



► ILO Brief

June 2021


Strengthening the National Rural Transport Program (SNRTP) NEPAL:

Decent employment through maintenance first approach for better road connectivity



 <p>FUNDING Government of Nepal World Bank Total budget 175.4 m. ILO TA 10m</p>	 <p>DURATION 2014-2019</p>	 <p>COVERAGE 37 of 77 districts, 7 Provinces of Nepal (15.7M people)</p>
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FOCUS OUTCOME




Percentage of population within 2- and 4-hours walking distance in the participating Terai and Hill districts respectively from an all-weather road.

Percentage of core network roads in participating districts rated in "good" or "fair" condition

PROJECT CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS

-  1 No Poverty
-  2 Zero Hunger
-  3 Good Health and Well-being
-  5 Gender Equality
-  8 Decent Work and Economic Growth
-  9 Industry, Innovation, and Infrastructure
-  12 Responsible Consumption and Production
-  13 Climate Action

BENEFICIARIES / PARTNERS



Ministry of Federal Affairs and General Administration (MoFAGA)
Department of Local Infrastructure (DoLI)
7 Provincial Ministry of Physical Infrastructure Development (MoPID)
7 Provinces- Transport Infrastructure Department (TID)
20 Infrastructure Development Office (IDO)
15.7 Million population (Over half the population of the Country)

► Introduction

Nepal is a mountainous country with over 80% of population living in rural areas. Good and all-season road connectivity invariably determine the prosperity of a rural community. Poorly engineered road constructions, unstable local roads, low surface quality, inadequate drainage, absence of crossing structures, and significant environmental damage characterize transport infrastructure in rural Nepal. These aspects, combined with poor road maintenance, have resulted in an impediment to overall development, hindering economic growth and poverty reduction efforts. Rural communities, isolated during the rainy season between June–September due to inaccessible roads, have asked that roads be rehabilitated and accessible year-round. For this reason, local bodies have been giving higher priority to the upgrade of existing roads and the construction of new roads.



Condition of rural roads in Nepal

Bilateral donors have provided funds for investments in rural roads, especially in building new roads, often with maintenance responsibilities entrusted to the Government of Nepal (GoN). However, maintenance of rural roads has been characterized by insufficient funding and sporadic intervention, fixing major defects only when required. Previous efforts made by GoN and donor agencies to develop an effective maintenance system faced resistance due to the lack of (i) maintenance-specific funding; (ii) operation and maintenance policies; (iii) institutional capacity.

After observing this pattern, and the urgent need to develop a sustainable system to prioritize construction and rehabilitation of rural roads, the ILO funded and implemented a year-long pilot project, which provided useful lessons for the design of the Strengthening the National Rural Transport Program (SNRTP). Building on ILO's 40 years of expertise and experience in the implementation of rural roads interventions across the globe and on previous experiences in Nepal, the pilot project was implemented in five districts, successfully developing a sustainable and systematic asset management structure focused on maintaining the existing assets.

Implemented with the development objective of enhancing the availability and reliability of transport connectivity in 37 districts, the SNRTP benefited 15.7 million people, i.e., more than half the total population in Nepal. SNRTP's success was measured by two outcome indicators: (i) the percentage of population within 2-4 hours walking distance in the participating Terai and hill districts and (ii) the percentage of the core network roads in participating districts rated in 'good' or 'fair' condition. The project was funded by GoN and the World Bank, and implemented by the Ministry of Federal Affairs and General Administration (MoFAGA).

The 37 districts were divided into the eastern and western clusters, with a Senior Routine Maintenance Engineer (SRME), a Safety and Health Officer, and a Rural Transport Information Management System (RuTIMS) engineer in each cluster. At the district implementation level, the District Routine Maintenance Engineer (DRME) and District Routine Maintenance Sub Engineer (DRMSE) supported each Infrastructure Development Office (IDO).

During the project, the ILO assistance principally focused on periodic and routine maintenance of rural roads. Specifically, the ILO provided (i) technical assistance to MoFAGA in the development of effective systems for maintenance of rural roads, (ii) capacity building to staff in charge of road maintenance works, and (iii) implementation support during the introduction of new systems and procedures.

The rest of brief focuses on the description of SNRTP, its interventions and key achievements.

► ILO brief

Strengthening the National Rural Transport Program (SNRTP) NEPAL

► How the ILO employment intensive programs work?

Over the last 40 years the ILO's Employment Policy Department's Employment Intensive Investment Program (EIIP) has comprehensively integrated infrastructure development with creation of decent jobs, poverty reduction, and promoting local economic and social development. The ILO provides technical assistance (TA) to Governments in planning and delivery of the infrastructure investments following a participatory model where decent job and mitigating effects of climate change are integral to design and implementation. The EIIP strategizes promoting optimal use of local resources, locally available skills and work methods, locally sourced materials,

and appropriate technology in creating and maintaining climate resilient infrastructure.

EIIP interventions attain this while paying due regard to the agreed timeframe, budget, and engineering quality standards. It achieves this by strategically addressing and supporting pro-infrastructure national policies; assists in institutional development and capacity building of both the public sector (labour ministries, local governments, and communities) and private sector (local contractors); knowledge building and dissemination; and by providing the project with practical arrangements required for implementation.



Women Road Maintenance Group at work

Developing effective maintenance systems

A self-sustainable maintenance system was developed building on the existing GoN maintenance funding mechanism. The funding mechanism of SNRTP ensured that maintenance was an integral component of local infrastructure development. By integrating dedicated maintenance funding into the IDO's Annual Road Maintenance Plan (ARMP), regular maintenance became a non-negotiable pre-condition to upgrade any roads.

Based on the District Transport Master Plan (DTMP), the following criteria were developed to select roads for maintenance: the urgency of repairs, number of vehicles plying a road per hour, and the social and economic importance of a road. To further validate the criteria set in the ARMP, District Technical Offices responsible for the roads selected for maintenance were obliged to develop detailed project reports (DPR) and carry out surveys rigorously detailing the extent of damage and the existing road structure condition. This generated a change in the existing institutional practice where DPRs were rarely developed for routine maintenance.

Maintenance work was composed of

(i) Routine Maintenance+ Approach

Given the poor condition of roads and crossing structures, merely focusing on routine maintenance was not sufficient. Therefore, a 'routine maintenance+' approach was adopted. This approach was not limited to cleaning and clearing but also included:

- a. Recurrent maintenance: minor repairs of road surfaces and other components of the road structure, caused by traffic and rainfall.
- b. Specific maintenance: ad hoc improvements and repairs that are not carried out every year and that depend on the nature and location of the roads. This involves localized repairs and improvements to ensure the proper functioning of the different road components and reduce the need for routine and recurrent maintenance.
- c. Emergency maintenance: activities carried out due to unexpected and sudden blockage of roads due to natural disasters. The aim of emergency maintenance is to quickly reopen the road, restore vehicular traffic and protect the road from further damage. However, reinstating the damaged road to its original condition after completion of emergency maintenance works was not included under emergency maintenance.



Rural road maintenance carried out by RMG members



Maintenance works under SNRTP


A combination of labor intensive and performance-based maintenance was adopted to maintain the roads. The Road Maintenance Groups (RMGs) were selected based on the Road Maintenance Group Guidelines developed for the Department of Local Infrastructure (DoLI). The Guidelines comprehensively detailed: (i) the quality and number of km of roads to be maintained by each RMG member; (ii) the selection criteria for RMG and (iii) financing of rural roads maintenance. The guidelines showed that 1.5 km and 3 km of road lengths, in earthen/gravel and bituminous pavement were allocated respectively to each RMG. RMGs included a minimum of five members in each group, and the recruitment criteria gave priority to women, ethnic groups, Dalits, and disadvantaged people from rural communities along the road. The works were based on monthly work plans, and payments based on monthly inspection of the completed works. The performance-based indicators were developed keeping in mind the local skills level, farming tools and the condition of the roads. RMGs were paid based on the compliance with the performance indicators and not on the amount of work carried out or the amount of time spent achieving the task.

(ii) Periodic Maintenance



Periodic maintenance consisted of large-scale works carried out at four to five-year intervals, sub-contracted, and aimed at preserving the structural integrity of the road. This mainly involved activities aimed at rejuvenating the road surface and carrying out repairs over long stretches of road. Roads with gravel and bitumen surfaces were subjected to periodic maintenance. Earthen roads were subjected to maintenance only in areas where there were no gravel or bitumen roads. Prior to SNRTP, periodic maintenance was not considered a viable option for rural roads in Nepal. SNRTP was the first project that made maintenance a central component in preserving road assets and improving connectivity.



Maintained crossing structure.


 GOVERNMENT OF NEPAL
 MINISTRY OF FEDERAL AFFAIRS AND LOCAL DEVELOPMENT
 DEPARTMENT OF LOCAL INFRASTRUCTURE DEVELOPMENT
 AND AGRICULTURAL ROADS (DOLIDAR)

ROAD
MAINTENANCE
GROUPS (RMG)

GUIDELINES

MARCH, 2016

Routine Maintenance Guideline.

Cost-effective rural road maintenance

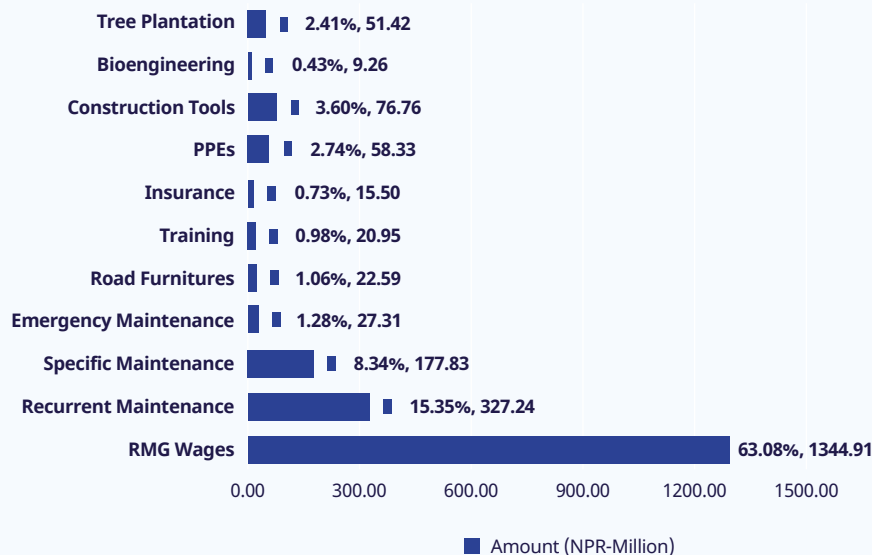
The program set a budget ceiling for periodic and routine maintenance. Additionally, it also identified a yearly minimum target of km to be maintained.

The yearly budget ceiling for routine maintenance+ was set to NPR 100,000 (USD 1,000¹) per km for roads in the Terai and NPR 132,000 (USD 1,320) per km for roads in the hills. The yearly minimum target was set to 150 km of roads maintained. By the end of the project the total expenditure on routine maintenance+ amounted to NPR 1,733.82 (USD 17.3) million – with an average expenditure per km per year of NPR 104,200 (USD 1,042). The monitoring of the costs of the maintenance works provided hard evidence that the intervention approaches were cost-effective and affordable in terms of managing the infrastructure assets in the rural road network. Analysis of the budget showed that a major portion of costs consisted of wage payments (63%), recurrent maintenance (15.35%), specific maintenance (8.34%), material costs (3.6%), and emergency maintenance (1.28%).

Similarly, a separate budget ceiling of NPR 1,136,000 (USD 11,360) per km in the Terai and NPR 1,200,000 (USD 12,000) per km in hill districts was set for periodic maintenance. Additionally, the budget ceiling for periodic maintenance of bridges was NPR 160,000 (USD 1,600) per m span in the Terai and NPR 180,000 (USD 1,800) per m span in the hill districts. The budget ceiling for causeways was set at NPR 480,000 (USD 4,800) and NPR 600,000 (USD 6,000) per m span for Terai and the hill districts, respectively.

Of the total expenditure on periodic maintenance, an average of NPR 762,000 (USD 7,620) per km was recorded in the Terai and NPR 849,400 (USD 8,494) per km in the hill districts.

► Figure 1. Cost breakdown



1 Conversion rate USD 1 = NPR 100

Technological innovations

Rural roads planning and management relied on unplanned surveys and outdated inventory of road assets, often leading to over- or under-budgeting of projects and overlapping between agencies. Additionally, contract management relied on limited staff to update the physical and financial progress of the project, leading to further delays in project completion.

The World Bank-funded Rural Access Improvement and Decentralization Project (RAIDP) initiated the digitization of road management systems. With lessons learnt from RAIDP, SNRTP developed the Rural Transport Information Management System (RuTIMS), a complete road database application for holistic planning, monitoring and management of rural transport infrastructure.

Rural Transport Information Management System (RuTIMS)

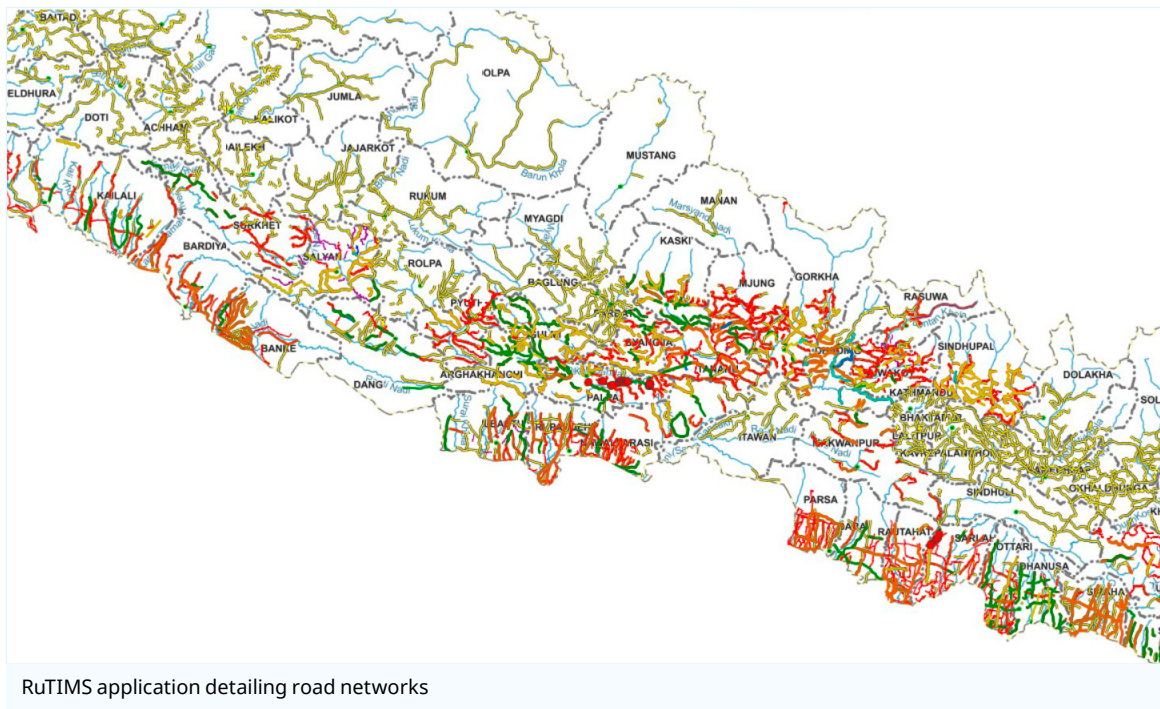
RuTIMS uses the Global Positioning System (GPS) and Geographic Information System (GIS) to locate and store data. The RuTIMS data repository integrated features include:

- ▶ Comprehensive rural road network data.
- ▶ Recording and managing rural road asset inventories: roads structure, condition, river-crossing structures, drainage, safety barriers and others road elements.
- ▶ Preparation and prioritization of Annual Road Maintenance Plans (ARMP) – including available budget projections, scope of the work for construction and maintenance works.
- ▶ Formats for auto-generating ARMPs according to IDO's needs.
- ▶ Contract management – physical and financial progress, milestones, payment certificates, variation orders, time extensions, and other features related to the status of contracts.
- ▶ Real-time monitoring – GPS recording and reporting of observations made by the project team.

The RuTIMS application aligned with the GoN's efforts to promote good governance and make infrastructure contract management transparent. Within SNRTP, it was a requirement for each participating district to prepare and upload their ARMP and contract information for all upgrading, periodic and routine maintenance contracts. Before awarding a contract each district uploaded information regarding the bidding documents, correspondence, payment certificates and bank guarantee; after the contract award they uploaded information on physical and financial progress, bill of quantities, milestones, interim payment certificates, variation orders, work schedules, and time extensions. Authorized personnel had access to relevant contract management information, necessary not only to ensure timely and efficient management, but also to provide planners with baseline information crucial for future planning and asset management. The tool also allowed the public to access information on district road network and ARMP, and had a detailed interactive road map which allowed users to toggle between various features and information on the map².

Over the project period, around 13,955 km (60%) of the road inventory in the participating districts were digitized in RuTIMS application. Additionally, to ensure the sustainability of the data repository, the application was handed over to DoLI. The successful establishment, implementation and sustainability of the system is validated by the fact that the RuTIMS system is being implemented in all infrastructure projects under MoFAGA.

² Accessible at: <http://rutims.aviyaan.com/>



Construction Site Monitoring (CSM)

Developed as a GPS-based, android version, mobile monitoring system within RuTIMS, Construction Site Monitoring (CSM) used smart phones and tablets to record monitoring observations under a predefined format. The users could feed in data including district name, road code, the category of their observation (i.e., road structure, type of road, location, type of ongoing road maintenance work), safeguards, occupational safety and health, and observation ratings. To validate the observations, users were also required to upload pictures or videos of the site condition. An additional feature of the application was its ability to save data offline without a network or data connectivity. Users could later log on to see their observations and edit reports through a computer, improving the quality of reporting and lessening the burden of completing reports while on site.

Accessibility to reports by the project management team and central project coordination unit accelerated the reporting time and rectified any non-compliance with the standards set in road maintenance. The detailed reports supplemented by pictures and videos

proved also to be an exceptional learning tool for the implementation team. Easy accessibility meant engineers and field staff were able to compare and share experiences on issues faced and implement solutions that were proven to be successful in other project districts.

In addition, the CSM was used as a performance tool by the project management team. The number of field visits for each user was recorded after the report was uploaded by the user. At the end of each month, an auto-generated report showed the number of site visits conducted by each user and accumulated district specific data on the number of site visits conducted by the specific district team. Performance of each district and more specifically of each individual team member was tracked through the CSM. At the end of the project, a total of 16,840 site visits were recorded in the system.

Construction Site Visit Report

Observer Name : Sumitra Rimal

Date : 2017-05-22

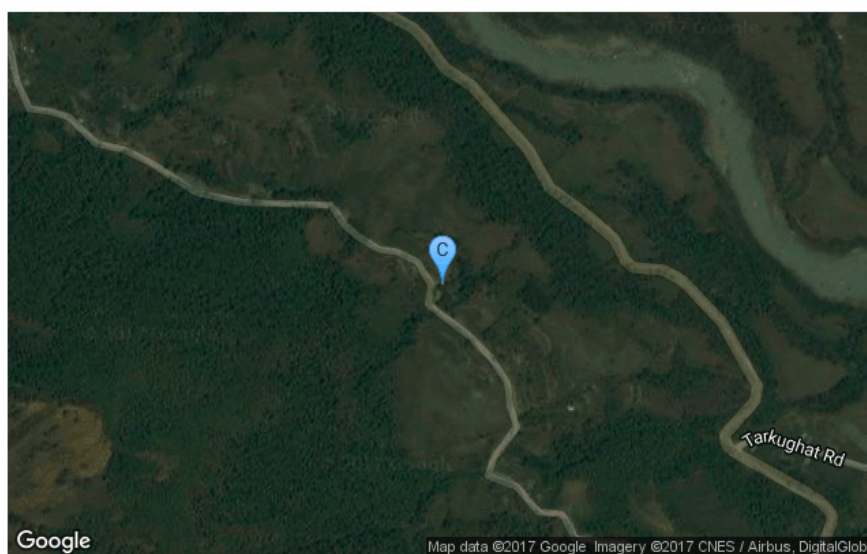
Designation : DRME

District : Tanahu

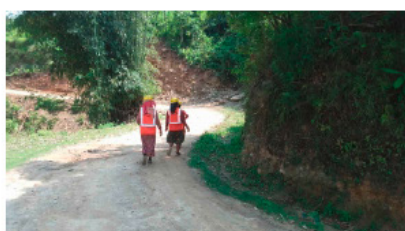
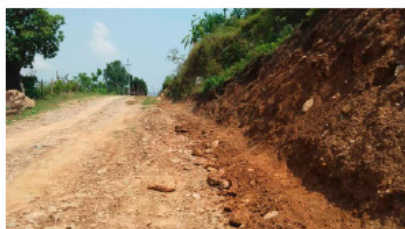
Road Code : 38A006R

Road Name : Kalimati-manechauka-risti-satrasaya-vyas

Observation 1



Observation Type	Routine Maintenance
Location Type	Point Location
Location	CH 3+200
Observation Notes	Preparation of side drain and maintainance of potholes
Observation Rating	Satisfactory
Co-ordinates Point (lat/long)	28.104928 / 84.432829
Elevation	617.500



Key ILO achievements

SNRTP surpassed the initial project target of maintaining 3,607 km of roads, under routine maintenance, within its first year of implementation. This target was eventually set at 5,500 km. By the end of the project, a total of 6,546 km were maintained under routine maintenance. Additionally, the initial target for maintenance of crossing structures was set at 4,000 m, while a total of 16,675 m were maintained by the end of the project. Similarly, under periodic maintenance, the initial target set at 1,400 km was surpassed and a total of 1,602 km of roads were maintained under periodic maintenance and 4,428 m of crossing structures were maintained with the initial target set at 4,427 m.

The section below highlights key ILO achievements.

Providing local employment and livelihoods through labor-intensive maintenance

The SNRTP's employment-intensive rural roads maintenance approach generated 5.5 million days of decent work by the end of the project cycle.

The SNRTP prioritized rural roads maintenance, making it the core of IDO's infrastructure works and ensuring this generation of long-term employment opportunities. Under routine maintenance, the RMG Guidelines developed for DoLI set a rigorous and systematic selection criterion targeting the most socially and economically vulnerable population, and women, especially single women living along the road. A total of 2,679 RMGs were recruited during the project period – 64% were women, of which 8% were single women; 36% male; 80% were from disadvantaged and vulnerable groups – of the disadvantaged groups 33% of RMG members were from Dalit communities.

In addition to prioritizing women, special work provisions were also made for people living with disabilities. By the end of the project cycle, people with different abilities (7) were among the RMGs recruited.

Contracted directly under the IDOs, each RMG was provided with the following provisions:

- (i) A steady average monthly wage of NPR 15,200 (USD 152), higher than the minimum national wage rate³.
- (ii) Identity cards recognizing them as employees of IDOs.

- (iii) Monthly wages deposited directly to individual bank account.

- (iv) Linkages to the nearest health posts or hospitals and a monthly routine health check-up.

- (v) Accident insurance of up to USD 5,000.

- (vi) Linkages with local transports for free bus services to and from work.

- (vii) Linkages to local financial institutions, banks and cooperatives.

The Environment and Social Management Framework (ESMF) and the contract document guided the contracting of petty contractors and recruitment of workers for periodic maintenance. Priority during the bidding period was given to local contractors and the budget ceiling provided encouraged the use of local resources. Similarly, petty contractors were encouraged to hire local laborer and prioritize women. By the end of the project cycle, 15% of workers were female and 40% of workforce were from local communities. Similar to the RMG workers, those recruited under petty contractors received wages higher than the district average rate, were insured under the accidental insurance of up to USD 5,000, were provided with first-aid boxes on each site and linked to the nearest health posts in case of emergencies.



RMG health checkup at health posts

³ Minimum wage set by MoLESS was NPR 13,400 (USD 134) in 2018

Enhancing livelihoods

Rural road connectivity is central to poverty alleviation in rural areas and is correlated to increased social well-being, increased income, access to health and nutrition, education and other services, improved food security and reduced vulnerability. SNRTP’s rural roads maintenance benefited 17.5 million people directly and indirectly, sustaining livelihoods and increasing their resilience to external shocks and stresses.

Directly, the project benefited 2,679 RMG members and their households. Each RMG member had an individual bank account and, additionally, 68% were linked to local cooperatives. Thanks to the training provided by the banks and cooperatives on savings, 80% of the RMG members had average individual savings of USD 6,000 in the bank or in local cooperatives; 30% were able to buy land with their savings; 45% sent children to government schools or private schools; 37% had toilet facilities; 13% were able to reconstruct their houses which were destroyed by the 2015 earthquake; 30% renovated their homes; 60% invested in animal husbandry or were able to start up a small business to support their family members.

Prioritizing decent work

Decent work employment conditions were further strengthened in the IDOs infrastructure project management and implementation through the SNRTP. To ensure its sustainability and implementation, the RMG and the Occupational Safety and Health (OSH) Guidelines developed for the IDOs systematically laid out decent work conditions at various stages of management and implementation of works.



45% of RMGs members were able to send their children to school with income earned through maintenance work



60% RMG members opened small businesses with saving from road maintenance.

Pioneer model in introducing occupational safety and health in infrastructure

The OSH Guidelines, developed for DoLI, primarily focused on safety and health in infrastructure in Nepal. The Guidelines were a pioneer in introducing a safety and health culture in the local infrastructure sector where this was previously neglected. The Guidelines were developed to cover all projects under DoLI and changed safety and health standards in rural road construction. The Guidelines provided for tripartite committees at Central, District and Project levels with distinct roles and accountability at each level.

SNRTP introduced OSH practices and standards similar to those followed by international bidders and large-scale infrastructures. The Guidelines set the following standards for the first time in the construction sector in Nepal:

(i) Contractors’ accountability for safe and healthy working conditions: the Guidelines made not just the principal contractors liable for safety and health but also ensured that petty and sub-contractors were equally liable for safety and health on site.

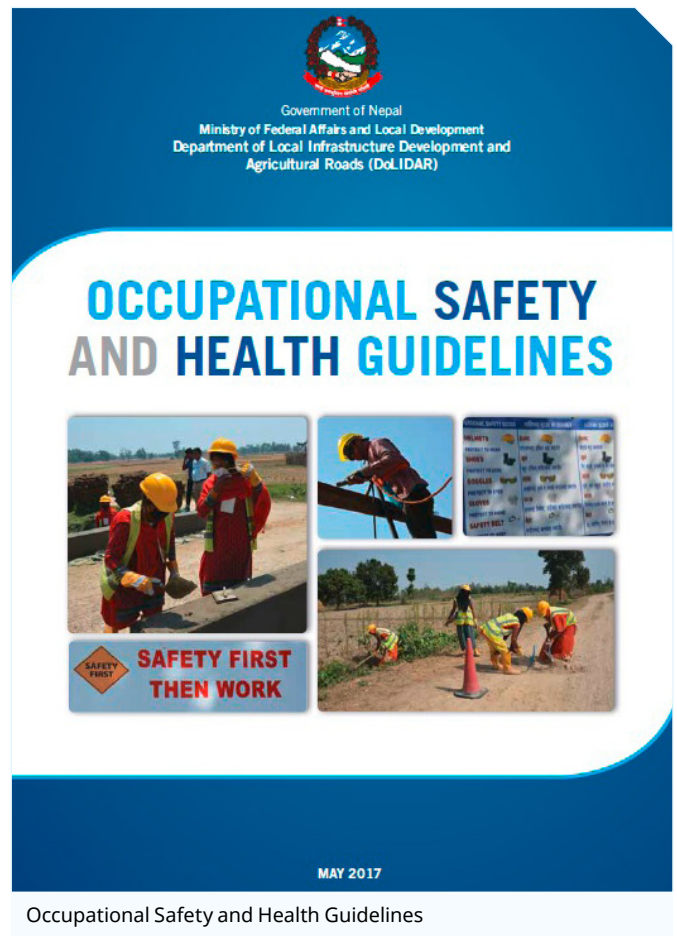
(ii) Safety and health prerequisites: similar to the financial prerequisites, a pre-qualification safety and health standards were set for contractors. Contractors mandatorily needed to include in their bidding documents their site safety plans and policy, OSH management plans, accident and incident records, emergency plans, and provisions for a dedicated OSH officer.

(iii) Bill of Quantities (BoQ) itemized: BoQ included an itemized budget for safety and health provisions for the contracts, which included but was not limited to labor camps, PPEs, insurance, etc.

(iv) Labor camp standards: standards for labor camps were developed and provided in BoQs, in line with the IFC/EBRD standards.

(v) Model bid document developed: bid document comprehensively provided details of the safety and health of workers at every stage of the work – provisions for prior planning for a safe and secure camp location; implementation of OSH guidelines and the Environment and Social Management Framework (ESMF); preparation of OSH management plan; accident insurance and first-aid provisions on site and in the camps to include emergency personnel, lifesaving equipment, emergency contact numbers; dedicated OSH personnel and periodical analysis of hazards on site.

(vi) Noncompliance penalty clause: 10% of the total amount of the penalty clause payable. This was also included in the contract document, where contractors were negligent towards safety and health standards on site.



OSH provisions in routine maintenance were covered by the budget provided to each district. This included (i) accident group insurance of up to USD 5,000, tools, PPE, traffic safety signs and training. As part of the recruitment process, each RMG member was oriented on OSH provisions provided within the project; PPE and its proper usage; first-aid kit and first-aid training provided by the Red Cross or local health clinics; emergency numbers and emergency personnel; linked to the nearest health posts; linked with the local transport; on-site orientation on the work in hand; proper usage of the tools and equipment provided to them; accident and incident recording and reporting; orientation on zero tolerance to harassment and bullying on site.

The systematic OSH approach set a standard for safety and health in infrastructure in the country and is being implemented in not just rural roads maintenance projects, but various Government Departments working on infrastructure development. Currently, the Department of Roads and the Department of Water Supply and Sewerage have developed Safety and Health Guidelines for their respective Departments.

Accident and incident working

A major achievement for SNRTP was developing and implementing a system of reporting and recording accidents and incidents. Prior to this, recording accidents and reporting on worksites were non-existent on construction sites. National data on accidents and incidents primarily centered on accidents in industries and recorded data only for major accidents or mortality. According to the Department of Labour and Occupational Safety (DoLOS), between 2004-2008, a total of 310 accidents and minor injuries were recorded across the country. The lack of reporting and recording can be attributed to the absence of a strong legal system and the notion of safety and health seen by employers as cumbersome.

Within the project, the DoLI OSH and RMG Guidelines both emphasized the need for, and provided RMGs with training on how to report and record accidents, incidents and near misses. During the project period a total of 375 on-site accidents were recorded on routine maintenance sites. Injuries were classified into minor injuries – those that were attended to with the first-aid kits present on site and did not need additional medical attention; and major injuries – those that needed further attention by a medical professional. Professional medical consultation and attention was sought for 50 accidents and a total of USD 4,690 was covered by the insurance for the major injuries. Accidents were not reported or recorded on periodic and upgrading sites, mainly due to the contractor’s unwillingness to report or record.

Additionally, the project also worked closely with the Ministry of Labour Employment and Social Security (MoLESS) in strengthening safety and health at work on a national level by:

- Forming a tripartite OSH committee at the national level
- Developing a National OSH Policy
- Fulfilling prerequisites to ratifying ILO Convention 155 on Occupational Safety and Health

Digital payment and link to financial institutions

A sustainable transparent wage payment system was developed through the project, with wage payments made directly into personal accounts. It was the first attempt in Nepal to establish such a system – i.e., directly transferring money into personal accounts. To ensure that individuals would not be requested to pay any fee to receive transfers, the SNRTP signed a Memorandum of Understanding with Mega Bank, or with partner banks in districts where Mega Bank was not operational. Mega Bank assisted in opening individual RMG bank accounts and additionally provided training and orientation on basic monetary transactions, i.e., cash withdrawal and deposits, savings, and loan application. Where ATMs were accessible, RMG members were provided with ATM cards and taught how to use them; where this was not possible, RMG members were taught how to write cheques and how to make deposits.

For most RMGs, this was the first time they were associated or had access to a financial institution, opened a bank account and, most importantly, had full access to their own finances.

Accident/Incident Recording (FY 2014 to 2019)

Types of injury	Number of injuries					Total insurance
	FY 2014-15	FY 2015-16	FY 2016-	FY 2017-18	FY 2018-19	
Minor injury	54	67	80	79	43	-
Major injury	1	9	14	16	18	USD 4,690
Total	55	76	95	96	53	375

Summary of recorded accidents

Additionally, SNRTP contributed to improve the financial literacy of RMGs. 80% of them are members of a local cooperative, with an average saving of USD 6,000 in different banks and financial institutions.



RMG member withdrawing monthly wage through personal bank account.

Mainstreaming gender and social inclusion in transport

The project prioritized recruiting women in the RMG. A target of not less than 60% (i.e., 100% more than the national inclusion rate⁴) in each district was set in the project design and recruitment procedures included in the RMG Guidelines.

The Guidelines, in its recruitment scoring process, clearly identified and prioritized women, and more specifically single women. The socio-economic status of single women is low in Nepal. Often marginalized by society, cultural practices put additional strains on them, often preventing them from public participation, increasing their economic dependency on the extended family and, eventually, making them vulnerable.

During the notification and awareness stages of recruitment, local women's groups and social groups were involved to ensure women, and especially single women, were aware of the opportunities and aided during the recruitment process. Districts where the percentage of women fell below 60% were asked to repeat their recruitment process, until the target was met. By the end of the project, 64% of the total RMG members were women, of which 8% were single women. More significantly, 788 km (12%) of the total length of

roads under routine maintenance+ was maintained by women-only RMGs.

To ensure women RMGs' operations without affecting personal and domestic responsibilities, the following provisions were included in the RMG Guidelines:

- The work plan developed at the beginning of the month stated the workdays, type of work, quantity, and quality of work for the month. Flexibility on work time was given to RMG members. This ensured that female RMG members had the option to change the time of their work based on their needs and domestic chores. Flexibility was particularly helpful given that Summer temperatures reach 45°C in the Terai districts and below 0°C in the Winter in the hill districts.
- RMGs had the opportunity to substitute weekdays with weekends to attend haat bazars, religious or cultural functions.
- Mandatory representation of women RMGs in the RMG group leadership positions.
- In cases where, due to unforeseen circumstances, an RMG member would have not been able to continue work or needed a few days off, priority for a substitute RMG was given to a family member of the RMG, including a male member of the family-based on prior approval from IDOs. This proved valuable especially in cases where an RMG member got pregnant or had to aid for a sick family member. In such cases, the RMG member had the assurance that a steady source of income was not going to be lost.

► My earnings from SNRTP have been a blessing. As a single mother, the last 12 years has been difficult. People would refuse to give me work or loan money, I could barely make ends meet. Now I can easily afford to send my daughter to school as well as support us both. A steady monthly income has also meant that shopkeepers now extend credit.

► **Kumari Thapa, RMG member**

⁴ Nepal's Constitution states 33% of women's inclusion in all forms of work

In Nepal, women are twice more likely than men not to have any form of legal identification. While ensuring that female applicants were maximized during the recruitment phase, DRME/DRMSE assisted RMG members, in coordination with the District Administrations, in acquiring their citizenship certificate⁵. With a form of legal identity, all RMG members were able to open their own individual bank accounts and were linked to cooperatives and other financial institutions. Financial literacy training was provided through banks and cooperatives and a saving culture was developed. Training and orientation were also provided on menstrual health and especially on clean and hygienic practices of sanitary towel disposal while on site.

Promoting women engineers

In Nepal and elsewhere in Asia, engineering is a male-dominated field. In 2011, women represented only 3% of the total workforce in the engineering service of public administration.⁶ In 2018, only 3.1% of the total number of engineering students were women, based on a World Bank study of five academic institutions⁷. Among the various branches of engineering, civil engineering is the preferred option for women. Cumulative data on women engineers registered with the Nepal Engineering Council between 2001 and 2017 showed that over 55% of all women engineers are civil engineers. However, once they graduate, most women engineers are restricted by their family and bad social reputations when taking up jobs involving fieldwork, that require long distance travel, residing in rural areas for project implementation and overnight stays. Additionally, since fieldwork is not seen as reputable for women, and since they are considered unfit for fieldwork by their male counterparts, most women engineers seek jobs in urban areas.⁸

To promote and encourage women engineers, the project at its initial stages aimed at recruiting 20% of women engineers in the team; by the end of the project, 14.2% of the engineers and sub-engineers involved in supervision of the maintenance works were women. To ensure these women were retained, during the recruitment process women engineers were given the opportunity to select the district of their choice – choices were often made based on proximity to their homes, a family member living in the district, or a neighboring district.

Given the nature of the job, entailing long distance travel between worksites, each district was provided with a two-wheeler so the staff could commute between worksites; women engineers/sub-engineers were provided with a scooter, instead of a motorbike. In the hill districts, each woman engineer was paired with a male sub-engineer given the rough terrain and the limitations posed by the scooters.

To ensure their safety on site and in the workplace, district teams – including government counterparts – were provided each year with training and awareness sessions on harassment in the workplace. Furthermore, engineers were asked to report any cases of harassment to the Senior Routine Maintenance Engineer (SRME), Project Coordinator or the OSH Officer, through an open channel for communication.



SNRTP encouraged me to do my best. SNRTP focused on hiring female engineers encouraging women engineers to pursue their careers and not be afraid. More importantly it has shown people who think women should not study engineering or become engineers that women can become engineers and gender does not limit us.

► **Sunita Bhandari, DRMSE**

5 23.65% of the population in Nepal above the age of 16 do not have a citizenship certificate based on a study conducted by Forum for Women Law and Development (FWLD) in 2011.

6 Janwillem Liebrand & Pranita Bhushan Udas (2017) Becoming an Engineer or a Lady Engineer: Exploring Professional Performance and Masculinity in Nepal's Department of Irrigation, Engineering Studies, 9:2, 120-139, DOI: 10.1080/19378629.2017.1345915

7 <https://thedocs.worldbank.org/en/doc/971721573811319478-0310022019/render/WePOWERRegionalReportPrint.pdf>

8 Janwillem Liebrand & Pranita Bhushan Udas (2017) Becoming an Engineer or a Lady Engineer: Exploring Professional Performance and Masculinity in Nepal's Department of Irrigation, Engineering Studies, 9:2, 120-139, DOI: 10.1080/19378629.2017.1345915 <http://dx.doi.org/10.1080/19378629.2017.1345915>



SNRTP women engineers

Institutional strengthening

The quality of rural roads in Nepal is inseparably linked to the strength of the district-level institutions – IDOs. Overwhelmed, under-resourced and with high capacity constraints, managing and planning rural transport infrastructure was a daunting task for the IDOs.

The ILO recruited a DRME and DRMSE to assist the IDOs in the daily functioning and monitoring of road maintenance. Institutional strengthening within the project took a holistic approach and was not limited to the government bodies. Capacity building and training were also provided to contractors, petty contractors, RMG members.

Government: DRME/DRMSEs stationed in each IDO not only assisted in the monitoring and reporting of maintenance activities, they also assisted the IDOs in adapting to the innovative technologies introduced. DRME/DRMSE assisted the IDOs in preparing bid documents, preparing evaluation reports, quality assurance and project completion reports, and assisted in updating the RuTIMS systems

Additionally, all 37 project districts were provided with laboratory facilities and equipment. The SNRTP also supported the cost of a full-time laboratory technician and an assistant. Training for the lab technicians to enable them to operate the laboratory in an effective manner was provided. This enabled test reports to be documented and attached to the payment certificates.

Capacity building training were organized in several ways, depending on the audience, training needs and subject. These included classroom training, workshops, study tours, practical sessions at the work sites as well as the on-the-job training provided by the technical assistance staff. Training providers were sourced from within and outside the country – such as the Indian Academy of Highway Engineers, the International

Training Centre of the ILO in Turin, the Institute of Engineering, Pulchowk Campus, and the Asian Institute of Technology in Thailand. Over the course of the project 20 training courses were provided to the SNRTP team which benefited 328 SNRTP team, i.e., Government, consultants, and the ILO team.



SNRTP team training in IAHE India

Contractors: More than 80 contractors were provided training on contract management, decent work conditions and occupational safety and health. Contractors were oriented to their responsibility towards providing a safe and healthy environment to their employees as specified in the national laws and contract documents. Regular onsite orientation and training were provided to site supervisors and site engineers on safety and health management on site.

RMG capacity training: Recruitment of RMGs included orientation and training which involved basic concepts of maintenance, maintenance activities, work methods, inspection and payment arrangements, safety, health on site and zero tolerance to harassment on site. First-aid training was provided in collaboration with the Red Cross Society and the local hospitals or health posts. Refresher training was continuously provided by DRME/DRMSE throughout the year.

To enhance the skills of the RMGs and not limit them to maintenance work, masonry and concrete work, repair and improving basic structures and painting the kilometer posts were also encouraged. These important skills have been beneficial in efforts to keep rural roads open throughout the year.

Additionally, all RMG members were provided with basic financial literacy where the banks and cooperatives provided training on saving, loan application and investments.



First aid training provided by Red cross to RMG members.

Bio-engineering

The most important aspect of maintaining roads in the hilly terrains is the use of scale of vegetation cover. The roadside bio-engineering is not only important for slope protection, soil erosion and landslides, but it also incorporates productive plants to become a part of the neighboring agricultural system.

Bio-engineering work was a part of routine and periodic maintenance. More roadside plantation was done in the Terai for environmental protection and livelihood promotion. Agreements between RMGs, IDOs and Village Development Committees allowed the RMG to receive a 60% share of future income from fruit and timber, with 40% assigned to respective local level authorities. Similarly, grass planting, brush layering, palisades, check dams, fascines, and tree planting were undertaken on barren hill slopes and in landslide-prone areas. A total of 84,672 trees were planted with bio-engineering works carried out on 162,294 sq m to stabilize side slopes. Additionally, turfing and grass/shrub planting for slope stabilization covered 273,560 sq m. Some 59,042 trees were planted as compensatory planting against the loss of 1,531 trees during the construction works, while 13,528 trees were planted for enhancement purposes.



Bio-engineering work for slope stability.

Monitoring

Pioneering systems and tools were developed and used for monitoring at different levels of the project. Each system and tool developed were initially piloted during the initial phases and implemented throughout the project districts.

RuTIMS and CSM: The ICT-based RuTIMS and CSM monitoring systems were an integral part of the planning and monitoring mechanism of the IDOs. RuTIMS was integrated into the project management cycle for each participating district to prepare and upload their ARMP and contract information for all upgrading and periodic maintenance contracts. The system made monitoring contract progress, delays, and irregularities accessible and transparent to DoLI and provincial IDOs, allowing for smoother contract management at all levels, and ensuring immediate action was taken and transparency provided throughout the system. At the central level DoLI monitored annual plans, the budget was set out for each year and the progress of each individual project implemented at the provincial levels. Similarly, the system also proved to be a useful learning tool, replicating efficient budgeting, formulating annual plans and project management practices across the project districts. Currently with the successful implementation under SNRTP, DoLI has implemented the system in all its projects throughout the country.

Daily real-time monitoring of roads through RuTIMS and CSM were the backbone to the monitoring system for the project. Each observation was recorded in audio, video and/or still-picture format. Accessibility of each individual road to the project management offices and central project coordination team made monitoring, tracking of progress, and especially taking immediate remedial actions on quality of works, social and environmental safeguards, highly efficient. The quality of works was measured against the standards set out in the RMG and OSH Guidelines. The daily record of the progress and issues faced also proved as an efficient learning tool, where teams from different districts were able to compare similar situations and replicate innovative practices.

A total of 16,840 site visit reports have been uploaded in CSM, making it the largest repository of rural road maintenance data in the country.

Jointly the RuTIMS and CSM system has proved a pioneering data repository tool with detailed breakdown on the cost of each item used in the process of maintaining rural roads in the country. Additionally, the data available has made it easier to analyze and develop further cost-effective EIIP programs in Nigeria and Papua New Guinea.



Making rural roads accessible

Technical Audits: Expenditure limits for routine and periodic maintenance was introduced through the Maintenance Performance Indicators (MPIs). To further ensure quality and transparency, for the first time in Nepal, independent technical audits for routine and periodic maintenance were made mandatory through the National Vigilance Center (NVC) auditors. The NVC prior to this was not mobilized for periodic or routine maintenance roads but focused only on upgrading roads. A comprehensive technical quality assessment tool was developed by the ILO for the quarterly NVC audits, in line with the quality predefined in the Routine Maintenance Guidelines and Occupational Safety and Health Guidelines.

The audit criteria were similar to the ones related to roads upgrade, where noncompliance to the standards were to be rectified within the timeframe stipulated by the auditor. Where districts failed to rectify the noncompliance within the stipulated timeframe, the matter was further investigated by the Commission for the Investigation of Abuse of Authority (CIAA), under the recommendation of NVC.

This ensured and promoted uniformity on the quality of rural roads maintenance across all 37 project districts. It also contributed to ensure accountability of authorities. A total of 700 routine maintenance and 14 periodic maintenance projects were audited by NVC.

Grievance Redressal Mechanism: A web- and telecommunication-based grievance redressal mechanism (GRM) was designed and developed in line with the Environment and Social Monitoring Framework (ESMF). The GRM gave a prompt, easy to understand, consistent and respectful mechanism to support the receiving, investigation, and response to complaints or grievances from community and stakeholders. It ensured proper documentation of complaints or

grievances and corrective action to be taken. It also contributed to continuous improvement in performance of SNRTP through the analysis of trends and lessons learned.

Altogether, 1,623 grievances were recorded under (i) social: missing plot, protection wall for private structure, delayed VCDP/GAP, lower assistance, error in cadastral survey; (ii) environment: soil disposal and garbage management, dust pollution, public utilities, retaining wall to public utilities, borrow pit, landslides; (iii) technical: construction of minor structure for protection (wall, drainage), quality of road and materials, ratio of mortar; alignment of road, location of crossing structures; delay of civil works. By the end of project period, all 1,623 grievances (100%) were resolved.

Lessons learnt

Project Strategy

The ILO's pilot project prior to SNRTP proved advantageous in the design and implementation of the project. The systematic use of established planning procedures, which were well described in the project document and operations manual, and others developed during the project, resulted in planning and management practices that made the transition of the management responsibilities from the districts to the provinces easier.

Maintenance+ approach

Various attempts and demonstrations have been carried out in the past to establish sound maintenance arrangements for rural roads. The SNRTP, with Technical Assistance (TA) from the ILO, managed to establish a systematic approach to the maintenance of core district roads covering 37 districts, i.e., more than half of the districts in Nepal.

The maintenance-first approach of the SNRTP proved that sound asset management principles are also helpful to manage rural roads in Nepal. Within the limits of the prescribed budget ceilings, it was possible to carry out a maintenance+ approach, in which standard engineering features – such as side drains, crossing structures, retaining walls, bioengineering, slope protection, road furniture (kilometer posts, traffic signs, sign boards, delineator posts), and other critical elements – have been added to selected roads in poor condition. This has proven to be a realistic and successful approach to the maintenance task considering the poor condition of many roads. It has resulted in significant connectivity gains with comparably small investments.

Routine Maintenance by RMGs

The mobilization of RMGs and their distribution along the roads selected for maintenance was not only sufficient to meet the routine maintenance demands but it also allowed to address (i) the maintenance backlogs and (ii) maintenance+ activities. The SNRTP provided good evidence of how routine maintenance can be organized in an effective manner, which is affordable to the government and the local authorities in charge of the upkeep of local roads. Considering the average costs of routine maintenance, the RMGs played an important role in the efficient preservation of rural roads and to some extent in the improvement of many rural roads.

The performance of the RMGs has proven that they are well motivated for their work and that they can have a significant impact on the condition of the roads even with limited inputs of materials and equipment. Additionally, clear selection criteria proved crucial in order to achieve desired levels of inclusiveness and gender balance during recruitment. Without these criteria, the risk of political involvement and undue privileges for certain groups would have been high.

Improved livelihoods of the maintenance workers

At the beginning of the project, most were hesitant to sign up as maintenance workers during the recruitment phase, due to lack of knowledge of what it involved. With collaboration from local bodies and grassroots organizations in recruiting and educating on the importance of maintenance, SNRTP directly benefited 2,679 RMGs and their families, improving their socio-economic status. Monthly income, above the national average, gave the RMGs a steady source to provide for their families. With access to financial institutions, for the first time RMGs were able to develop a savings culture and had access to loans through formal channels and did not have to rely on moneylenders. They were better able to provide for their families by sending their children to school, or starting up small businesses and husbandry for their family members as an additional source of income. The most notable outcome of the RMGs members has been the ability to rebuild their houses after the 2015 earthquake with the savings from their wages.

Cost of Road Maintenance

Close monitoring of the costs of the maintenance works has provided hard evidence that the intervention approaches were cost-effective and affordable in terms of managing the infrastructure assets in the rural road network. The monitoring of expenditure on maintenance was carried out with a high level of detail providing good knowledge and reliable cost estimates for road maintenance. These detailed expenditure data

from the SNRTP can be used for planning and estimating future maintenance works.

Not only does the costs of the maintenance works appear competitive when compared to other countries where such data is available, the data also clearly shows that the cost of the safeguard measures, such as PPE, insurance of workers, first aid, etc., constitute a minor portion of the maintenance expenditure. These figures also confirm that the mobilization of RMGs is a cost-effective approach for the provision of routine maintenance.



Training on contract management, dispute resolution and arbitration in rural roads

Safeguards in Road Infrastructure

The SNRTP has been a pioneer in terms of securing decent conditions of employment for the maintenance workers. The project has been a ground breaker in introducing a systematic approach to occupational safety and health practices, which have been eventually applied in all road work activities throughout the country. Providing decent working conditions is a priority in general for the government, however there are many challenges related to the implementation intention of such policies. With the ILO involvement, it has been possible to use the SNRTP as a vehicle for implementing the decent work aspirations of the government. This is also proof of the fact that it is possible to establish high standards of conditions of employment with limited additional inputs.

Institutional Capacity Building

At the start of the SNRTP, the responsibility for rural road works was vested in the IDOs which possessed varying implementation capacity. With frequent transfers of staff at central and local level, the reorganization of local government into federal entities that posed the largest challenge affected the implementation of works activities.

The capacity development efforts then had to be re-directed to the new IDOs of the provincial administrations. However, with adequate resources both at local and central level, the ILO proved capable of adjusting to changing demands, such as the change in government structures, the difficulties resulting from the earthquakes and during periods of political unrest. This ability to adjust to the changing environment is credited to having clear operational procedures and sufficient staff posted where work operations took place, thereby being able to implement changes in implementation arrangements in a timely manner.

Improved rural access for the ultimate beneficiaries

Improved all-year-round rural roads access benefited 15.7 million people in Nepal. Investment in maintenance not only ensured employment generation but more importantly rural connectivity ensured economic growth, access to markets, social and economic services and emergency assistance to the ultimate beneficiaries in the 37 SNTP districts. Previously, one third of the population in the hilly areas had to walk for more than four hours to reach an All-Season road. With regular maintenance, the travel time was reduced to almost half saving both travel and vehicle maintenance costs. The sustainable and cost-effective system developed through the SNRTP for the IDOs for maintaining roads has been validated and adopted by Provincial governments. With the adoption of the maintenance system, districts not previously covered in SNRTP rural roads in Nepal will be accessible throughout the year.



Improved rural roads