Trail Bridge Sector-Wide Approach Framework I (2009-14)

External Review

Report

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Mandated by:
Swiss Agency for Development and Cooperation / Nepal

Kathmandu, NEPAL

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Abbreviations

ADB	Asian Development Bank
ASE	Apprenticeship in Science and Engineering
BE	Bachelor in Engineering
DAG	Disadvantaged Groups
DDF	District Development Fund
DFID	Department for International Development (UK)
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DMBT	Demonstration Model Bridge Trainings
DP	Development Partners
DTOs	District Technical Officers
EI	Educational Institutes
IOE	Institute of Engineering
LBS	Local Bridge Section
LDOs	Local Development Officers
LSTB	Long Span Trail Bridges
MOF	Ministry of Finance
MoFALD	Ministry of Federal Affairs and Local Development
NGO	Non-Government Organisations
OMS	Outcome Monitoring Summary
PAF	Poverty Alleviation fund
PBBA	Post Bridge Building Assessments
RADC	Rural Area Development Committee
RAIDP	Rural Access Improvement and Decentralization Project
RMC	Routine Maintenance Committee
RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Programme
SBD	Suspension Bridge Division
SSTB	Short Span Trail Bridges
SDC	Swiss Agency for Development and Cooperation
TA	Technical Assistance
TB	Trail Bridges
TBIS	Trail Bridge Information System
TBS/LIDP	Trail Bridge Strategy/Local Infrastructure Development Program
TBSSP	Trail Bridge Sub-Sector Support Programme
TBSU	Trail Bridge Support Unit
TB-SWAp	Trail Bridge Sector Wide Approach
UC	User Committees
VDC	Village Development Committees
WB	World Bank

Acknowledgement

The External Review (ER) team would like to thank the persons involved in this review for sharing their views and experiences. Particular thanks go to the staff of Local Bridge Section/DoLIDAR and Trail Bridge Support Unit for the open discussion on all aspects of the project and for accompanying and guiding the team during the household survey and field trips. We highly regard the contributions of Mr. Madhav P. Bhattarai, Chief, LBS/DoLIDAR who was part of the external review team, on behalf of DoLIDAR, during the field trips. We highly appreciate the invaluable commitment of Mr. Aman Jonchhe, SDC, Ms. Jun Hada, SDC, Mr. Tulsi Nepal and all TBSU staff responsible for logistics, scheduling and rescheduling the mission programmes in a way that enabled the accomplishment of intensive field trip in a smooth and fairly comfortable manner. We would like to express our high regards for the government staff at the centre as well as the districts for their commitment to serve communities, often under difficult circumstances. Last but not the least, all the NGOs, private sectors and other stakeholders are acknowledged for their contribution.

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Executive Summary

Background

This report presents the findings of the external review (August – December 2013) of the Trail Bridge Sector-Wide Approach i.e. TB SWAp Framework 1 (2009-14).TB SWAp Framework 1 was conceived by MoFALD/DoLIDAR in 2009. The aim of this approach, which ends in July 16, 2014, is to harmonize and improve better aid-effectiveness and coordination amongst the various funding agencies. Swiss support to the TB sector has been continuous since 1960s and is currently in the form of Technical Assistance and the contributions to materials.

The overall objective of the review is to: (i) assess the socio-economic impact of safe and improved access provided by trail bridges on the lives of local people, including disadvantaged groups and (ii) focus on how the institutional systems and capacities put in place at different levels will bring sustained impacts to the society. The results are to serve as an input for designing the next Framework of TB-SWAp including next phase of TBSSP for technical assistance.

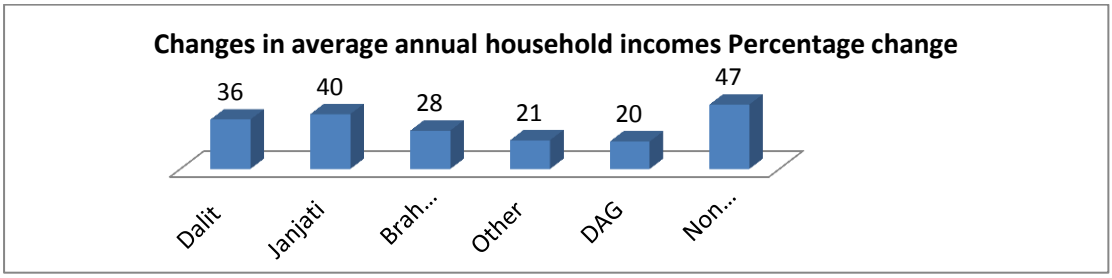
Impact

The primary finding of this review is that the *Trail Bridge Sector Wide Approach of MoFALD/DoLIDAR has contributed significantly to the improvement in access for a large number of the rural population through trail bridges, especially those in remote areas who are marginalised.* On *average 153 people were found to be using the trail bridges to cross rivers daily* with the bridges saving 30 minutes, 20 minutes and *10 minutes for a one-way journey* for accessing markets, schools and performing household chores respectively. The access provided by the trail bridges were found to be distributed across all social and economic groups.

Beneficiaries were found to have experienced positive changes in social indicators in education and health as a direct consequence of the year round mobility provided by the bridges. Sampled schools reported increased attendance rates, which ranged from 5%-20%, *the number of patients accessing health facilities from across rivers increased in 40% of the sampled health facilities*. Around one million people cross the trail bridges every day in the country. In addition, the bridges were found to be essential for conducting household chores (collecting firewood, fodder); with women predominantly crossing the bridges to perform these activities.

The strongest links with trail bridges in terms of livelihoods generation was the employment generated during construction and the emergence of small business enterprises (2 new shops on average) near the vicinity of the bridges and/or the greater trade flows as a result of improved access. According to the 2013 records, trail bridge construction had facilitated creation of over 2,500,000 person days of employment at the local level, out of which over 1,600,000 (64%) person days of employment had been created for disadvantaged groups.

Overall, cereal farming continues to be the main source of household income within the sampled population.



Source: Household Survey 2013

The mandatory criteria of having a proportionate representation of social groups and at least 33% of women in the User Committees (UCs) have also played a pivotal mechanism in mainstreaming exclusion and gender into the sub-sector. The representation of women in the UCs is around 40% against the planned 33%, representation of Disadvantaged Groups (DAGs) in proportion to the beneficiary population is 61%, and at least one executive position allocated to the discriminated groups in UC 99%.

Contrary to the assumption that the increased number of bridges within the last five years may have led to saturation, the demand for trail bridges has remained high. With the expansion in road networks, settlement areas and people's desire to be connected to the wider region, the need for bridges has increased.

Net Present Value (NPV): The NPV is the difference of TB schemes discounted annual incremental investment benefits and costs streams. The result gives that a rupee today has a higher value than a rupee after a year from now. The NPV for 30 sampled TB is found Rs. 158 million. This positive NPV for all regions indicate that the investment in TB scheme is greater than the estimated opportunity to invest elsewhere.

Benefit Cost Ratio (BCR): Cost benefit analysis is the assessment of the economic merits of the trail bridges in terms of efficiency of resource utilisation. The present value of BCR for the sampled 30 TBs is found 2.97. The result of benefit cost ratio signifies that the benefit of per unit investment in TB is greater than 1 in different ecological region. Thus, investment in TB project is economically beneficial.

Economic Internal Rate of Return (EIRR): IRR is the rate of return in economic prices that would be achieved on all expenditures of the TB schemes. The overall economic return on investment of the sampled TBs is 22 percent, which justifies clear economic benefits resulting from the TB construction.

Relevance

The relevance of TB SWAp Framework is high in particular for communities. District Development Committees (DDC) and Central Government agencies consider the approach as relevant since it provides a viable model for addressing the priorities of marginalized communities. It is in line with the District Development Plans and with policy options provisioned in the Trail Bridge Strategy (TBS)/Local Infrastructure Development Policy (LIDP).

> They also favoured that introduction of TB SWAP Framework I has been an image enhancer of the DDC/DTO 'a leading institute for TB construction and maintenance in the district' – District Technical Officers.

District authorities who are directly involved in the planning, funding and supervision consider TB sub-sector a suitable approach for the district because of the adoption of systematized TB selection, planning, prioritizing and SSTB implementation by DDC/District Technical Office (DTO).

The assertiveness within MoFALD/DoLIDAR has increased after implementation of TB SWAp in 2009. They feel pioneer in Trail Bridge sub-sector. Confidences within the central agencies have increased**.**

> **'We construct one trail bridge a day i.e. 300 per year, and are planning to construct 1.5 bridges per day in the next phase of TB SWAP Framework II i.e. 450 per year (2014-15) – MoFALD.**

Effectiveness

With the construction of 1046 new bridges (by July 16, 2013), major maintenance of 474 bridges and routine maintenance of 12,195 bridges (3000 per annum) against the targets of constructing 2,200 new bridges and maintenance of 370 bridge including routine maintenance of 5000 per annum); TB has created safe and improved access to 2.5 m rural people against the target of 2.2 million, out of which 2.0 m (83%) belong to discriminated groups and 1.5 m (60%) belong to Disadvantaged Groups. Overall, the approach is contributing to a more equitable distribution of benefits.

All 75 DDCs were found to adhere to the TBS/LIDP and its core manuals in managing the trail bridges, integration into DDC planning and implementation, scaling-up.

In terms of institutionalizing TB sub-sector, DoLIDAR so far has succeeded in integrating the Local Bridge Section (LBS) within the DoLIDAR structure, however, human resources is inadequate in TB sector. To help meet the current human resouece needs in the TB sector; institutional restructuring within DoLIDAR is found necessary i.e. creation of 'Bridge Directorate' with the merger of the Suspension Bridge Division (SBD) and LBS by retaining existing technical capacities of SBD for TB and local roads bridge construction and maintenance management. Use of technical human resources of Rural Area Development Committee (RADC) functional in the rural infrastructure in 23 districts has to be linked with the functions of the Directorate.

Technical assistance (technical inputs, communication, monitoring, information sharing, management) provided by SDC through the Trail Bridge Support Unit (TBSU)/Helvetas is also widely recognized and appreciated. In practice, roles of TBSU (at the centre and districts), is much more than what was foreseen in the SWAp Framework that also shows the ambiguity regarding TBSU's implementation versus technical assistance role.

Coordination at district and central level and the effectiveness of the provision of complementary inputs and services after TB construction require attention.

Efficiency

Positively, the resources allocated from the government in recent years have also increased from Rs. 258 m (2009/10) to Rs. 1,168 m (2013/14). But, a Basket Fund as provisioned in the TB SWAP Framework I document has not yet come into operation.

Operational performance at district level is good, although compromised by institutional constraints and lack of clear roles. At central level progress of institutionalizing TB SWAp approach is slow.

Sustainability

Improvements of access and safety are so substantial that local bodies and community based organisations including the communities will have a genuine interest to maintain them.

Routine maintenance is governed by a bridge warden, which are employed and paid by the Routine Maintenance Committees as contributed from the DTO.

Priority to maintenance has been given by GON and TA provider by increasing funds for detailed survey/design of critically unsafe bridges for rehabilitation and major maintenance.

Conclusions and Recommendations

Overall, the ER team consider TB SWAp Approach and the TA provided by SDC a relevant and effective approach which deserves to be developed further. The focus of further development should be on:

- Continue scaling-up trail bridge development under Program Based Approach (SWAp)
- Optimizing / maximizing impact of the TB through complementary mechanisms.

  These can be achieved through:

  - Institutional restructuring and strengthening TB designing, planning and prioritization capacity of DoLIDAR and DDC/DTO (where substantial improvement at current level is desirable). The functioning of Suspension Bridge Division (SBD) and Local Bridge Section (LBS) can be integrated into one entity by the merger of the two and incorporating the entity within DoLIDAR as a Bridge Directorate. Provisions can also be made to utilize technical staffs of the Rural Area Development Committee (RADC) that are working in 23 districts.
  - Making DoLIDAR and DDC/DTO accountable in monitoring and quality control. TA to facilitate and support in capacity building lowering direct involvement in monitoring and QC in future through third party monitoring and technical audits.
  - Improving the procurement process i.e. reducing procurement risks in devolved programs such as evaluating bids timely, procuring and delivery of TB materials timely, etc.
  - Strengthening the community elements i.e. improving facilitation and vigilance in terms of NGOs and community mobilization management.
- Giving special focus to trail bridge construction in the Karnali and Terai districts.
- Broadening the funding of TB by integrating all related GoN-funds and attracting new donors to subscribe to the approach.
- Reassessing the needs and support needed to communities in terms of 'backward and forward' linkages within the economic value chain required to get the maximum benefit after TB construction. Local bodies to include this process in their annual participatory planning process.
- Coordinating with relevant agencies, by local bodies, to provide complementary support for social and economic promotion activities at the community level after trail bridge construction.

Trail Bridge Sector-Wide Approach Framework I (2009-14)
External Review Report

1. Background

1.1 Introduction

In 2009, the Government of Nepal implemented a Trail Bridge Sector Wide Approach (TB-SWAp) Framework for the Trail Bridge (TB) construction under its infrastructure investment portfolio. The aim of this approach, which ends in July 16, 2014 is to harmonize and improve better aid-effectiveness and coordination amongst the various funding agencies which include the WB (World Bank), ADB (Asian Development Bank), Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC). The Trail Bridge-SWAp is governed by the National Policy i.e. Trail Bridge Strategy/Local Infrastructure Development Program (TBS/LIDP) which aims to promote a coherent, government-led process for planning, coordination, construction and maintenance of trail bridges throughout the country.

Swiss support has been continuous since 1960s and is currently in the form of Technical Assistance and the contributions to materials (wire-ropes and bull-dog grips) through the third phase of the Trail Bridge Sub Sector Program III (2009-2014). The major aim of the Program is to provide safe and improved access to the local people (particularly women, Dalits, and people belonging to ethnic communities and disadvantaged and underprivileged groups) to social and basic services and economic resources and opportunities, and thereby contribute to poverty alleviation.

The main objectives in the TB-SWAp are:

Goal: Contribute towards poverty reduction through improvement of access to social & basic services and economic resources & opportunities of the local people by building trail bridges within one hour detour.

***Outcomes*:**

- Engagement of local communities enhanced in the construction and operation of trail bridges to improve safe access to basic services (Health, Education, Markets, Farms and Employment Opportunities) at local level; and
- Institutional framework at national level strengthened to enforce Trail Bridge Strategy/Local Infrastructure Development Policy (TBS/LIDP) in the construction and maintenance of trail bridges.

***Outputs*:**

Output 1: Trail bridges constructed and maintained by District Development Committees (DDCs) with participation and contribution of local communities.

Output 2: Capacity of local bodies and local communities (including CBOs/NGOs and private sector) strengthened to implement trail bridges Programs at local level.

Output 3: Capacity of Department of Local Infrastructure and Agricultural Roads (DoLIDAR) enhanced to enforce trail bridge policy.

Output 4: Stakeholders at national level enabled to select and use right technologies for trail bridge construction

In July 2013, Swiss Agency for Development and Cooperation (SDC) commissioned an External Review (ER) of the Trail Bridge Program and the development of the next phase of the SWAp framework. The Terms of Reference is attached in Annex 1.

1.2 Objectives of the review

The overall objective of the review is to assess the socio-economic impact of safe and improved access provided by trail bridges on the lives of the local people including disadvantaged groups. The study will also focus on how the institutional systems and capacities put in place at different levels will bring sustained impacts to the society. The results will then serve as an input for designing the next Framework of TB-SWAp including next phase of Trail Bridge Sub-Sector Support Programme (TBSSP) for technical assistance.

Specifically they include:

- To assess the socio-economic impacts of TBSSP on lives and livelihoods of local communities in general and with special focus to the disadvantaged groups including women;
- To review the impacts on strengthening capacities of stakeholders at village, district and national level from a sustainability point of view; and
- To capture lessons learned and derive recommendations for future course of actions for SWAp Framework II.

1.3 Methodology

- An initial task of ER team involved review and assessment of various trail bridge related documents. Reports and the achievement of results recorded through the Outcome Monitoring System (OMS), Trail Bridge Strategy Information System (TBSIS) and other relevant quantitative data to supplement the qualitative information from the field;
- Consultative meetings with National Planning Commission, Ministry of Finance (MOF), Ministry of Federal Affairs and Local Development (MoFALD), DoLIDAR/LBS, SDC, Department for International Development (DFID), World Bank (WB), Asian Development Bank (ADB), Embassy of Denmark, Trail Bridge Support Unit (TBSU), KAADOORIE, Poverty Alleviation fund (PAF) and Rural Area Development Committee (RADC);
- Residential meeting/workshop with the taskforce formed by the MoFALD for TB SWAp Framework II document preparation (Annex 2);
- Consultative workshops with Local Development Officers (LDOs) and District Technical Officers (DTOs) of 75 districts in the MoFALD Regional Review Workshops organised in Biratnagar, Pokhara and Nepalgunj;
- Household Survey and Traffic Count: Altogether 30 Short Span Trail Bridges (SSTBs) from 24 districts that were constructed after the implementation of SWAP (i.e. after 2009), which have baselines and have been in operation for at least one year were sampled for the survey. From the 30 sampled bridges, 3024 household surveys and a weeklong traffic counts were conducted. All the surveys were conducted by hired enumerators who were provided training on the questionnaires; and
- Key informant interviews were also carried out with 80 service providers to assess the outcomes on trial bridge access to different service centres.

1.4 Report Organisation

The report is organised based on the ER Terms of Reference and the structure of the TB SWAP Framework I logical framework document. Section 1 provides some context and background to TB SWAp and the ER process; Section 2 presents the analysis of progress against indicators, observations and a summary of the main findings of the ER team; and Section 3 presents a set of findings and recommendations based on the analysis in the previous sections.

1.5 Limitations

The ER-team relied on the desk study of available documents, checklists for interviews with interface interviews, focus group discussions (FGDs) and traffic count and household survey through enumerators. The household survey and traffic count conducted represents trail bridges constructed after the implementation of SWAp from 2009 onwards, which have baselines and have been in operation for at least one year; findings of the survey might not represent the impact of all the 5361 trail bridges constructed in Nepal and needs to be validated with detailed Trail Bridge Impact Survey in future. Furthermore, the outcomes and impacts observed and analysed in this ER were caused by many complex pathways, including the intended and unintended consequences of the TBSSP interventions, as well as external factors that had no relations with the access provided by trail bridges. This report has therefore, sought to identify the '*strongest links'* which are directly attributed to trail bridges as well as identifying and analysing other factors, which in addition to the trail bridges, have brought about changes in the lives of the study population.

2. Impact

2.1 Observations

The goal of the TB SWAp is to contribute towards the poverty reduction through improvement of access to social & basic services and economic resources & opportunities of the local people by building trail bridges within one hour detour.

The attribution to this impact has been well considered by the stakeholders. The TBSU Progress Report, 2012/13 states that all DDCs adhere to the prescribed prioritization formula and criteria of 1 hour detour. Trail Bridge Strategy Information System maintained by the TBSU provides information on distance gained after construction of trail bridges after 2009. However, the information system less reflects towards attribution of the TB SWAp towards the goal level indicator i.e. availability of river crossing facility to local people within one hour detour. The Master Plan for 'One hour detour' and relevant data to prove attribution to it has not been observed by the ER.

2.2 Findings

2.2.1 Household Survey and Traffic Count Results

2.2.1.1 Safety and Improved Access

Trail bridges have significantly enhanced access to service centres and were found to be providing safer river crossings to over 3,000 beneficiaries on average within the 'zone of influence' (i.e. within half a day's walk from the trail bridges or those who use the bridges at least on alternative days). This is in line with the RTI SWAp objectives of providing 'improved accessibility and mobility from rural

transport infrastructure to basic services' and is at par with the intended social benefits to access service centres.

The majority of the beneficiaries belong to Janjatis (51%) followed by Brahmin/Chhetrys (32%), Dalits (15%) and Terai/Madeshi other castes (2%) (Household survey 2013). ***Data from the household surveys indicate that 26% belong to disadvantaged groups*** (i.e. those who are economically poor as well as socially discriminated due to their caste/ethnicity, gender and geographic location). These figures are in line with the past Post Bridge Building Assessments (PBBA) which has calculated the DAG percentages as being 23.5% (2012) and 23.8% (2010). It is however lower than the 36.8% calculated in 2009 and reflects the methodological differences applied.

This validates the TB SWAp OMS information – with the construction of 1046 new bridges (by July 16, 2013), major maintenance of 474 bridges and routine maintenance of 12,195 bridges (against the intended targets of providing access to 2.2 million rural people to basic services and economic opportunities by constructing 2200 new bridges and maintenance of 370 bridge including routine maintenance of 5000 per annum); TB has created safe and improved access to 2,513,253 rural people, out of which 2,078,786 (83%) belong to discriminated groups and 1,506,423 (60%) belong to Disadvantaged Groups (DAG). Data discrepancy has been found in terms of accessing opportunities to DAGs; for example out of the aforementioned people TB SWAP intended number of discriminated and DAG groups are 2,078,786 (83%) and 1,506,423 (60%) respectively. These data discrepancies between PBBA and the current survey might be because of methodological process and number of beneficiary populations within 'zone of influence' in the surveyed TBs.

Data gathered from the traffic counts also show that a large number of people, living within the general vicinity of the trail bridges as well as travellers from different districts (at 57% of the sampled bridge sites), continue to rely on the bridges for safer access. Amongst the sampled trail bridges 73% (22 TBs) were providing Rural-Rural access to locals (i.e. were located in rural areas, linking different VDCs); while 27% (8 TBs) were provided Rural-Urban connectivity (i.e. were located near district headquarters, regional markets, and road heads).

On average 153 people were found to be using the SSTBs to cross rivers daily.

Chart 1: Main benefits of the trail bridges by topography

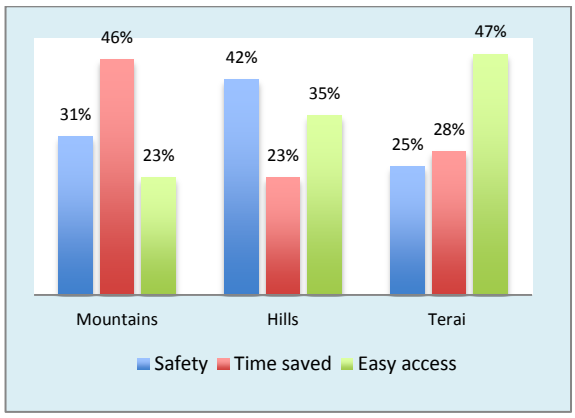
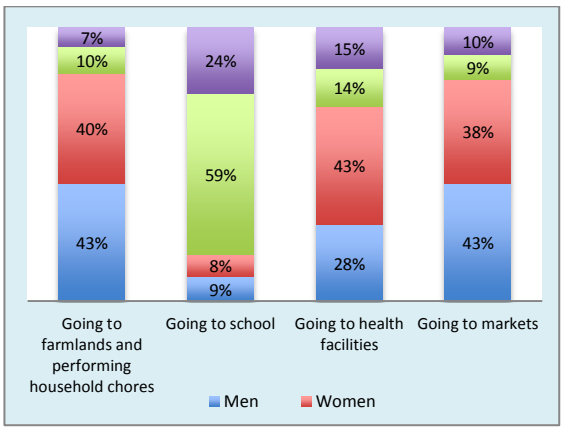


Chart 2: Purpose of crossings by gender in %



Source: Traffic counts 2013

Higher numbers of average daily crossings were found to be in the Hills (232) compared to the Terai (94) and Mountains (75). This is more of a reflection of multiple factors such as population densities (lowest in the mountains), presence of

alternative crossings (Terai), mobility patterns of locals and distances saved, amongst others. Findings from the household survey further show that people in the Hills regard the *safer access* provided by the TBs to the most important benefit, indicating an absence of other alternative crossings within the vicinity.

Gender disaggregated data show that the ***boys (33%) followed by men (28%), women (23%) and girls (16%), are the main users of the trail bridges***. With the highest number of bridge crossings undertaken to go to farmlands and perform household chores, such as collect firewood and fodder (31%). ***Women were found to predominantly cross trail bridges to perform household chores, access farmlands and go to health centres***. Men on the other hand mostly used the trail bridges to also go to farmlands and markets (Chart 2). Simultaneously, more boys were recorded to have used the bridges to access schools (59%) than girls (Chart B), which differs from the finding of the 2012 PBBA, which recorded higher number of girls (56%)[1]. When cross verified with school enrolment records it was seen that boys did out number girls (53% to 47%) and one can infer was reflected in the daily traffic counts.

2.2.1.2 *Social Effects*

Access to Educational Services

Access to educational centres continues to be one of the most important purposes of trail bridges (Chart 2). In fact 14 (47%) of the sampled trail bridges were constructed specifically to ensure safer river crossings for children. Baseline studies record *that* ***prior to trail bridge construction there would be a dramatic reduction (up to 56%) in school attendance during the rainy season*** (Chhetry 2010). In addition, when it did rain ***29% of the schools sampled reported that they would have to stop classes***, mid-way, in order to ensure that the students reached their homes safely before the rise of river waters.

During this study, 24 schools (21% Primary, 58% Secondary, and 1% High Schools) were visited. Records from these schools show that 48% of the students were girls while 52% were boys. When compared with baseline data, it was seen that ***prior to trail bridge construction 22% of the students were coming across the rivers (Chhetry 2010, Karki, 2012), while after construction, the figure was slightly higher at 28%***. Amongst them, 58% of the crossers were girls. **Altogether 50% of the sampled schools reported an increased in attendance rates, which ranged from 5% - 20%.** It would be very simplistic to assume that increases in attendance were a direct result of the trial bridges, as behavioural changes depend equally upon other factors such as quality of education, desire of parents to send their children to school, financial circumstances, amongst others. Nevertheless, when parents and students were interviewed they noted that safety (12%) and convenience (23%) were important factors in deciding to go to school or not.

Access to Health Services

Comparisons with baseline data collected prior to trail bridge construction showed that ***the number of patients accessing health facilities from across rivers increased in 40% of the sampled health facilities (N=19)***. ***On average 35% of those seeking out treatments had to use the trail bridges compared to 21% recorded prior to trail bridge construction*** (Chhetry 2010).

[1] Other past PBBA records show a mixed picture. In 2010, the figures were higher for boys crossing (52.5%) compared to girls (47.5%); while in 2010, it was equal (50%).

During the study, it was noted that the bridges not only improved access to the nearest health facilities, but also opened up further alternatives to higher levels of centres through access to road heads, from which district and zonal hospitals could be accessed. ***Data from the traffic counts indicate that the majority (43%) of crossers coming for check-ups are women*** (Chart 2).

Overall, the importance of trail bridge for both maternal health care and medical emergencies was stressed by many. ***84% of the health service providers reported increasing number of women coming for antenatal care and deliveries***. Interestingly, 76% of the household respondents reported to have given birth at health facilities. For many, the trail bridges ensured safer crossings, encouraged health service providers to come to their households for checkups and reduced time.

Health workers also noted that the bridges had improved the transportation of medical supples, equipment, and had helped to continue outreach services (such as vaccination campaigns) during the rains.

Performing Household chores

Accessing farmlands and performing household chores (gathering firewood, fodder, going to mills) were the main purpose of crossings (31%) in the majority of the sampled sites (Chart 2). With ***an equal number of men (43%) and women (40%) recorded to be crossing the trail bridges to perform these activities.***

In most of the sampled sites, the time savings were approximately 10 minutes for a one-way journey, which when aggregated becomes quite significant when one considers that an individual may have to visit his/her farmlands a number of times in a day as well as perform other activities. Traffic counts recorded the movement of 22 animals (cows, buffalos, goats) across the trial bridges on average in one day. Most (62%) were taken for grazing.

Access to markets

Connectivity to markets was an important benefit provided by the trail bridges and is in line with the TBSSP SWAp objective of improved access to markets. *At 50% (N=15) of the sampled sites, access to local and/or regional markets were found to be the main reason for trail bridge demand.* On average the bridges were found to save 30 minutes for a one way journey. Meanwhile, ***traffic counts recorded that usually more men (43%) were crossing to go to markets, either to buy goods or sell their produce than women (38%).***

Interviews and observational visits noted that the effect of trail bridges led to both increases in businesses (through higher traffic flows) as well as newer opportunities. For example, ***71 % (N=10) of the traders interviewed who had already established shops reported increases in the number of buyers***, especially during the rainy season. They mentioned that locals do not need to rush back home in the evenings and that there are greater number of people come to buy their goods even when it rains.

Meanwhile, it was found that ***on average 2 new business enterprises (retails, tea shops) had opened near the vicinity of the trial bridges***. Most had started their shops in order to take advantage of the traffic flows, especially along long journeys routes where travellers would be more inclined to rest before starting off. Incidentally, in some sites the presences of a large number of shops were seen to have a negative effect on the general cleanliness of the area, affecting the trial bridges. In these areas, throwing rubbish, urinating, and drying clothes were common. This will inevitably affect long term sustainability and is an issue that needs

to be made aware to these local communities and the bridge wardens who are entrusted with their maintenance.

Increasingly, the study team also noted that locals were riding motorbikes and cycles across the bridges. With many transporting goods either for home consumption or selling. When interviewed, they were appreciative of the slopes/ramps.

These survey findings validate the OMS information of the TB SWAp Framework I that:

- Although the progress attained in terms of construction of trail bridges is less than 50 percent (July 2013), routine maintenance, major maintenance and improvement of access trails is satisfactory. The intended social effects creation are at par to what has been planned e.g. the health seeking behaviour increment among the local population whereas attainment of progress towards the school attendance rates are less than expected (12% as against planned 15%).
- The TB infrastructure created expected effects at social level e.g. 12% increment rate in school attendance (although it is less than anticipated target) and 36% increment in health service seekers is a tremendous achievement of the TB SWAp Framework I.
- Off-farm or entrepreneurial activities has been created around the trail bridge after its construction. Emergence of shops, a self-employment and entrepreneurial ventures, has been in and around 36% of the bridges.

2.2.1.3 Economic Effects

Employment

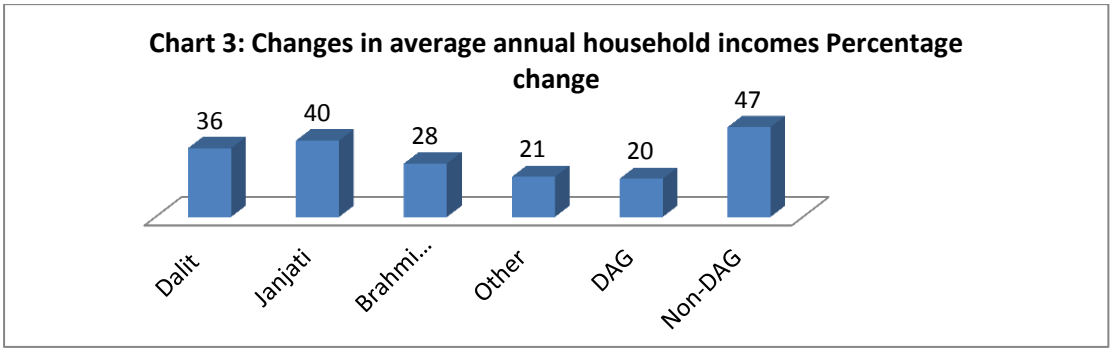
TBSU OMS report, 2013 indicates that the TB access has facilitated creation of 2,506,042 person days of employment at local level, out of which 2,004,758 (79%) person days of employment has been created for discriminated youths, where 64% or 1,628,349 person days of employment has been generated to DAGs. This at an average wage rate of NPR 300 is equivalent to NPR 750 million injected into the local economies.

Progress attained in terms of local wage employment creation is less than 50%, which is natural as the resource allocation to trail bridge construction was less than what has been planned in the TB SWAp Framework I document.

Rural livelihoods and incomes

***Trail bridges were found to have limited outcomes on the livelihoods and incomes of the beneficiaries*.** Complementary services, in areas of agricultural and non-agricultural sectors, are therefore required to generate multiplier impacts to take advantage of improved access provided by the bridges.

Overall, cereal farming continues to be the main source of household income within the sampled population (Table 3, Annex 3), with the exception of Dalit households who were found to be more reliant on agricultural-wage labour. This is not surprising considering that 48% of this population were found to be landless. For many, agricultural and non-agricultural works were the most important sources of income. In addition, migration (to India and beyond) and the subsequent remittances sent back were also found to be significant.

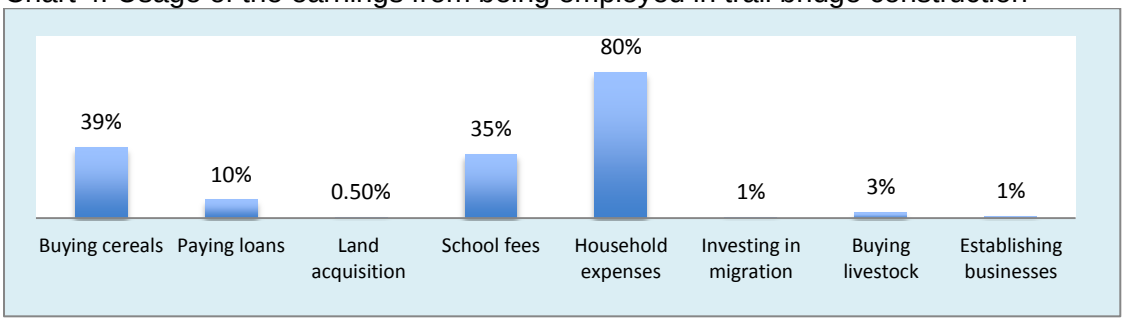


Source: Household Survey 2013

This was primarily due to the increased incomes from remittances and business enterprises that they had started since the construction of the trail bridges (Table 3 Annex 3). Dalits and disadvantaged groups were however found to have not diversified into these opportunities in comparisons with the other social group due to high investment costs (and consequently high interest rates on loans), the lack of knowledge and inability to take risks. This is also because of the unavailability of complementary investment in the 'zone of influence' after trail bridge construction.

The strongest link with trail bridges in terms of livelihoods generated was the emergence of small business enterprises near the vicinity of the bridges and/or the greater trade flows as a result of improved access.

Chart 4: Usage of the earnings from being employed in trail bridge construction



Source: Household survey 2013

2.2.1.3.1 Cost Benefit Analysis

Cost benefit has been analysed to assess the economic merits of (per bridge) the surveyed TB during ER in terms of efficiency of resource utilisation. The economic efficiency measures the relationship between cost and benefit of the TB Programme. The economic cost-benefit of sample TBs was calculated in terms of common monetary unit. The aggregates of TB construction and routine maintenance cost was compared with economic benefits from economic activities incur by traveller's due to saving in travel times. The major maintenance and other indirect costs were excluded. The economic activities are considered for marketing, agriculture input supply and farm field visit. The social cost benefit was derived whether the investment amount is beneficial or not in terms of common monetary unit. The different criteria such as Benefit Cost Ratio, Net Present Value and Internal Rate of Return was undertaken to analyse the impact of TB based on benefit and cost streams (Refer to Table 1).

Table 1: Calculated value of costs and benefits of TB by ecological region.

Indicators	Ecological Region			Total
	Mountains	Hills	Terai	
Number of sample TB	9	13	8	30
Construction cost (in NPR millions)	21.71	39.72	17.65	79.08
Maintenance cost (in NPR millions)	0.03	0.04	0.02	0.09
Aggregate cost (in NPR millions)	21.74	39.76	17.67	79.17
Normal travelling benefits (in NPR millions)**	6.14	16.80	15.91	19.50

Source: Field Survey, 2013 and TBSU (**Refer to Table 1, 2 and 3 Annex IV)

The construction cost of 30 sample TBs were Rs 79.08 million (mountain - Rs 21.71, hill – Rs. 39.72 and Terai- Rs. 17.65 million) and its maintenance cost were 0.09 million (mountain – Rs. 0.03, hill - Rs 0.04 and Terai – Rs. 0.02 million). The normal traveling benefits were computed in terms of travelling for the purpose of marketing, agriculture input supply and farm field visit. The benefit was found to be Rs. 19.50 million (mountain – Rs. 6.14, hill – Rs. 16.8 and Terai – Rs. 15.91 million). The economic rate of returns was analysed based on the costs and benefits.

The technique of cost-benefit analysis was used to show the impact of TB on economic activities from present value of benefit and cost. In analytical process, the life span of TB was assumed to be 50 years. The future benefits and costs of TB would be appropriate to measure at present value considering the country context and international practices. The TB is public goods having longer life span and its social time preference has longer time horizon so that its discount rate would be lower than other private projects. Therefore, 8 percent discount rate has been determined considering lending rate in Nepal as well as suggested by Gittinger (1982) in between 8 to 15 percent. The Net Present Value technique was adopted for measuring economic viability of TB by taking into account a time preference for money e.g. comparison of the present value of the cost streams with the present value of the benefit streams. The Benefit–Cost Ratio was calculated to identify cost effectiveness in the present value of benefits to the present value of costs. The Economic Internal Rate of Return was calculated to analyse the return on investment percentage. Refer to Table 2 for results.

Table 2: Results of the economic evaluation based on time saved

Economic Indicator	Mountain	Hill	Terai	Aggregates
Net Present Value (NPV) in NPR million	53	165	176	158
Benefit Cost Ratio (BCR)	3.40	5.10	10.83*	2.97
Economic Internal Rate of Return (EIRR) %	22	21	21	22

Source: Field Survey, 2013

*The data were collected based on mixed method and phenomenology that was the basis for data analysis. Therefore, perception and embodied action of respondents has been considered in analytical process. In the context of travelling time and distance, the respondents from Terai were of the view that they needed longer travelling time before construction of TB. Therefore, more travelling days and longer distance was usual in without project situation so that normal travelling benefit gave higher value and thus, BCR is of larger value in Terai.

Table 2 presents the results of monetary value of incremental investment costs and incremental benefits derived from the time saved of travellers in economic activities. Aggregate investment amount in TB was measured by using economic prices. The economic price refers to value of the contribution to the country's basic socio-

economic objectives made by the marginal change in the availability of the present value of TB.

Net Present Value (NPV): The NPV is the difference of schemes discounted annual incremental investment benefits and costs streams. The result gives that a rupee today has a higher value than a rupee after a year from now. In 30 sampled TB, NPV is found to be Rs 158 million (Rs 176 million in Terai, Rs 165 million in hill and Rs 53 million in mountain). The positive result of NPV in aggregate as well as for all geographic regions indicates that the investment in TB scheme is greater than the estimated opportunity to invest elsewhere. Thus, the TB scheme is sufficient to recover investment.

Benefit Cost Ratio (BCR): The benefit and cost ratio criterion was used for the evaluation of TB schemes based on the direct aggregate investment costs and benefits. The ratio was calculated on the basis of present worth of the benefit streams divided by the present worth of the cost streams. The result shows the efficiency of scheme's resource investment. BCR for the sampled 30 TB has found to be 2.97 (3.40 in mountain, 5.10 in hill and 10.83 in Terai). The result of benefit cost ratio signifies that the benefit of per unit investment in TB is greater than 1 at national level as well as in all ecological regions. Thus, investment in TB scheme is economically beneficial.

Economic Internal Rate of Return (EIRR): The benefits and costs effect of the scheme's alternative is the IRR. IRR is the rate of return in economic prices that would be achieved on all expenditures of the scheme. It was calculated through an iterative process by assuming different discount rates. The overall economic return on investment has been calculated at 22% interest rate. It has shown 22% for mountain and 21% for hill and Terai region. The effects of TB were measured in terms of values of marketing, agriculture input supply and farm field visit. The EIRR of similar infrastructure project were 19% and 17% for the Dolakha-Singati and Sindhulimadi-Bhimsensthan roads respectively (DRSP, 2013). This implies that EIRR is higher in TB scheme. Hence, the investment in the TB project can be justified by the clear economic benefits resulting from its construction.

Economic Internal Rate of Return (EIRR): The benefit and costs effect of the project alternative is the Internal Rate of Return (IRR). IRR is the rate of return in economic prices that would be achieved on all expenditures of the project. It was calculated through an iterative process by assuming different discount rates. The overall economic return on investment has been calculated at 21% interest rate. It has shown 22% for mountain and 21% for hill and Terai region. The effect of TB were measured in terms of values of marketing, agriculture input supply and farm field visit. The EIRR of similar infrastructure project were 19% and 17% for the Dolakha-Singati and Sindhulimadi-Bhimsensthan roads respectively (DRSP, 2013). This implies that EIRR is higher in TB schemes. Hence, the investment in the TB schemes can be justified by the clear economic benefits resulting from its construction.

2.2.1.4 Gender empowerment

Within the sampled bridge sites, the surveys and traffic counts indicated that women have equally been benefiting from the bridges as compared to men. Though, their purpose of crossings were found to be different and generally revolved around gendered roles (Fernando and Porter 2002); such as performing household chores (40%) (Chart 2). This reinforces the need to maintain a gendered-lens while designing and implementing transport infrastructure projects, as there are fundamental gender-based differences in women's and men's needs for transport.

For both, the 10 minute time saved for a one-way journey while performing household chores, when aggregated for a number of crossings in one day (for visiting farmlands, collecting firewood and fodder) were found to be regarded as being important. Efforts to quantify how the time saved was being utilised were however found to be difficult, as their responsibilities and the work required to be done never ceased. Nevertheless, all the respondents noted and were appreciative of the safety and convenience provided by the trail bridges.

The community approach of 'user groups' in trail bridge building have also played an important role in decision making and implementation. In particular, the mandatory criteria of having a proportionate representation of social groups and at least 33% of women in the UCs have been pivotal mechanisms for mainstreaming inclusion and gender into the sub-sector, which need to be continued with complementary support. For example, interviews with female members indicated that though the provisions have created a space for women to 'share their voices' it has also increased 'time burdens'.

Amongst 30 UC members interviewed, 16% (5 women) reported to have had difficulties in being active. They indicated pressures of household chores, time constraints and lack of know-how as reasons for being unable to fully contribute to the process. On the other hand, others (13%) noted that they were more confident and satisfied in having contributed to their local communities. Presently, there are a few provisions available such as stipends for mothers who need to bring their babies with them to Demonstrating Model Bridge Trainings. Other supplementary activities would provide further encouragement and support.

This information validates the TBSU OMS information that representation of women in the UCs is around 40% as against planned 33%, representation of DAG in proportion to the beneficiary population is 61%, and at least one executive position allocated to the discriminated groups in UC 99%.

The standardization of equal pay for equal work, as per the TBSSP-SWAp, has also provided clear directions for greater gendered equity. This was found to be implemented and monitored and needs to be continued.

2.2.1.5 Safeguards on Vulnerable Groups and the Environment

Within the trail bridge sub-sector safeguards for vulnerable groups were found to be focused on displaced populations, provisions of labour generated during bridge constructed and wages. Presently, there are no provisions on resettlement of villagers who occupy land required for trail bridge construction, though forced land donations are prohibited. If someone is unwilling to donate land, then the general procedure is to seek another technically feasible location elsewhere. From the interviews conducted with villages, no such problems are reported at the sampled bridge sites. When, displacement did occur, this was primarily for families which earned their living by ferrying people across rivers. Here, the provision is to provide trainings to seek alternative employment or become bridge crafts persons during the Demonstration Model Bridge Trainings (DMBT).

During the construction process it was noted that equal pay for equal work was established. It was reported that UCs are made aware of this concern and is monitored throughout the construction cycle of the bridge. The provision of safety gear (helmets, life jackets) is also significant, as is the securing of insurance for labourers and ensuring that companies pay compensation, when the needed. Child labour is also strictly prohibited and was found to be ensured through active monitoring.

It was noted that bridge locations also are selected at geologically and environmentally sound sites, as per the SSTB Manual and LSTB Manual Vol. B. These manuals are in accordance with the Environmental Protection Act (1997) and Environment Protection Rules (1997). In addition, the replacement of wooden decks with galvanized steel parts has inevitably resulted in less number of trees being cut.

The loss of incomes for families that ferry locals across rivers in exchange for cash or kind were also found to have been directly affected by the construction of the trail bridges (such as in ***Bhīma Bridge*** in Dang). According to TBSU records, these displaced boatmen are provided with trainings for alternative employment.

Analysis Report of the Traffic Count and Household Survey is given in Annex 3.

Cost-benefit Analysis report is given in Annex 4.

3. Effectiveness of Trail Bridge Sub-sector

3.1 Capacity Building

3.1.1. Capacity at District Level to Manage TB SWAp

3.1.1.1 Observations

(i) DDC/DTO

All 75 DDCs were found to adhere to the TBS/LIDP and its core manuals in managing the trail bridges (TBSU Annual Report, July 2013). One focal person has been assigned and becoming the point of reference in TB related matters in more than 70 districts. Since the implementation of SWAp, the capacities of the engineers and sub-engineers have also been developed through technical training, although it is still inadequate. Nevertheless, local bodies have started entrusting technical responsibility to the employees capacitated and trained in the TB subject as per their availability at local level.

(ii) NGOs

Presently, NGOs are working in 70 districts for Short Span Trail Bridge (SSTB) construction (TBSU Annual Report, July 2013). The ER observed that Non-government Organizations (NGOs) are supporting communities for construction of SSTB bridges, providing social organizational and technical support, imparting the required know-how to UCs by means of the Demonstration Model Bridge Training, then later assisting Users Committees (UC) in maintaining Project Books, reporting on physical progress, and assist UCs in organizing Public Hearings, Public Reviews and Public Audits.

(iii) Private sector

The private sector is playing significant role in both SSTB and Long Span Trail Bridge (LSTB) construction as they have been provided Trail Bridge related trainings for enhancing the capacity of their technicians. Private sector consultants, construction entrepreneurs, fabricators and non-governmental organizations are also provided opportunity to participate in trail bridge training.

Overall the implementation of TB SWAP Framework I is satisfactory as it is executed as planned at all levels, such as:

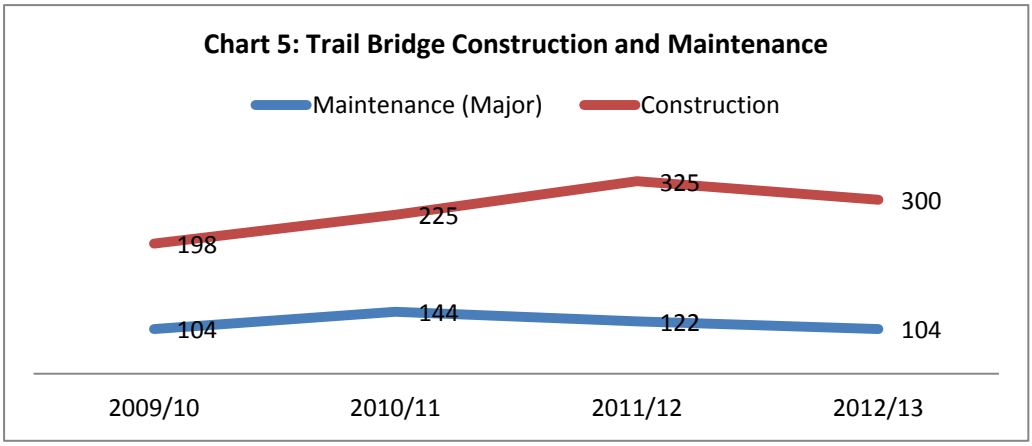
- Consultants have been supporting in survey, design, and supervision of LSTB bridges.
- Contractors are involved in the construction and major maintenance of LSTB bridges.
- Fabricators are trained as planned and are capable fabricating the required steel parts all over the country.

3.1.1.2 Findings

(i) DDC/DTO

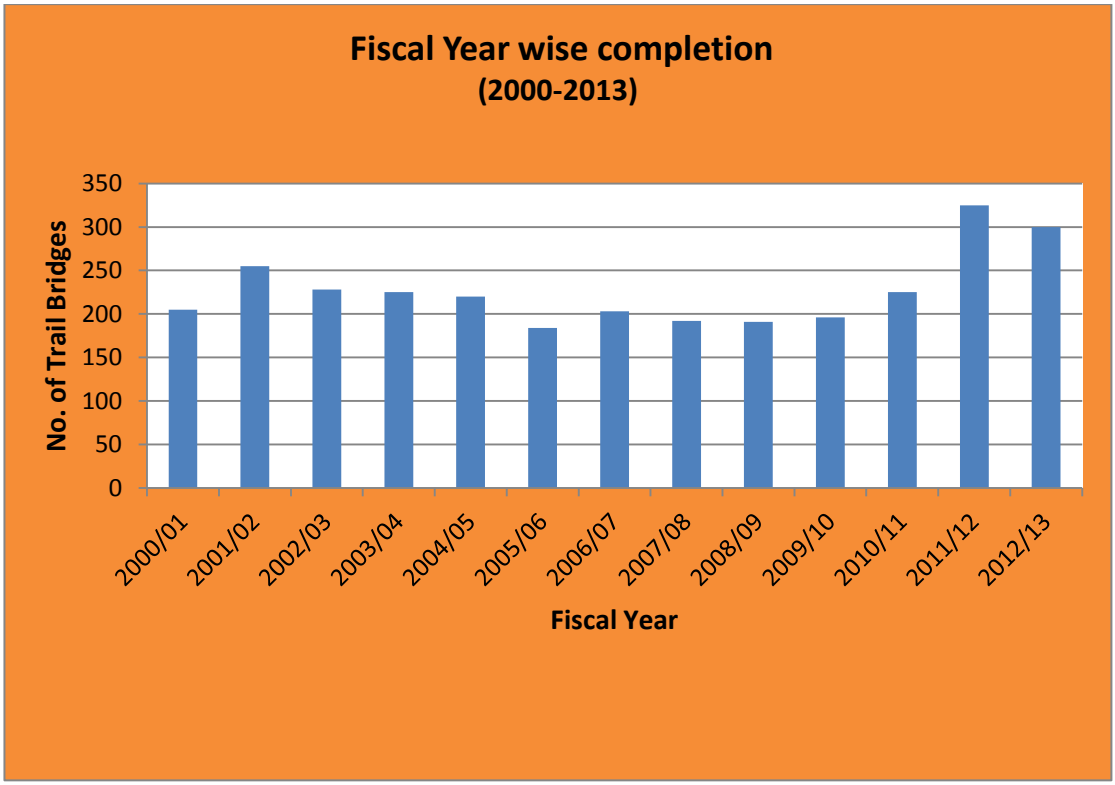
There has been an increasing trend in the annual output of trail bridges constructed per year (Chart 5). However, due to the inadequate number of staff in the DTO, the increased number of bridge construction and maintenance, the LBS/DoLIDAR and DDC/DTO were found overloaded.

Adjustment of HR to 24 Gha 1 e.g. the automated promotion system for the government employees (especially technical human resources) adopted by the government after completion of specified number of service years would negatively affect Local Bridge Section's (LBS) functions at local level. After promotion, such staffs are transferred elsewhere, as a consequence the human resources required for field level works become insufficient.



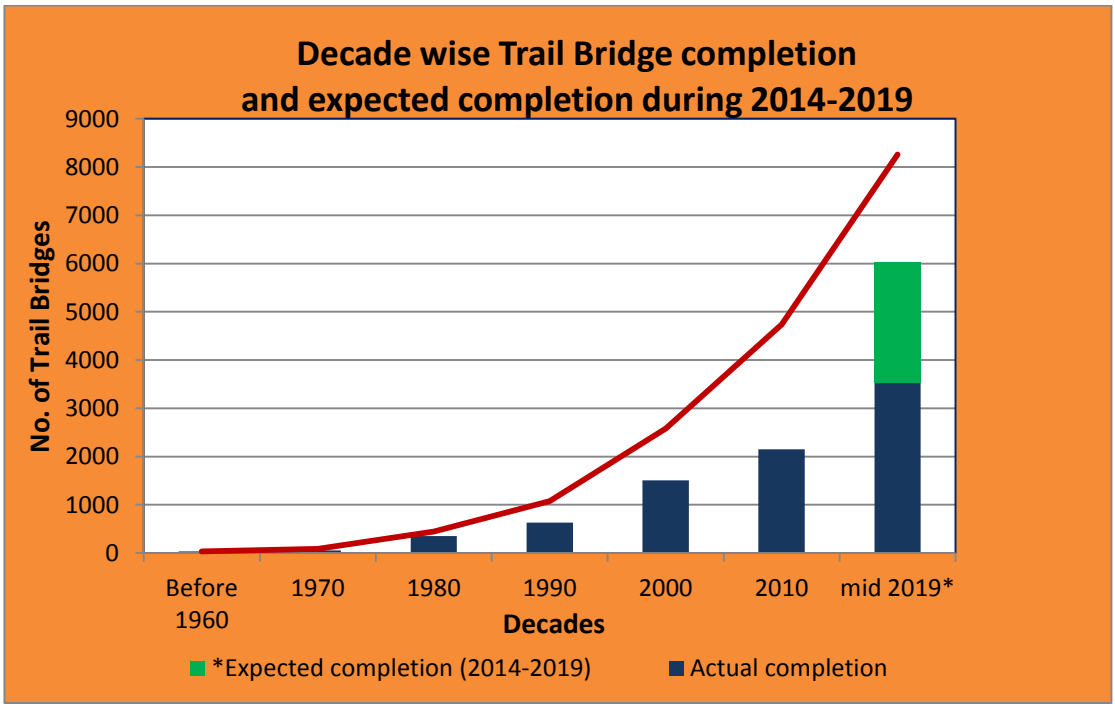
Source: TBSIS 2013

Since the implementation of SWAp (FY 2009/10 to 2012/13) 1046 trail bridges have been built across the country by different agencies. Bringing the total number of bridges constructed to be 5036. This includes 4725 SSTBs along and 311 LSTBs.



Source: TBSIS 2013

Trend analysis shows that there has been a steady rise in the number of bridges built since 1970 (Chart below). On average the annual number of trail bridges built in each successive decade has been higher compared to previous years. This is quite substantial considering that even during the conflict years (1996-2006) the number of trail bridges being built did not decrease.



Source: TBIS 2013

(ii) NGOs

NGOs were found to have played an important role in the implementation of the project both for technical support and social mobilization. The User Committees were mostly satisfied with their services (social and technical) except in the inadequacy in staff mobilization during TB construction. DDC/DTOs were also satisfied, except in their reporting, which was noted to be generally untimely. The ER also observed that the cooperation and coordination between DDC/DTOs and NGOs was still weak due to the priorities of TBSU staff for timely action directly coordinating with NGOs, rather than through DDC/DTOs.

Over the years, the capacity of NGO staff involved in technical and social mobilization was found to have been developed, thought there is still a high turnover rate of technical staff. Retention of staff should be a priority and could possibly be improved through modular courses for technical staff.

(iii) Private Sector

Quality inspection, quality assurance of goods and work, and reporting on physical progress and independent technical audit of both SSTB and LSTB bridges was found weak. Constant inspection and follow-up is needed for quality assurance and as a result TBSU has had to invest more than 60% of its time on these activities.

3.1.2 Capacity Building at Central Level

3.1.2.1 Observations

(i) DoLIDAR/LBS

According to the project document, a Steering Committee is functional in endorsing the Yearly Plan of Operations of the TB SWAp TA. The Local Bridge Section of the DoLIDAR is responsible to "manage and administer the overall TB Programme", which prepares annual Programme and budget for the TB SWAp supported by the Trail Bridge Support Unit (TBSU). The TBSU is functioning as Project Support Unit for the TB SWAp TA (supported by SDC).

Since its implementation, the SWAp sub-sector approach has become very prominent and well-conceived of by Government agencies including National Planning Commission and Ministry of Finance.

(ii) Educational institutes (EIs)

Educational Institutes (EIs) are involved in capacitating practitioners from local and central governments as well as NGOs and the private sector. Trail Bridge has been included in the curriculum by Institute of Engineering (IOE) at Apprenticeship in Science and Engineering (ASE) level and elective course at Diploma and Bachelor in Engineering (BE) level. BE students are encouraged to take Trail Bridge as elective course and carry out project works. Training in TB is also conducted by IOE.

3.1.2.2 Findings

(i) DoLIDAR/LBS

There is a growing realisation within MoFALD/DoLIDAR that a stronger institutionalization at the centre and in the local system is necessary for successful implementation of the SWAp approaches. For this to occur, in the future, the

development of human resources dedicated for TBs need to be increased to meet the ultimate objectives of the TB SWAp Framework, as presently DoLIDAR and DDC/DTO has been managing SWAp with existing human resources available within DoLIDAR structure.

(ii) Educational Institutes

The ER noted that the training module and hands-on application at the field level (35 days training) was not effective because of its inapplicability from the EIs itself e.g. training completion certificate was given without fieldwork in some cases. There is a high turnover of NGO staffs. One way of overcoming this could be by providing short modular courses, with students encouraged and incentivised to conduct research and development in TBs. Signing Memorandum of Understanding between the EIs and/or LBS/DoLIDAR or TBSU also needs to be a priority.

3.2 Institutional Development

3.2.1 Observations

In terms of institutionalizing TB sub-sector, DoLIDAR so far has succeeded in integrating the Local Bridge Section (LBS) within the DoLIDAR structure, even though it has not yet been officially endorsed by the government. TB has been operational within the regular implementation procedures of the DDCs/DTOS. Thereby the main intended indicator of the TB SWAp Framework I has been achieved. Furthermore, the assignment of roles and responsibilities of LBS/DOLIDAR, DDC/DTO, NGOs and private sector including TBSU as defined in the TB SWAp Framework document (to provide TA) is in place and is being implemented; with the Suspension Bridge Division (SBD) still implementing bridges other than LSTB.

3.2.1 Findings

The ER team's assessment (and the views of the respondents during interviews) is that there needs to be an organisational assessment between the two separate units (SBD and LBS) for TB management in DoLIDAR, primarily because SBD has the institutional assets and human resources to top-up support to the LBS. The functioning of SBD and LBS can be integrated into one entity with the merger of the two by retaining existing technical capacities of SBD that can be used in meeting needs of complex technological requirements in TBs and for the construction of strategic trail bridges. This will help meet the current needs of human resources in the TB sector; with the entity incorporated within DoLIDAR as a Bridge Directorate.

The capacities of technical staff in the Remote Area Development Committees, which are working in the local infrastructure sector including TB, have also not been adequately used. This provides an additional opportunity for the integration of these personnel by DoLIDAR in 23 districts.

3.3 Decentralised Planning

3.3.1 Observations

TB sector has been fully owned by the MoFALD/DOLIDAR at central level and DDC/DTO at the district level. MoFALD/DoLIDAR at the centre is responsible for overall implementation and monitoring of the TB-SWAp Framework I, including policy formulation and enforcement, securing funds, coordination among stakeholders and procurement of steel wire ropes and bulldog grips. The responsibility of quality assurance at national level therefore lies with the MoFALD. The responsibilities of

planning, implementation, operation and maintenance of trail bridges remain with the DDC/DTOs. DDC/DTOs implement the Short Span Trail Bridge through community approach by hiring NGOs. Long Span Trail Bridge (LSTB) is managed by the SBD and is implemented through turn-key contract modality.

TBSU has also been providing good support to DoLIDAR in terms of technical inputs, communication, monitoring, information and other management related matters; and by the local bodies (DDC and Municipality) at local levels.

3.3.2 Findings

Overall, the trail bridge building agencies were found to adhere to the Trail Bridge Strategy (TBS) 2006 for selection, prioritization, construction and monitoring of the trail bridges. TBs are included in the District Periodic Plan and the annual TB Programme is endorsed by the district council and is part of the Annual District Development Plan in all the districts. Furthermore, the review of the TB Programme has been a regular phenomenon under the local bodies' trimester and annual review Programme.

Devolution has not been highly successful in Local Governance because of lack of elected representatives at local level. The ER observed the following:

- TB has been fully decentralized from the center to the districts, but the institutional delegation from DDC to DTO (as its technical section) for TB program implementation has been partly successful.
- The DDC has made DTO fully responsible for TB implementation only in some districts

Planning and selection of most SSTB TBs come from the long-list with prioritisation criteria as laid down by TBS/LIDP. The selection process introduced by DDC/DTO is as per the provisions of the Trail Bridge Strategy (2006), which is accepted and considered transparent by stakeholders. Nevertheless, interviewees suggest that demand based planning and monitoring of progress is not fully optimal. This is a constraint, as functions are often disassociated because of addition of bridges other than prioritized in the long list during annual planning. In addition, with the changing context (realignment of new roads, establishment of new settlements), there is a need to update the existing bridge long-list by removing the completed bridges.

3.4 Financial Management

3.4.1 Observations

Government of Nepal allocates annual budget for TBs to the DDC through District Development Fund (DDF). The DDCs channels such funds through DTO for construction and provide technical and managerial support to the Users Committee.

SDC, DFID, WB and ADB are the important development partners (DP) in the TB sector. Supports provided are:

- TA + material (wire rope, bulldog grips and steel parts) support from SDC
- Steel Parts fabrication from RAIDP/WB in 58 districts
- RRRSDP and DRILP under ADB support constructed bridges in 25 districts
- Partial material support received from DFID

Joint Financing Agreement has been ratified by DPs (except ADB). But, a Basket Fund as provisioned in the TB SWAP Framework I document has not yet come into operation (even though DFID once provided some funds in the basket). Rather, most of the DPs follow a projectized approach, which makes predictability difficult. In the past, SDC has had to provide additional funds (for the procurement of wire ropes and bulldog grips) to retain the progress within TB construction because of the untimely budget availability. In the next phase, DoLIDAR has to explore opportunities for additional funding from DPs.

3.4.2 Findings

DPs (SDC) had to provide additional funds to retain progress in TB construction because of untimely budget availability for the procurement of wire ropes and bulldog grips. It imposed procurement of such items directly from TBSU.

3.5 Monitoring and Quality Assurance

3.5.1 Observations

Quality concerns have been realized at all levels (central and district) after implementation of TB SWAp Framework I (2009-14). Review of the TB Programme has been a regular phenomenon under the local bodies' trimester and annual review Programme. Post Bridge Building Assessments are also conducted every year.

According to the framework the District Technical Offices in principle are responsible for supervision and quality assurance of TBs, together with TBSU staff. But, in reality, the lack of human resources and funds has meant that quality assurances have not been anchored within the DDC/DTO. With TBSU having to undertake the bulk of the work and being heavily engaged (almost 60% of its time). At the central level, LBS/DoLIDAR have also not made provisions of in-house personnel for Quality Control/Assurance endeavours and has also not provided such services for inspection and monitoring at the district level.

Transparency: Public hearings of the SSTB are conducted in all the bridges which symbolize increase in transparency and accountability in the TB sector. However, at the end of the fiscal year, public audit of 81% TBs had been completed, with the remaining planned (TBSU, 2013). The TBSU supplements that public audit of the remaining bridges will be complete as soon as the Users Committee informs the DDC in writing about settlement of financial statements. Such events are also seldom carried out in LSTB; however, because of its turnkey nature it is up to the contractor to organize such events, although is part of the DDC/DTO/Contractor agreement for LSTB construction.

In the SSTB constructed by DDC/DTO:

- Public hearing done during survey for all the bridges
- Public review done during mid-way of construction in most of the TB almost 60%
- Public audit done during final assessment
- Hording board/contract information board installed at bridge site in case of LSTB.

3.5.2 Findings

Outsourcing may be a necessity for quality assurance and monitoring in the future until the capacity DTOs are strengthened. But to date, DDC/DTOs have not yet procured services of monitors / inspectors from the private sector (even though they have been capacitated under the TA) for independent third party monitoring/inspection (except for a technical audit of some TBs by the National Vigilance Centre). One reason is the high costs. This suggests that TA is still required to fill in the human resources gaps.

3.6 Technical Assistance

3.6.1 Observations

SDC provides technical assistance to the sub sector through TBSU/HELVETAS Swiss Intercooperation Nepal. Under technical assistance, the responsibilities include assisting LBS/DoLIDAR in:

- Coordinating all trail bridge related activities (i.e. Planning, Budgeting, Technical, Social, Financial, Managerial, etc.),
- Planning, monitoring & inspection, quality assurance especially of districts that are not (sufficiently) supported by the DTO/LBS. providing punctual support to the districts,
- Monitoring, upgrading and expand the number of EIs that can provide capacity building
- Assist LBS/DoLIDAR on R&D in areas of Access Trails, Improve the scope of SSTB/LSTB,
- Developing norms, standards as well as manuals for rural road bridges.

The TA has been appreciated by DoLIDAR and local bodies including NGOs and the private sector. The TA has been relevant because:

- With four years of its implementation, TB SWAp has been internalized at local (district) level very well.
- DoLIDAR, at the centre is leading the program and all trail bridge building agencies are adhering to the Trail Bridge Strategy, 2006 at large.
- The districts have developed the confidence to implement the trail bridge program despite the fact that heavy technical assistance is involved.
- The government of Nepal has acknowledged the program as priority one (P1) program and allocated significant budget each year in an increasing trend.
- The annual outputs are increasing each year though the SWAp targets have not been met mainly due to insufficient resources.

3.6.2 Findings

In practice however, the roles of TBSU (at the centre and districts), is much more than what was foreseen in the SWAp Framework. Till now, this has been balanced by a strong commitment on the part of most TBSU staff, but it shows the ambiguity regarding TBSU's implementation versus technical assistance role.

The expansion of the TBSU-team with the establishment of regional teams of 6 to 7 staff per region and a Coordinator and other staff at the PSU has partly compensated for the human resource inadequacies in TB sector. But, there remains implementation functions which are overloading TBSU, such as:

- Procurement of wire ropes and bulldog grips done by TBSU directly and managing it
- Collection and compilation of physical and financial progress reports
- Survey and design of bridges
- Need of extensive site visits in every milestones to most of the bridges
- Quality monitoring of steel parts for each lot and cement for brands

Furthermore the changing context (establishment of new settlements, new road networks) and focus areas (such as the Terai and Karnali region, where the geological, hydrological and remoteness needs are different) indicate that TA support needs to be reviewed and update as per the needs.

Social mobilization support of DPs to local governance sector is in the Local Governance Community Development Programme and Trail Bridge TA. Linkage needs to be established to make it more results-oriented.

Although it was beyond their specified role, the TA has been instrumental in liaising with the government, local bodies, NGOs and private sector including establishing coordination among these agencies in the current phase. The development of TB sector demands further and strengthened participation of public, private and civil society in the future as well; however, attaining such functions needs national and local capacity. Thus, the ER team found that there is a need to restructure TA intuitional delivery mechanism for future with the following options:

Evolution of TA:

- Farming out to local NGOs at district in the first phase which has been successfully accomplished
- Farming out Regional implementation, backstopping, monitoring and reporting to the NGOs/ Private firms active at the regional level in the second phase
    - Options
        - Consulting firms
        - NGOs active at the regional level with experiences in TB building
        - Mobilization of the current TBSU staff through NGOs or consulting firms
        - Joint venture of the any of the above

In addition, while there is wide recognition / acceptance of TBSU's support by all stakeholders, the initial plan was to phase out SDC TA support after the current phase, even though currently there is no exit plan in place.

4. Relevance

4.1 Changes Observed at Community level

Responding to the question of the review team on the most significant changes that had occurred in their villages and their lives over the past years, trail bridge, were ranked high. As discussed in the earlier sections, TBs were proven to have improved safety and access to local communities, this in turn has the potential to contribute towards increasing the livelihoods options in remote areas and along road corridors (i.e. because of eased inputs supplies to the communities and products/services marketing to the adjacent road corridor and market centres after construction of trail bridges). TBs were also found to have increased the utilization of social service (attainment of health and education).

Concerning the construction of TBs, the financial, technical and social support provided were important 'triggers' / incentives, but equally important were the community's own contribution either in the form of cash or kind and through the management of User Groups. Villagers stated that establishing UCs were important and a necessary step for joint action in the construction with support from the NGO and later the operation and maintenance of the TBs.

4.1.1 Findings

In a few cases, the involvement of contractors, on behalf of UCs, was also noted to be taking place; primarily because of the lack of confidence, competency and time on the part of the UC members. The old/disused (obsolete) bridges were also noted. New trail bridge construction should be closely linked with the local roads bridge planning, prioritization and selection to reduce its obsoleteness and to ensure long-term use of TB by the local people.

Overall, UCs, NGOs, Routine Maintenance Committees (RMC) and the TBSU team have played a major role in mobilizing the local agencies and resources - with all the stakeholders appreciating the community based working approach for SSTB construction and routine maintenance by Bridge Wardens.

4.2 Changes Observed at Village and District Level

VDCs are supporting the participatory planning process for TB construction. Community people together with representatives from different political parties were found to be participating in public hearing and public audit Programmes conducted at the bridge sites in most of the bridges. This has led to increased transparency of the TB Programme.

The District authorities who are directly involved in the planning, funding and supervision consider TB sub-sector a suitable approach for the district because of the adoption of systematized TB selection, planning, prioritizing and SSTB implementation by DDC/DTO. They also favoured that introduction of TB SWAP Framework I has been an image enhancer of the DDC/DTO 'a leading institute for TB construction and maintenance in the district' As such, the DDCs and VDCs show a strong interest to regularly support the SWAp approaches with improvement in the NGOs and private sector mobilization process.

4.2.1 Findings

There still exist gaps with respect to routine maintenance. According to the TB SWAp Framework I, it was anticipated that VDCs would report on bridge condition, carry out routine maintenance through Bridge Maintenance Committees or Bridge Wardens, conduct random inspection of bridge construction and major maintenance, and share bridge construction and maintenance costs. But, these activities have not been carried out as envisioned.

The encroachment by traders/shopkeepers onto TB premises which may have repercussions on the long term sustainability has also been noted.

4.3 Changes Observed at Central Level

Conceptualization of the Trail Bridge SWAp was the determination of the government and development partners to formalise a harmonised approach and abandon/discontinue a projectized model of funding in the Trail Bridge sector. This was based on the understanding that the full-fledged Rural Transport Infrastructure (RTI) SWAp will be adopted and the TB SWAP Framework II (2014-19) will then be part of it.

With respect to the TBSSP, the Central Government agencies (MoFALD, National Planning Commission and Ministry of Finance) consider the TB SWAp approach as relevant since it provides a viable model for safety and access improvement to address the priorities of remote areas of the country. It is in line with the Three Year Plan (2012-15), with policy options being discussed for the Social Development Strategies (i.e. health, education, food security, agricultural productivity, connectivity and resilience, sustainable production and resource management, etc.) and with the national agenda of poverty reduction. As such, the MOFALD/DoLIDAR was found to be proactively promoting the SWAp approach in the local infrastructure sector.

Ownership of TB Programme was found to have increased within the MoFALD/DoLIDAR since the implementation of SWAp I. Confidence in the sub-sector has increased, along with MoFALD/DoLIDAR's assertiveness. One reason has been the success achieved in completing over 5000+ TBs. Which was celebrated throughout the country, and with different districts with the presence of the Secretary, MoFALD and His Excellency the Ambassador, Embassy of Switzerland in 2012/13 (March 2013). Photo exhibitions were organised and a special bulletin was published along with a TV talk Programme, reflecting the ownership towards TBs by the GoN and DPs.

The assertiveness within MoFALD/DoLIDAR has increased after implementation of TB SWAp in 2009. They feel pioneer in Trail Bridge sub-sector. Confidences within the central agencies have increased 'we construct one trail bridge a day i.e. 300 per year, and are planning to construct 1.5 bridges per day in the next phase of TB SWAP Framework II i.e. 450 per year (2014-15)'

As such, TB is a priority 1 Programme for the government of Nepal. More so now, as there has been the growing realization that the demand for TBs have increased along with the construction of roads (such as the mid-hill highway alongside the Koshi River), because of increased demand of river crossings nearby to transport agricultural and horticulture products such as vegetables and fruits produced by the farmers alongside the road corridor.

4.3.1 Findings

The MoFALD/DoLIDAR has prepared the RTI SWAp; however, concrete steps for application to this end are not yet visible. Possible reasons are that prioritization of the increasing demand for RTI and allocation of available resources is still taking place in a scattered way, influenced by strong pressure from various stakeholders. Moreover the Planning and Foreign Aid Coordination Division of the MoFALD and the Agricultural/Rural Roads Division of DoLIDAR are appreciative of the adoption of RTI SWAp approach, but are not (yet) adequately strengthened in terms of human resources and management capacity. As the Trail Bridge Sub-sector is within the RTI SWAp and is part of a process, the SWAp Framework II will have to be part of RTI SWAp as soon as it will be adopted.

In the past, resources allocated to the TB sub-sector was less than what was planned in the TB SWAp Framework I document, but within the past couple of years this has been increased by many folds (Table 3). In addition, the ER team also noted that there were plans to further improve the sub-sector through the introduction of performance measures by including it in the Minimum Conditions and Performance Measures (MCPM) indicators.

4.4 Relevance - Views of Development Partners

The value of TBs is increasing and has been realized as an important link for rural development as stated by the GON and DP representatives during ER interview at the central level. DPs (SDC, DFID, WB and ADB) have expressed their satisfaction on the performance of the TB- SWAp and their support for the future.

New DPs such as the Government of Denmark will also be joining the sub-sector from 2014 to 2019 under their 'Unnati' project in 7 districts of Mechi and Koshi zone. But, on the other hand it must be noted that trail bridge is not included in the new project Strengthening National Rural Transport Programme - successor of the RAIDP.

5. Efficiency

5.1. Operational Performance in Districts

The fact that the TB SWAp approach is highly accepted at district level can be taken as an indication for a good operational performance. We found project staff of DDC/DTO and TBSU in the districts being very committed, striving for good implementation even under difficult circumstances. Nevertheless we saw, within the limitations which are mainly a result of institutional constraints (e.g. capacity, procedures), fairly good coordination and cooperation with DDC/DTO, NGOs and TBSU. Due to government procedures respectively related institutional inefficiency this does not always mean *efficient* operations.

Linkages to other TB agencies such as KAADORI and PAF were however not directly observed at the district level.

5.2 Operational Performance at Centre

As far as LBS management is concerned we see that the team is committed and performs quite efficiently.

The Steering Committee was also found to be holding meetings once a year, reviewing the progress of the TB SWAp framework, its implementation and management support to DoLIDAR. Meanwhile the Trail Bridge SWAp Coordination Committee meetings were held two times a year, with the committee approving the Yearly Plan of Operations and reviewing the progress of TB SWAp Framework I implementation.

At the district levels, the fact that the TBSSP approach is highly accepted can be taken as an indication for good operational performance. The ER found project staff of TBSSP in the districts being very committed, and striving for better implementation even under difficult circumstances. There however remains an impression, both at district and central level, that TB management is only focused on its own performance, leaving less room for networking with other local infrastructure Programmes.

TBSU is also an integral part of the sub-sector and has had substantial input into the implementation of the TB SWAp Framework, supporting DoLIDAR in every aspects of the TB sub-sector management and promotion of the TB SWAp.

On the Government side the process towards establishing an institutional system for the TB sub-sector management and developing policies for RT SWAp has been slow. Through, MoFALD/DoLIDAR has spent more than 80% of the budget in terms of Nepali Rupees (as per GON budget allocation).

Table 3: Allocation of funds (NRs. in Million)

Source	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	Total
GoN	258.000	355.000	426.930	733.926	1,773.86
DPs	358.683	477.500	428.491	283.421	1,548.095
Local Bodies (DDCs/VDCs)	32.688	32.081	49.734	39.614	154.117
Community Contribution	7.080	8.614	12.788	14.141	42.623
Total NRs.	**656.451**	**873.195**	**917.943**	**1,071.10**	**3,518.69**
SDC (Materials: Cables and Steel Parts for MM)	51.853	45.383	36.817	188.399	322.452
SDC (TA)	106.474	102.528	118.834	147.709	475.545
Total (NRs.)	**158.327**	**147.911**	**155.651**	**336.108**	**797.997**

Table 4: Development Partners Support

FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	Total (NRs.)
358.683	477.500	428.491	283.421	1,548.095
158.327	**147.911**	**155.651**	**336.108**	**797.997**
				2,346.092

Source: TBSU, 2013

6. Sustainability

6.1 Sustainability of Results

According to the UCs and communities the benefits resulting from the TBs are so substantial that safe and improved access will be continued, and if possible further increased through routine maintenance at local level. It will also help retain benefits generated in terms of production, inputs and products marketing in the future to sustain the gains in food sufficiency and to further increase income for their children's schooling and health services.

However, there were no evidences of complementary services in the areas of agricultural and non-agricultural products and services after trail bridge construction in those areas.

6.2 Sustainability of Schemes

The review team found that in all the visited TBs, routine maintenance are governed by a bridge warden, which are employed and paid by the RMC as contributed from the DTO.

Routine Maintenance

Bridge Wardens have been instrumental for RM. Maintenance allowance has been increased from Rs. 3,000- to Rs. 6,000- and provided to 3776 bridges from the fiscal year 2013/14. However, status of RM in all the bridges has not been found documented because of weak monitoring system. RM Guidelines has been prepared and approval from MoFALD is awaited.

Major Maintenance

Priority for maintenance has been given by GON and TA provider by increasing funds for detailed survey/design of critically unsafe bridges for rehabilitation and major maintenance.

District Bridge Record has been prepared in 44 districts, which will facilitate planning maintenance in those districts.

Preparation of web based GIS data mapping of existing bridges with location and data of all existing bridges with bridge conditions and flagging is in-progress.

7. Conclusions / Overall Assessment

Given the impact observed and the fact that improvement of access remains the main option for a large number of people especially from marginal groups in rural Nepal, the TB SWAp approach of MoFALD/DoLIDAR contributes significantly to important development goals both of the Government of Nepal and development objectives of the development partners that are providing support in the TB sector. These goals are access improvement, food security, increased income as a basis for improved livelihood and participation of DAG in the development process.

When comparing the approach with alternatives, it shows that it is not a question of either or, but of complementarity, because 'access' remains the basis for socio-economic development in the country.

Even economically the approach appears viable, not in terms of contribution to the GNP, but in terms of a positive return on the investment, which is not given in many similar projects

Thus we consider TB SWAp Approach and the TA provided by SDC a relevant and effective approach which deserves to be developed further. The focus of further development should be on:

- Continue scaling-up trail bridge development under Program Based Approach (SWAp)
- Optimizing / maximizing impact of the TB through complementary mechanisms.

  These can be achieved through:

  - Institutional restructuring and strengthening TB designing, planning and prioritization capacity of DoLIDAR and DDC/DTO (where substantial improvement at current level is desirable). The functioning of Suspension Bridge Division (SBD) and Local Bridge Section (LBS) can be integrated into one entity by the merger of the two and incorporating the entity within DoLIDAR as a Bridge Directorate. Provisions can also be made to utilize

technical staffs of the Rural Area Development Committee (RADC) that are working in 23 districts.

- Making DoLIDAR and DDC/DTO accountable in monitoring and quality control. TA to facilitate and support in capacity building lowering direct involvement in monitoring and QC in future through third parties and technical audits.
- Improving the procurement process i.e. reducing procurement risks in devolved programs such as evaluating bids timely, procuring and delivery of TB materials timely, etc.
- Strengthening the community elements i.e. improving facilitation and vigilance in terms of NGOs and community mobilization management.

- Giving special focus to trail bridge construction in the Karnali and Terai districts.
- Broadening the funding of TB by integrating all related GoN-funds and attracting new donors to subscribe to the approach.
- Reassessing the needs and support needed to communities in terms of 'backward and forward' linkages within the economic value chain required to get the maximum benefit after TB construction.
- Coordinating with relevant agencies, by local bodies, to provide complementary support for social and economic promotion activities at the community level after trail bridge construction.

8. Recommendations

1) Continuation of TB SWAp Framework

- Against the background of our conclusions we recommend designing TB SWAP Framework II and continuing the TB SWAp approach and make it a part of RTI SWAp process as soon as the RTI SWAp is adopted.

2) Long-term Commitment of GON and Development Partners

- We recommend, GON and DPs to continue increased funding and Technical Assistance for the Trail Bridge Programme implementation, based on a long-term commitment which allows accelerating the development of a TB SWAP approach.

- Prepare TB SWAp Framework II Document (2014-19) and follow consultative process with DPs to fulfil financial gaps.

- DoLIDAR to pursue Transport + approach and ensure at least 10% support for TB in all transport infrastructure projects.

3) TB Planning and Budgeting

- Review cut-off points for TB estimate in mountain, hill and Terai for example to address construction materials transportation problems in Karnali. Introduce appropriate foundation type for TB construction in Terai districts.

- Review TB design and make its size appropriate for entry to power tillers (three wheelers) if there are cultivated areas to the other side of the TB.

- Prepare standard specifications, manual designs, procedures needed for: (i) span demarcation and width of SSTB/LSTBs, (ii) the Terai, (iii) Karnali, and (iv) motorised two-wheelers and three wheelers.
- Prepare special design to construct trail bridges near the district headquarters and in other appropriate places with aesthetic value additional such as beautification, lighting, picnic spot facilities etc. and handover it to the VDC after construction with a provision that the VDC has to develop the TB site as a tourist spot for its revenue generation.

- Make pre-feasibility mandatory before selection. Prepare separate long list for bridges with pre-feasibility and without pre-feasibility.

- Include TB in the DTMP so that new TB construction could be linked with local roads bridge construction

- Integrate LSTB into the district system and construct under the contingency list of the district. Gradually devolve LSTB to those districts where there is TB engineers (at least one technical HR) to manage the LSTB construction cycle.

- Prepare TB Master Plan to assess attribution towards attainment of one hour detour.

- Introduce GIS mapping methodology to update the list of trail bridges as an alternative to the long list.

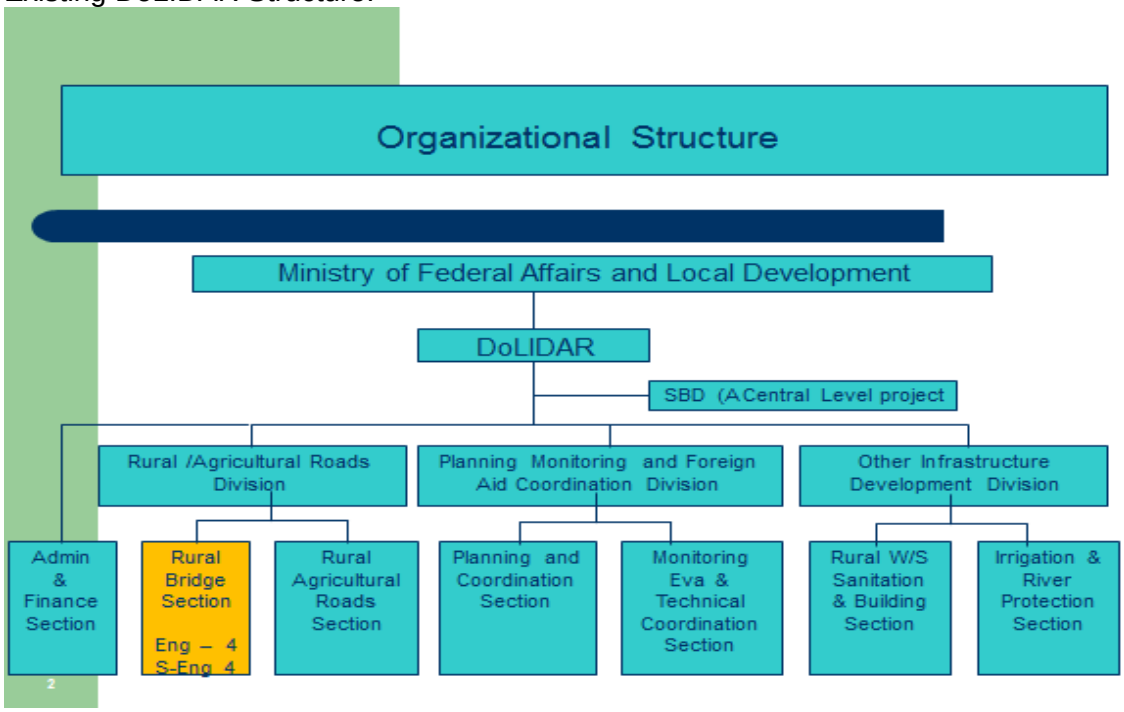
4) TB Management Capacity

Organizational review

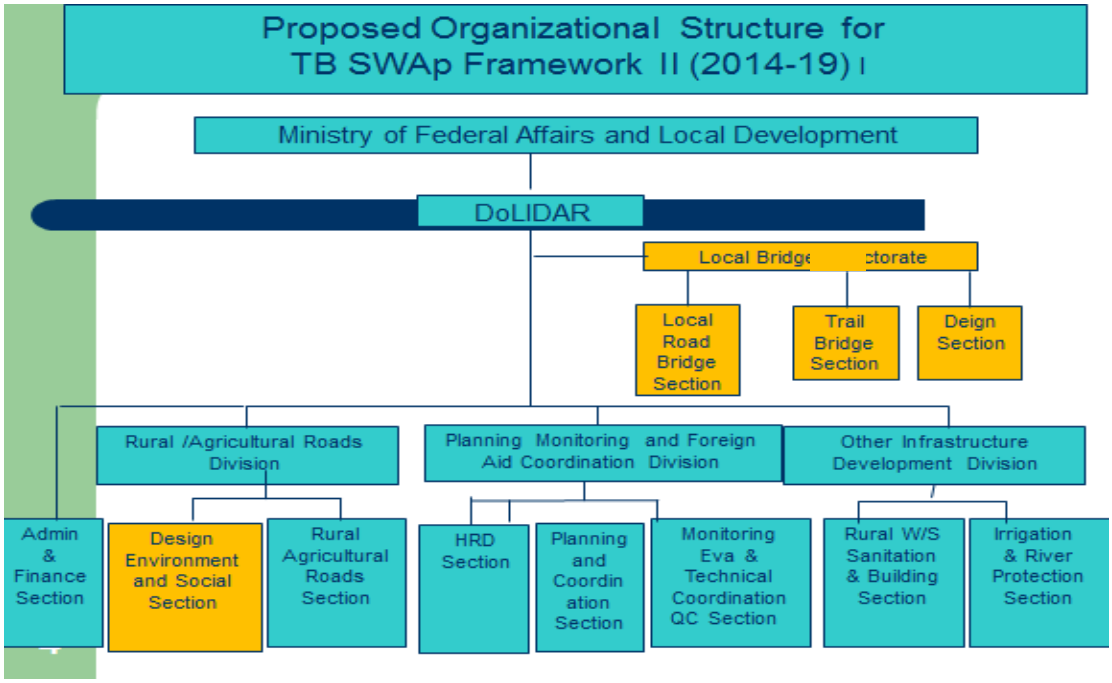
An area of considerable discussion during the ER was the degree to which the current organizational arrangements within the DoLIDAR and DDC/DTO were functioning optimally. Recognizing that there has been brief internal restructuring within the DoLIDAR of the central level in the recent past this is an area that needs careful consideration. Having said this, the ER team has concluded that there are several areas where roles and responsibilities for important aspects of sub-sector management is unclear, duplicated or poorly linked. Until some of these management functions are clarified, strengthened and organized in a way that facilitates decision-making, strategic planning and oversight of implementation, inefficiencies will continue and systems improvement proceed slowly. The issue of organizational review was highlighted in interviews with senior managers and the need for further attention generally.

The ER team recommends integrating SBD and LBS as an entity with merger of staffs and other resources i.e. by retaining the existing technical capacities of SBD that can be used in the entire trail bridge sector including meeting needs of complex technological requirements in TB and for the construction of strategic trail bridges in future. Also make provisions to utilize technical staffs of the RADC (permanent staffs under Development Board Act, 2013) that are working in 23 districts.

Existing DoLIDAR Structure:



Recommended DoLIDAR Structure:



5) Human Resources and capacity Building

(i) Bridge Directorate and DDC/DTO

- Establish Bridge Directorate and Section (centre and district) and fulfil sufficient technical staff in that section.
- Rehabilitate and strengthen regional stores of SBD and manage it by Bridge Division.

- If technical staff at the DDC/DTO is vacant, make role of BS staff flexible so that they could take responsibilities to look into different areas as per needs of the DTO.
- Create additional positions (technical) to fulfil HR gaps created by the promotion to 24 Gha so that field works can be carried out by DDC/DTOs.
- Make policy provisions for outsourcing of technical staff by DTO as per their needs, if numbers of assigned staffs are not fulfilled at the DTO.
- Initiate a results-based system. Include TB in the indicators of DDC MCPM.
- Develop competency of the BD and DTO staff in bridge building.
- Organize exposure trips to observe, disseminate and exchange TB experiences of Nepal to other countries.

(ii) NGOs

- In case of SSTB, make provision to separate social and technical services and indicate maximum number of bridges for supervision by one technician from NGO. Indicate qualification of the NGO technician which should be at least equivalent to Sub-engineer.
- A technician should be present at the construction site during whole period of TB construction – NGOs are not complying to the provisions of the DDC/NGO contact throughout in case of providing need of technical staff during construction.
- There is an utmost need to retain the technical human resources deployed and used by NGOS in trail bridge construction, as the rate of turnover of such staff have been very high. The ER recommends developing modular courses (1-3 months annual x 4 years) through the EIS to the Assistant Sub-Engineers that are working or want to work in the TB sector. It will possibly enhance retention of trained staff for at least 4 years.
- Increase timely support of NGO's to UCs in accordance with TB construction work plan. Enhance Social Mobilization activities.
- Capacitate at least one NGO in each district.
- Improve Social Organizational Support activities to increase proportionate representation in UC.
- Provide farm and off-farm income generation training to the communities (adjacent to the bridge) after bridge construction completion

(iii) Private Sector

- Improvement is needed in Quality assurance. Strengthen the QA system of fabrication at all levels.

- Develop roaster of consultants and trained HR in the TB sector so that they can be contracted and used in the TB construction as per needs.
- Build capacity of private sector on regular basis (consultant, fabricators and contractors).
- Make civil contractors and fabricators equally responsible (JV of both parties) In LSTB construction.
- Strengthen capacity of private sector contractors to increase number of contractors for LSTB construction, as their capacity is inadequate now

(iv) Educational Institutes

- Review of capacity development modality of the EIs (elective course)
- Introduce one year field work mechanism in the training modality to be eligible for certificate of the TB training
- Sign MOU with EIs for short courses and intern.
- Introduction of TB as regular course at BE and Diploma level. Make mandatory provisions for On-the-Job-Experience as interns for certificate of such courses.
- Introduce provisions of interns from EIs in TB related research and pilot works.
- Prepare roster of resource persons and consultants in the trail bridge sector.

6) Quality Assurance and Monitoring

- Establish Quality Assurance Team at the centre and at district level.
- Develop capacity of private sector in TB inspection and monitoring. Outsource TB construction monitoring to the NGO/private sector until DDC/DTOs will have human resources and capacity to carry out such functions.
- Prepare roster of quality materials as per periodic testing to support quality procurement at DDC/DTO level.
- Make provision that TBSU should do technical inspection/monitoring together with DTO technician as per needs
- Trail bridge sector planning needs to be more demand-based as per TBS, driven by district analysis and plans rather than by centrally planned and funded Programs. This will involve considerable change in the way business is conducted in the sector and is linked to the proposed review of functions and structure above. It will also require a revised planning and budgeting approach and related capacity development. A year on year Program of change should be developed so that by the start of TB SWAp Framework II the planning and budgeting is driven by local needs.

7) Information

- Develop and apply information mechanism about approval of budget, construction, and completion of TB at VDC level.
- Prepare/update District Bridge Record and carry out maintenance works accordingly next year
- Introduce web based data collection system.
- Integrate GIS based mapping for selection and prioritization of TB

8) Technical Assistance

- Continue next phase of Trail Bridge TA in the areas stated below:
  - Provide technical backstopping services and to fulfil additional human resource gaps.
  - Institutional capacity building of TB sub-sector.
  - Demand of TB is increasing after construction of roads at local level e.g. the adjacent areas of Mid-hill highway, so TA is needed for the use and promotion of TB technologies in those areas - provide TA support as per needs in those areas.
  - Conduct TB related research, development and piloting works such as modification of TB technology suitable for Terai.
  - Introduce appropriate TB construction procedure for Karnali region.
  - Provide support to introduce aesthetic value based TB construction mechanisms basically in touristic areas.
  - Provide support to reinforce maintenance packages in the TB sub-sector.
  - Design short span arch structure below 16 m.
  - Provide support to design, modify and update policy, guidelines, directives and manuals as per needs.
  - Provide technical support to the centrally implemented bridges.
  - Provide support to strengthen reporting (physical and financial) and knowledge management mechanisms.
  - Prepare joint TA plan to harmonize functions among TA providers (e.g. with Embassy of Denmark in the 7 districts of Koshi and Mechi zone).
- Restructure the TA implementation mechanism or the TBSU to make it small and smart
  - Implement the TA through Helvetas with the following institutional provisions
    - Consider Helvetas as national implementation agency
    - Helvetas to select autonomous Regional Implementation Partners (NGOs/Firms) and deliver TA through them as Regional Implementing Agency
    - Gradually follow this process - starting from Eastern Development Region from year 1 and other regions subsequently.

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Annex 1: Terms of Reference

External Review of the Trail Bridges Sub-Sector Support Program (TBSSP III) - Phase III in Nepal
and
Development of Trail Bridge SWAp Framework II (August 2014 – July 2019)

1. Background

Trail bridges are still the backbone of transport infrastructure in the rural areas of Nepal as for majority of population, and walking remains their basic means of transport. In the absence of trail bridges, local people are prevented from accessing basic services easily and their opportunities to diversify their sources of livelihoods are limited. There are 6000 rivers and rivulets in Nepal and majority of them are turbulent. Safer crossings are thus required to facilitate rural accessibility. There is an additional potential demand for 6000 trail bridges according to the Nepal Trail Bridge Directory. There are more than 5000 trail bridges that have been already built in the last 40 years, mainly with support from Switzerland, and more recently through the financial support of World Bank, ADB, DFID and GoN.

After the merger of the Suspension Bridge Project and the Bridge Building at Local Level Project in 2001, when trail bridges was identified as a vital sub-sector in rural transport infrastructure, and Trail Bridge Sub-Sector Support Program (TBSSP) started with its first phase in December 2001. In 2009, the Government of Nepal decided to implement Trail Bridge construction under a Sector Wide Approach (SWAp), and accordingly, this Program is now anchored completely within the GoN's infrastructural investment portfolio, while the Swiss Agency for Development and Cooperation (SDC) continue to support the Program's undertaking as a Trail Bridge SWAp in the form of Technical Assistance and contributions to the materials (wire-ropes and bull-dog grips) throughout the third phase of TBSSP, which is coming to an end in mid-2014.

The major goal of trail bridge Program (TBSSP – III for implementation of TB SWAp Framework – I) is to provide safe and improved access to the local people (particularly women, Dalits, and people belonging to ethnic communities and disadvantaged and underprivileged groups) to social & basic services and economic resources & opportunities, and thereby contribute to poverty alleviation. The following two outcomes are the main results which the Program intends to generate:

Outcome 1: Local government and communities engage themselves in the construction and operation of trail bridges to improve safe access to basic services (Health, Education, Markets, Farms, Natural Resources and Employment Opportunities) at local level.

Outcome 2: The institutional framework at national level enforces Trail Bridge Strategy in the construction and maintenance of trail bridges.

For details, please refer to Program log-frame in the annex attached.

It has been realized that trail bridges are one of the major solutions that can provide access to various service centres for the local people. As a result, it has received P-1 priority from the government for rural infrastructure development.

The table below illustrates the number of bridges built by different agencies by the Fiscal Year 2011/12. There are few agencies which have covered the full costs of bridge construction. In most of the cases, costs have been shared jointly by different collaborating agencies. The table below reflects some of the major cost contributors in the sub-sector. The DDCs and VDCs have also made remarkable financial contributions, and communities have contributed significantly in cash and in kind both. This is probably one of the best examples of decentralization and how financial devolution took place in the sub-sector and how the DDCs and local communities took ownership in building and managing these trail bridges over the course of the last decade, even in the absence of elected representatives in their local states.

Agency	No. of bridges	Agency	No. of bridges
ADB	210	Others	523
CARE Nepal	67	RADC	179
District/DDC	226	"Swiss"	1991
GoN/SBD	584	SWAP	460
KAAABGN	381	USADP	60
KLDP-SNV	26	VDC	10
LTBP	212	WB	132
Total			**5061**

Post Bridge Building Assessments (PBBA) have been carried out for assessing the impacts on rural lives since 2003. The Post Bridge Building Assessment of 2012 revealed that an overall increase in school attendance of 26% was achieved, with boys' attendance climbing by 44% and girls' attendance by 56%. Similarly, the number of health centre visits went up by 30% (male – 37% and female – 63%). It is interesting to note that in both cases (access to education and health), the increment is higher for females, and therefore it could be claimed that the women have benefitted more from bridges on these aspects. After construction of a bridge, emergence of small shops is a very common trend, and as time passes, small shops gradually attract larger shops as mall market centres grow up around the vicinity of a Trail Bridge. The PBBA study shows that new shops were established at 32% of bridge sites. This has contributed to the development of local economies, particularly by improving the lives of those who have started such small enterprises. This has brought services nearer to the people not only benefiting to the shop-owners but also to the customers. The PBBAs were focused on the short term impacts only. These assessments were carried out without establishing comparisons to reliable baseline information as there were no baseline studies carried out before year 2009. The assessments are based purely on perceptions of the users, though some of the information on access to health and education were triangulated through the database of health institutions and schools in the areas in the samples studied.

An *Impact Assessment* of long span trail bridges was made in 1999 taking three bridges located on main trails. The main findings of the study emphasize on the safety, travel convenience, huge time saving made by people on each trip they make; and year round accessibility to services. Starting in 2007/08, the Program has been annually reporting on outcomes on the basis of the outcome indicators of the logframe. Outcome monitoring focuses on two major areas, viz., access to basic services and enhanced capacities to implement trail bridge Program.

This proposed external evaluation will therefore focus on socio-economic returns; particularly looking at how people have benefited from new access to resources and opportunities thanks to TBSSP interventions over the last 12 years. Similarly, the study will also focus on how the institutional systems and capacities put in place at different levels will bring sustained impacts to the society.

2. Objective

The overall objective of the external review is to assess the impacts of trail bridges on the lives of the people and assess the effectiveness of Sector Wide Approach in terms of bringing systemic change in the institutions for sustainability of trail bridge building in the country. The study results will then be used as an input for designing the next Framework of Trail Bridge SWAp including next phase of TBSSP for technical assistance.

2.1 Specific Objectives

The specific objectives of the study are:

2.1.1 To review the impacts of trail bridges on the lives and livelihoods of local communities in general and with special focus to the disadvantaged groups including women;

2.1.2 To review the sustainability of Program interventions on strengthening capacities of stakeholders at village, district and at national level;

2.1.3 To assess the performance of the project under the Sector Wide Approach as opposed to the donor driven 'project' approach.

2.1.4 To develop Trail Bridge SWAp Framework II based on its findings; and

2.1.5 To recommend future courses of action for Swiss support in the implementation of Trail Bridge SWAp Framework II.

3. Study Focus

The above specific objectives of the external review will mainly focus on the following aspects with respect to Program log-frame's key outcome indicators:

3.1 Verification of results on improvement of physical accessibility and overall access to services :

- Distance gained, time saved and utilization of time saved in productive activities
- Services delivered by state, private sector and civil society organizations after trail bridge construction due to safer crossing – basically to look into provision of services for e.g. extension of agricultural input services, extension of immunization services, extension of birthing facilities etc. reaching villages, utilities and shops catered to the needs of people in the villages
- Other services accessed by people including DAGs (also included in social impact below)
- Assess changes on specific groups considering both disadvantaged and non-disadvantaged groups, including men and women.

3.2 Verification of results on livelihoods:

A. Economic Impacts:

- Local employment generation and its impact – short term employment through wages earned through Trail bridge building and maintenance
- Long-term employment – use of gained knowledge, skills in other areas beyond wage works in trail bridges
- Promotion and diffusion of local enterprises/commerce and associated impacts
- On-farm and off-farm activities and their impacts (particularly on volume of increased productions and farm inputs, volume of exports of farm products to markets)
- Impact on poverty indices (focused on household incomes and food security)

B. Social Impact:

- Access to basic and social service centres – for e.g. because of improved and safer access, people have increased their demand for services – in accessing schools, health posts, hospitals, gaining electricity, clean water supply etc.
- Impact on health conditions
- Impact on education
- Impact regarding empowerment/capacity – building resilience and reduced vulnerability, voices of disadvantaged groups including women – their roles in decision making positions

3.3 Impacts on institutional capacity

- On stakeholders at village, district and national level from a sustainability point of view,
- On the private sector – consultants, contractors, UCs, suppliers, NGOs, EIs etc. those who are directly and indirectly engaged in the sub-sector
- assess the performance of the Sector Wide Approach as opposed to the donor driven 'project' approach.
- Assess the value of the Government of Nepal and different donors.
- Assess the contribution of other bridge building institutions

3.4 Additional results:

- Impacts that were not foreseen by the Program, either positive or negative but occurred due to Program interventions.

4. Methodology

4.1 General Framework

This study will adopt an ex-post evaluation approach comparing before and after situations of the people living surrounding the trail bridge locations. A representative and statistically significant sample size considering the three ecological and five development regions will be selected from the bridges completed and in use for a couple of years.

Then study is also expected to conduct extensive desk studies and consultations at all the levels.

4.2 Team Formation

This study should be undertaken by a team of independent local (Nepali) consultants, who have considerable knowledge of local government and state institutions, decentralization, government budgeting systems, gender equity and social inclusion, impact assessments and transport infrastructure in Nepal. As required by the study, the team will be complimented by economist, statistician and social and rural development specialists. The study team will be gender balanced. The team leader will be responsible for the overall review, including assigning specific tasks to other member(s).

4.3 Scope of Works

The study team shall first make a desk study of all the available documents and reports (Post Bridge Building Reports, Annual Reports, Outcome Reports and the Program Logframe, TB SWAp Framework Documents) and meet with LBS team/DoLIDAR, SDC and TBSSP/HSI and in order to identify/select appropriate bridges as representative samples (30 trail bridges) to undertake the review. It is recommended that the completed bridges should be which are under operation for at least one year. As mentioned above in the background that TBSSP has baseline date of bridges from 2009. A suitable approach for taking different sets of samples of those bridges having baselines may be proposed by the team so that the situation before and after could be compared. It is suggested at least 30 bridges be taken as samples representing the bridges across the country.

After the desk study of available documents, the team shall then design a checklist and semi-structured questionnaire, appropriate for collecting the required information. They shall also propose a methodology for conducting surveys, for example: household survey (sample size 100 HH at each bridge site equalling a total of 3000HH, individual interviews, and visits to districts and district technical offices for institutional assessment, focus group discussions, traffic counts, economic surveys with respective samples for each method chosen.

4.4. Reporting

The review team shall report to the Local Bridge Section and SDC.

An inception report describing the methodology and study instruments, sample size prior to field survey should be shared with SDC. SDC shall review and approve the consultant's proposals for the questionnaire and the methodology, within a week of its submission. After incorporating feedback from SDC, a field investigation and survey will be carried out. Depending on the agreed inception report, the team may undertake and/or organize appropriate survey works, whereby the team may be facilitated by TBSU team at different regional offices to reach to selected sample bridges for administering the surveys.

Once the field work is complete, the team shall submit a draft report in order to provide feedbacks from SDC and GoN counterparts. The draft report will then be finalized once it is shared with all the stakeholders and incorporated feedback from them.

4.5. Review and Drafting of TB SWAp Framework II

The team will also review and assess the overall policy, institutional, financial, implementation, monitoring, reporting, governance and accountability arrangements of TB SWAp Framework I.

The preparation of the TB SWAP framework II shall follow a highly consultative process. It is proposed that 3 consultative workshops (regional) with the DDC's LDOs and DTOs representing 75 districts is conducted. Opinions of the users committees, bridge wardens and the local NGOs shall also be covered from selective districts and sites. The review team will share the findings of the review including results achieved in the workshops and recommendations for way forward will be sought from the participant representatives.

A national consultative workshop with the representations from central GoN stakeholders - LBS/DoLIDAR, National Planning Commission, Ministry of Federal Affairs and Local Development, Ministry of Finance, and other development partners (DFID, WB, ADB, JICA, DANIDA, KAADOORIE etc.) should also be held in order to gather their feedback. Based on the outcomes of the regional workshops, the team will draft a framework for TB SWAp II, which will be shared with all the participants in the national workshop for finalization of the framework document. The SWAP Framework II document (including the targets for the next 5 years with a tentative financial commitment from the GoN, Donors and other bridge building agencies). will be submitted to LBS who will initiate the process for seeking approval from all the partners including donors and line ministry and the department. The review team should also submit a copy to SDC.

5. Budget

An estimated budget is included with this as an annex. All taxes, duties and levies applicable except VAT in the course of these services shall be borne by the Consultant him/herself as per GoN rules. The consultant has to submit copy of PAN and VAT registration.

6. Insurance

The Consultant team will be responsible for procuring accident and liability insurance for themselves. The employer will not be responsible for any loss or damage and /or death for whatever reasons

7. Time frame

The study shall commence on 5th August, 2013 and shall be completed by 30th December, 2013. The consultant team is expected to submit the detail schedule of activities with time-line during the submission of the inception report.

Annex 2: MoFALD/DoLIDAR Task Team

LDOs

i. Nuwakot district
ii. Baglung district
iii. Dolakha district

DTOs

i. Dolakha district
ii. Palpa district
iii. Lalitpur district

DoLIDAR

i. Mr. Madhav Prasad Bhattarai
ii. Mr. Bam Bahadur Thapa
iii. Dr. Murali Ranjitkar
iv. Mr. Badri Dhungana

Annex 3: Analysis Report of Traffic Count and Household Survey

Mobility and Socio-economic Outcomes

A. Methodology for socio-economic outcomes:

1. Trial bridges sampled

Altogether 30 SSTBs from 24 districts that were constructed after the implementation of SWAP (i.e. after 2009) were sampled for the review. It was decided through consultations with DoLIDAR to select only those bridges which have baselines and have been in operation for over a year. This allowed the study to conduct a more robust analysis of the 'before and after' outcomes of the trail bridges and ensure that the findings reflected a more reliable picture of changing mobility patterns and household incomes. The selection was also based upon the need to have a representative sample from different geographical and regional areas (including the Karnali region), remoteness from district headquarters, and funding mechanisms (Table 1). The full list of the 30 trail bridges along their salient features are provided in Attachment 1.

Table 1: Sampled Trail Bridges

Ecological regions	Developmental Regions					Total
	Far-West	Mid-West	West	Central	East	
Mountain	0	1	2	2	3	8
Hill	4	3	4	3	1	15
Terai	0	2	1	2	2	7
Total	4	6	7	7	6	30

Source: TBIS 2013

1.1. Household Survey

Socio-economic household surveys were conducted at all the sampled bridge sites during September 2013. In total 3024 households within the '*zone of influence'* (i.e. within half a days walk from the trail bridges or those who use the bridges at least on alternative days) were surveyed. Based on the Trail Bridge Information System (TBIS), this represents a confidence level of 95% at a sampling error of 1.75 %. All the surveys were conducted by hired enumerators who were provided training on the questionnaires (details are attached in Attachment 2).

As mentioned earlier, all the sampled bridges had 'baseline studies' which enabled *ex-post* assessments of the bridges. Due to this availability of information prior to trail bridge construction, for the majority of indicators that were developed based upon the TBSSP Logframe (2009-2014), a *counterfactual analysis* (i.e. selecting a comparable area which has not benefited from trail bridges, to assess the impact of bridges) was not undertaken.

Altogether, the majority of the sampled population were from the Hills (44%). With most of the respondents belonging to Janjaties (51%) followed by Brahmin/Chhetries (32 %) Dalits (15%) and Others (2%). Further demographic details of the respondents are summarised in Attachment 1.

1.2. Traffic counts

Traffic counts were conducted for all 30 sampled bridges for a week during September 2013. The time period included both normal days and busy '*hãt bazaar'* days, during which the crossers were disaggregated by gender, age, locality and purpose of crossings (the checklist used for recording has been attached in Attachment 4).

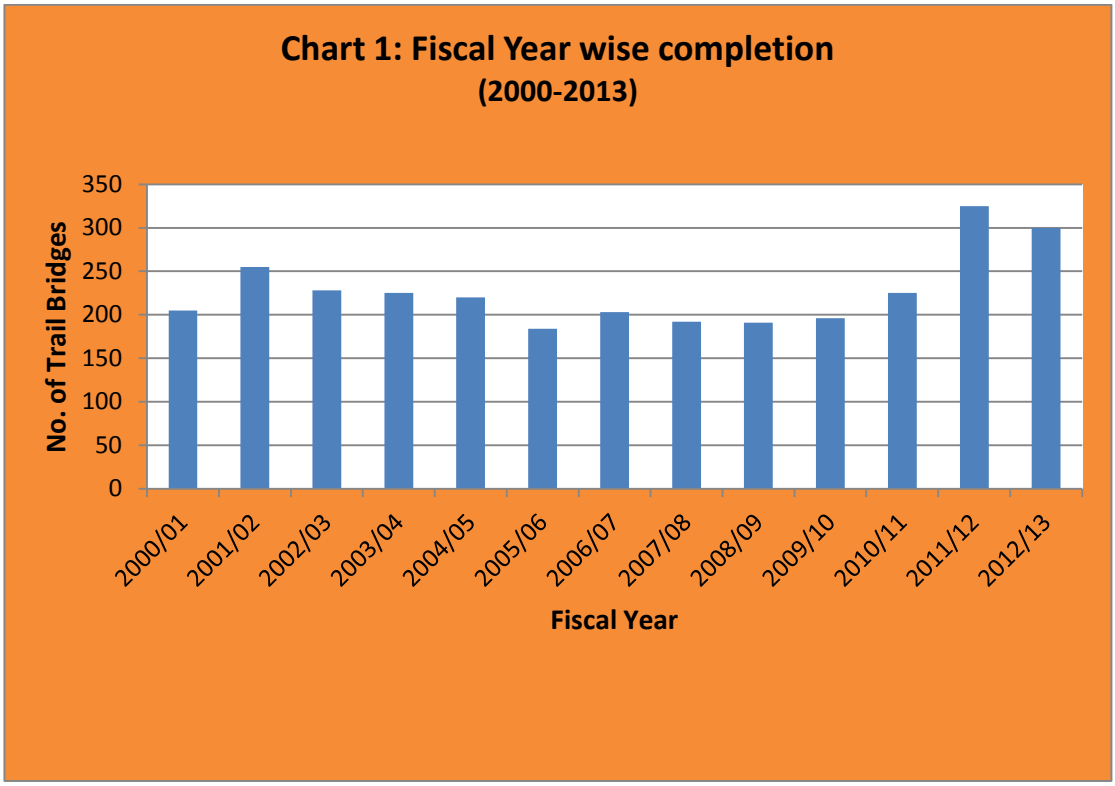
1.3. Key Informant Interviews

Key informant interviews were also carried out with 80 service providers to assess the outcomes on trail bridge access to different service centres. Altogether 24 teachers, 19 government Assistant Health Workers (AHW) and private health providers, 11 agriculture workers and 26 traders and shop owners were interviewed based on a checklist (details attached in Attachment 4). Previous User Committee members in all the sampled bridges were also interviewed in order to gain an understanding of the trail bridge building process, their involvement and the technical/social/managerial support received from the DDCs, local NGOs and TBSU.

B. Outputs

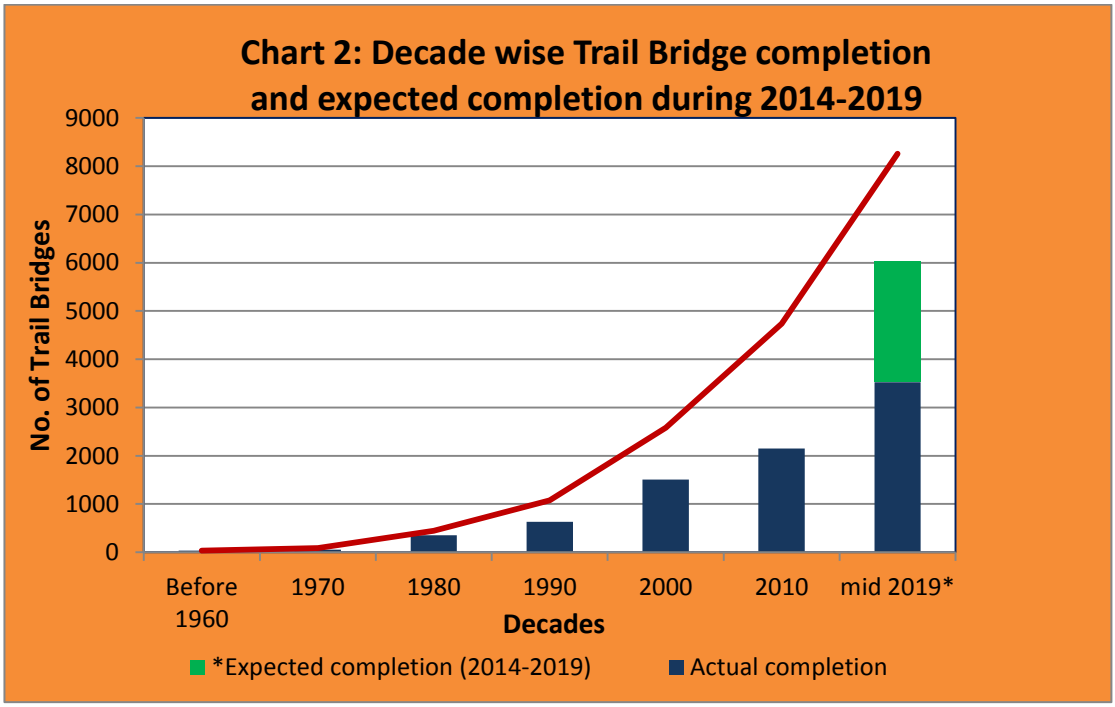
1. Trail bridges built

Since the implementation of SWAp (FY 2009/10 to 2012/13) 1046 trail bridges have been built across the country by different agencies. Bringing the total number of bridges constructed to be 5036. This includes 4725 SSTBs along and 311 LSTBs.



Source: TBSIS 2013

Trend analysis shows that there has been a steady rise in the number of bridges built since 1970 (Chart 2). On average the annual number of trail bridges built in each successive decade has been higher compared to previous years. This is quite substantial considering that even during the conflict years (1996-2006) the number of trail bridges being built did not decrease.



Source: TBIS 2013

C. Outcomes

1. Changing mobility patterns and access provided by trail bridges

Trail bridges have significantly enhanced access to service centres and were found to be providing safer river crossings to over 3,000 beneficiaries on average within the 'zone of influence' (i.e. within half a days walk from the trail bridges or those who use the bridges at least on alternative days) across the country. This amounts 16 million people or over half of the total population of the country (27.4 million), when aggregated for 5,361 bridges that have been constructed to date (TBIS 2013). This is in line with the RTI SWAp objectives of providing 'improved accessibility and mobility from rural transport infrastructure to basic services' and is at par with the intended social benefits to access service centres.

Figure 1: Mobility provided by the trial bridges

The majority of the beneficiaries belong to Janjatis (51%) followed by Brahmin/Chhetrys (32%), Dalits (15%) and Terai/Madeshi Other castes (2%) (Household survey 2013). ***Data from the household surveys indicate that 26% belong to disadvantaged groups*** (i.e. those who are economically poor as well as socially discriminated due to their caste/ethnicity, gender and geographic location). These figures are in line with the Past Post Bridge Building Assessments (PBBA) which have calculated the DAG percentages as being 23.5% (2012) and 23.8% (2010). It is however lower than the 36.8% calculated in 2009 and reflects the methodological differences applied.

Data gathered from the traffic counts also show that a large number of people, living within the general vicinity of the trail bridges as well as travellers from different districts (at 57% of the sampled bridge sites), continue to rely on the bridges for safer access. Amongst the sampled trail bridges 73% (22 TBs) were providing Rural-Rural access to locals (i.e. were located in rural areas, linking different VDCs); while 27% (8 TBs) were provided Rural-Urban connectivity (i.e. were located near district headquarters, regional markets, and road heads).

On average 153 people were found to be using the SSTBs to cross rivers daily. ***This amounts to over 700,000 crossings throughout the country in one day.*** For LSTBs, which are located along strategic paths, the figures are higher at 335 persons per day (DEFT 1999). Interestingly, the demand for the bridges were found to not have diminished with the construction of new road networks. Rather, demand was still high, as more and more communities sought to have more river crossings to have access to the new roads.

Chart 3: Main benefits of the trail bridges by topography

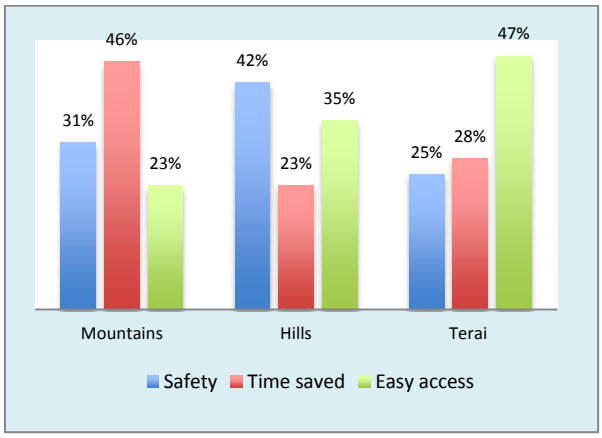
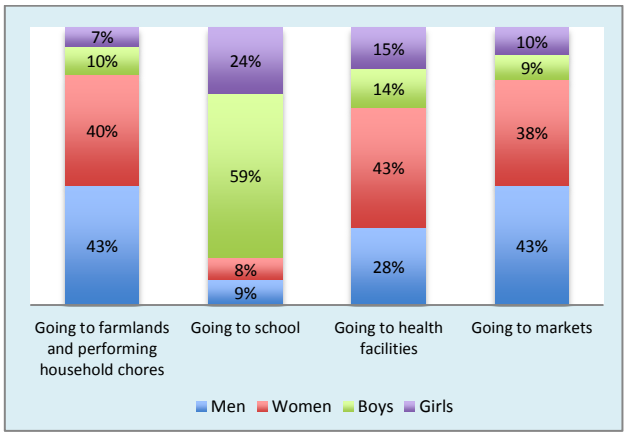


Chart 4: Purpose of crossings by gender in %



Source: Traffic counts 2013

Higher number of crossings was found to be in the Hills (232) compared to the Terai (94) and Mountains (75). This is not surprising and is more of a reflection of multiple factors such as population densities (lowest in the mountains), presence of alternative crossings (Terai), mobility patterns of locals and distances saved, amongst others. Findings from the household survey further show that people in the Hills regard the *safer access* provided by the TBs to the most important benefit, indicating an absence of other alternative crossings within the vicinity.

Gender disaggregated data show that the ***boys (33%), followed by men (28%), women (23%) and girls (16%), are the main users of the trail bridges***. With the highest number of bridge crossings undertaken to go to farmlands and perform household chores, such as collect firewood and fodder (31%). ***Women were found to predominantly cross trail bridges to perform household chores, access farmlands and go to health***. Men on the other hand mostly used the trail bridges to also go to farmlands and markets (Chart 4). Interestingly, more boys were recorded to have used the bridges to access schools (59%) than girls (Chart 4), which differs from the finding of the 2012 PBBA, which recorded higher

number of girls (56%)[2]. When cross verified with schools enrolment records it was seen that boys did out number girls (53% to 47%) and one can infer was reflected in the daily traffic counts.

1.1. Access to educational centres

Access to educational centres continues to be one of the most important purposes of trail bridges (Chart 4). In fact 14 (47%) of the sampled trail bridges were constructed specifically to ensure safer river crossings for children. Baseline studies record *that* ***prior to trail bridge construction there would be a dramatic reduction (up to 56%) in school attendance during the rainy season*** (Chhetry 2010). In addition, when it did rain ***29% of the schools sampled reported that they would have to stop classes***, mid-way, in order to ensure that the students reached their homes safely before the rise of river waters.

During this study, 24 schools (21% Primary, 58% Secondary, 11% High Schools) were visited. Records from these schools show that 48% of the students were girls while 52% were boys. When compared with baseline data, it was seen that ***prior to trail bridge construction 22% of the students were coming across the rivers (Chhetry 2010, Karki, 2012), while after construction, the figure was slightly higher at 28%***. Amongst them, 58% of the crossers were girls. **Altogether 50% of the sampled schools reported an increased in attendance rates, which ranged from 5% - 20%.** It would be very simplistic to assume that increases in attendance were a direct result of the trial bridges, as behavioural changes depend equally upon other factors such as quality of education, desire of parents to send their children to school, financial circumstances, amongst others. Nevertheless, when parents and students were interviewed they noted that safety (12%) and convenience (23%) were important factors in deciding to go to school or not.

Figure 2: Students crossing bridges to go to school

Safer access trails (leading to and away from the trial bridges) in mountainous and hilly areas with steep cliffs were also found to be a major concern for parents and students, especially during the rainy season when chances of slipping and falling are very high. Amongst the sampled bridge sites, there were a few sites (such as *Behridad* trail bridge site in Doti) where such safer trails would be very important; indicating the need of not only trail bridges but also access trials that adjoin them.

[2] Other past PBBA records show a mixed picture. In 2010, the figures were higher for boys crossing (52.5%) compared to girls (47.5%); while in 2010, it was equal (50%).

1.2. Access to health facilities

Comparisons with baseline data collected prior to trail bridge construction showed that ***the number of patients accessing health facilities from across rivers increased in 40% of the sampled health facilities (N=19)***. ***On average 35% of those seeking out treatments had to use the trail bridges compared to 21% recorded prior to trail bridge construction*** (Chhetry 2010).

During the study, it was noted that the bridges not only improved access to the nearest health facilities, but also opened up further alternatives to higher levels of centres through access to road heads, from which district and zonal hospitals could be accessed. ***Data from the traffic counts indicate that the majority (43%) of crossers coming for check-ups are women*** (Chart 4).

Overall, the importance of roads for both maternal health care and medical emergencies was stressed by many. ***84% of the health service providers reported increasing number of women coming for antenatal care and deliveries***. Interestingly, 76% of the household respondents reported to have given birth at health facilities. For many, the trail bridges ensured safer crossings, encouraged health service providers to come to their households for checkups and reduced time.

Health workers also noted that the bridges had improved the transportation of medical supples, equipment, and had helped to continue outreach services (such as vaccination campaigns) during the rains.

1.3. Access to markets

Connectivity to markets was an important benefit provided by the trail bridges and is in line with the TBSSP SWAp objective of improved access to markets. At 50% (N=15) of the sampled sites, access to local and/or regional markets were found to be the main reason for trail bridge demand. On average the bridges were found to save 30 minutes for a one way journey. Meanwhile, ***traffic counts recorded that usually more men (43%) were crossing to go to markets, either to buy goods or sell their produce than women (38%).***

Figure 3: Access provided by trail bridges to markets

Interviews and observational visits noted that the effect of trail bridges led to both increases in businesses (through higher traffic flows) as well as newer opportunities. For example, ***71 % (N=10) of the traders interviewed who had already established shops reported increases in the number of buyers***, especially during the rainy season. They mentioned that locals do not need to rush back home in the evenings and that there are greater number of people come to buy their goods even when it rains. Meanwhile, it was

found that ***on average 2 new business enterprises (retails, tea shops) had opened near the vicinity of the trial bridges***. Most had started their shops in order to take advantage of the traffic flows, especially along long journeys routes where travellers would be more inclined to rest before starting off. Incidentally, in some sites the presence of a large number of shops were seen to have a negative effect on the general cleanliness of the area, affecting the trial bridges. In these areas, throwing rubbish, urinating, and drying clothes were common. This will inevitably affect long term sustainability and is an issue that needs to be made aware to these local communities and the bridge wardens who are entrusted with their maintenance.

Increasingly, the study team also noted that locals were riding motorbikes and cycles across the bridges. With many transporting goods either for home consumption or selling. When interviewed, they were appreciative of the slopes/ramps

1.4. Performing household chores and accessing farmlands

Accessing farmlands and performing household chores (gathering firewood, fodder, going to mills) were the main purpose of crossings (31%) in the majority of the sampled sites (Chart 4). With ***an equal number of men (43%) and women (40%) recorded to be crossing the trail bridges to perform these activities.***

In most of the sampled sites, the time savings were approximately 10 minutes for a one-way journey, which when aggregated becomes quite significant when one considers that an individual may have to visit his/her farmlands a number of times in a day as well as perform other activities.

2. Outcomes of trail bridges on rural livelihoods and incomes

Trail bridges were found to have limited outcomes on the livelihoods and incomes of the beneficiaries. Complementary services, in areas of agricultural and non-agricultural sectors, are therefore required to generate multiplier impacts to take advantage of improved access provided by the bridges.

Overall, cereal farming continues to be the main source of household income within the sampled population (Table 2), with the exception of Dalit households who were found to be more reliant on agricultural-wage labour. This is not surprising considering that 48% of this population were found to be landless. For many, agricultural and non-agricultural work were the most important sources of income. In addition, migration (to India and beyond) and the subsequent remittances sent back were also found to be significant.

Table 2: Main household livelihood sources by caste/ethnicity and DAGs (in %)

Livelihood sources	Before Trail Bridge Construction						After Trail Bridge Construction					
	D	J	B/C	O	DAG	Non-DAG	D	J	B/C	O	DAG	Non-DAG
Cereal farming	21	47	47	81	37	47	22	43	40	74	33	41
Commercial farming	6	28	16	16	16	23	6	33	16	22	18	25
Wage labor	56	44	26	49	32	64	55	45	28	52	33	65
Micro-enterprise/Business	6	9	12	7	20	10	8	15	14	6	10	15
Remittance	20	21	27	9	23	25	22	30	32	11	25	35
Salaried job	6	13	19	8	13	17	7	12	19	10	4	18

Source: Household Survey 2013 Note: Rural households have more than one source of income.

Household surveys showed that on average incomes increased by 30% since the construction of the trail bridges (Table 3). ***Non-disadvantaged groups and Janjati were found to have benefited the most***. This was primarily due to the increased incomes from remittances and business enterprises that they had started since the construction of the trail bridges. Dalits and disadvantaged groups were however found to have not diversified into these opportunities in comparisons with the other social group due to high investment costs (and consequently high interest rates on loans), the lack of knowledge and inability to take risks.

Table 3: Changes in average annual household incomes

Caste/ethnicity	Annual HH income before TB construction (NPR)	Adjusted annual HH income before TB construction (NPR)	Annual HH income after TB construction (NPR)	Percentage change
Dalit	97609	81630	111257	+36
Janjati	120540	100806	141564	+40
Brahmin/Chhetri	100808	100809	128806	+28
Other	135012	112909	136266	+21
DAG	63591	53181	63985	+20
Non-DAG	128007	107051	157131	+47

Source: Household Survey 2013

Note: Annual income before construction has been adjusted for inflation for trail bridge site based on the Consumer Price Index (CPI) of the year in which construction was started

The percentage change is in addition to changes attributable to inflation

The strongest link with trail bridges in terms of livelihoods generated/lost was the emergence of small business enterprises (discussed in detail in 2.2) ***near the vicinity of the bridges and/or the greater trade flows as a result of improved access. The loss of incomes for families that ferry locals across rivers in exchange for cash or kind were also found to have been directly affected by the construction of the trail bridges*** (*Bhimbad bridge* in Dang). According to TBSU records, these displaced boatmen are provided with trainings for alternative employment.

2.1. Effects of trail bridges on agriculture

Within the agriculture sub-sector there has been little change in terms of intensification and/or emergence of commercial production. The majority of households continued to be reliant on subsistence farming, which had under gone limited change since the construction of the trail bridges in terms of cropping area. Overall, 56% of the sampled population had food sufficiency less than 6 months compared to 14 % between 6-9 months, 21% between 10-12 months and 9% more than 12 months. Interviews with agro-vets (N=11) did however indicated that gradually more farmers are turning towards chemical fertilizers for their crops, though not significantly.

Commercial production (of vegetables) had emerged in a few of the sampled sites (such as *Balimtar* trail bridge in Gorkha). Altogether, this is not surprising as emergence of commercial farming requires markets, access to inputs, irrigation, technological know-how, transportation networks and appropriate climatic conditions, amongst others. But, many of the sampled trail bridge sites were located in remote areas (70%), at least half a day walk from the nearest road head, where motorised transportation was low and infrequent.

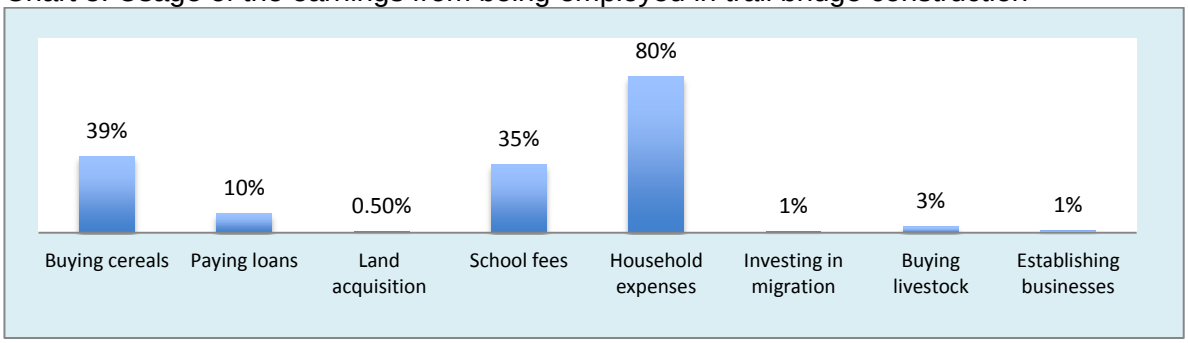
The most significant impact of the trail bridges on agriculture remained the easy daily access afforded households (31% of all daily traffic counts) to their farmlands and the time savings (10 minutes for a one-way journey). In addition, the convenience in transporting inputs (fertilizers) and on-farm produce (cereal grains, milk) were reported to be important. ***5% of the respondents also noted that the trail bridges had encouraged agriculture service providers (government and private) to enter their villages during the monsoon***.

2.1. Effects of trail bridges on non-agriculture livelihood opportunities

Employment during rail bridge construction was found to have contributed towards a 'short term' cash injection into rural households, which helped to tie over food requirements and children's school fees.

Local populations have benefited from the labour-intensive approach to bridge building. On average approximately 2600 person-days of employment (2000 person-days of unskilled and 600 person-days of skilled) was generated at the bridge sites (TBIS 2013). Household surveys showed that ***27% of the respondent households had at least one member who had been employed during the construction of the trail bridge for an average of 30 days***. ***Overall households were found to have earned on average NPR 9,700***. These short term cash injection were found to have been important in meeting daily households needs, such as buying oil, spices, etc. (80%) and cereals (39%) (Chart 5) , but overall did not have any far reaching impacts on livelihoods like other rural infrastructure projects, such as roads. Except in a few cases when the skills (masonry) learnt or improved were useful in acquiring other employment opportunities (non-agriculture labour). This was noted to be the case for 15% of the households who had been employed during bridge construction.

Chart 5: Usage of the earnings from being employed in trail bridge construction



Source: Household survey 2013

Trail bridges also had some limited impact on local trade. Those who were entrepreneurial were found to have set up businesses (retail, tea shops), with 2 new businesses emerging at the bridge sites on average. This has been associated with greater availability and diversity of goods within villages.

3. Changes in living standards

Living conditions of the sampled population has improved. Table 4 summarises the details that have occurred across the different socio-economic groups.

Table 4: Changes in living conditions before and after trail bridge construction

Living standards		**DAG**		**Non-DAG**	
		Before	**After**	**Before**	**After**
Drinking water sources	Tap at home	19%	23%	23%	27%
	Community tap	60%	62%	58%	61%
	River	4%	1%	9%	1%

	Well	15%	14%	10%	11%
Type of toilet	Temporary	31%	25%	29%	19%
	Permanent	28%	49%	43%	70%
	No toilet	41%	26%	28%	11%
Source of cooking energy	Firewood	98%	94%	96%	92%
	Kerosene	0.5%	0.5%	0.5%	1%
	LPG Gas	2%	5%	3%	6%
	Bio-Gas	0	0	1%	1.5%
	Electricity	0.5%	0.5%	0.5%	0.5%
Source of lighting	Firewood	6%	4%	2%	1%
	Kerosene	37%	23%	29%	15%
	Electricity	46%	51%	53%	61%
	Solar	11%	2%	16%	23%
Type of house/ roofing	Mud, thatched	34%	29%	30%	27%
	Mud, Zinc roof	51%	55%	58%	61%
	Cemented	2%	3%	5%	6%
	Bamboo	13%	13%	7%	6%

Source: Household survey 2013

After the construction of the trial bridges, certain services were found to have started in the villages. 10% of the household respondents (located in 3 sites) noted the entry of electrification while 9% reported that new development Programs by local NGOs had started. Most clarified that the bridges had helped to overcome the reluctance of people coming into their villages and had also set about reducing the 'remoteness' and 'isolated' perception of 'out siders'.

Ovearll, the changes in the living standrads were most notable for usage of electricity and permanent toilets. ***For DAG households, there was an increased usage of electricity from 46% to 51% and from 53% to 61% of Non-DAG householeholds.***

One of the most signficant changes has been in the use of permanent toilets, which has increased for DAGs from 28% to 49% and from 43% to 70% for Non-DAGs. People within the bridge sites were increasingly aware of the need of proper hygiene behavioural practices.

Usage of firewood for cooking has however not changed, with over 90% of households continuing to rely on wood. Costs and availability are two of the most significant factors associated with the type of fuel used. In rural areas, it is therefore not surprising that many families continue using wood compared to other available fuels such as kerosene. The health costs associated are however high, as the smoke released from burning solid fuels causes respiratory problems.

3. Gender empowerment

Within the sampled bridge sites, the surveys and traffic counts indicated that women have equally been benefiting from the bridges as compared to men. Though, their purpose of crossings were found to be different and generally revolved around gendered roles (Fernando and Porter 2002); such as performing household chores (40%) (Chart 4). This reinforces the need to maintain a gendered-lens while designing and implementing transport infrastructure projects, as there are fundamental gender-based differences in women's and men's needs for transport.

The community approach of 'user groups' in trail bridge building have also played an important role in decision making and implementation. In particular, the mandatory criteria of having a proportionate representation of social groups and at least 33% of women in the

UCs have been pivotal mechanisms for mainstreaming exclusion and gender into the sub-sector, which need to be continued with complementary support. For example, interviews with female members indicated that though the provisions have created a space for women to 'share their voices' it has also increased 'time burdens'. Amongst 30 UC members interviewed, 16% (5 women) reported to have had difficulties in being active. They indicated pressures of household chores, time constraints and lack of know-how as reasons for being unable to fully contribute to the process. On the other hand, others (13%) noted that they were more confident and satisfied in having contributed to their local communities. Presently, there are a few provisions available such as stipends for mothers who need to bring their babies with them to Demonstrating Model Bridge Trainings. Other supplementary activities would provide further encouragement and support.

The standardization of equal pay for equal work, as per the TBSSP-SWAp, has also provided clear directions for greater gendered equity. This was found to be implemented and monitored and needs to be continued.

4. **Safeguards on vulnerable groups and the environment**

Within the trail bridge sub-sector safeguards for vulnerable groups were found to be focused on displaced populations, labour generated during bridge constructed and wages. Presently, there are no provisions on resettlement of villagers who occupy land required for trail bridge construction, though forced land donations are prohibited. If someone is unwilling to donate land, then the general procedure is to seek another technically feasible location elsewhere. From the interviews conducted with villages, no such problems are reported at the sampled bridge sites. When, displacement did occur, this was primarily for families which earned their living by ferrying people across rivers. Here, the provision is to provide trainings to seek alternative employment or become bridge crafts persons during the Demonstration Model Bridge Trainings (DMBT).

During the construction process it was noted that equal pay for equal work was established. It was reported that UCs are made aware of this concern and is monitored throughout the construction cycle of the bridge. The provision of safety gear (helmets, life jackets) is also significant, as is the securing of insurance for labourers and ensuring that companies pay compensation, when the needed. Child labour is also strictly prohibited and was found to be ensured through active monitoring.

It was noted that bridge locations also are selected at geologically and environmentally sound sites, as per the SSTB Manual and LSTB Manual Vol. B. These manuals are in accordance with the Environmental Protection Act (1997) and Environment Protection Rules (1997). In addition, the replacement of wooden decks with galvanized steel parts has inevitably resulted in less number of trees being cut.

Attachment 1: Salient features of the sampled trail bridges

SN	Bridge Name	District	Span	Supporting Agency	Distance to Road head (days)	distance to district HQ (days)	Affordability of river (months)	Immediate Beneficiaries				Employment Generation			
								M	F	DAG	Total	M	F	DAG	Total
1	Andheri	Sunsari	106	RRRSDP	0	1	3	1103	1115	1177	2218	1397	486	1398	1883
2	Thalaha	Sunsari	28	RRRSDP	0	0	7	1300	1595	224	2895	943	0	840	943
3	Apthyaregauda	Ilam	68	RRRSDP	0.5	1	8	757	765	709	1522	1273	2074	2847	3347
4	Balimtar	Gorkha	84	DRILP	0.125	1	8	1000	1230	1057	2230	1365	367	557	1732
5	Baluwa	Rasuwa	92	SWAp	0.125	0.125	0	428	423	758	851	1665	457	1502	2122
6	Patharabudharam	Rautahat	32	SWAp	0	0	7	2915	2810	4214	5725	865	301	1050	1166
7	Murtiya	Sarlahi	32	SWAp	0	0	6	3660	3540	4258	7200	841	360	1060	1201
8	Ratopairosatighat	Kaski	218	SWAp	0	0	0	5295	5475	4106	10770	4722	999	4222	5721
9	Kaligandaki	Mustang	118	RRRSDP	0	0	0	199	209	275	408	2184	1158	1984	3342
10	Batar	Dailekh	102	SWAp	0.5	1	0	728	733	1050	1461	1764	840	2092	2604
11	Loligad	Baitadi	32	DRILP	1.5	1.5	9	1530	1470	1320	3000	1110	330	780	1440
12	Dhansinggha t	Nawalparasi	32	SWAp	0.125	1	6	1008	1032	1572	2040	861	236	604	1097
13	Bheri Dad	Doti	51	SWAp	0	1	4	1047	303	358	1350	1805	1307	1628	3112
14	Ghattekhola	Bajura	60	SWAp	3	1	3	1241	1290	1308	2531	1532	1511	1533	3043
15	Jatada	Kalikot	32	SWAp	0.25	1	0	614	612	473	1226	899	217	347	1116

16	Chewabesi	Sankhwasabha	53	SWAp	0.25	0.5	6	1324	1336	1527	2660	1107	324	1129	1431
17	Motichaurghat	Syangja	120	SWAp	0.125	0.5	6	1564	1638	2431	3202	2955	500	1905	3455
18	Sangrewang	Makwanpur	110	SWAp	1	2	6	410	418	771	828	1696	910	2606	2606
19	PipaldandaBesi	Makwanpur	111	SWAp	0.06	0.39	8	2700	2796	4929	5496	2178	670	2527	2848
20	Kakaharighat	Kaski	96	SWAp	0.5	1	6	1734	1856	1277	3590	2786	716	2100	3502
21	Mewa khola	Taplejung	114	DRILP	1	1.5	7	1640	1550	1590	3190	2787	925	2398	3712
22	AmaleseFawa	Taplejung	75	DRILP	1	1.5	6	820	822	855	1642	3605	282	2251	3887
23	Thatigaughat	Dang	75	SWAp	0	0.5	8	1308	1332	2118	2640	1939	537	1981	2476
24	Daharawang	Rolpa	116	RRRSDP	0	1	8	1071	1165	1196	2236	2128	570	1375	2698
25	Chakrikhola	Rolpa	65	RRRSDP	1	1	3	670	724	1225	1394	2112	632	2662	2744
26	Tueneghat	Solu	44	SWAp	2	0.5	0	901	944	1057	1845	2018	503	1311	2521
27	Chuwarkhola	Chitwan	60	RRRSDP	1	1	8	1219	1282	2501	2501	1656	662	1778	2318
28	Bhimbad	Dang	165	SDC	0.1	0.5	0	3365	3367	6088	6732	4250	2415	3671	6665
29	Juresunkoshi	Sindhupalchwok	142	SWAp	0	0	0	3405	3545	3449	6950	2362	1198	3075	3560
30	Kakare	Sindhuli	180	SWAp	0	0	8	490	490	388	980	785	1555	1525	2340

Attachment 2: Traffic Count Survey Sheet

TC Form No.		Day :	

TRAFFIC COUNT FORM

Bridge name: _____ District: _____, VDC Name/s :

Date:		Range of time:		Market day ? (Y/N)		Weather ? (Wet/Dry)	

I. HUMAN TRAFFIC

COUNT (no.)	NUMBER OF USERS (no.)			PORTER (no.)	ORIGIN (✓)			DESTINATION (✓)			PURPOSE OF River CROSSING (✓)					Type of load carried (✓)				
	Men	Women	Children		Same VDC	Diff VDC, Same Dis.	Diff Dis.	Same VDC	Diff VDC, Same Dis.	Diff Dis.	Hh chores	School	Health facility	Market	Others	Fodder/ Fire wood	Agri /livestock produce for selling	Food items[3]	Construction materials	Others

CO	NUMBER OF	POR	ORIGIN	DESTINATION	PURPOSE OF	Type of load carried

[3] Bought for household consumption

UNT (no.)	USERS (no.)			TER (no.)	(✓)			(✓)			CROSSING (✓)					(✓)				
	Men	Women	Children		Same VDC	Diff VDC, Same Dis.	Diff Dis.	Same VDC	Diff VDC, Same Dis.	Diff Dis.	Hh chores	School	Health facility	Market	Others	Fodder/ Fire wood	Agri /livestock produce for selling	Food items	Construction materials	Others

II. LIVESTOCK

COUNT (no.)	TYPE OF LIVESTOCK (no.)	PURPOSE OF CROSSING (✓)	TYPE OF LOAD (s) CARRIED (✓)

	Buffalo/ Cow	Goat/ Birds	Mule/Donkey	Grazing	Buying/Selling	Portering	Others	Fodder/ Fire wood	Agri /livestock produce for selling	Food items	Construction materials	Others

Attachment 3: Household Survey Questionnaire

HOUSEHOLD SURVEY QUESTIONNAIRE-2013

Survey Form No.	

PARTICIPATED IN PREVIOUS BASELINE STUDY: *Please (✓)*	**Yes**		**No**	

I. GENERAL INFORMATION

Name of Respondent	

1. Sex:	a.	Male		b.	Female	
2. Age:						

3.Caste/Ethnicity:	a.	Dalit		b.	Janajati		c.	B/C		d.	Others	

4. Total number of household members: (***Please write the number)***	a.	Male		b.	Female		c.	Total	

5. Location: ***(Please write name and number)***	a.	VDC		b.	Ward no.	

6. How far is your house from the nearest trail bridge? ***(Please write in minutes)***	mins

II. HOUSEHOLD INCOME

1. Landholdings (**in ha**): ***Please write in numbers*** or ***(✓)***			
a. Own Khet (Irrigated	b. Own Bari/Pakho (Un irrigated	c. Rented Khet	d. Landless

2. Food sufficiency from own production:	a.	<3 mths		b.	3-6 mths		c.	6-9 mths	
	d.	9-12 mths		e.	> 12 mths				

BEFORE the construction of the trail bridge

3. What were your **main sources of household income**? ***Tick (✓) all that apply***											
a.	Cereal crop Farming		b.	Cash crop farming		c.	Agri. Wage Labour		d.	Non-Agri. Wage	

e.	Business		f.	Remittance		g.	Salaried job		h.	Others	

4. On average, what was your yearly **household earnings** ? **Write amount In NRs**					
a.	Selling cereal crops	NRs	b.	Selling cash crops (veg, fruits, spices)	NRs
c.	Agriculture Wage	NRs	d.	Non-Agri. Wage	NRs
e.	Business	NRs	f.	Remittance	NRs
g.	Salaried job	NRs	h.	Livestock/products	NRs
i.	Pension	NRs	j.	Others	NRs
k.	TOTAL				

5. Did you or any of your family members go abroad for labour migration? (more than one											
a	Yes, I used to		b.	Yes, I had a family		c.	Yes, I still have a family		d.	No	

6. If yes, where did you or the other family members go for work?											
a.	Inside Nepal		b.	India		c.	South East Asia		d.	Gulf countries	
e.	Others										

DURING bridge construction**:**

7. Did you or any of your other family members get employment during	a.	Yes		b.	No	

8. If yes, how many of your family members were employed and for how	a.	No. of family		b.	Total number of labour	

9. What were your total household earnings? ***(Please write the amount in NRs)***	NRs

10. Where have you utilized the income earned from bridge construction? ***Tick (✓) all that apply***											
a.	Buying food		b.	Paying off debt		c.	Buying land		d.	Children's	
e.	House improvement		f.	Investment in livelihood		g.	Buying gold		h.	Invested in migration	
i.	Savings			Buying livestock			Others		y		

11. Have you or any of your other family members who were provided skill trainings (during bridge construction or livelihoods trainings) managed to utilize it for earning livelihoods?	a.	Yes		b.	No	

AFTER bridge construction:

12. What are the **main sources of your household income**? ***Tick (✓) all that apply***											
a.	Cereal crop		b.	Cash crop		c.	Agri. Wage		d.	Non-agri Wage	
e.	Business/ Shop		f.	Remittance		g.	Salaried job		h.	Others	

13. During last year, what were your yearly **household earnings**? **Write amount In NRs**					
a.	Selling cereal crops	NRs	b.	Selling cash crops (veg, fruits, spices)	NRs
c.	Agriculture Wage lab	NRs	d.	Remittance	NRs
e.	Business	NRs	f.	Livestock/products	NRs
g.	Salaried job	NRs	h.	Others	NRs
i.	Pension	NRs	j.	Others	NRs
k.	TOTAL				

14. After the construction of the bridge, has there been any change in your household income											
a.	No, there has been no		b.	Yes, but only a little		c.	Yes, moderate		d.	Yes, significant	

15. If yes, then what new or improved income earning opportunities have been generated for **your family** after the construction of the bridge? ***Tick (✓) all that apply or write***		
a.	We have set up a retail shop/tea shop/other business enterprise	
b.	We have now started commercial agriculture production	
c.	I have new employment opportunities across the river	
d.	Others Specify:……	

III. PHYSICAL ACCESS

1. In your opinion what has been **the most important** benefit from the trail bridge ***Tick (✓) only one or write***		
a.	Safety	
b.	Time saved	
c.	Easy to cross the river	
d.	Others Specify:……	

2. How far do you/your family members have to travel for carrying out the following activities: ***Please (✓) or write in <u>minutes</u>***													
	Activity	Frequency ***(✓)***			Who usually performs the activity ***(✓)***			Do you need to cross the river to access the services ?		**Before** construction of the bridge the avg. time taken to perform the activity		**After** construction of the bridge the avg. time taken to perform the activity	
		Once a day	Once a week	When needed	Men	Women	Children	Yes	No	Dry Season (**in min**)	Wet season (**in min**)	Dry Season (**in min**)	Wet season (**in min**)
a	Market												
b	Health facility												
c	School												
d	Agro-vet												
e	District Hq												
f	Household chores												

3. How has the trial bridge made a difference in **<u>accessing schools</u>** ? ***Tick (✓) all that***		
a.	There has been no change	
b.	Children can now safely cross the river	
c.	Classes are no longer disrupted during the rainy season	
d.	Children are n longer stranded	
e.	It now takes less time to reach the school	
d.	Others Specify:……	

4. **<u>Before</u>** the construction of the trail bridge, where did women in your household give birth?	a.	Home		b.	Health facility	
5. **<u>After</u>** the construction of the trail bridge, where do women in your household give birth?	a.	Home		b.	Health facility	

6. How has the trial bridge made a difference in **accessing and utilising health facilities** ? ***Tick (✓) all that apply or write***		
a.	There has been no change	
b.	Time is not lost while taking detours or waiting for the rivers to subside	
c.	Easier to take the sick, pregnant women for check ups and deliveries	
d.	Health service providers are more likely to come to provide services	
e.	Health Programmes such as immunization has become more regular	
f.	Others Specify:……	

7. How has the trial bridge made a difference in **performing household chores**? ***Tick (✓) all that apply or write***		
a.	There has been no change	
b.	Time is not lost while taking detours or waiting for the rivers to subside	
c.	Easier to perform the chores	
d.	It is not hard to take livestock for grazing	
e.	Is it easier to go to mills?	
f.	Others Specify:……	
8. After the construction of the trail bridge, have **new services entered/started** in the village? ***Tick (✓) all that apply or write***		
a.	No, there has been no change	
b.	Yes, we now have electricity	
c.	Yes, we now have piped water and toilet	
d.	Yes, agricultural extension coverage has started/increased	
e.	Yes, new NGOs/CBOs have started work	
f.	Others Specify:…… ……	

9. After the construction of the trail bridge, have **there been any new/unexpected developments? If yes, then please *explain***

IV. LIVING STANDARDS

1. What is your main source of drinking water? ***Tick (✓) only one***													
a.	Piped water at home		b.	Piped community tap		c.	River		d.	Kuwa		e.	Other	

2. What type of toilet do you have at home? ***Tick (✓) only one***								
a.	Temporary pit latrine		b.	Permanent (water sealed)		c.	I don't have one	

3. What is your main source of cooking? ***Tick (✓) only one***													
a.	Fire wood		b	Kerosene		c.	LPG gas		d.	Gobar gas		d.	Gobar gas	

4. What is your main source of lighting? ***Tick (✓) only one***													
a.	Fire wood		b	Kerosene		c.	Electricity		d.	Solar panels		d.	Others	

5. What type of house do you live in? ***Tick (✓) only one***											
a.	Stone and mud wall with straw roof		b	Stone and mud with zinc/slate roof		c.	Cement and stone/brick wall with RCC roof		d	Bamboo/ wooden and straw roof	

Date:	
Name of Interviewer	
Mobile number of respondent	

Attachment 4: Checklist for Key Informant Interviews at the National and Regional levels

A. National Planning Commission/Ministry of Finance:

- What were the priorities of the TB sector in the Three Year Plan (last 2 and the forthcoming plan)? Does TB fall under the priority sector for poverty reduction in Nepal?
- How relevant is the external support in the TB sector?
- What is the status of RTI SWAp ?
- What do you think about continuation of the TB SWAp for the future?
- Will government financing on TB sector continue in the future as of now - for how long? What are the outlooks towards local bridge building and TB?
- What are their ratings –
    - TB SWAp progress (success factors)
    - What improvements are needed in the SWAp Framework
    - Demand based selection – how pursued, what % is still influential selection, **Diminishing value principle** – has been this in peak or reduced nationally as compared to when it started
- Suitability of the TB to Gender, Inclusion and Rights Based Approach
- Sense of ownership of the local bodies – what are your analyses?
- Dedicated funds availability from DPs for TB sector – predictability
- Alignment of external development partners to national policy as well as institutional alignment
- What are your assessments of TA support available in TB sector in this phase?
- Will TA support needed for the future or not? If, yes where and why?
- Outlook on socio-economic impact of the Trail Bridge sector

B. Ministry of Federal Affairs and Local Development

- How relevant is the external support in the TB sector?
- What is the status of RTI SWAp ?
- What do you think about continuation of the TB SWAp for the future?
- Will government financing on TB sector continue in the future as of now - for how long? What are the outlooks towards local bridge building and TB?
- What are their ratings –
    - TB SWAp progress (success factors)
    - What improvements are needed in the SWAp Framework
    - Demand based selection – how pursued, what % is still influential selection, Diminishing value principle – has been this in peak or reduced nationally as compared to when it started
- Suitability of the TB to Gender, Inclusion and Rights Based Approach

- Sense of ownership of the local bodies – what are your analyses?
- Dedicated funds availability from DPs for TB sector – predictability
- Alignment of external development partners to national policy as well as institutional alignment
- What are your assessments of TA support available in TB sector in this phase?
- Will TA support needed for the future or not? If, yes where and why?
- Outlook on socio-economic impact of the Trail Bridge sector

C. DOLIDAR/TBS

- How relevant is the external support in the TB sector?
- What is the status of RTI SWAp?
- What do you think about continuation of the TB SWAp for the future?
- What are your outlooks towards local bridge building and TB?
- What are their ratings –
    - TB SWAp progress (success factors)
    - What improvements are needed in the SWAp Framework
    - Demand based selection – how pursued, what % is still influential selection, Diminishing value principle – has been this in peak or reduced nationally as compared to when it started
- Suitability of the TB to Gender, Inclusion and Rights Based Approach
- Sense of ownership of the local bodies – what are your analyses?
- Dedicated funds availability from DPs for TB sector – predictability
- Alignment of external development partners to national policy as well as institutional alignment
- What are your assessments of TA support available in TB sector in this phase?
- Will TA support needed for the future or not? If, yes where and why?
- Outlook on socio-economic impact of the Trail Bridge sector
- How do TBSSP results compare with those of similar other projects/Programmes? The pros and cons of the SWAp approach vs. “project” modalities?
- Were there any unforeseen circumstances during or as a consequence of the implementation of the SWAp?
- How would you assess the role and support provided by the various funding agencies? What further roles can they play?

Operational Institutional Arrangements

- Planning, budgeting and implementation through public/CSO and private sector – what are your assessments?
- What is the mechanism for monitoring?
- Maintenance and sustainability – what are your views?
- Public hearing/public audit of TBSSP conducted or not – when did they conduct it?

Sustainability

- What do you think about sustaining TBSSP approaches?
- Which other TB support projects are working in the district?
- Are there any sustainability risks?
- How will you mitigate such risks?

LDO/DTO/District Planning Officer/District level political parties

- Ask for some highlights on success factors –
- Are people/users benefitted – how? Only access of socio-economic as well
- Selection and prioritization – is demand based or also influence based sometimes
- What is the modality of fund transfer and its utilization? What about local resource mobilization – where?
- Is there increased demand for TB after 2009 – if yes, give reasons
    - Selection and prioritization of TB at local level
    - Selection based on demand list at the central level (diminishing value principle??)
    - Capacity building
    - Governance and management (including monitoring and evaluation)
    - Safeguards/Environmental Impact
    - Operational arrangements (NGO/private sector mobilization)
- Have the cost sharing mechanisms affected local community perception regarding ownership over the bridges?
- Maintenance of TB/sustainability
- What are your assessments of TA support available in TB sector in this phase?
- Will TA support needed for the future or not? If, yes where and why?
- What has been the key learning's from your experience with TB?

Effectiveness

- How do TBSSP results compare with those of similar other projects/Programmes? The pros and cons of the SWAp approach vs. "project" modalities?
- What are the strong points of TBSSP and why?
- What are the weak points of TBSSP and why?

Are the local NGOs competent to under take on the roles and responsibilities? What are the benefits of working with local NGOs and the challenges?

Operational Institutional Arrangements

- Planning, budgeting and implementation through public/CSO and private sector – what are your assessments?
- What is the mechanism for monitoring?
- Maintenance and sustainability – what are your views?
- Public hearing/public audit of TBSSP conducted or not – when did they conduct it?

Sustainability

- What do you think about sustaining TBSSP approaches?
- Which other TB support projects are working in the district?
- Are their any sustainability risks?

How will you mitigate such risks?

D. NGOs

- How many staff does the NGO have dedicated for trail bridge construction?
- Were the staff fully trained on aspects related to trail bridge construction?
- What type of support has the NGO received from the local bodies and TBSU? Has the support been adequate or are there areas for improvement? Specify areas if so.
- Challenges faced by the NGO while working in the trail bridge sub-sector?
- Were there any unforeseen outcomes during the construction process?

E. Educational institutions

- What is the yearly number of professionals to whom you provide training on TBs?
- A high turn over rate is a very big challenge within the TB sub-sector, what do you think needs to be done in order to mitigate the situation?
- Is there a demand to learn about TBs? Is the demand increasing/decreasing?

F. Consultants

- What has been your experience while working with the local bodies and TBSU in terms of:
    a. Technical assistance
    b. Fund management/disbursement

G. Development Partners

Explain about the ER and its brief findings including Safeguard mechanism to start

1. Your support to the TB sector – please tell us about it
2. DoLIDAR is implementing TB SWAP Framework since 2009
    - Where are your views on : ownership, alignment, harmonization, managing for results and mutual accountability?
3. What are your assessments about the management of TBSSP?

   If uncovered ask probing questions on:
    - Institutional structure and process
    - Public Financial mechanism
    - Human resources
    - Capacity building
    - Decentralized mechanism
    - Monitoring and mechanism
    - Policy support
    - Sustainability
4. What are the areas of support that you are providing to the TA sector? Financial support and TA support
    - Mobilization of DP support – through red book or other mechanism?
    - Do you think further TA support is needed in the TB sector – what for?
5. Is TB still priority of the GON of the value is diminishing if compared to before
    - Do DPs still value development of TB sector in Nepal?
    - Will your organization be providing support to the TB sector in the future?

      If yes, through Swap or other mechanism?
6. What are your views on the sustainability of TB constructed in Nepal?
7. Any other points that you will like to say

H. INGOs/Other TB Building Institutions

Explain about the ER and its brief findings including Safeguard mechanism to start

1. Your support to the TB sector – please tell us about it
2. DoLIDAR is implementing TB SWAP Framework since 2009
    - Where are your views on it?
3. What are your assessments about the management of TBSSP?

   If uncovered ask probing questions on:
    - Institutional structure and process
    - Public Financial mechanism
    - Human resources
    - Capacity building
    - Decentralized mechanism
    - Monitoring and mechanism
    - Policy support
    - Sustainability

4. What are the areas of support that you are providing to the TB sector? Financial support and TA support
    - Mobilization of support – through red book or other mechanism?
    - Do you think further TA support is needed in the TB sector – what for?
5. Is TB still priority of the GON of the value is diminishing if compared to before
    - Do DPs still value development of TB sector in Nepal?
    - Will your organization be providing support to the TB sector in the future? If yes, through Swap or other mechanism?
6. What are your views on the sustainability of TB constructed in Nepal?
7. Any other points that you will like to say

Attachment 5: Checklist for Key Informant Interviews at the Community Level

A. Health facility:

Bridge name: _____ **VDC name:** _____ **District name:**_____
Health facility name:_____ **Level (SHP/HP/PHCC/Medical):** _____
Health service providers name: _____ **Designation:**_____

1. What was the situation like for people wanting to access health services before the		
a.	Sometimes the river would prevent people from coming to the service	
b.	Vaccination campaigns used to be disrupted	
c.	It was hard to bring the sick and elderly to the health centre	
d.	It was difficult to bring pregnant women for deliveries	
e.	It was difficult for health service providers to go into communities	
f.	It was difficult to provide emergency services	
g.	Others Specify:……	
2. What changes in terms of health service utilization have you observed after TB		
a.	There has been no change	
b.	There has been an increase in the number of patients coming for check	
c.	There has been an increase in the number of deliveries at the health	
d.	Now more outreach Programmes are conducted	
e.	Others	
3. Among the changes in health service utilization, how has the TB made a difference?		
4. Based on your perception, how has the health conditions changed (improved/deteriorated) in the villages in terms of spread of diseases, health seeking practices, medication ?		

5. Can you please provide the following information:							
Total number of patients who received treatment in the last year				Total number of patients who received treatment in the last year that had to cross the TB			
Male	Female	Children	Total	Male	Female	Children	Total

Date:_____ Name of Interviewer:_____

B. School:

Bridge name: _____ VDC name: _____ District name:_____

School name:_____ Level (Primary/Secondary/Campus): _____

Principle/Teachers name: _____

Designation:_____

1. What was the situation like for children coming to the school before the construction of		
a.	Sometimes the river would prevent children from reaching the school	
b.	Sometimes children would be stranded, unable to reach their homes	
c.	Crossings were very dangerous	
d.	The school had to be closed	
e.	Children were always late or wet	
f.	Others Specify:……	
2. What changes in terms of school access have you observed after TB construction?		
a.	There has been no change	
b.	There has been an increase in the number of children coming from	
c.	The school is now no more closed due to the weather	
d.	Enrolment rates have improved	
e.	Children are now more regular	
f.	Now there are no more accidents	
g.	Others Specify:……	
3. Among the changes in school going behaviour, how has the TB made a difference?		
4. If enrolment rates and school going behaviour has changed? Can you please provide by how much this has changed in terms of percentage?		
5. Can you please provide the following information:		

Total number of students		Total number of students who have to cross	
Girls	Boys	Girls	Boys

Date:_____ Name of Interviewer:_____

C. Traders

Bridge name: _____ **VDC name:** _____ **District name:**_____

Interviewee's name: _____
Type:_____

1.Total number of enterprises that were established after the construction of the trail bridge: ***Please write in numbers***								
a.	Tea shops		b.	Retail		c.	Others	

2 When did you start your enterprise?					
a.	Before the construction of the TB		b.	After the construction of the TB	
3. What encouraged you to start the enterprise ?					
4. How has the construction of the TB affected your business?					
a.	There has been no change				
b.	There has been an increase in the number of people who cross the bridge who				
c.	It is now easier for me to transport goods				
d.	Others Specify……				
5. Do you see additional income generating activities – on farm and off farm- after the construction of the TB?					

6. How many new chops/enterprises have been established after the construction of the trail bridge?	
8. Do you see a need of other bridges such as local road bridge adjacent to the trail bridge now? If yes, will the value of the trail bridge diminish after such bridge construction?	

Date:_____ Name of Interviewer:_____

D. Agriculture Extension Worker

Bridge name: _____ **VDC name:** _____ **District name:**_____

1. Has the cropping pattern changed after the construction of the trail bridge? If yes, how?
2. If cropping patterns of changed then how has it been affected by the trail bridge?
3.Has new demand for agricultural services extension services increased after TB construction? If yes, what type of services?
4. What additional economic activities –on farm and off-farm- have you observed after trail bridge construction?

Interviewee's name: _____

Type:_____

Date:_____ Name of Interviewer:_____

Date:_____ Name of Interviewer:_____

E. User Committees

Bridge name: _____ **VDC name:** _____ **District name:**_____

UC Member's name: _____

Position:_____

1. Were you satisfied with the support provided by TBSU/DDDC/DTO/NGO for:					
a. Technical assistance:					
b. Release of funds					
c. Handing over of materials:					
d. Management and Payment of workers (based on equal pay for equal work):					
2. Did you face any difficulties during construction? If so, what and how was the problem resolved					
3. Has a bridge warden been appointed for routine maintenance?					
a.	Yes		b.	No.	
4. Could you please explain how you worked in the UC in terms of: (i) time management, (ii) delineation of duties, (ii) performance, (iv) difficulties/challenges and (v) learnings					

Date:_____ Name of Interviewer:_____

Annex 4: Cost Benefit Analysis

1.1. Return on Investment

The return on investment has identified by evaluating the impact of TB which shows the picture of success and/or failure of investment project which would help to formulate future plan. The impact includes positive or negative changes produced by project, directly or indirectly, intended or unintended which is measured empirically as economic and social changes. It is the effects that can be expected in accrue from the intervention (Mikkelsen, 2009). Evaluation means assessing the value of benefits due to the investment cost. It is more time bound and comprehensive effort which focuses on benefits to the people and fulfilment of objectives of the evaluated scheme of investment return. Though the question of estimating a "return on investment" of TB is not easy it is difficult to establish the "return to whom". In this evaluative study investment on returns has been analysed on the basis of reduction of travelling time of consumers for economic activities performed and it has also been considered to quantify return on investment in monetary unit. In this context, this evaluation has been done by assuming time saved of the travellers and used that additional time for socioeconomic activities. The survey data of traveller shows that 92 percent of them lives within one hour distance from TB and among them 1,694 (56%) need to cross TB for economic activities. The activities of those travellers were analysed based on incremental investment cost and incremental benefits to identify economic rate of returns.

The evaluation is of formative and summative. Formative evaluation is done to improve the performance of project through learning from experiences gained. It is a summative economic evaluation of TB. The summative evaluation are undertaken to judge the worth after the completion of development project (Dale, 2004). It refers to review of TB project. This summative evaluation is done based on economic cost benefit analysis. The cost includes construction and maintenance cost of 30 sampled TBs (mountain, hill and Terai region). The cost was covered by central and local government of Nepal, TBSU and NGOs/INGOs. The gross cost was compared with normal travelling benefits. The normal travelling economic benefits was computed by HDM-4 (Highway Development and Management) model in terms of travelling purpose such as marketing, agriculture input supply and farm field visit. It requires travelling distance and cost in with and without project. For this, the distance was calculated from household to destination for economic activities in with and without TB, by assuming per hour 4 kilometre walk in both cases for all sample TBs. The cost was determined on the basis of average crossing time, traffic count and frequency of visit for marketing, agriculture input supply and farm field visit during a year. The traveling time was converted into days (per day eight hour working time) and cost was calculated by per day wage rate in with and without project situation.

1.1.1. Distance and Time Saved

The TB is public goods which gives multiple benefits to the society such as safety, distance gained, easy to cross and others. The distance gained is an important aspect of TB so that traveller saves time for additional economic (productive) activities. In addition to this, it has also been connected two sides of community through which they can come together in social capital formation.

The distance benefit has been calculated based on the consumer's surplus approach (ADB, 1999) for economic analysis. The without project was considered length of willingness to travel and with project situation was actual traveller's travelling length. It was assumed that the rational traveller wants to travel with shorter distance through which they can save time to get benefits.

Therefore, distance was taken as measuring rod of time benefits. Based on the embodied action of respondents, the distance was computed from household to destination for different activities (See Table 1).

Table 1: The distance (in km.) in with and without project situation by ecological belt*

Activities	Without TB				With TB				Distance
	Mountains	Hills	Terai	Average	Mountains	Hills	Terai	Average	Surplus
Market	3.0	4.5	5.7	4.3	1.9	2.7	3.3	2.6	1.7
Health	1.6	3.5	4.1	3.1	1.1	2.3	2.7	2.1	1.1
School	0.8	1.5	2.0	1.5	0.5	1.1	1.1	0.9	0.5
Agro-inputs	1.6	2.5	3.4	2.5	1.1	1.4	2.3	1.5	0.9
District HQ	9.1	6.7	6.2	7.3	5.4	3.9	3.9	4.3	3.0
Farm Field	1.1	0.5	1.8	1.0	0.7	0.3	0.7	0.5	0.5
Distance surplus					6.4	7.8	9.3	2	7.7

Source: field survey, 2013

*Distance per hour 4 km walking

The above table show that in an average, TB has reduced 2 kilometre distance to reach their destination. It has reduced the travelling distance for socio-economic activities and all ecological belts. Thus, after the construction of TB travellers gets distance benefit. The benefit saves travelling time. It was assumed that people has been used saved time in additional economic activities.

The traveling time was computed by taking average of river crossing times in dry and rainy season with and without project situation. Average time saved has also been calculated which can be used for socioeconomic activities. The average time saved for economic and social activities in mountain, hill and Terai is given table 2.

Table No 2: The crossing time for different activities in without and with TB by ecological belt

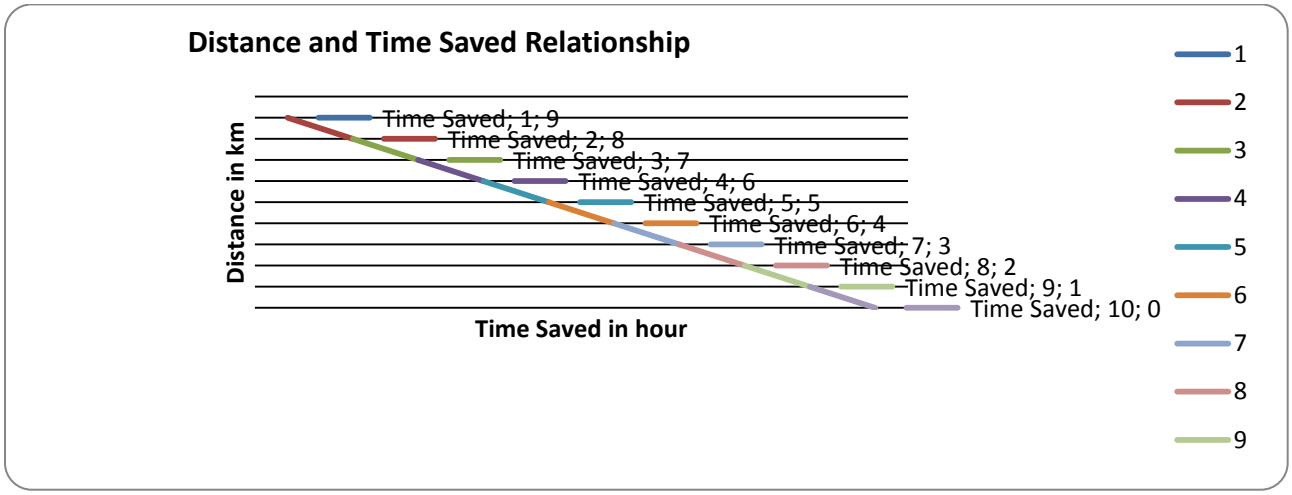
Activities	Without TB (time in min.)				With TB (time in min.)				Time Saved (Average)
	Mountain	Hill	Terai	Total	Mountain	Hill	Terai	Total	
Market	45	67	56	65	28	40	50	39	26
Health	24	53	62	47	16	34	40	31	16
School	12	23	30	22	8	16	16	14	8
Agro-inputs	24	37	51	37	16	21	35	23	14
District HQ	137	101	93	110	81	58	58	65	45
Farm Field	16	8	27	15	11	5	11	8	7
Time Saved					16	19	23	19	

The table shows that a traveller has been saving the traveling time by 19 minute due to the construction of TB. It is 16 minute in mountain, 19 minute in hill and 23 minute in Terai. It was also found that a traveller is more benefited while going to district headquarters followed by market and health centre. The distance elasticity was measured to show it's per unit effect on time saved.

1.1.2. Distance Elasticity

The distance elasticity was measured to get it's per unit effects on time saved for economic and social activities. The constructed TB has reduces travelling distance that affects on travelling time. The distance and travelling time has positive relationship i.e. shorter distance minimizes the travelling time and vice versa. On the other hand distance and time saved has negative relationship i.e. shorter the distance more the time saved and vice versa. The relationship has given in following figure 1.

Figure No 1: The relationship between distance and time saved



In above figure, there is inverse relationship between distance and time saved. The downward sloping curve shows that saving of time increases as decreasing the distance.

The per unit distance effect on time can be identified by distance elasticity. The elasticity shows effectiveness of TB in terms of relatively inelastic, unitary elastic and relatively elastic. The greater than one resultant data shows relatively elastic distance which implies positive impact of TB on time saved. Refer to Table 3 below.

Table 3: The distance elasticity of different activities by ecological region

Activities	Mountains	Hills	Terai
Market	1.04	1.01	0.99
Health	1.08	1.06	1.05
School	0.87	1.17	1.05
Agro-inputs	1.08	0.98	0.96
District HQ	1.01	1.02	1.02
Farm Field	0.83	0.92	0.96
Total	1.01	1.02	1.01

The above table shows that arc distance elasticity is positive and greater than one for all ecological regions. This implies that one percent reduction in distance by construction of TB increases time saved more than one percent. Thus, the construction of TB is effective for saving

travel time. The elasticity is higher in hill (1.02) in comparison to mountain (1.01) and Terai (1.01). This implies that the construction of TB in hill region can save more time than other region. The activity based elasticity shows that TB is effective to go to health centre and district headquarters for ecological region. The school children of hill region and agriculture input supply in mountain region has been identified more effective. The important issue is whether the travellers have used saved time in productive activities or not.

The return on investment was compared with construction and regular maintenance costs. The measure maintenance and miscellaneous cost was not included in gross costs. The economic benefits have derived from farm and off farm activities. For which TB has provided the opportunities to the needy people directly and/or indirectly. In this report, the economic analysis was done based on direct benefits of TB through which travellers saved time for additional economic activities such as marketing, agriculture inputs supply and farm field visit. The direct benefits of transport costs and indirect benefits of economic opportunities are not included in this analysis. The benefits were measured based on crossing time of travellers with and without project situation. The normal traveling benefits were identified in monetary value based on wage rates (see table 4)

Table 4: The construction as well as maintenance costs and normal benefits by ecological belt

Indicators	**Ecological Region**			**Total**
	Mountains	**Hills**	**Terai**	
Number of sample TB	9	13	8	30
Construction cost (in NPR millions)	21.71	39.72	17.65	79.08
Maintenance cost (in NPR millions)	0.03	0.04	0.02	0.09
Aggregate cost (in NPR millions)	21.74	39.76	17.67	79.17
Normal travelling benefits (in NPR millions)**	6.14	16.80	15.91	19.50

Source: Field survey, 2013 and TBSU.

The construction cost of 30 sample TB were Rs 79.08 million (mountain- Rs 21.71, hill- Rs 39.72 Terai- Rs 17.65) and its maintenance cost were 0.09 million (mountain- Rs 0.03, hill- Rs 0.04 and Terai- Rs 0.02). The normal traveling benefits were computed in terms of traveling for the economic purpose of marketing, agriculture input supply and farm field visit which was found to be Rs 19.50 million (mountain- Rs 6.14, hill- Rs 16.80 and Terai- Rs 15.91). The economic rate of returns was analysed on the basis of this costs and benefits.

The cost benefit analysis shows the impact of TB in terms of time saved. In analytical process, the life span of TB was estimated for the 50 years. The discounting technique was used for the analysis. It is payment that occurred at various times throughout the life of a project that can be made equivalent to present payments. A process of complex flow of payments can be converted to a single net figure, facilitating the valuation of one project or a comparison between projects in a way that reflects time preference and opportunity cost. The future benefits and costs would be appropriate to measure at present value considering the country context and international practices. The discount rate was selected to correspond to the highest return available from alternative investment. In this analysis, 8 percent discount rate was determined considering lending rate in Nepal and related literatures (Gittinger, 1982).

It was analysed from the technique of Net Present Value (NPV), Benefit-Cost Ratio (BCR) and Economic Internal Rate of Return (EIRR). NPV measures a project's financial and economic viability by taking into account a time preference for money. This technique was adopted for

measuring economic viability of TB by taking into account a time preference for money by comparing the present value of the cost streams with the present value of the benefit streams. The Benefit–Cost Ratio was calculated to identify cost effectiveness in present value of benefits to the present value of costs. The Economic Internal Rate of Return was calculated for analysing the percentage return on investment.

The economic effect of TB were measured in terms of values of marketing, agriculture input supply and farm field visit. There could be series of debatable assumption; however, economic evaluation of TBs in this study has tried to quantify the benefits. The investment in the TB can be justified by the clear economic benefits resulting from the construction of TB. Refer to table 5 below.

Table 5: Results of the economic evaluation based on time saved for economic activities

Economic Indicator	Mountain	Hill	Terai	Aggregates
Net Present Value (NPV) in NPR million	53	165	176	158
Benefit Cost Ratio (BCR)	3.40	5.10	10.83	2.97
Economic Internal Rate of Return (EIRR) %	22	21	21	22

Source: Field survey, 2013

The above table 5 presents the monetary value of incremental investment costs and incremental benefits to the travellers for their economic activities. The non-monetary value was excluded in this analysis. The results are:

Net Present Value (NPV): The NPV is the difference of schemes discounted annual incremental investment benefits and costs streams. The result gives that a rupee today has a higher value than a rupee after a year from now. In 30 sampled TB, it is found to be Rs 158 million (Rs 176 million in Terai, Rs 165 million in hill and Rs 53 million in mountain). The positive result of NPV in aggregate as well as for all geographic regions indicates that the investment in TB scheme is greater than the estimated opportunity to invest elsewhere. Thus, the TB scheme is sufficient to recover investment.

Benefit Cost Ratio (BCR): The benefit and cost ratio criterion was used for the evaluation of TB schemes based on the direct aggregate investment costs and benefits. The ratio was calculated on the basis of present worth of the benefit streams divided by the present worth of the cost streams. The result shows the efficiency of scheme's resource investment. BCR for the sampled 30 TBs has found to be 2.97 (3.40 in mountain, 5.10 in hill and 10.83 in Terai). The result of benefit cost ratio signifies that the benefit of per unit investment in TB is greater than 1 at national level as well as in all ecological regions. Thus, investment in TB scheme is economically beneficial.

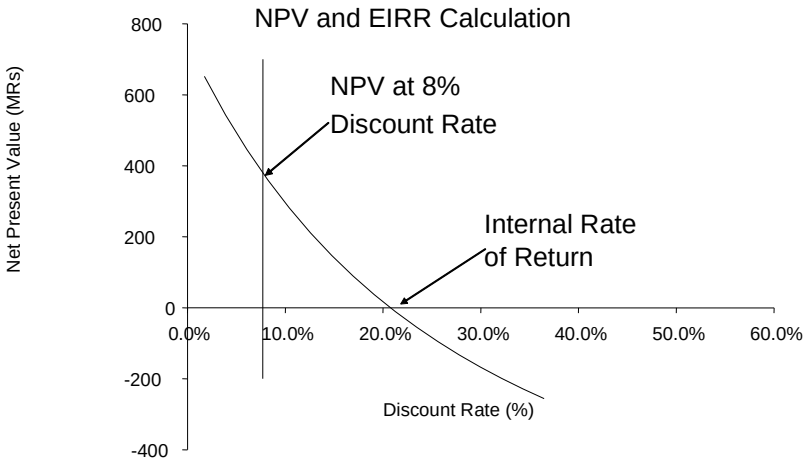
Economic Internal Rate of Return (EIRR): The benefits and costs effect of the scheme alternative is the IRR. IRR is the rate of return in economic prices that would be achieved on all expenditures of the scheme. It was calculated through an iterative process by assuming different discount rates. The overall economic return on investment has been calculated at 22% interest rate. It has shown 22% for mountain and 21% for hill and Terai region. The effects of TB were measured in terms of values of marketing, agriculture input supply and farm field visit. The EIRR of similar infrastructure project were 19% and 17% for the Dolakha-Singati and Sindhulimadi-Bhimsensthan roads respectively (DRSP, 2013). This implies that EIRR is higher in TB scheme. Hence, the

investment in the TB project can be justified by the clear economic benefits resulting from its construction.

Economic Internal Rate of Return (EIRR): The benefit and costs effect of the project alternative is the Internal Rate of Return (IRR). IRR is the rate of return in economic prices that would be achieved on all expenditures of the project. It was calculated through an iterative process by assuming different discount rates. The overall economic return on investment has been calculated at 21% interest rate. It has shown 22% for mountain and 21% for hill and Terai region. The effect of TB were measured in terms of values of marketing, agriculture input supply and farm field visit. The EIRR of similar infrastructure project were 19% and 17% for the Dolakha-Singati and Sindhulimadi-Bhimsensthan roads respectively (DRSP, 2013). This implies that EIRR is higher in TB schemes. Hence, the investment in the TB schemes can be justified by the clear economic benefits resulting from its construction.

The economic effect of TB were measured in terms of values of marketing, agriculture input supply and farm field visit. There could be series of debatable assumption, however, economic evaluation of TB in this study tried to quantify the benefits. The investment in the TB can be justified by the clear economic benefits resulting from the construction of TB.

The relationship between calculated NPV and EIRR has shown in following figure 2.



The figure 2 shows that assumed discount rate of 8% has resulted Rs 4,213 million NPV which is not zero for IRR. The NPV will be zero only in 21 percent discount rate. Thus, IRR is 21%.

Supporting Appendices

Table 6: Per TB traveling cost by ecology and economic activities

Ecology	Activities	Person Per day visit	Visit frequency	Days	
				Without TB	With TB
Mountain	Marketing	33	12	37	23
	Agriculture input purchase	47	3	7	5
	Farmer land	47	10	16	11
	Total	127	25	60	39
Hill	Marketing	33	12	111	66
	Agriculture input purchase	47	3	11	6
	Farmer land	47	10	8	5
	Total	127	25	130	77
Terai	Marketing	22	12	142	83
	Agriculture input purchase	NA	3	15	10
	Farmer land	36	10	26	11
	Total	58	25	183	104

Table 7: Average (mean) Traveling Time Saved from TB (in min)

Ecological region	Mountains	Hills	Terai	Average
Market	17	27	36	26
Health	8	19	21	16
School	4	7	14	8
Agro-inputs	8	16	16	14
District HQ	55	44	35	45
Farm	5	3	16	7
Average	16	19	23	19

Table 8: The change in earnings of labourer in with and without project situation

Indicators	Labour	Wage Rate	Employment	Earnings	Change (2009-2013)
With Project	Skilled	Rs.533	45	Rs.24003	49%
	Unskilled	Rs.242	777	Rs.188353	
	Total		822	Rs.212,356	
Without Project	Skilled	Rs.173	45	Rs.7785	
	Unskilled	Rs.173	777	Rs.134421	
	Total		822	Rs.142,206	

Table 9: Average work days and earnings during TB construction by ethnicity

Ethnicity	Average no. of household members engaged	No. of person employed	Average days involved	Average earnings (NPR)
Dalit	1.45	133	29	7167
Janjati	1.63	370	34	11538
Brahmin/ Chhetry	1.25	314	26	8594
Other	1.20	5	56	17600
Total	1.45	822	30	9743