental benefits, the Study has compared the figures for the year 2021 (before) & 2023 (after) only. Previous (2013-2020) years information are not considered since this may skew the results to a larger extent given that only one data point is available for the years after the Trail Bridge construction. The year 2022 is not considered since this was the year most of the construction work took place.

Table 22 presents that the total cost of construction of 198 trail bridges is NPR 878.1 million. There are 157 TBs (79%) constructed in the hills while 21 TBs and 20 TBs are constructed in the mountains and the hills respectively. Hence the cost of construction is also the highest in the hills. The operation and maintenance expenses are a little over NPR 0.1 million for each TB as fixed by the LGs. The expenses are incurred to pay monthly salary to the bridge wardens.

Table 22: Cost of construction and Operating expenses

	Terai	Hill	Mountain	Total
Number of trail bridges	20	157	21	198
Total cost of construction (NPR in million)	188.00	612.00	78.10	878.1
Operation and maintenance expenses per TB per annum (NPR in million)	0.104	0.104	0.104	0.104
Annual operation and maintenance (NPR in million)	2.08	16.33	2.18	20.59

Table 23 presents the economic analysis of project using discount rate of 9 percent and assuming 50 years as the life of the trail bridges.[23]

Table 23: Economic analysis

@9% (social discount rate)	Terai	Hill	Mountain
NPV (NPR in million)	53.16	4,965.19	80.63
BCR	1.34	10.88	2.32
IRR	12%	34%	21%

Net present value (NPV) – The NPV is positive in all the ecological regions indicating the viability of trail bridges to generate net economic benefits to the society. The total NPV is nearly NPR 5,196 million. Out of these, Hills have the highest NPV, followed by Mountain and Terai. High NPV in Hills is due to high number of human, livestock and vehicle crossing.

Benefit-cost ratio (BCR) – The BCR is almost five times bigger in the Hills compared to Mountain and eight times compared to Terai.

[23]Analysis using 12 percent discount rate is shown in the annex 2.

Internal rate of return (IRR) – The IRR is greater than the social discount rate of 9 percent used in the Study in all three ecological regions, which further ensures the average earning power of the projects. Hence, the trail bridges are economically viable.

Conclusions

Trail bridges are economically viable both nationally and in all ecological zones, and given this, development of bridges helps to improve the societal welfare of the people and promote economic activities by linking remote areas to the market and the market to the agricultural produce. Further, trail bridge construction also is noted to help save trees by avoiding its use in building wooden bridges and the boats. The Study has shown that the Trail Bridges are helpful in cutting down the household expenses on health and this ensures health of the community and thus enhance their productivity in the current and future jobs. It is therefore expected that trail bridges, when built on a large scale, are instrumental in the economic and social development of the nation particularly in the hills and the mountains where the access problem is still significant.

8. CONCLUSIONS

This Impact Study carried out a series of site-based surveys, consultations with key government and private sector institutions and undertook a comprehensive analysis of the data to arrive at the outcomes and impacts of trail bridges on the lives and livelihood of locals. There was also an analysis of relevant stakeholders' ability to take forward Nepal's trail bridge development in the full absence of Swiss government support. Table 24 summarizes some of the important outcomes and medium and long-term impacts of the trail bridge on the lives and livelihood of people.

i. Outcomes and impacts of trail bridges

Trail bridges have become a symbol of economic development and prosperity and people have credited this infrastructure to have provided significant positive impacts on their livelihoods. For many Nepalis, particularly those living in disadvantaged and remote areas, livelihoods without trail bridges would be unimaginable as they have continued to use trail bridges to access schools, markets and health facilities. For them, markets have suddenly come closer, goods are more readily available and prices of goods have decreased after trail bridge construction.

The trail bridges have consistently brought immediate, visible and multi-dimensional changes in their areas of influence. It is rare that the presence of a single and comparatively simple piece of infrastructure could make such a large impact on the lives and livelihoods of people in remote areas. Trail bridges have allowed students to reach school safely, quickly and attendance rates have increased, leading to better opportunities for enhancement of their education after construction. Trail bridges have made health facilities more accessible, resulting in higher number of patients seeking treatment. Similarly, for users of trail bridges, the farm lands are more accessible, and production has increased with greater access to farm inputs and markets.

Trail bridges have proven to be a trigger for positive economic, social and development changes for traders and porters. While the trail bridges have, in the first instance, provided access to safer routes, the secondary processes have been more significant and sustained. Trail bridges continue to bridge a significant gap, both time and space, to enable the communities to access safe crossing until the expansion of road networks into the villages over an average time frame of two decades. They have helped to achieve increased earnings. Local farming families could not imagine the possibility of agriculture growth and accessing markets without trail bridges. In brief, the following conclusion statements cover key outcomes and impacts in a range of areas.

Table 24: Immediate, Medium Term and Long Term Impact of Trail Bridge

Outcomes	Medium-Term Impacts	Long-Term Impacts
Trail bridges have led to safer river crossings. No one has died while crossing rivers after trail bridge construction. People save travel times in using the trail bridges and use that spare time in productive activities. For example, users of trail bridges save on average 39	Trail bridges are still very much in use and offer notable positive changes in livelihood. Life and livelihood without trail bridge would be unimaginable as they have continued to provide access to schools, markets and health facilities.	Trail bridges have consistently brought transformational impacts in the areas of influence. Trail bridges have proven to be highly visible catalysts in brining notable economic changes. The Trail Bridge Sub-Sector Programme (TBSSP) have

Outcomes	Medium-Term Impacts	Long-Term Impacts
minutes in a two-way journey using a trail bridge Nationwide, a large number of people use trail bridge throughout the year for crossing rivers safely. More than 1.15 million people use TBs each day during monsoon and only 18.5% lower in dry periods. Trail bridges reduce daily drudgery while carrying out household chores, especially for women. Students reach school safely, quickly and attendance rates have increased by 8.5 percentage points, leading to better opportunities for enhancement of their education after TB construction. Health facilities are more accessible, as indicated by the 31.4% in the percentage of patients seeking treatment at health facilities after TB construction. Markets have come closer, goods are more readily available and prices of goods, particularly vegetables/fruits, dairy products and building materials, have decreased by an average of 17.0% after TB construction. Trail bridges have contributed to increased agricultural production, i.e. at least 10% increase annually.	While trail bridges continue to save time, provide safer crossings and are still relevant, their marginal utility has decreased over time, due to increasing motorable access; increasing numbers of motorable bridges and proliferation of markets, services and utilities on both sides of rivers. Schools have informed an average of 8.5% annual increase in student attendance. Farmers believe that in the past 5 years, their average household income has increased by at least 15% annually, particularly as a result of new income-generating activities, triggered by trail bridges. Trail bridge construction has contributed to more people having access to a wider variety of goods in their local markets. For instance, the percentage of people having access to fuel has increased by 81.8%. Trail bridges have contributed to accessing healthier and scientific health practices. The practice of going to traditional faith-based healers has reduced, as medical health facilities are now more accessible. For instance, the percentage of people who rarely visited health facilities has decreased by 64.7%. More people have started growing and selling cereal crops, particularly maize and millet. Before trail bridge construction, only 40% and 47% of the respondents grew maize and millet respectively. This number has increased to 62% and 68% respectively.	prioritized local institutions to engage in construction and maintenance process, building their long term capacity and good governance practices at CSOs and NGOs. Trail bridges continue to bridge a significant gap, both time and space, to enable the communities to access safe crossing until the expansion of road networks into the villages covering average time frame of two decades. Trail bridges are a very prominent trigger for traders and porters, as they increased safer routes and increased earnings. Local farming families could not imagine the possibility of agriculture growth and accessing markets without trail bridges. The well-documented technical, social and process manual and technical handbooks on the trail bridges have allowed Nepal to be an international partner in disseminating and supporting development of trail bridges in South countries. Trail bridges have become an integral part of the lives of Nepali people, especially the ones living in remote regions. A trail bridge holds an image of a beautiful piece of infrastructure reaching out to Nepali wilderness and close to the Nepali people spanning across mountains, hills and Terai.

Outcomes	Medium-Term Impacts	Long-Term Impacts
	Trail bridge users have diversified their income sources with new access opening triggered by the trail bridges. Out of 993 respondents, 52%, i.e. 516, indicated either a change or an increase in their number of sources of income when compared to before and after TB construction.	

ii. Institutional impacts

Swiss assistance to Nepal in the trail bridge development sector has transformed the sector into a locally led, government-owned system capable of leading a sustainable trail bridge building process. This Swiss government support has been critical in strengthening the capacities of stakeholders in communities, government bodies, educational institutions and the NGOs in the new federal reality. The trail bridge stakeholders have significantly improved their ability to plan, to construct and to manage trail bridges.

The rich and systematic documentation of technical and material know-how on trail bridges have enabled Nepal to mainstream trail bridge building process in Nepal while developing an ability to export knowledge and expertise internationally. Due to focused and systematic development of Trail Bridge in Nepal under the Swiss support, the trail bridge sector development has seen excellent research, development and capacity building process taking place as more and different types of trail bridges have emerged. The rich and extensive planning and technical knowledge is managed well by the Swiss support, and consequently, Nepal is now a recognized international partner in disseminating and supporting development of trail bridges in global South countries.

Understandably, there remains challenges and areas for improvement in building capacity in federalized governance context. The gaps and challenges still exist, and are notable as identified by this Study and could pose a challenge to sustaining the quality of trail bridge construction and institutionalizing the maintenance cycle. For example, PTAP, the focal body responsible for the technical assistance, monitoring of trail bridges and training, grapples with the challenges of retaining competent staff due to increasing financial constraints. MoPID/TID are unable to disburse the budget on time to contractors, fabricators, local governments (LGs) and lacks in coordination with local governments which hampers timely construction and maintenance of trail bridges. Local governments face the challenge of delayed disbursement of funds to the user committee and material suppliers, further weakening the quality and timely delivery of trail bridges.

ANNEX

ANNEX 1: ECONOMIC ANALYSIS

The following approach and methodology were used to carry out the economic analysis.

Methodology

Valuation of benefits: The construction of TBs in rural areas are primarily meant to uplift the living standard of rural population through increased economic activities and income. Such an incremental economic activities (and thereby an increase in income) from trail bridge construction is mainly realized by saving the time required to cross the bridge, by avoiding the risk of accidents (fatalities and injuries), and by sustaining least possible impact on environment. In addition to the value of travel time saved in economic activities, this study therefore also considers these avoided cost from risks of accidents and environmental impact as benefits of the trail bridges.

Following the methodology proposed by HDM 4 (Highway Development and Management), traveling benefit is calculated primarily taking into account the value of travel time saved as a difference in the value of travel time in with and without the project situation. The daily traffic count and frequency of trips are considered for the valuation purposes. The market wage rate is used to convert the average travel time saved (in minutes) into the value of travel time saved. The time saved while using the bridge for major economic activities such as access to market (to buy and sales agricultural produce, jobs, etc.), visit farmlands and kitchen garden (bari), collect fodder, firewood and drinking water are taken into account for calculating the benefits from time traveling time saved. The traveling time saved for non-economic activities (at least in the short term) such as visits to health facilities, schools, ward or municipality offices etc. are not accounted in the calculation of benefits since these activities do not directly generate additional income to the villagers. However, the time savings from non-economic activities is also calculated for the purpose of informing stakeholders about the additional social benefit that the project may generate.

Next the avoided cost from the risk of accidents (fatalities and injuries) is also added to the benefit stream. For the accidental injuries, valuation will be done by the amount of health spending households incurred. On the other hand, valuation of deaths will be done by taking into account the life-saving expenses that the households incurs. Any accidents or deaths incurred before (2021) and after (2023) the construction of TBs are considered.

Finally, the impact on environment is taken into account based on the natural resource conservation activities where less or no natural resource will be used for the construction of bridges (if any). For example, less or no trees will be cut when wooden bridges or boats are replaced by the trail bridges. The value of woods thus saved can be considered as an environmental benefit of the project.

Costs

On the cost side, the study considers the cost of construction and annual maintenance cost of trail bridges. For the purpose of economic analysis, these costs measured at market prices (called financial price) will be converted into economic prices. For the use of physical inputs into the construction process and/or maintenance, their financial prices is multiplied by standard conversion factor (SCF) of 0.85. The standard conversion factor converts non-traded goods prices into border (world) prices. For the use of different types of labour (skilled, semi-skilled and unskilled),

their market wage rate (collected during the survey for agricultural and construction workers) is converted into shadow wage rate. As such, the SCF of 0.80 is used for the annual operation and maintenance (O & M) costs. The annual O & M for each TB is assumed to be NPR 104,000; this is based on the average remuneration that each palika budgets for the bridge warden. The detail valuation methods for the befit and cost is provided.

Discount rate

For discounting future benefits and costs for the economic analysis, discount rate of 9 percent is used.[24]

Benefits and costs of Trail Bridges

Benefits	Method of valuation	Calculation	Source
Traveling benefits	Value of average travel time saved from following activities (on-farm economic activities): ▪ Market (for economic activities) ▪ Fodder ▪ Farm land (for agricultural production) ▪ Firewood ▪ Drinking water	Difference in average time saved in with and without the project situation multiplied by local wage rate per hour	Household survey KII
Cost of avoided accidents	Average health expenditure for health care (for injuries) Life-saving expenses made by the household	Difference in health expenditure incurred with and without project situation Difference in value of life-saving expenses incurred in with and without project situation	Household survey
Environmental benefits	Value of the use of natural resources (e.g. woods etc.) saved by building the trail bridge	Value of alternative bridge and boat being built using natural resource, e.g. wood, instead of trail bridges	Household survey

Cost	Method of valuation	Calculation	Source
Cost of construction	Fixed cost valued at border prices using standard conversion factor (SCF=0.85)	Fixed cost (market price) multiplied by SCF Willingness to pay for skilled and semi-skilled labor (market wage rate will be used as willingness to pay) Wage rate of porter/unskilled labour	Project records and KII
Operation and maintenance costs	Variable cost on materials and labour (example included the wages and salary paid to the caretaker and other expenses for repairs and maintenance) Shadow price of caretaker (assumed unskilled: SCF=0.80)	Wage rate of caretaker (assumed unskilled) multiplied by shadow price	Project records and KII

[24]https://www.adb.org/sites/default/files/linked-documents/48218-003-efa.pdf. https://www.adb.org/sites/default/files/linked-documents/52097-001-efa.pdf

ANNEX 2: INSTITUTIONALIZATION OF TB BUILDING WITHIN GOVERNMENT SYSTEMS

Table 1: Local Governments' Major Functions and Capabilities

Function	Analysis		Capacity	Risk
Planning and prioritization of trail bridges for new construction	Status	▪ Trail bridge planning is incorporated into LGs periodic and annual plans and passed by the LG Councils. ▪ Most follow the prioritization criteria as per the TB Strategy.	LGs are and can plan trail bridge construction as per TB Strategy	There are notable instances of redundant trail bridges, either from their poor design or from developments that have taken place after their construction. For example, KII with NGOs in West Rukum, Karnali indicated that the Trail Bridge in Musikot, West Rukum is redundant because there is a nearby motorable road and bridge in the area. They indicated that favouritism and political party affiliation of local government officials sometimes undermine priority in the trail bridge selection process.
	Areas for improvement	▪ Few cases of bridges being constructed at unsuitable locations, e.g. Arughat[25] or locals having to wait decades compared to people in areas with less severe needs,e.g. Jajarkot[26], bridges planned where motorable bridges are also in the pipeline indicate that there is still room for improvement.		
Implementation and monitoring of SSTBs through UCs	Status	▪ Most (98%) of the bridges implemented by LGs are SSTBs (span <120m). ▪ The increasing trend of Trail Bridge outputs (91% rise between 2019 and 2023) indicates that LGs have been strengthened and can deliver. ▪ Delayed disbursement of Federal SWAp grants has led to delays in construction. ▪ TA provided by NGOs is a significant factor in the high outputs.	LGs can confidently implement SSTBs.	LGs preferring to go for contractors for SSTBs due to vested interests, would set a negative trend. It would lead to delays, loss of accountability to local communities, and possibility of decrease in quality. Dilution of inclusive UCs due to less rigorous monitoring by TA providers.
	Areas for improvement	▪ Timely release of SWAp grants, especially additional budgets, would ensure that TBs are completed in time and payments to laborers are not delayed. ▪ Greater monitoring by LGs during construction process. ▪ Few LG representatives reported that they did not have enough training about TB construction management cycle, quality control, and guidelines, e.g. NGO selection).		
Implementation and monitoring of LSTBs through consultants/ contractors	Status	▪ Few LSTBs implemented by LGs. ▪ Technical support is required from TA providers.	LGs require additional TA for implementation of LSTBs	Irregular monitoring of trail bridges could lead to accidents and fatalities.
	Areas for improvement	▪ Communication between local governments; between local and Provincial/Federal governments and between local governments and NGOs is oftentimes irregular and needs improvement. Local government officials believe this is because of improper management systems; high staff turnover and budget limitations. ▪ Local government representatives have indicated that they lack training and understanding about TB construction and management which limits their ability to participate in and oversee the entire TB planning, construction and management abilities.		

[25] , TB is being constructed at a site that will soon have no beneficiaries as Budhi Gandaki hydropower (Gorkha – Gandaki Province) upon completion will soon displace the settlement so people wonder why the bridge is being constructed or given priority. Baseline Study Report 2022.
[26] Baseline Study Report 2022.

Function	Analysis		Capacity	Risk
Procurement of services (NGOs), works (contractors), goods (steel parts).	Status	▪ LGs are procuring NGO services for SSTB implementation. ▪ Few LGs have procured contractor services for LSTB implementation. ▪ LGs have published tenders and successfully awarded bids for steel part fabrication. Initially TBSU/PTAP reported that they needed to be supported in documentation, but now they can procure services independently. ▪ The need to re-bid is however, not uncommon due to low rates and bidders not bidding for bridges in remote areas.	Most LGs can procure services, works and goods.	All local government representatives have indicated that they were aware of limitations caused by the untimely allocation of budget, however, they receive budgets in installments which limits their ability to disperse budget on time to fabricators, NGOs, and TBUC. Local governments are under-budgeted and have to work under limited resources. The criteria of 13% contribution to TB from local government's budget reportedly adds more pressure on the local governments.
	Areas for improvement	▪ Few LG representatives (in Nawalparasi, Gandaki) shared that they need to be further oriented/trained on inspection for quality control. ▪ Few LG representatives (Nuwakot, Tanahun) shared that they were not aware of guidelines for NGO selection – indicating that not all are aware of TB related processes.		
Allocation of budget and execution of Routine Maintenance through Bridge Wardens.	Status	▪ Latest records show that only 1,737 bridges (17% of total bridges) are undergoing RM through Bridge Wardens. This is very low and indicates, also re-confirmed through interviews and Immersive study, that RM is not a priority for LGs, even though it falls within their mandate as per the new federal system.	LGs have neglected RM of bridges.	Negligence of RM could severely affect the life span of the bridges, making them dangerous.
	Areas for improvement	▪ LGs need to prioritize RM and appoint Bridge Wardens. ▪ Routine Maintenance Trainings (RMT) should be continued to orient Bridge Wardens by LGs.		
Coordination with Provinces and Federal government.	Status	▪ TBSU/PTAPs had been acting as the bridge between LGs and Provinces and Federal government for coordination on planning and budgeting. ▪ Trail Bridge Coordination Committee Meetings (TBCCM) are important forums for continuing coordination amongst the government agencies.	Communication and coordination between LGs and Provinces and Federal government needs to be strengthened.	Lack of timely communication and coordination can delay planning, budgeting and implementation of bridges.
	Areas for improvement	▪ It is vital that communication of LGs with the other government agencies is maintained and that they respond to the needs of the LGs (as a few LGs shared that they do not get timely response from Provincial and Federal government).		

Table 2: Provincial Government's Major Functions and Capabilities

Function	Analysis		Capacity	Risk
Promulgation of Provincial Trail Bridge Strategies	Status	▪ 3 Provinces – Koshi, Bagmati, Gandaki – have published their own Provincial Trail Bridge Strategies that align closely with the "Directive Principles, Policies and Obligations of the State" in the Constitution. The new strategies have 3 overarching objectives: build bridges with provincial targets in priority areas with reduction of detour time to 30 mins; perform maintenance; provision of TA to provincial and LG bridges.	Provinces are exerting their rights with the promulgation of Provincial Trail Bridge Strategies	Although the strategies are well designed, the policies and objectives mentioned in the strategies need to be implemented diligently.
	Areas for Improvement	▪ Promulgation of strategies in the remaining Provinces, in line with the updated National Trail Bridge Strategy and past 'good practices' such as "community approach" for SSTBs, would provide further impetus for the implementation of the program in the respective Provinces.		

Function	Analysis		Capacity	Risk
Establishment and function of Steering mechanisms	Status	▪ Trail Bridge Coordination Committee Meetings (TBCCM) were found to be useful platforms for coordination amongst Provinces and LGs and the overall guidance of the sector. In Koshi and Karnali, MoPID and PTAP indicated that TBCCMs provided good coordination amongst stakeholders.	TBCCMs, chaired by the Secretary of MoPID, provided the forum for steering the sector and addressing bottlenecks	Non-functioning TBCCMs would greatly affect coordination for bridge building.
	Areas for Improvement	▪ TBCCMs need to be continued to ensure guidance for the sector and a platform coordinated amongst Provinces and LGs.		
Planning, prioritization and budgeting of trail bridges for new construction	Status	▪ Trail bridge planning is incorporated into Provinces' annual plans and passed by the Provincial Councils. ▪ The proportion of funds from the Provinces' own sources for trail bridges has increased gradually, from 76% (FY 2019/2020) to 95% (FY 2022/2023) ▪ The majority (80%) of the TBs constructed are SSTBs, indicating that the SCM 2018 decision to focus solely on complex, strategic, LSTBs is not being fulfilled. Karnali and Gandaki provinces indicated that they are building SSTBs due to the high demand. While complex bridges have not been initiated due to the lack of technical capacity in engineering and management. ▪ Provinces also indicated that the dearth of wire-ropes (procured by the Federal government) has delayed construction of bridges.	Provinces are taking greater ownership and increasing their own funds for bridge construction	Provinces encroach on the rights of LGs by continuing to construct SSTBs.
	Areas for Improvement	▪ Federal government needs to strengthen the capacities of Provinces for the implementation of complex and strategic bridges. ▪ Provincial governments need to turn their attention to complex and strategic bridges		
Planning, prioritization and budgeting for Maintenance of bridges	Status	▪ Only 40 bridges underwent MM during the last TB SWAp Framework III (APR 2019-2023). Indicating that maintenance is not a priority for the provinces. ▪ According to interviews with Provincial staff, the reason for low maintenance is- the high demand for new bridges, untimely release of budget causing delays, lack of adequate HR.	MM has not received priority by the Provincial governments.	Neglecting MM would result in risky bridges, which could endanger the lives of people.
	Areas for Improvement	▪ Provinces need to devote more resources and implement MM. ▪ The newly promulgated Provincial TB Strategies have MM as a priority. This needs to be implemented according to the need of each province.		
Quality assurance and Lab testing in each province	Status	▪ All of the lab testing (steel parts) is conducted by the laboratory in Institute of Engineering (IOE) in Kathmandu, which causes back log. ▪ Reports show that the possibility of lab testing (besides IoE in Kathmandu) was explored and possibilities were identified in Koshi (Biratnagar) and Lumbini (Butwal). According to TBSU piloting of testing was started in Butwal, but later it was not continued as the testing done by the private sector does not have as much credibility as IOE. ▪ Swiss TA had been covering the lab testing costs, which will no longer be available from the next fiscal year.	Establishing lab testing facilities in each province did not materialize.	If budgets by provincial governments are not set for lab testing, then it would send a negative message and result in poor quality of bridges being built.
	Areas for Improvement	▪ It is essential that budgets be allocated for lab testing of bridge parts by provinces to ensure the quality of bridge materials.		
Procurement and mobilization of PTAPs	Status	▪ All 7 Provinces procured the services of the PTAPs, with co-financing with Federal government and SDC. This was a new service arrangement for the GoN (as the previous TA service providers were procured by SDC during the last phase) ▪ The high TB outputs, achieved through the contribution of PTAPs, indicates that Provinces have mobilized them successfully for TB construction. ▪ Budgeting of PTAP procurement for FY 2023/2024 and the process initiated for the procurement of new PTAPs indicates that the TA arrangement will most likely continue (even after Swiss TA exit)	Provincial governments successfully procured and mobilized PTAPs for trail bridge program.	Delays in the procurement of new PTAP services could hamper the smooth functioning of the trail bridge system and lead to decrease in quantity and quality of bridges. PTAP services may be focused only on Provincial bridges. Neglecting those planned and implemented by LGs.

Function	Analysis		Capacity	Risk
	Areas for Improvement	▪ Procurement of new PTAPs, as the contracts of the Framework-III ones' ends, should be completed so that there is smooth handing-over. Furthermore, the new contracts should reflect the learnings – of the challenges faced while mobilizing PTAPs (high turn-over, vehicle mobility, transport and daily allowances, amongst others). ▪ Provinces need to ensure that PTAP TA services are provided for both bridges implemented by Provinces and LGs.		
Store Management	Status	▪ Five Provinces – Koshi, Madesh, Bagmati, Gandaki and Karnali – have taken over the management of Stores (for wire-ropes, bull-dog grips) from TBSU/Helvetas. ▪ The remaining stores are being managed by SBD (Amlekhgunj) and handed over to DoLI/LIDPO for Lumbini and Sudur Paschim. ▪ Bagmati and Gandaki indicate minimum difficulty in managing the stores. The other provinces (at the time of the study) were still in the initial process of managing the stores. For those being managed by DoLI, early indication is that dedicated persons have not been assigned as yet.	Provinces have taken over Store management. Early signs indicate that they will be able to undertake the responsibility.	During times of wire-rope shortages, bridges being built by Provinces and DoLI/SBD may get prioritized ahead of those being built by LGs
	Areas for Improvement	▪ Arrangements for dedicated focal persons for store management need to be made by DoLI. ▪ Provinces and DoLI/SBD need to be equitable in releasing wire-ropes to ensure that bridges being built by LGs, Provinces and DoLI		
International Wire-rope procurement	Status	▪ Bagmati province completed the international procurement of wire-ropes, with TBSU/Helvetas support. ▪ Remaining provinces also indicate interest, but they have indicated difficulties. This is not surprising as international procurement needs to be done in bulk, with sufficient budget allocated, and all necessary procedures fulfilled.	Besides Bagmati Province, other provinces have not yet been successful in international procurement of wire-ropes.	Shortages may occur in the future, if international procurement is limited to Federal government, thereby affecting trail bridge outputs.
	Areas for Improvement	▪ DoLI needs to support Provinces for international procurement.		
Anchoring and operation of Monitoring Information Systems (MIS)	Status	▪ Access and orientations on the MIS systems provided to TID focal persons for monitoring purposes (PTAPs have the responsibility of entering inputs) ▪ Early signs indicate that information is being entered into PMIS, but not for TBSIS.	Information is being entered into PMIS and is functional, but TBSIS requires more support.	PMIS and TBSIS could become useless if data is not entered as per the requirements.
	Areas for Improvement	▪ Provinces need to ensure and monitor that PTAPs enter the required information into both PMIS and TBSIS for them to be fully functional as a planning, monitoring, and reporting tool. ▪ Provinces need to orient and monitor new PTAP staff on updating and operating the monitoring information systems.		
Coordination between Federal and LGs	Status	▪ TBSU/PTAPs had been acting as the bridge between Provinces and LGs and Provinces and DoLI for coordination. ▪ TBCCMs are also effective forums for coordination amongst all three spheres. ▪ Some provincial staff shared concerns about the lack of coordination with LGs since Swiss TA exit.	Greater effort needs to be made to improve communication and coordination between Provinces and LGs and DoLI.	Lack of timely and effective coordination would greatly hamper the function of the trail bridge program.
	Areas for Improvement	▪ Designating focal persons in TID to coordinate on trail bridges with both DoLI and LGs would ensure that communication channel is maintained.		

Table 3: The LBS/DoLI Major Functions and Capabilities

Function	Analysis		Capacity	Risk
Policy formulation	Status	• LBS initiated processes for the updating of the National Trail Bridge Strategy 2006 (at the time of preparation of this report) to align with changes as per the federal structures and needs of the country.	DoLI in the process of updating of the National Trail Bridge Strategy.	There could also be a few potential drawbacks to shifting DoLI from MoFAGA to MoUD. The DoLI's longstanding presence within the MoFAGA had helped create an environment of collaboration and clarity,

Function	Analysis		Capacity	Risk
	Areas for Improvement	• While updating the strategy, incorporating past "good practices" such as ensuring SSTBs are implemented through the "community approach", and social inclusion measures and governance tools would ensure that achievements of the past are continued for the future.		between the department and the ministry, but also between the department and other ministries. The shifting of DoLI to a new ministry would mean the department would need to re-establish collaboration with the ministry and strive to maintain clarity in roles and responsibilities.
Steering mechanisms	Status	• Steering committee meetings (SCM), chaired by Sectary of MoUD are conducted annually to approve annual plans, achievements and solve bottlenecks. The SCM has been integral to the effectiveness of the trail bridge program as it provides strategic guidance as indicated by DoLI officials. • SCM of 2018 was especially important as it demarcated the roles/responsibilities of different agencies after federalization.	DoLI as the member secretary coordinates Steering Committee Meetings, which have been vital to guide the sector.	Discontinuation of SCMs would greatly hamper the strategic direction of trail bridge building and result in coordination gaps between the three spheres of the government.
	Areas for Improveme	• It is essential that SCMs are continued to guide the sector.		
Trail bridge planning, budgeting, monitoring implementation and coordination	Status	• Annual TB SWAp budget has steadily increased over the years and during FY 2022/2023 was NRs 7.665 billion, with the allocation for LBS amounting to 24% of the total budget. • LGs complained that due to the untimely disbursement of budget grants bridge construction is delayed (including payments to laborers). Contractors also stated that price of materials fluctuate and which makes it difficult for them to fulfil their contract obligations. • TBSU/Helvetas was acting as the bridge between the Federal government and Provinces and LGs for coordinating planning, budgeting, and monitoring. During consultative meetings, DoLI staff indicated that due to the high turnover of staff, knowledge and capacity is lost. • DoLI has taken proactive steps to increase communication with Provinces, starting with the consultative workshops planned in all the provinces for the updating of the National Trail Bridge Strategy.	DoLI needs to proactively coordinate with Provinces and LGs for planning, budgeting and monitoring implementation.	Coordination gap left by the exit of Swiss TA if not adequately filled by LBS may result in disruptions in planning, budgeting, implementation and monitoring.
	Areas for Improvement	• Many bridges are aging and require maintenance. While the responsibility (as per the SCM 2018 decisions) lie with the Provinces and LGs, DoLI should also encourage and ensure that maintenance is undertaken. • Dismantling of redundant/obsolete bridges needs to be a priority as they can become dangerous and a risk to people's lives. • A dedicated focal person to coordinate with Provincial focal persons and LGs need to be appointed to coordinate on trail bridge program (planning, budgeting, implementation, monitoring and reporting)		
Quality assurance	Status	• One of the key mandates of the Federal government is to ensure the quality of the bridges. In the past, third-party inspections through the National Vigilance Center were conducted on sample number of bridges. But annual progress reports indicate that no such third-party inspections were conducted during TB SWAp Framework III. • Lab testing of materials was conducted for all the bridges. Costs for the tests was provided through Swiss TA. DoLI now needs to make the necessary arrangements to ensure that lab-testing is continued for the next fiscal year onwards.	Doli is and has been a department deeply grounded in engineering. This could align very well with the technical aptitude of the Ministry of Urban Development and DoLI's longstanding association with the MoFAGA means that they have well-developed experience and networks with the ministry, with other ministries, with local governments and in rural areas. DoLI could leverage these networks while functioning within the MoUD to mitigate potential gaps.	Lack of routine maintenance and major maintenance could impact bridge functionality and could also lead to accidents.

Function	Analysis		Capacity	Risk
	Areas for Improvement	• LBS should conduct third-party inspections to monitor the quality of the bridges. • Arrangements for the cost of lab-testing of materials need to be made.		
International procurement of wire-ropes	Status	• Wire-ropes were internationally procured by DoLI for the trail bridge program. This was a one-window system for the entire sector. At the time of preparing this report, Bagmati province was in the process of procuring wire-ropes, and other provinces also expressed an interest. Other provinces also procuring wire-ropes would be a positive as there would be less likely for wire-rope shortages, which has in the past occurred regularly. • DoLI has in the past procured wire-ropes to ensure adequate stock for the current and next fiscal year. According to cable inventory system, the current stock will be adequate for FY 2023/2024.	DoLI has long history of successfully procuring wire-ropes internationally.	Lack of projection and corresponding procurement of wire-ropes could lead to shortages in the future.
	Areas for Improvement	• DoLI needs to ensure adequate stock of wire-ropes by projecting future bridge needs. • DoLI needs to ensure that wire-ropes are dispersed equitably to bridges being built by all three levels of the government.		
Research and development of trail bridge design and norms	Status	• In the past DoLI and its predecessor DoLIDAR was instrumental, with the TA Swiss experts, in developing and publishing trail bridge manuals which laid the foundations for trail bridge building.	DoLI is capable and needs to continue R&D in trail bridge building.	The out-migration of qualified engineers from Nepal and/or the high staff turnover in DoLI could have an impact on the available and necessary expertise at DoLI.
	Areas for Improvement	• LBS/DoLI needs to continue R&D of new trail bridges as per the needs of the country to ensure that the sector is continuously developing and evolving as per the changed needs.		
Store management	Status	• DoLI (in Lumbini and Sudur Paschim) and SBD (Amklekhgunj) are managing three stores (with the other 5 managed by Provinces).	DoLI is managing 3 stores.	Prioritization of wire-ropes first to LIDPO and SBD implemented bridges.
	Areas for Improvement	• It is essential that the store focal persons continue to enter data and use the Cable Inventory System (handed over by TBSU/Helvetas) so that a nationwide stock information is readily available for planning and procurement. • Stores managed by DoLI need to equitably provide wire-ropes to LGs.		
Anchoring and operation of Monitoring Information Systems (MIS)	Status	• MIS servers were transferred from Helvetas to the National Information Technology Centre (NITC) of the government. • All monitoring systems – PMIS, TBSIS, Bridge Record, Cable Inventory system – were updated. Focal person at DoLI were provided with access and oriented on the system.[27]	MIS are anchored within the GoN structure. Early signs indicate that operation of MIS is working well, but it is vital that IT support arrangements be made to ensure its smooth functioning.	DoLI needs to coordinate with Provinces and PTAPs to ensure that the MIS tools are functioning, otherwise it will become defunct.
	Areas for Improvement	• Software needs to be updated and de-bugged and for this it is essential that DoLI makes arrangements for quick IT support when the MISs are not functioning.		

[27] APR FY 2022/2023

Table 4: The NGO Major Functions and Capabilities

Function	Analysis		Capacity	Risk
Technical assistance for pre-feasibility study, survey, preparation of DPRs, and construction	Status	▪ Capacitated NGOs are providing TA to UCs for survey, DPR preparation and construction. All stakeholders recognize the important role played by NGOs for SSTB construction. Information collected from the field sites indicate that NGOs are dedicated and provide timely inputs. ▪ NGOs were found to be responsive to UCs needs and take ownership of trail bridge building as it is beneficial for their own name recognition due to the tangible and quick outputs. ▪ Consultation with NGOs stated that staff turnover is high, with most complaining that their service cost (6% of bridge cost) is insufficient to retain staff.	NGOs are providing timely TA to UCs for SSTB implementation.	Without NGO TA, the scale and quality of trail bridge building would decrease dramatically.
	Areas for improvem	▪ Turnover of NGO staff indicates that orientations/trainings should be regularly conducted to ensure that new staff are capacitated on trail bridge building. ▪ NGO service costs should be re-evaluated and considered with respect to complaints made by NGOs.		
Social mobilization for social inclusion and good governance	Status	▪ NGOs are vital to ensure social inclusion of UCs and implementation of governance tools (Public hearing, Public Audit). ▪ NGOs are heavily invested in raising awareness and have better community engagement[28] (compared to LGs which cannot always reach all the communities frequently), especially with UCs to manage bridge construction. ▪ Past studies[29] indicate that social mobilization normally takes a backseat to technical matters.	NGOs raise awareness, support UCs and ensure social inclusion and good governance with trail bridge building.	Dilution of social mobilization by NGOs would greatly hamper trail bridge construction processes which have become 'good practices' to ensure equitable control over resources.
	Areas for improvement	▪ Similar to technical aspects, NGO staff also need to be regularly capacitated on social matters (inclusive UCs, targeting employment for discriminated groups, maintaining transparency) and the necessary tools for them to ensure its actualization as per the National Trail Bridge Strategy and targets. ▪ LGs should encourage and monitor NGOs to focus on social mobilization as a necessary aspect of the trail bridge process		

Table 5: The PTAP Major Functions and Capabilities.

Function	Analysis		Capacity	Risk
Support in the preparation of Provincial Trail Bridge Strategies and steering mechanisms	Status	▪ 3 Provinces promulgated their own strategies with the support of PTAPs. The remaining 4 Provinces have drafted strategies, which are anticipated to be finalized and promulgated in the upcoming months. ▪ Trail Bridge Coordination Committee Meetings (TBCCM) have been organised annually, with the support of PTAPs/TBSU, to guide the sector.	PTAPs have supported Provincial governments to prepare strategies and steer the sector.	The trail bridge strategy must meet the distinct requirement of that Province, and should not be generalized. PTAP must focus on a participatory approach to identifying priorities while building trail bridges.

[28] Even during the COVID pandemic, trail bridge activities continued (while maintaining adequate safety measures) at the bridge sites due to the engagement of NGO staff, who were closer situated to provide TA (APR FY 2022/2022).

[29] Helvetas (2017). Transforming gender relations in the trail bridge programme in Nepal: An analysis of policies and practices; Tumbahangfe, A (2021). Mainstreaming gender in Trail Bridge Sub-Sector in Nepal: Tracing the Development of Policy Changes. Transport and Communication Bulletin for Asia and the Pacific. No.91.

Function	Analysis		Capacity	Risk
Support LGs and Provinces for planning, budgeting, implementation and reporting of SSTBs and LSTBs	Status	▪ PTAPs communicate, compile and support LGs and Provinces to plan, prioritize bridge needs, review DPRs, and monitor construction cycle. ▪ PTAPs have also supported LGs to procure services (NGOs), works (contractors) and goods (steel parts) by orienting them and supporting in the documentation processes. ▪ Joint evaluations by MoPID and TBSU assessed the capacities of 5 PTAPs as being "Good" and the remaining 2 to be "Satisfactory to Good". ▪ The evaluations further assessed that PTAPs can independently support for SSTB (Suspension and Suspended) construction, but are not yet fully capable on LSTBs (indicating the need for additional support from DoLI) ▪ At the time of preparing this report, the contracts of 4 PTAPs[30] had already expired and though processes were underway for the procurement of new PTAPs, it has not been completed. This has resulted in gaps in TA services to LGs.	PTAP arrangements have been successful in providing TA to LGs and Provines for trail bridge construction.	Delays in procuring PTAP services by Provinces would severely affect the quantity and quality of trail bridge construction. In adequate human resource and high staff turnover has affected effective functioning of the PTAP. PTAP reported difficulties in retaining staff in absence of attractive pay packages and difficulty in hiring and retaining competent candidates. Due to high demand and a limited number of staff, PTAP is unable to routinely monitor TBs and unable to provide DMBT on time.
	Areas for improvement	▪ PTAP arrangements have demonstrated to be effective in providing TA. Records indicate that – early on there was a high turnover of staff, lack of skills and know-how, and management issues (related to salaries, vehicle usage) which affected their quality of services. But, after this initial transition phase, and the resolution of many (if not most) of the management issues, the arrangement stabilized and has worked effectively. ▪ PTAP services need to be procured by the provinces to ensure that bridge building continues with the same momentum as past phases. In doing so, it is also important the issues raised by the PTAPs- such as measures to retain staff, vehicle movement, DSAs be addressed.		
Support and monitor social inclusion and implementation of good governance in the sector	Status	▪ Social inclusion (in UCs, targeting of employment opportunities) and governance tools (public hearings, public audits) have been institutionalized. PTAPs, along with NGOs, have played a key role in ensuring that the provisions are monitored and adhered to.	PTAPs have contributed towards the institutionalization of social inclusion and implementation of governance tools.	There needs to be monitoring of social inclusion, targeting and governance tools to prevent neglect and prioritization of only technical aspects of trail bridge building.
	Areas for improve	▪ Ensuring the continuation of social inclusion and governance measures within trail bridge building needs to be an integral part of the new PTAP contracts.		
Operate and update Monitoring Information Systems (MIS)	Status	▪ PTAPs have been responsible for the data entry and operation of PMIS (Program Monitoring Information System) and TBSIS (Trail Bridge Strategy Information System) since the start of the phase. ▪ Records indicate that while PMIS (which contains trail bridge construction cycle) is well functioning and updated regularly, TBSIS (which includes indicators for the adherence to the strategy, social indicators, employment numbers) was less frequently updated.	PTAPs had been regularly updating and operating PMIS, but less so for TBSIS.	TBSIS will become defunct if it is not updated regularly.
	Areas for improvemen	▪ New PTAPs will have to be oriented on updating and operation of the monitoring systems. This will be the responsibility of Province focal persons.		
Support to strengthen capacities	Status	▪ PTAPs with the support of TBSU conducted numerous trainings and orientations to different stakeholders –e.g. Technical trainings (559 Engineers/Sub-engineers from LGs) and Routine Maintenance Trainings (for 885 Bridge Wardens). ▪ PTAPs also strengthened the capacities of trainee engineers, sub-engineers and assistant sub-engineers through traineeships and on-the-job trainings to develop skilled human resources for the market.	PTAPs are capable of providing trainings on SSTBs to LGs and routine maintenance to Bridge Wardens	PTAP reported difficulties in retaining staff in absence of attractive pay packages and difficulty in hiring and retaining competent candidates.

[30] Koshi, Lumbini, Karnali and Sudur Paschim. The contracts for the remaining (Madesh, Bagmati, Gandaki) are/or extended till the end of the current FY 2023/2024.

Function	Analysis		Capacity	Risk
	Areas for improveme	▪ Capacities of the new PTAPs will have to be first strengthened before they can support other actors.		

Table 6: The TBSU Major Functions and Capabilities.

Function	Analysis		Capacity	Risk
Support in the preparation and updating of National and Provincial strategies	Status	▪ TBSU is assisting DoLI to update the National Trail Bridge Strategy through TA and coordinating consultative Provincial meetings. ▪ TBSU also supported the Provincial Governments to draft their own Provincial strategies as per the Federal context.	TBSU has the institutional understanding and recognition to provide TA to the government for updating and drafting strategies related to trail bridge building	
	Areas for improvement	▪ It is essential that TBSU takes proactive role in ensuring that the "good practices" such as "community approach" and social inclusion measures are reflected in the updated National Trail Bridge Strategy as per the spirit of the Constitution and mandates provisioned for the different government spheres.		
Coordinating between all three spheres of the government for trail bridge planning, budgeting, monitoring and implementation	Status	▪ TBSU was quick to re-structure its HR (with the establishment of Provincial offices) and working modalities (including updating formats, guidelines) as per the federal context. ▪ TBSU has been the bridge, especially between the Federal and Provincial governments, for coordinating the trail bridge program. Which in the past has worked well. But with the phasing out of TBSU, it is inevitable that a gap will be created if LBS/DoLI and Provinces do not take a more proactive role in developing a more structured coordination mechanism, such as appointing focal persons in their respective departments and ensuring that the Steering Committee Meetings and Trail Bridge Coordination Committee Meetings at the federal and Provincial levels are continued. ▪ Overall, the program has been implemented as per the National Trail Bridge Strategy, with impressive outputs. ▪ During the study, a few isolated cases were however found which flagged up the need for better prioritization and planning – when trail bridges were constructed near motorable bridge. This indicates that TBSU should have been more alert to prevent unwarranted construction.	TBSU has successfully coordinated between the different governments spheres for trail bridge building. The challenge will now be for DoLI and Provincial governments to ensure that communication and coordination is maintained.	All aspects of the trail bridge program (planning, budgeting, implementation, quality control, reporting, maintenance) will be hampered if coordination measures between the government spheres is not maintained GoN staff transfers also pose a challenge to retain institutional memory.
	Areas for improvement	▪ According to consultation with TBSU, recommendation for the need for focal persons was raised during TBCC meetings, with the commitment from Provincial governments that individuals will be appointed. Since then, individuals have been designated. But the challenge will be for them to take a proactive role for program implementation.		
Quality assurance	Status	▪ TBSU has adopted a multi-strategic approach for quality assurance. This included the review of survey, designs; enhancing technical know-how; conducting joint inspections with PTAPs to fabricators; lab testing; load testing (of a sample number of bridges) amongst others. The result was the good quality of bridges that were constructed. ▪ One key area which TBSU was not successful was supporting private sector or educational institutions to set-up a lab testing facility – to reduce the backlog at the only lab facility in Kathmandu. Here, reports indicate that while processes were initiated for lab testing in Butwal, Lumbini, it was not followed through and by the end of the phase, no new facilities were fully established.	TBSU was successful in ensuring the quality of the trail bridge during its tenure. The challenge is now for the GoN to ensure new arrangements so that even without Swiss TA, the measures are continued in the new set-up.	Dilution of quality assurance and control measures would result in poor quality of trail bridge being constructed.

Function	Analysis		Capacity	Risk
	Areas for improvement	▪ The cost of lab testing of raw materials was covered by SDC during framework II. But, with its end, these costs will have to be covered by the GoN. According to TBSU, the most efficient and cost-effective arrangement would be for the Provincial governments to budget this cost rather (based on the number of bridges under construction) than include it in individual bridge cost estimates, as it would be easier to monitor in bulk compared to individual bridges.		
Strengthening the capacities of all relevant stakeholders, transferring competencies and trail bridge know-how	Status	▪ Reports show that the COVID-19 pandemic affected various training and orientation at the start of framework III, but in the later years, TBSU heavily invested in numerous trainings. Primarily focused on technical sections within LGs (559 E/S-E), Provincial (130 E/S-E) and NGOs (434 S-E/ASE, 342 social mobilizers) with most of all the relevant stakeholders covered throughout the country. ▪ In the case for capacitating PTAPs, the project states that in addition to trainings (on LSTBs) the strategy has been on "accompanied capacity building" – which is to say that TBSU staff provided back stopping support to PTAP staff during implementation of the program. The high outputs demonstrates that this has been effective along with the acceptance by GoN and other stakeholders to PTAP arrangements. However, during consultative meetings there were cases where PTAPs considered themselves poorly equipped with resources to fulfill their tasks, in particular due to HR management and finances. ▪ Similarly, project reports indicate that private sector – consultants, contractor and fabricators – have been capacitated through regular feedback on their quality of works. With the one notable achievement being the automation processes now adopted by 50% of fabricators at the recommendation of TBSU. ▪ TBSU has also invested in providing traineeships and on the job trainings to engineers, sub-engineers and assistant sub-engineers to increase the pool of trail bridge expertise. ▪ Knowledge centers at all the Provincial offices were also established in all the Provinces with the support of TBSU. This primarily included the re-printing of manuals, guidelines and formats so that it is easily readable.	TBSU has heavily invested in enhancing the capacities of stakeholders. The effectiveness of these trainings will be evident in the next fiscal year, when TBSU will no longer be present to provide TA.	High turnover and transfer of staff in all sectors (PTAP, NGO, GoN) could result in capacitated HR no longer retained within the trail bridge program, which would critically impact implementation.
	Areas for improvement	▪ As turnover of staff, especially within PTAPs and NGOs, is always a high possibility. LBS/DoLI will have to take on the responsibility of strengthening the capacities of new staff and providing refresher trainings regularly to maintain the same momentum of program implementation		
Handing over store management and monitoring systems to the GoN	Status	▪ TBSU consultations indicate that focal persons assigned for the store management by 5 Provinces have been oriented and that wire-ropes are being distributed without much disruption. Especially in Bagmati and Gandaki, where the handing over processes were initiated much earlier than the others. ▪ In the case of the 2 stores taken over by DoLI (Lumbini and Sudurpaschim) the process has been delayed and at the time of the closing of the project, had still yet to fully takeover and manage the stores. ▪ The previously managed MIS were also transferred to the GoN, this included the server to the National Information Technology Center, updating of the software programs, and orienting the focal person (Federal and Provinces) on operating the systems. Early indications show that PMIS (which tracks the construction cycle) is being updated and functional, but that TBSIS (which monitors adherence to the Trail Bridge Strategy and social indicators) is not updated as frequently. The risk is that after phasing out of TBSU, TBSIS may no longer be used, with the focus solely on construction.	TBSU has handed over the key responsibilities of store management and MIS to the GoN. The onus will now be on the Federal and Provincial governments to effectively operate them.	A few delays for the distribution of wire-ropes during the initial transitional months is to be expected. One positive factor is that a few Provinces have hired previous TBSU storekeepers to maintain continuity which ensures smooth operation. There is a risk that social indicators, e.g. inclusive UCs, targeting of employment to discriminated groups, conducting of public hearings and audits, may no longer be monitored and reported, thereby leading to a dilution of the processes within trail bridge program.
	Areas for improvement	▪ TBSU staff also noted that there is a need for IT expert to support in trouble shooting as it is inevitable that problems will arise during data entry as well as the operation of systems		