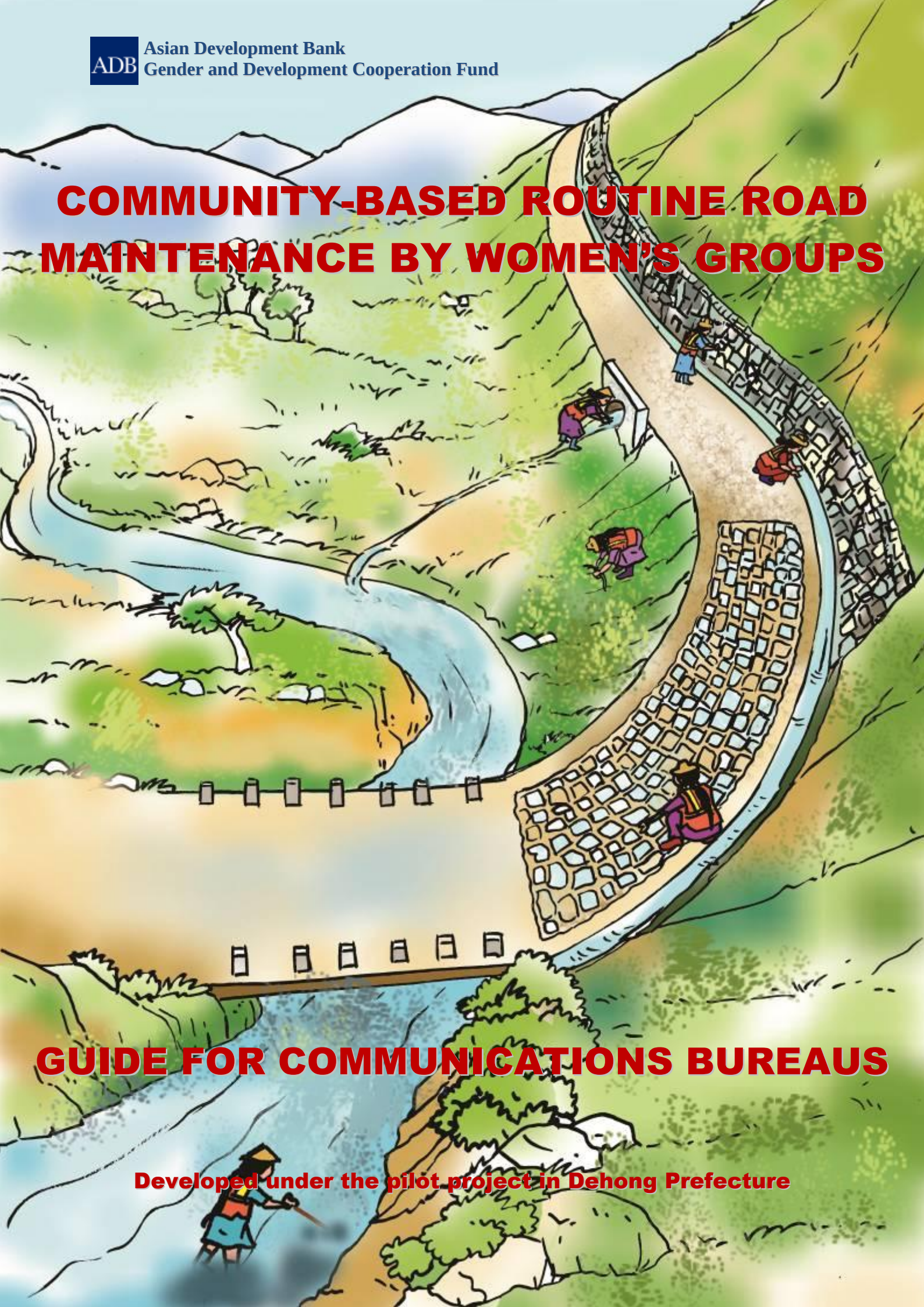
Asian Development Bank
Gender and Development Cooperation Fund

COMMUNITY-BASED ROUTINE ROAD MAINTENANCE BY WOMEN'S GROUPS



GUIDE FOR COMMUNICATIONS BUREAUS

Developed under the pilot project in Dehong Prefecture

CONTENTS

Currency unit

(as of 8 November 2010)

Currency Unit	–	yuan (CNY)
CNY1.00	=	$0.150
$1.00	=	CNY6.656

Weights and measures

cm	–	centimeter
m	–	meter
m^2	–	square meter
m^3	–	cubic meter

Acronyms

ADB	-	Asian Development Bank
DPCB	-	Dehong Prefecture Communications Bureau
DPWC	-	Dehong Prefecture Women's Committee
DPWF	-	Dehong Prefecture Women's Federation
EAOD	-	Office of the Director General. EARD
EARD	-	East Asia Department
EATC	-	East Asia Transport Division
GDCF	-	Gender and Development Cooperation Fund
RSGS	-	Poverty Reduction, Gender, and Social Development Division
YPDOT	-	Yunnan Provincial Department of Transport

FOREWORD

The physical condition of roads is critical to any transportation network. However, unless roads are adequately maintained, they inevitably deteriorate, leading to higher road user costs and slower travel times. When simple routine maintenance is postponed for long periods, there is often a need for more extensive rehabilitation, which is much more costly.

Routine maintenance is often delayed due to various factors, such as lack of funds or insufficient technical knowledge.

The purpose of this guide is to assist prefectural and county communications bureaus in Yunnan Province, People's Republic of China, in managing and implementing the routine maintenance of unpaved township and village roads.

The guide is the outcome of a pilot project on Community-Based Routine Road Maintenance by Women's Groups that was financed by the Gender and Development Cooperation Fund at the Asian Development Bank (ADB). The pilot project sought to involve women and other vulnerable populations (such as indigenous minorities) in rural road maintenance projects, both to undertake badly needed improvements in rural roads, and also to provide employment opportunities for women and minorities. The guide explains the organization, training, and contracting of community-based groups for routine maintenance of roads in rural areas, using as an example the maintenance work carried out by women's groups under the pilot project in Dehong Prefecture, Yunnan Province.

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According to 2008 road data, there are 99,080 kilometers (km) of township roads and 33,406 km of village roads in Yunnan Province. Of these roads, less than 4% have either concrete or (simple) asphalt pavement while just over 96% are classified as unpaved, including 3% with stone-paved surfaces, 43% with gravel surfaces (including 47% of township roads and 28% of village roads), and 51% with earthen surfaces (45% of township roads and 67% of village roads). The unpaved township and village roads amount to 127,275 km and, as such, comprise 62% of the total road network in Yunnan. The maintenance of these unpaved roads is therefore very important for ensuring continued access for the province's rural areas and economic development in these areas. Many roads are currently impassable for a number of months each year, in part due to a lack of timely maintenance. This chapter will look at the deterioration process of these unpaved roads, identifying a suitable maintenance strategy to address this deterioration and to ensure better road conditions and more continuous access.

ROAD DETERIORATION

Roads deteriorate over time, mainly through the forces of water and traffic. Of these two, water is by far the most important, especially for unpaved roads. Water can cause damage through erosion, where the flow of water removes material, resulting in rills in the road surface, cuts in the road shoulder, gullies in the drainage system, and undermining of the road structures. However, stagnant water can also cause damage by penetrating the road surface, road base, and slopes, resulting in potholes and muddy areas, slumping and landslides, or collapse of the road. Traffic also causes road deterioration through material loss and road deformation as a result of the forces of the tires, resulting in ruts, potholes and corrugations. These two causes of road deterioration aggravate each other, as a road weakened by water is more susceptible to damage by vehicles, and a road surface deformed by vehicles can prevent water from leaving the road, leading to increased erosion and weakening of the road.

Such road deterioration is generally slow at first (phase A in Figure 1), as the conditions of the road are generally good just after construction or rehabilitation. The road surface is not yet deformed and allows the water to easily flow off the road, and the drainage system is working properly and safely guides the water away from the road. With time, however, isolated damage to the road will start to appear, as a result of general wear and tear and minor damage to the road. Deformation of the road surface by traffic appears in the form of potholes and ruts, and the drainage system may become partially blocked, limiting its ability to safely guide the water away from the road. During this initial deterioration phase, however, the road still appears to be in good condition and the road user tends not to notice the deterioration despite the gradual increase in isolated minor failures. As a result, the deterioration may remain unchecked in this phase.

As such minor failures become more numerous and serious, the deterioration tends to increase in speed (phase B in Figure 1), mainly due to water flowing over the road or remaining on the road. The deformation of the road surface prevents the water from flowing off the road and causes it to flow over the road causing erosion, resulting in rills and exposing the road base. This is worsened by blockage of the drainage system, which is no longer able to guide the water safely away from the road, and causes the water to flow over the road. Potholes cause water to remain on the road surface, weakening the road surface and road base, making it more susceptible to damage by vehicles. The foundations of road structures such as headwalls and retaining walls also become affected, leading to their possible collapse. Although the damage to the road is very localized at the beginning of this phase, it spreads until the entire road can be said to be in poor condition. During this phase, the road becomes more difficult to pass and travel times and costs tend to increase significantly.

Once the road condition has become very poor, the deterioration tends to decrease in speed (phase C in Figure 1), as traffic levels go down severely and because there is little left to deteriorate. At the end of this final stage of deterioration, the road becomes impassable and traffic ceases altogether.

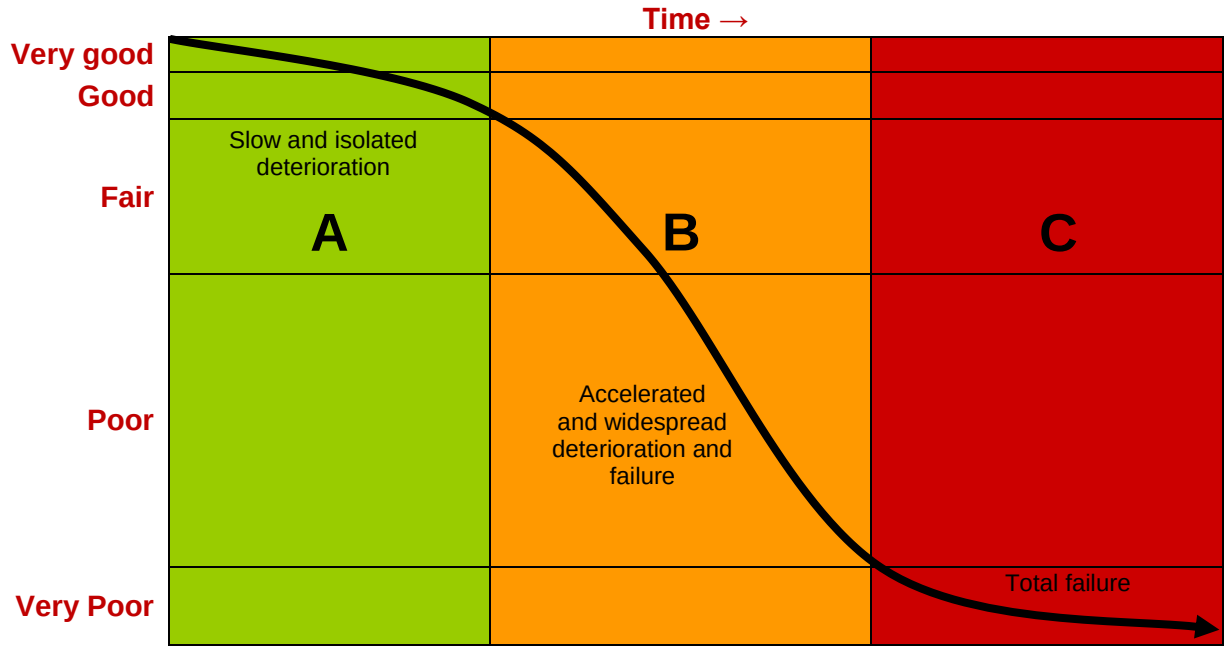

Figure 1: Road Deterioration

ROAD MAINTENANCE

To counter the deterioration process, road maintenance is carried out. One type of maintenance, corrective maintenance, is aimed at repairing the damage that has occurred. Repairs are made to the road surface and shoulder, the drainage system, and the road structures, generally resulting in the road being brought back to a good condition. The improved road conditions result in lower travel times and costs, and a decreased deterioration speed as the deterioration process starts from scratch. The more deteriorated the road is, the more intensive and thus costly the required repairs will be. Corrective maintenance when the road is still in fair condition may entail patching of potholes, reformation of the road surface, and minor repairs to the drainage system and road structures (arrow 1 in Figure 2). If the road has already deteriorated to a poor condition, the corrective maintenance will include complete resurfacing of large stretches of road, replacement or reconstruction of the drainage system and road structures, and possible reconstruction of the road base (arrow 2 in Figure 2). Depending on the type of activities required, such maintenance is generally referred to as periodic maintenance (medium maintenance) or rehabilitation (major maintenance).

The distance from the black line indicating the road condition, to the desired good or very good condition is therefore indicative of the level of corrective maintenance required, and thus the cost of such maintenance. After having been brought back to good condition, the deterioration process starts anew (arrow 3 in Figure 2) and corrective maintenance therefore needs to be carried out repeatedly. Although corrective maintenance carried out when the road is still in fair condition will have to be repeated more frequently, this results in lower overall maintenance costs and better overall road conditions than waiting until the road has deteriorated to a poor condition.

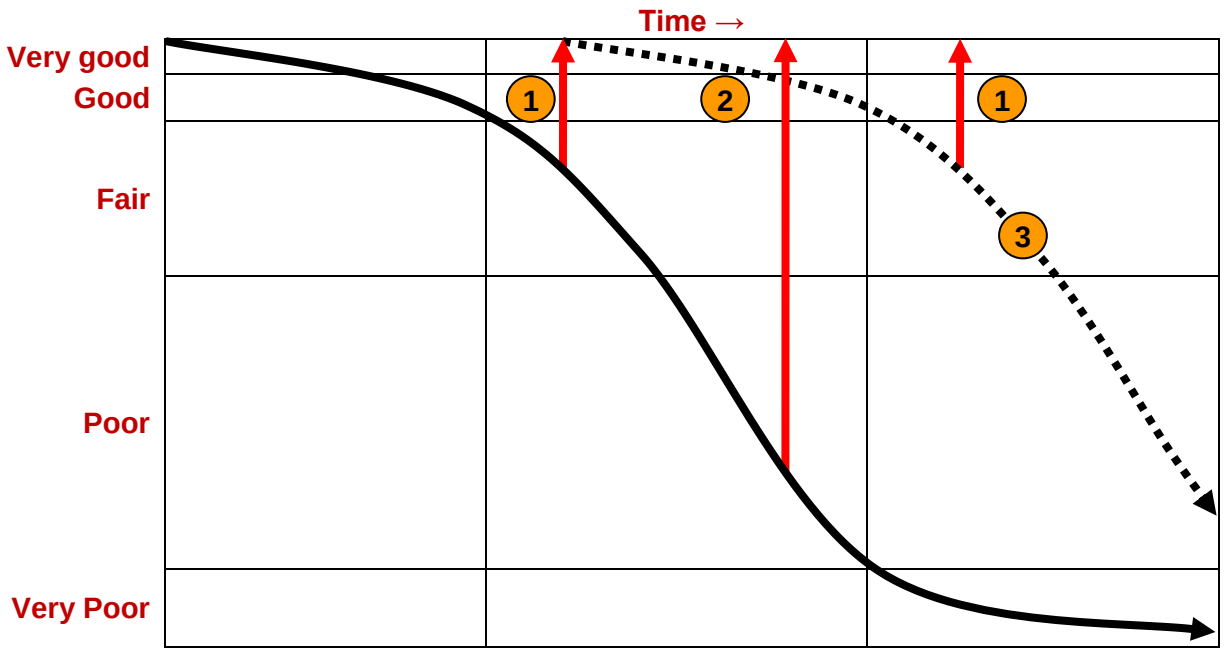

Figure 2: Corrective Maintenance

Apart from carrying out corrective maintenance once the road has already deteriorated, it is also possible to carry out preventive maintenance aimed at stopping or slowing down the deterioration of the road. Such preventive maintenance is generally carried out on a continuous basis throughout the year to ensure effective and timely response to maintenance needs in order to avoid (further) damage to the road, and is generally referred to as routine maintenance (minor maintenance). A significant part of preventive maintenance consists of the cleaning and clearing of the different road elements to ensure they work properly, especially the road protection measures such as the drainage system, in order to avoid damage by water. As a result of such preventive maintenance measures, the deterioration process is slowed down considerably, as can be seen in Figure 3 (arrow 4).

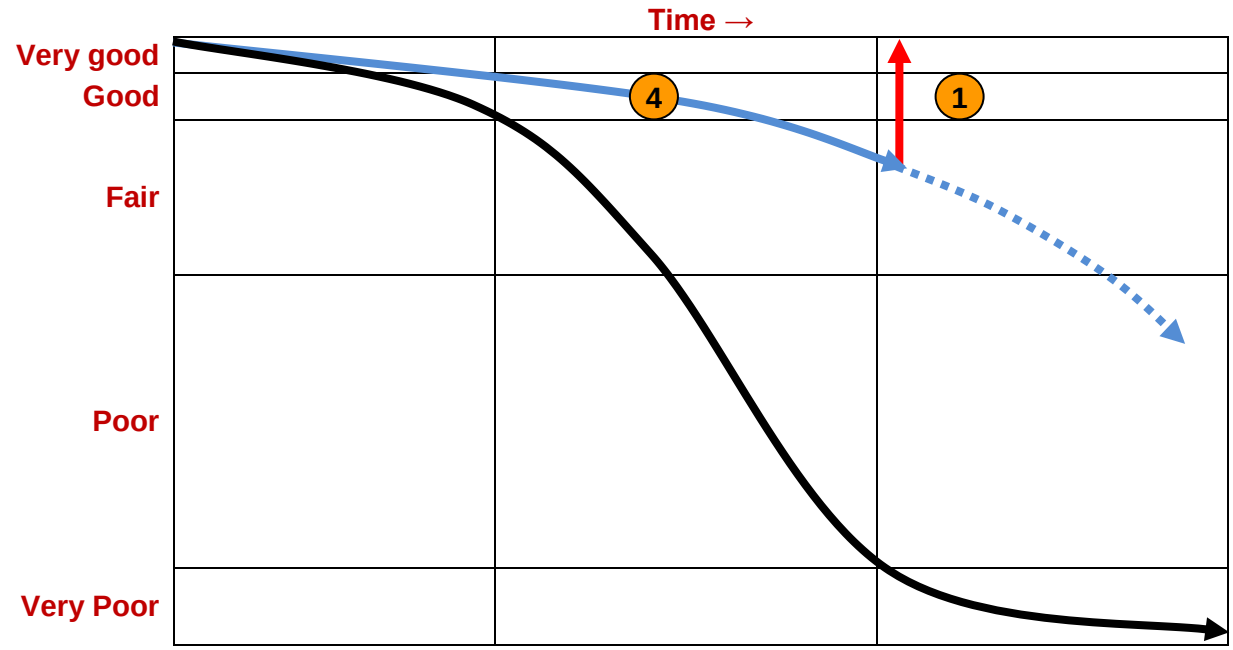

Figure 3: Preventive Maintenance

Even though the deterioration process is slowed down as a result of such preventive maintenance, it is not stopped and corrective maintenance will still be required (see arrow 1 in Figure 3), although the need for such corrective maintenance will be less frequent as can be seen by comparing figures 2 and 3. Such maintenance can be carried out periodically as depicted in the graph, but some corrective activities may also be included as part of the routine maintenance carried out to prevent or slow down deterioration. Such minor repairs not only aim to bring the road back to a better condition, but especially try to avoid more serious damage by ensuring the proper working of the different road elements, resulting in a reduction of the overall maintenance costs and ensuring better average road conditions.

Examples of such minor repairs are the patching of potholes and the filling of ruts and rills to ensure that water can easily flow off the road, repairs to the drainage system so the water can be guided safely away from the road, and the fixing of road structures so these do not collapse. Where possible and required, such repairs are combined with the creation of additional basic protection measures to avoid the damage from occurring again, specifically in the case of damage by water. By doing so, the road is brought back to a better condition and the deterioration process is further slowed down.

Despite such combined efforts, the deterioration of the road will at some stage be such that more intensive corrective maintenance is required. This is especially the case for roads with improved road surfaces, where regravelling or a rehabilitation of the stone pavement may be required. Where road structures have collapsed, these may also require more intensive corrective maintenance to bring them back into order. However, especially in the case of unpaved roads, routine maintenance, consisting of preventive maintenance, minor repairs and the creation of additional protection measures, will result in a significant decrease in the loss of asset value or investment, and as a result the corrective maintenance required to bring the road back to its original condition will be significantly less costly (see Figure 4).

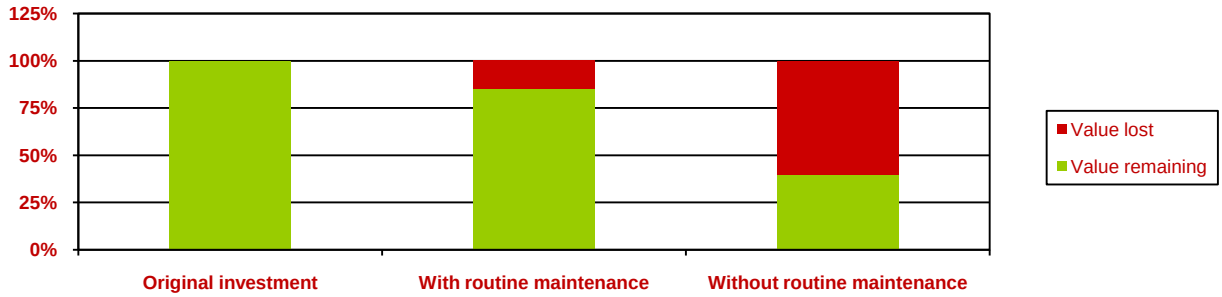

Figure 4: Impact of Routine Maintenance on Asset Value

The additional costs of such continuous routine maintenance are generally more than compensated by the cost savings as a result of the delayed need for more intensive and costly corrective maintenance. As a result, the overall conservation costs tend to be lower, at the same time ensuring that the average road conditions are better (see Figure 5).

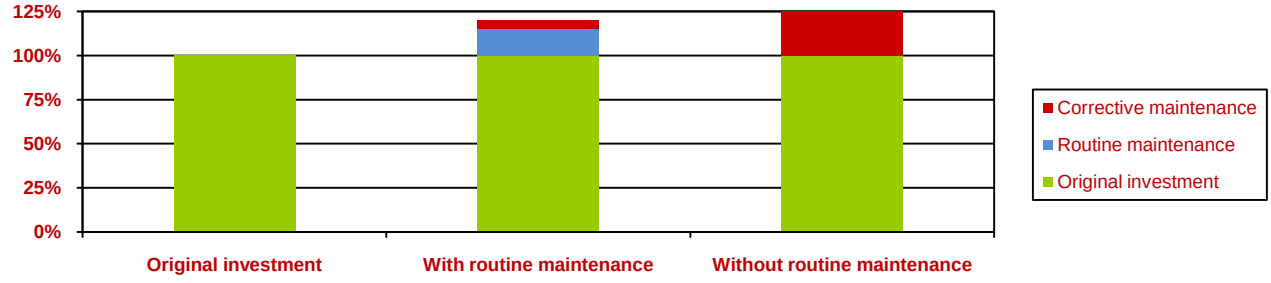

Figure 5: Impact of Routine Maintenance on Overall Conservation Costs

MAINTENANCE ACTIVITIES

This guide focuses on the routine maintenance of unpaved rural roads, especially the unpaved township and village roads of Yunnan Province that make up 62% of the total road network in the Province. It focuses on routine maintenance that is carried out on a continuous basis, with the objective of preventing needless aggravation of road deterioration. Given that protection measures in Yunnan's rural roads are often inadequate, this guide includes under the rubric of "routine maintenance" the creation of additional basic measures to protect the roads, especially from water. There are thus three categories of routine maintenance activities, which are explained below: clearing road elements, repairing road elements, and creating protection measures.

Clearing road elements

The first type of routine maintenance involves clearing road elements to ensure that they function properly. This is the most basic type of routine maintenance and, as such, it is included in almost all routine maintenance systems. This type of routine maintenance of unpaved rural roads includes the following:

1. Clearing landslides – Any landslides or other obstacles smaller than 5 cubic meters (m^3) that are blocking the road surface, road shoulders, or side drains are removed. Larger landslides or other obstacles are reported to the communications bureau, which will arrange removal.
2. Clearing side drains – Any earth, stone, vegetation, garbage, or other material in the side drains is removed, and the drains are restored to their proper shape so water can flow easily.
3. Clearing culverts – Any earth, stone, vegetation, garbage, or other material inside culverts or at the inlets and outlets of the culverts is removed so water can flow easily.
4. Clearing bridges – Any earth, rock, branch, vegetation, garbage, or other material under or near bridges is removed so water can flow easily underneath them.
5. Clearing vegetation – Any vegetation that hinders visibility, traffic, or the flow of water away from the road and through a drainage system, or which is damaging road elements, is removed.

Repairing road elements

The second type of maintenance activities is aimed at repairing minor damage that has occurred to the road, bringing the different road elements back into good condition. This set of routine maintenance activities is primarily aimed at avoiding more serious damage and ensuring the proper working of the different road elements. It is not always included in routine maintenance systems, although for unpaved roads it generally is. For the unpaved township and village roads the following activities are included:

6. Repairing unpaved roads – Any ruts, rills, and potholes in the road surface of earthen or gravel roads are repaired by filling in the deformations, ensuring protection measures are in place to avoid repetition of the damage (*see also activities 11, 12 and 13*).
7. Repairing stone pavement – Any loose or missing stones are replaced and the road shoulder is filled up to avoid stones becoming loose.
8. Repairing the road shoulder – Any cuts or depressions in the road shoulder are filled up and compacted, ensuring protection measures are in place to avoid repetition of the damage (*see also activities 11, 13, 14,15*).
9. Repairing the drainage system – Any erosion and other damage to side drains, culverts, and bridges is repaired, ensuring protection measures are in place to avoid repetition of the damage.
10. Repairing retaining walls – Any loose or missing stones in retaining walls are replaced, using cement or gabion wiring where needed, and weep holes are cleared.

Creating protection measures

The third type of maintenance activities is aimed at creating additional road protection measures where these are not sufficient, further protecting the road from damage. Often this is done in combination with repairs, to ensure the damage does not happen again. This set of maintenance activities is less commonly included in routine maintenance systems, but very good experience exists in its application in unpaved roads where insufficient road protection measures exist and damage, especially due to water, is widespread. By means of the creation of basic road protection measures, the deterioration process can be significantly slowed down, resulting in much less need for repairs and a lower overall maintenance need.

11. Creating side drains – Where water flowing along the road is causing damage to the road surface or shoulder, side drains are constructed to guide the water safely away from the road.
12. Creating water bars – Where water is flowing through ruts and rills in the road, water bars are constructed across the road to guide the water away from the road surface, as a temporary measure until road surface repairs can be carried out.
13. Creating paved crossings – Where water flowing across the road is causing damage to the road surface or shoulder, stone-paved splashes are constructed to protect the road surface from damage.
14. Creating retaining walls – Where the slope is very unstable or is severely eroded by water, resulting in cuts or landslides, dry-stone retaining walls are constructed to stabilize the slope.
15. Planting vegetation – Where the slope is mildly unstable or is lightly eroded by water, vegetation is planted to protect the soil.

Together these fifteen routine maintenance activities ensure a decrease in deterioration of the road as well as a continuous good to fair condition of the road. Apart from these common maintenance activities, additional activities may be required for very specific cases, especially where emergency maintenance is required such as when a river is cutting away the road (washouts).

16. Additional activities – Specific activities that are agreed between the communications bureau and the maintenance group according to need.

Despite the continued routine maintenance of the road, there will be deterioration beyond the scope of these routine maintenance activities, which will need to be addressed through corrective maintenance at certain intervals. The required levels of corrective maintenance and the frequency with which they are required will be significantly reduced as a result of these routine maintenance activities, thus reducing the overall maintenance costs while at the same time ensuring better average road conditions.

TOOLS, SAFETY EQUIPMENT, AND MATERIALS

The maintenance activities mentioned above are mostly labor-based, requiring very little material inputs or use of equipment. Generally only hand tools and safety equipment are required, and for some of the activities basic materials are needed. This section looks into those tools, safety equipment, and materials that are required to carry out the maintenance activities listed above.

Tools

In terms of tools, these are required for excavation, cutting, transport, spreading, and compaction. The tools should be provided by the communications bureau and should be of good quality and available in sufficient numbers to ensure a high productivity of the maintenance workers. A tool maintenance allowance should be provided to the maintenance groups for the sharpening and repair of these tools to ensure a continued high productivity. It is furthermore important that the maintenance workers use the right tool for the job at hand. The use of proper tools together with the proper use of these tools can lead to significant productivity increases and should be promoted.

For instance, although baskets are a useful tool for transporting material over short distances, for longer distances they are less suitable and wheelbarrows are more appropriate, and for large quantities or long distances two-wheeled tractors and trailers or trucks may be more efficient. Similarly, for excavation a hoe can be very useful, but for hard stony material a pick-axe may be more efficient and effective, while for very loose material a shovel can be more appropriate.

- Pickaxe – to loosen hard or stony material
- Hoe – to loosen or excavate soft material
- Shovel – to excavate and throw soft or loosened material
- Rake – to spread out loose material
- Bush knife – to cut vegetation
- Earth rammer – to compact material in a small area
- Watering can – to spread water before soil compaction
- Basket – to transport material over a short distance
- Wheelbarrow – to transport material over a medium distance
- Tractor and trailer – to transport material over a larger distance

Safety equipment

Safety equipment serves to ensure the safety and health of the maintenance workers and should be used at all times. The safety equipment should be provided by the communications bureau.

- Safety vest – to ensure drivers can clearly see the maintenance workers and so avoid accidents. These should be worn by all maintenance workers at all times.
- Safety cones – to warn the drivers that people are working on the road and so avoid accidents. These should be placed 100 m on each side of the working area.
- Warning Signs – to adequately warn the drivers of ongoing maintenance or dangerous situations in order to avoid accidents. These should be used for maintenance work that lasts more than 1 day, and should be placed 250 m on each side of the working area.
- First-aid kit – to treat any injuries and avoid infection. The first-aid kit should contain disinfectant soap, adhesive bandages, sterile gauze, bandages and clamps, scissors, alcohol wipes, antiseptic solution (iodine or similar) and/or cream, tweezers, and painkillers (paracetamol, ibuprofen). Minor injuries should be washed with soap and water, treated with antiseptic cream and covered with plasters or bandages. In case of more serious injuries, a doctor should be consulted.

Materials

Some of the maintenance activities require materials, especially the repairs and the creation of basic road protection measures. To a certain extent, these can be obtained locally, but in some cases these may have to be transported to the road. Where transport distances are short, the maintenance workers can be made responsible for this, using wheelbarrows or hiring two-wheeled tractors and trailers or trucks (the maintenance groups will receive a transport allowance to cover such costs). Where distances are long, however, it is recommended that the communications bureaus be responsible for organizing the transport, leaving stores of the required materials along the road for further distribution by the maintenance workers. The materials required for the routine maintenance of rural roads include the following:

- Gravel – for repairs to roads with a gravel surface. In some cases, this can be obtained locally, but often this will have to be transported to the road.
- Paving stones – for repairs to roads with a stone surface. It is recommended to ensure the provision of suitable pre-cut paving stones for easy repairs to stone-paved roads.
- Stones – for repairs to retaining walls and the drainage system, and in some cases as a base in repairs to the road surface and shoulder, but also for the creation of stone-paved crossings and retaining walls. These can generally be obtained locally.
- Cement – for repairs to concrete or cement mortar retaining walls and other road structures. It is recommended that this be provided to the maintenance workers where required.
- Binding wire – for repairs to gabion walls. It is recommended that this be provided to the maintenance workers where required.

The routine maintenance activities described in the previous chapter are best carried out on a continuous basis throughout the year, thus ensuring that maintenance needs are addressed in a timely manner, decreasing the costs involved and limiting the loss of asset value to the road. This approach also results in minimal deterioration to the road, and the improved overall road conditions lead to lower travel costs and times, resulting in increased access and development resulting from the road. The activities listed are furthermore labor-based and quite simple in nature, making them suitable for implementation by unskilled labor after receiving some basic training. These two aspects of routine maintenance of rural roads make it very suitable for implementation by members of the communities located along the road, who are able to maintain the road on a continuous basis and generally have ample experience with agricultural activities that are very similar to the routine maintenance activities. This chapter will look in detail at the community-based maintenance groups that will be responsible for carrying out the routine maintenance activities as described in the previous chapter, as well as the formation, registration and training of these groups.

MAINTENANCE GROUPS

Although some routine maintenance activities are already being carried out by the communities along the road, this is currently happening on a voluntary basis, which has a number of drawbacks. Firstly, due to the voluntary nature of the maintenance, the supply of labor is governed more by its availability than by the need for it, and as a result much of the maintenance is not carried out on a timely basis or insufficient labor is available. In addition, the maintenance is generally carried out only once or twice a year, with little to no attention being given to the road for the rest of the year, allowing the deterioration process to run unchallenged. A second drawback is that the voluntary nature of the maintenance tends to result in the poor and the women ending up carrying out the maintenance activities, with all-women groups not being uncommon under such a system. Their motivation is limited and they aim mainly to bring the road back to a passable condition or to provide the minimum input required of them. The third drawback is the fact that the persons carrying out the maintenance activities generally lack the required skills and tools, resulting in a lower quality of the maintenance. Therefore, although the costs of such a voluntary system to the communications bureau are very low, the benefits in terms of improved road conditions are also very limited.

In many countries there is therefore a tendency to formalize the implementation of routine maintenance through contracted maintenance workers who are remunerated in order to ensure a more timely response to maintenance needs. The maintenance workers furthermore receive certain basic training and tools to ensure the quality of the work, and are selected from interested candidates according to specific selection criteria to ensure fairness. Apart from ensuring better maintenance, this approach also leads to income and employment generation, which contributes to poverty alleviation and general development of the rural areas, with the maintenance workers easily spending 70% of their incomes locally, creating indirect employment opportunities.

Different experiences exist with the organization of such maintenance workers, ranging from individual lengthworkers to formalized maintenance microenterprises. In the case of lengthworkers, each maintenance worker is responsible for a specific length of road. This system has lost ground, however, due to the high administrative requirements and the problems related to the balancing of workloads between workers and the effective response to larger localized maintenance needs. There is now a tendency to work more with group-based systems, whereby these groups can be formalized to different degrees, individually or associatively managed, and either open to temporary workers or closed and limited to only the group members. The most significant experience is that of Latin America, where in the majority of the countries a system of associative microenterprises exists, whereby the workers are co-owners (managers) of the microenterprises, which are closed and only foresee the participation of the microenterprise members, and which are formally registered as associations, cooperatives, or even limited liability companies.

This guide, however, focuses on less formal, associative, open-ended maintenance groups, which are better adapted to the context within which the maintenance is to take place. In the People's Republic of China and especially the rural areas in Yunnan where many ethnic minorities live, little entrepreneurial experience exists, and the registration and management of enterprises would therefore form a serious difficulty. For this reason a less formal registration of the maintenance workers with the communications bureau has been chosen in order to facilitate this process. The maintenance groups remain associative, taking advantage of the fact that although individually the skill levels of the different maintenance workers may be low, collectively they generally have the basic skill levels required for the implementation of the maintenance activities and the management of the maintenance group. It was furthermore decided to use open-ended maintenance groups, whereby additional maintenance workers can be contracted when needed, spreading the benefits of employment and income generation, and allowing the labor input to vary significantly in different months in response to the maintenance demand.

GROUP SIZE

It may be clear that the size of the maintenance group depends on the length of the road to be maintained and the number of workdays required per kilometer per year. Regarding the latter, most international experience varies from approximately 50 workdays per kilometer per year (equivalent to one full-time person for 5 km of road) to 130 workdays per kilometer per year (equivalent to one full-time person for 2 km of road). This variation depends mainly on the maintenance activities included under the responsibility of the maintenance workers and the characteristics of the road. Unpaved roads, roads in steep terrain, roads with high traffic levels, and roads in areas with high vegetation growth require a higher level of inputs than paved roads, roads in flat terrain, roads with low traffic levels, and roads in areas with low vegetation growth.

In the case of this pilot project, an average productivity rate of 130 workdays per kilometer was selected (or one full-time person for every 2 km), due to the fact that the unpaved rural roads in Yunnan are generally in poor condition and require significant repairs and because the maintenance activities were expanded to also include the creation of basic protection measures, resulting in higher labor requirements. It is expected, however, that for recently constructed or rehabilitated roads with adequate road protection measures, as well as for roads that have already been significantly improved as a result of the routine maintenance activities, lower inputs will suffice of between 50 and 90 workdays per kilometer per year (equivalent to one full-time person for every 3–5 km), with the required input for each particular road determined by traffic levels, the surface type and the topography.

Although it was decided to apply a productivity rate of 130 workdays per kilometer, it was also decided to contract the maintenance workers on a more or less half-time basis in order to allow them to also carry out other activities related to their household and agricultural responsibilities. Especially for this pilot project, which targeted women as maintenance workers, this aspect is considered important as women generally have multiple other responsibilities regarding the care of the household, the family, livestock, and agricultural land, which do not allow them to enter into full-time employment. As a result, one maintenance worker was required for each kilometer of road. The size of the group is therefore the same as the kilometers of road(s) under its responsibility, whereby certain roads close together may be packaged and given to one single group to facilitate the contract administration. Alternatively, very long roads may be split and given to two different groups.

SELECTION OF GROUP MEMBERS

Once the required number of maintenance workers has been determined based on the length of the road to be maintained, these workers have to be selected from interested candidates. The selection criteria generally include technical requirements to select those with the most experience and best skills, as well as social objectives to provide income and employment to certain underprivileged groups. In the case of this pilot project, it was decided to focus on women from ethnic minority groups (Dehong Prefecture has a large ethnic minority population), with poverty being a second important criterion. The criteria used in the pilot project are listed below.

- Interest – all candidates must be actively interested in joining
- Gender – all candidates must be female
- Age – all candidates must be between 18 and 55
- Residence – all candidates must live near the road
- Race – candidates from ethnic minority groups are given preference and at least 40% of selected candidates should be from ethnic minority groups
- Poverty – candidates from poor households (under the poverty line of CNY 1,160 per capita) are given preference and at least 50% of selected candidates should be from poor households
- Leadership skills – candidates with leadership experience are given preference
- Other skills – candidates that have basic reading/writing/math skills are given preference

It may be clear that some of these criteria are eligibility criteria, with which any candidate must comply in order to be able to apply, while others are preferential criteria, whereby preference is given to those candidates that comply with them, sometimes with quota regarding the makeup of the group. Although these criteria were used in the pilot project, they may be adapted for other areas or to incorporate other objectives. It is strongly recommended, however, to formalize any selection criteria in order to keep the process transparent.

Before the maintenance workers are selected, however, information on the employment opportunities should be disseminated as widely as possible. This can be done by using mass media forms such as radio or television, or simple measures such as flyers and posters and by informing local leaders and organizations. What is important is that an effort is made to inform the vulnerable groups, especially women, the poor, and ethnic minorities who generally have less access to common means of communication and information. By ensuring they are also informed, their chances of being able to participate in the selection process and obtaining employment are increased significantly.

The information regarding the routine maintenance positions should include information on the activities to be carried out, the working hours, the remuneration levels, and means of payment. In doing this, it is important to take account of the reality of the target groups, indicating clearly that vulnerable groups are also requested to apply and clarifying that the required experience and skills are within range of most persons (e.g. by stating that experience in agriculture is considered sufficient for carrying out routine maintenance and that experience in the road sector is not required). Also, the determination of the working hours or days can influence the participation of certain groups. For instance, women are generally unable to participate in full-time employment due to their numerous other responsibilities in caring for the household, the family, the livestock and the agricultural land. Another example could be certain ethnic minority groups which may prefer not to work on certain days. The use of part-time or flexible working hours and working days can significantly increase the participation of certain groups.

The manner of applying for the position should also be indicated, as well as the date and manner in which the final selection will be made public. Use can be made of an application form indicating the relevant information of each candidate, thus allowing for an objective selection of the best candidates. However, a simpler system whereby the interested candidate simply informs a local leader or organization which already has information on them can be just as effective and can greatly simplify the selection process. For the selection of the women's groups, for instance, use can be made of the women's organizations at the village level.

REGISTRATION OF THE MAINTENANCE GROUP

Once the members of the maintenance group have been selected, the group needs to be registered in order to allow it to enter into a contract with the communications bureau. This registration can be very formal, but due to a lack of entrepreneurial experience and suitable legal organizational modalities, with high costs and other requirements involved in the registration of such forms, it is recommended to simply register the maintenance group with the communications bureau. For this purpose, a simple form can be used as given in Annex 1, listing the different members and their signatures (or fingerprints), and witnessed by a representative of the communications bureau. It is important to note, however, that such an informal registration has some drawbacks, such as not allowing for a bank account to be opened in the name of the group.

This registration form also identifies the leader and treasurer of the group, who need to be elected by the group members. The group leader is the main representative of the maintenance group and is responsible for the overall management of the group, making sure the agreed work is completed each month and that the work is distributed to the different workers and subgroups. The group treasurer is responsible for managing the money of the group, keeping track of all the payments to the group and all the expenditure on salaries and transport in a cashbook (Annex 2). In addition each group or subgroup should elect a person to record the days worked by each member, both for payment purposes as well as for reporting purposes. These responsibilities and requirements should be made clear before the election of these persons. It is preferable that these persons be able to read and write.

After registration, the group should also open a bank account to receive the payments for the maintenance work. Given the informal nature of the group, a bank account in the name of the group is generally not possible, and the account should therefore be opened in the name of individuals. Where possible, the account should be opened in the name of both the group leader and treasurer.

TRAINING OF THE MAINTENANCE GROUP

Before the maintenance group starts work, the group members need to receive basic training. This training looks both at technical aspects related to the proper implementation of the maintenance activities as well as managerial aspects related to the management of the maintenance groups and the work itself. The initial training needs to be followed up by regular on-the-job training to further improve the skills.

Technical training

The technical training consists of a theoretical part and a practical part. The aim of the theoretical part is to explain the causes of road deterioration and the need for road maintenance, introducing the different maintenance activities and explaining the role they play in slowing down or even halting the different types of deterioration. Through a better understanding of the deterioration process and the purpose of the different road maintenance activities, the maintenance group members will be better able to respond to the different maintenance needs in a timely manner. This theoretical training is done in a classroom context, using a PowerPoint presentation showing photographs and pictures of the different road elements and types of deterioration and of the different maintenance activities. This training will take half a day and should aim to promote a discussion between the different group members by asking questions regarding deterioration and maintenance based on the photographs and pictures being shown.

The objective of the practical training is to have the group members practice implementing the different maintenance activities. This is done along the road, preferably the road for which the maintenance group is responsible. It is recommended to identify suitable sites along the road beforehand, where the different maintenance activities can be practiced, preferably with visible deterioration that needs to be corrected. To properly practice the different activities, it is important to have sufficient tools so all group members can have a go without waiting too long (it is, however, not necessary to have a full complement of tools). For each activity, the different tasks involved are explained, and the proper use of the tools and safety equipment is demonstrated. This practical training will ideally take one full day, but can be compacted to half a day if necessary.

Managerial training

The managerial training looks at the planning and organization of the work, and the management of the maintenance group. It first looks at the monthly workplan and how the monthly payment is determined based on the amount of work to be carried out using the unit rates for the different maintenance activities and how this is indicated in the workplan. It also goes into the importance of the monthly report for verifying the appropriateness of these unit rates by recording the number of days worked by the different group members and any additional workers, forming the input for the inspection report. It continues with the monthly inspection and how this is based on the amounts indicated in the workplan and the quality as defined by the performance indicators listed in the contract, and how the result of the inspection influences the monthly payment in case deductions are applied due to incompliance with the workplan or performance indicators. Apart from the monthly payments, it also explains the allowances that are given to the maintenance group for transport and tool maintenance. Lastly, it goes into the actual management of the group, explaining the roles of the group leader and treasurer, as well as those responsible for recording the days worked by each group member, and the records they have to keep. More information on these managerial aspects can be found in the next chapter and in the *Manual for Maintenance Groups*.

On-the-job training

Although the initial training at the beginning of the contract will provide the maintenance group with the basic skills required for implementing the maintenance activities and managing the work and the maintenance group, it is recommended to provide continued on-the-job training to the maintenance group to improve their skills and correct their errors. This can be done during the monthly visits during which the workplan is prepared and the inspection is carried out, although initially it could be beneficial to arrange more frequent visits.

During such on-the-job training, the focus will lie on the efficient and effective execution of the maintenance activities, ensuring that the productivity of the maintenance team is sufficient and that the quality of the work is in order. The use of proper tools and the proper use of these tools, the appropriate organization of the maintenance workers, the monitoring of work progress, and the use of the performance indicators are central issues to be addressed. The management of the maintenance group, including the recording of the days worked by the different group members and additional workers in the monthly report, the monthly payment of the maintenance workers, and keeping the cashbook up to date, should also be monitored and additional training given where required. Although these aspects are to a certain degree an internal matter to the maintenance group, their proper implementation will ensure the continued existence of the group and avoid internal conflicts, ensuring higher levels of efficiency and effectiveness of the group.

CONTRACTING ARRANGEMENTS

This chapter looks at the contracting arrangements involved in community-based routine maintenance of rural roads by women's groups. It starts by looking at the core aspect of this maintenance system: performance-based contracting and the related performance indicators. It then goes on to discuss the planning of maintenance work throughout the year, regular inspections to check if the work is being carried out properly, and the payments to the maintenance groups. The final sections look at the contract document, the financing of the maintenance groups, and issues regarding the replication of the system.

PERFORMANCE-BASED CONTRACTING

The application of the system of community-based routine maintenance of rural roads necessarily involves a large number of small contracts, but that number is already much reduced by the practice of having contracts cover groups of workers instead of individual lengthworkers. The number can be further reduced by packaging shorter roads that are close together and contracting out their maintenance to one group of workers. However, there are still many small contracts to administer and manage, and this requires a lot of resources if the contracts are input-based.

The answer is to apply a performance-based approach, whereby the payments are based on the performance of the maintenance group (i.e., the quality of its output) rather than on the length of time the workers spent on the job (the input). This means that only results count, making the inspection process a lot easier. The planning and budgeting process is also made easier because the budget is based on the planned output, rather than on input, which may vary from initial estimations. And the monthly payment procedures can be easier, especially if the payments are in fixed amounts that only vary when deductions are made. The use of a performance-based system can thus greatly simplify the communications bureau's task of managing a large number of contracts.

Performance-based contracting is also very logical for road maintenance, where the objective is to keep the road in good condition. In other words, the workers are paid for producing a desired outcome: a good road. It therefore makes sense to have the payment depend on the outcome rather than on the required input. Such a system has been seen to result in more efficient and effective work by those responsible for doing the maintenance, be they maintenance groups or larger contractors, because they can plan their activities more efficiently. Those doing the maintenance will tend to focus on cheaper preventive measures and the avoidance of more costly corrective repairs, thus maximizing profits while producing better road conditions. This is especially the case when the planning of maintenance activities is the responsibility of a group of workers, and when the only criterion for payments and deductions is the condition of the road elements.

This guide does not go so far as to introduce a completely performance-based system for the pilot project in Dehong Prefecture, mainly because the poor condition of the rural roads there makes it difficult to apply such a system. Instead, the project uses workplans to determine the scope of the work each month according to volume-based criteria. This is a step away from the traditional system and toward the performance-based system, as will be discussed in the next section. In the future, however, once road conditions have improved and the groups have gained sufficient experience through this first step toward performance-based contracting, the transition to a full-fledged performance-based system will be easier.

PLANNING OF THE MAINTENANCE WORK

As mentioned above, it is impractical to apply a full performance-based system right away in Dehong because the roads there are not in good condition. The extent of work required to achieve the required road condition is so great that it resembles periodic rather than routine maintenance. One way around this problem is to carry out periodic maintenance or rehabilitation, then switching to performance-based routine maintenance when the type of work required better fits that description, as has been widely done in other countries. Where this is not possible, the answer is to use a system of service levels in which there are different maintenance standards resulting in different road conditions. In this system, roads in poor condition are put under a lower maintenance standard that is easier to achieve. For instance, a "satisfactory" maintenance standard might involve only a slight improvement over initial road conditions. However, this system is complicated and does not necessarily lead to significantly better road conditions.

For the Dehong project, a third alternative was chosen, one based on monthly workplans agreed upon by the maintenance group and the communications bureau. The workplans define the road elements and the road sections to be worked on in a particular month, and the performance-based system is only applied to these elements and sections, allowing the maintenance group to focus its limited resources on priority needs. This approach allows road conditions to be improved significantly, but spreads the renovation process over a longer period, thus preventing major peaks in labor inputs and funding requirements.

Although this third alternative is still performance-based, the workplans limit the sections and elements of the road where it is to be applied. It is therefore not yet a genuine performance-based maintenance system, where the whole road and all road elements would be included. As a result, under this third alternative the monthly payments also vary according to the sections and elements of the road that are included in the workplan, as opposed to a genuine performance-based system where the payments are generally fixed. But as a first step, this third alternative is a good middle ground between traditional input-based and genuine performance-based contracting, and can easily be changed to a full-fledged performance-based system once the time is ripe.

In the monthly workplan (Annex 3), the amount of work to be carried out is specified for each maintenance activity, together with the corresponding payment. The amount of work required for any particular activity depends on maintenance needs, but an attempt is made as much as possible to have mostly fixed workloads (although these may be higher just before and during the rainy season and lower during the dry season). Large variations in workloads, and thus in incomes for maintenance group members, would result in less interest in road maintenance as an employment opportunity because of the uncertainty of income. And this could lead to the withdrawal of some workers, creating the need to recruit and train new ones. In certain seasons, when the maintenance workers must devote a large part of their time to their farms, the workloads may be reduced, but only if there are no urgent maintenance needs at the time. Such flexibility will greatly increase the possibility for women and other vulnerable groups to participate. The fact that the working hours are half-time and also flexible—allowing work to be done early in the morning or late in the afternoon, or even on alternate days—will enable the maintenance workers to combine their working hours with their other responsibilities.

The types of activities to be carried out are determined by the communications bureau, depending on the season and the condition of the roads. Different maintenance activities are carried out in different seasons, with a focus on drainage systems just before and during the rainy season, and on the other repairs at the end of the rainy season and during the dry season. An overview of the timing of the different maintenance activities is given in Table 1. The seasonality of the different activities is not rigid, however, and may be brought forward or postponed according to the circumstances, including the availability of labor and other resources.

Table 1: Seasonal Priority of Activities

Activity / Month	Dry period				Rainy period						Dry period	
	J	F	M	A	M	J	J	A	S	O	N	D
1. Clearing landslides												
2. Clearing side drains												
3. Clearing culverts												
4. Clearing bridges												
5. Clearing vegetation												
6. Repairing unpaved roads												
7. Repairing stone pavement												
8. Repairing the road shoulder												
9. Repairing the drainage system												
10. Repairing retaining walls												
11. Creating side drains												
12. Creating water bars												
13. Creating paved crossings												
14. Creating retaining walls												
15. Planting vegetation												

High priority Low priority

In the system of volume-based contracting being applied in Dehong, the activities and amounts of work to be carried out as defined in the workplan, are linked to the payments through the use of unit rates, which are the average costs of carrying out these activities per unit of output (actual costs may vary, depending on road conditions). The unit rates included in the workplans are given in Table 2. These rates are based on international experience and the lessons learned from the pilot project. They are derived by taking the number of workdays required for each activity and converting that figure into a cost using a daily wage rate of CNY40. For additional activities, a lump sum is agreed upon by the communications bureau and the maintenance group, depending on what the additional activities will entail.

Table 2: Unit Rates for Maintenance Activities

Maintenance activity	Unit	Unit rate (CNY)
1. Clearing landslides	m^3	40
2. Clearing side drains	100 m	20
3. Clearing culverts	unit	20
4. Clearing bridges	unit	40
5. Clearing vegetation	100 m^2	10
6. Repairing unpaved roads	10 m^2	25
7. Repairing stone pavement	10 m^2	20
8. Repairing the road shoulder	m^3	20
9. Repairing the drainage system	m^3	15
10. Repairing retaining walls	m^3	15
11. Creating side drains	10 m	10
12. Creating water bars	10 m	10
13. Creating paved crossings	m^2	20
14. Creating retaining walls	m^3	40
15. Planting vegetation	10 m^2	20
16. Additional activities	Lumpsum	To be determined

The payment for each activity can be calculated based on the amount of work required and the unit rate for each activity. By adding up the amounts for all maintenance activities, one can calculate the total monthly payment, which is written at the bottom of the monthly workplan. This is the amount that will be paid to the maintenance group if the work indicated in the workplan is carried out correctly.

Although the amount of work may differ greatly between one road and another, the cost per unit of work will generally be constant. Nevertheless, it will be necessary to verify the correctness of the unit rates and monthly payments by comparing it to the number of days spent in carrying out the work. For this purpose, the maintenance groups will be required to keep monthly reports (Annex 4) recording the number of days worked by each group member and any additional workers hired by the group. Apart from facilitating the distribution of the monthly payment amongst the group members and additional workers according to the number of days worked, based on the data recorded in this monthly report, the total number of workdays spent by the maintenance group and by additional workers can be calculated. This is subsequently recorded in the inspection report at the end of each month.

The average daily rate can then be calculated by dividing the monthly payment by the total number of days worked by the group members and any additional workers. Any significant differences between this calculated daily rate and the target rate of CNY 40 per day would imply that certain posited unit rates were not accurate. These can then be checked by measuring the number of workdays required to carry out a certain amount of work. For instance, if 6 maintenance workers need 4 hours to clear a landslide of 3 cubic meters (m^3), the productivity rate can be calculated as 3 m^3/(6 persons x ½ day) = 1 m^3/person-day. The unit rate should then be 40CNY/m^3. It is important that these unit rates be checked initially to guarantee that the maintenance workers are being paid the appropriate amounts for the time spent, to prevent these workers from leaving their groups because of insufficient wages, and to avoid overburdening the limited financial resources of the communications bureau because of overpayments.

The data from the monthly reports and workplans can eventually be used to determine a single standard monthly payment per kilometer for all activities. That will happen at a later stage, when the conversion takes place to a completely performance-based system, in which payments will be based on the average amount of work expected over the year.

Although the workplan indicates which activities need to be carried out and how much work needs to be done by the end of the month, it does not indicate where along the road these activities should be implemented. For this purpose, the places where the work must be carried out are indicated on-site during the explanation of the workplan to the maintenance group.

INSPECTION OF THE MAINTENANCE WORK

At the end of the month, the work is inspected and the payment is approved. Under a full-fledged performance-based system, the condition of all road elements would be inspected along the entire stretch of road worked on by the maintenance group, but under this volume-based system, only those road sections and elements included in the workplan are inspected, and the amount of work completed is compared with the work completion targets indicated in the workplan.

The inspection of the road elements included in the workplan utilizes performance indicators, whereby each activity has an indicator that must be complied with. The performance indicators should be objective and easily measurable to allow the maintenance groups to monitor their own performance and to facilitate the inspection process. The recommended performance indicators are listed on the next page. In a full-fledged performance-based system the same indicators can be applied. They would then be applied to all road elements and for the entire stretch of road under maintenance.

1. Clearing landslides – There are no landslides or other obstacles on the road surface, road shoulder, or side drains.
2. Clearing side drains – The side drains are clear and at least 20 cm wide and 15 cm deep, and there is no stemming of water.
3. Clearing culverts – The culverts and their inlets and outlets are clear, and water can flow freely.
4. Clearing bridges – The area under the bridges is clear, and water can flow freely.
5. Clearing vegetation – The vegetation does not impede visibility or normal vehicle transit, nor does it restrict the flow of water away from the road.
6. Repairing unpaved roads – There are no potholes larger than 30 cm and no ruts or rills deeper than 5 cm, and water does not flow over or remain on the road.
7. Repairing stone pavement – There are no holes or loose stones, and the shoulder is not more than 2 cm below the pavement.
8. Repairing the road shoulder – There are no depressions or cuts in the road shoulder, and where necessary water has been directed away, and the shoulder has been stabilized with vegetation or retaining walls.
9. Repairing the drainage system – Scour checks have been placed in eroded side drains, and undermined structures are protected by stones.
10. Repairing retaining walls – There are no loose stones in the retaining walls, and weep holes are clear.
11. Creating side drains – The side drains are at least 20 cm wide and 15 cm deep, have no sharp curves and have a proper outlet, and water no longer flows over the road.
12. Creating water bars – Temporary water bars have been created at regular intervals to guide the water safely away from the road, and water no longer flows over the road.
13. Creating paved crossings – Where water crosses over the road, the road surface is protected from damage by stone-paved splashes.
14. Creating retaining walls – The created dry stone retaining walls are stable, and the area behind it has been compacted.
15. Planting vegetation – The slopes and road shoulders prone to erosion are protected by vegetative material.
16. Additional activities – Performance indicators will be agreed upon in coordination with the communications bureau depending on the type of work.

In the monthly inspection form (Annex 5), the inspector indicates whether each activity has been completed satisfactorily, both in terms of quantity (compared with the workplan) and quality (compared with the performance indicators). If an activity has not been carried out satisfactorily, either because the work has not been completed or because it has not been done properly, this is also indicated, and the incompliance is explained. Any activity that has not been included in the workplan is not inspected.

When part of the work has not been carried out satisfactorily, a deduction is made from the monthly payment that is indicated in the workplan. The amount of this deduction depends on the amount of work not carried out satisfactorily or, in other words, by the amount of work that remains to be done to complete the monthly workplan. This amount of work is multiplied by the relevant unit rates to obtain the monetary amount of the deduction.

The deduction amount is indicated in the bottom part of the inspection form, just below the monthly payment. When the work is satisfactory and no deduction is made, the relevant box must be checked. The approved final payment is the planned monthly payment minus the deduction amount. The total number of workdays spent by group members and additional workers must also be recorded in the inspection form. The inspection form must be signed by both the inspector on behalf of the communications bureau and by the maintenance group leader. The payment will then be made based on the information in the inspection form.

PAYMENTS

As mentioned above, the monthly payment is determined in the workplan and then confirmed in the monthly inspection form, minus any deductions considered necessary. After the signing of the inspection form, the monthly payment can be transferred to the bank account of the maintenance group or paid directly by check. The experience in the pilot project has shown that these payments are generally very quick and do not lead to any delays in the maintenance workers receiving their salaries.

Apart from the monthly payments, other maintenance group costs need to be covered: those related to the transport of materials and group members (e.g. to and from the bank) and maintenance of the tools used by the maintenance groups. To facilitate the administration of these payments, allowances are given in lump-sum increments, whereby the amounts are dependent on the length of the road or section of road for which the maintenance group is responsible. The proposed amounts per kilometer per year are given below.

- Transport allowance – a payment of CNY250 per kilometer per year will be provided to cover the costs of transport of group members and materials (this amount may need to be adjusted depending on the amount of material transport required in each specific road).
- Tool maintenance allowance – a payment of CNY20 per kilometer per year will be provided to allow for the repair and sharpening of the tools used by the maintenance group.

In addition to these allowances, the communications bureau will be responsible for providing the maintenance groups with tools and safety equipment, with an average cost of CNY250 per kilometer. The communications bureau will also be responsible for obtaining accident insurance for the maintenance workers at an average cost of CNY150 per kilometer (assuming one person per kilometer). The costs of transporting materials to the roadside will also be borne by the communications bureau. In the pilot project CNY450 per kilometer was allocated for these material transport costs, although the required amount will depend very much on the type of road and the availability of suitable materials nearby.

MAINTENANCE CONTRACT

The contracting arrangements explained in the previous sections are reflected in the contract document that is signed between the communications bureau and the maintenance group. A contract template is included in Annex 6.

The maintenance contract defines the road section to be maintained and the duration of the contract. The second clause stipulates the maintenance activities to be carried out and their related performance indicators, explaining the use of monthly workplans to define the work to be carried out each month and the need for recording workday data in the monthly reports. The third clause explains the basis of the monthly payments and stipulates the unit rates that will be used, the allowances that will be given as advance payments for transport and tool maintenance, and the tools and safety equipment that will be provided by the communications bureau. The fourth clause looks at the monthly inspections and explains the application of deductions in case on non-compliance with the workplan or performance indicators. Clause 5 refers to changes to the contract or its termination, and the final clause refers to procedures to be followed for matters not prescribed in the contract.

As such, the contract document is a simple document of three pages, with the objective of ensuring proper understanding by the maintenance groups and avoiding unnecessary complication of the contracting process.

SUSTAINABILITY AND REPLICATION

In order for the maintenance of rural roads to be sustainable, the costs of maintenance must be in line with the available funding. In the pilot project, the average maintenance cost, including the costs of tools, safety equipment, insurance and material transport; came to CNY5,250 per kilometer (May to December).

It must be noted that the maintenance costs for this pilot project were relatively high because the goal was to properly test the system within a short period of time. As a result, the pilot project included a lot of landslide removal (forming over 40% of total costs) and extensive road surface repairs (35% of total costs). The exclusion of such major landslide removal and extensive road surface repairs (limiting interventions to spot improvements) will decrease the required number of workdays per kilometer and reduce costs for routine maintenance by at least 40%. Landslide removal and more significant road surface repairs would then be funded under emergency maintenance or periodic maintenance (medium maintenance).

Although funding for routine maintenance of rural roads has increased significantly in recent years, there is still a clear need for additional funding to meet the maintenance requirements and to ensure continued access to rural villages in Yunnan Province. A second pilot project is therefore currently underway to determine an appropriate investment level per kilometer per year for routine maintenance and to align this with available financing for rural road maintenance.

ANNEXES

Registration of Road Maintenance Group

This document serves for the registration of the road maintenance group *Name of maintenance group*, hereinafter referred to as the **Maintenance Group**. It serves to identify the members of the **Maintenance Group** and its representatives (leader and treasurer). It is signed by all members of the **Maintenance Group** and witnessed by the communications bureau of *Name of county or district*, represented by *Name of representative*, *Position held by representative*, with identity document *Number of identity document*, hereinafter referred to as the **Communications Bureau**. The **Maintenance Group** consists of the following members:

	Name	**Signature**
1.	.....(Leader)	.....
2.	.....(Treasurer)	.....
3.	.....	.....
4.	.....	.....
5.	.....	.....
6.	.....	.....
7.	.....	.....
8.	.....	.....
9.	.....	.....
10.	.....	.....
11.	.....	.....
12.	.....	.....
13.	.....	.....
14.	.....	.....
15.	.....	.....
16.	.....	.....
17.	.....	.....
18.	.....	.....
19.	.....	.....
20.	.....	.....
21.	.....	.....
22.	.....	.....
23.	.....	.....
24.	.....	.....
25.	.....	.....
26.	.....	.....
27.	.....	.....
28.	.....	.....
29.	.....	.....
30.	.....	.....

Communications Bureau

Maintenance Group

Date:

Date:

CASH BOOK

General information

Name of group or subgroup:	
Month:	
Balance from previous month:	

Income & Expenditure

Income

Date	Description	Amount	Receipt number
Total:			

Expenditure

Date	Description	Amount	Receipt number
Total:			

Conclusion

Balance at end of month:	

MONTHLY WORKPLAN

General Information

Planning period (month)	☐Original ☐Amendment
Road name and length	
Road section start and end	
Group leader's name	

Monthly Results

Maintenance activity	Unit	Unit rate (CNY)	Amount of work planned	Approved remuneration (CNY)
1. Clearing landslides	m^3	40		
2. Clearing side drains	100 m	20		
3. Clearing culverts	unit	20		
4. Clearing bridges	unit	40		
5. Clearing vegetation	100 m^2	10		
6. Repairing unpaved roads	10 m^2	25		
7. Repairing stone pavement	10 m^2	20		
8. Repairing the road shoulder	m^3	20		
9. Repairing the drainage system	m^3	15		
10. Repairing retaining walls	m^3	15		
11. Creating side drains	10 m	10		
12. Creating water bars	10 m	10		
13. Creating paved crossings	m^2	20		
14. Creating retaining walls	m^3	40		
15. Planting vegetation	10 m^2	20		
16. Additional activities			Lump sum	

Conclusion

Agreed monthly payment (CNY)	
Signature inspector	
Signature group leader	

ANNEX 4 MONTHLY REPORT

MONTHLY REPORT
General Information

Reporting period (month)	
Road name and length	
Road section start and end	
Group leader's name	

Actual workdays

Name of group member or additional worker	Date																														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

Conclusion

Total workdays by group members	
Total workdays by additional workers	

ANNEX 5 MONTHLY INSPECTION FORM

MONTHLY INSPECTION FORM

General Information

Inspection period (month)	
Name of inspector	
Date of inspection	
Road name and length	
Road section start and end	
Group leader's name	

Inspection Results

Maintenance activity	In order	Deficient	Problems to be corrected
1. Clearing landslides	☐	☐	
2. Clearing side drains	☐	☐	
3. Clearing culverts	☐	☐	
4. Clearing bridges	☐	☐	
5. Clearing vegetation	☐	☐	
6. Repairing unpaved roads	☐	☐	
7. Repairing stone pavement	☐	☐	
8. Repairing the road shoulder	☐	☐	
9. Repairing the drainage system	☐	☐	
10. Repairing retaining walls	☐	☐	
11. Creating side drains	☐	☐	
12. Creating water bars	☐	☐	
13. Creating paved crossings	☐	☐	
14. Creating retaining walls	☐	☐	
15. Planting vegetation	☐	☐	
16. Additional activities	☐	☐	

Conclusion

Agreed monthly payment (CNY)	
Deduction (CNY)	☐ None ☐ CNY_____
Approved monthly payment (CNY)	
Total workdays spent	Group members: _____ Additional workers: _____
Signature inspector	
Signature group leader	

Road Maintenance Agreement

This is an agreement between the communications bureau of *Name of county or district*, represented by *Name of representative*, *Position held by representative*, with identity document *Number of identity document*, hereinafter referred to as the **Communications Bureau**, and the road maintenance group, *Name of maintenance group*, represented by *Name of representative*, *Position held by representative*, with identity document *Number of identity document*, hereinafter referred to as the **Maintenance Group**. Under this agreement, the **Maintenance Group** is contracted by the **Communications Bureau** to carry out the routine maintenance of the road segment from *Start of road segment* to *End of road segment*, with a total length of *Length in km* kilometers.

Clause 1 Term of Agreement

1.1 The term of the agreement is from *Start date* to *End date*.

1.2 When the agreement expires, if the two parties agree, the agreement can be extended.

Clause 2 Scope of Work

2.1 The **Maintenance Group** will carry out the maintenance activities in the contracted road segment as described in the table below.

2.2 Each month the **Maintenance Group** will implement the specific activities in the specific road sections as indicated in the monthly workplan prepared by the **Communications Bureau** and agreed to by the **Maintenance Group**.

2.3 In doing so, the **Maintenance Group** will ensure compliance with the performance indicators as described in the table below for those activities and road sections indicated in the workplan.

2.4 The **Maintenance Group** will record the days worked by the group members and any additional workers in the monthly report and provide this data to the **Communications Bureau** at the moment of the inspection.

The **Communications Bureau** will organize technical and managerial training for the **Maintenance Group** according to the requirements of road maintenance.

Maintenance activities and performance indicators
1. Clearing landslides - There are no landslides or other obstacles on the road surface, road shoulder, or side drains.
2. Clearing side drains - The side drains are clear and at least 20 cm wide and 15 cm deep, and there is no stemming of water.
3. Clearing culverts - The culverts and their inlets and outlets are clear, and water can flow freely.
4. Clearing bridges - The area under the bridges is clear, and water can flow freely.
5. Clearing vegetation - The vegetation does not impede visibility or normal vehicle transit, nor does it restrict the flow of water away from the road.
6. Repairing unpaved roads - There are no potholes larger than 30 cm and no ruts or rills deeper than 5 cm, and water does not flow over or remain on the road.
7. Repairing stone pavement - There are no holes or loose stones, and the shoulder is not more than 2 cm below the pavement.
8. Repairing the road shoulder - There are no depressions or cuts in the road shoulder, and where necessary water has been directed away, and the shoulder has been stabilized with vegetation or retaining walls.
9. Repairing the drainage system - Scour checks have been placed in eroded side drains, and undermined structures are protected by stones.

Performance indicators
10. Repairing retaining walls - There are no loose stones in the retaining walls, and weep holes are clear. 11. Creating side drains - The side drains are at least 20 cm wide and 15 cm deep, have no sharp curves and have a proper outlet, and water no longer flows over the road. 12. Creating water bars - Temporary water bars have been created at regular intervals to guide the water safely away from the road, and water no longer flows over the road. 13. Creating paved crossings - Where water crosses over the road, the road surface is protected from damage by stone-paved splashes. 14. Creating retaining walls - The created dry stone retaining walls are stable, and the area behind it has been compacted. 15. Planting vegetation - The slopes and road shoulders prone to erosion are protected by vegetative material. 16. Additional activities - Performance indicators will be agreed upon in coordination with the communications bureau depending on the type of work.

Clause 3 Compensation

3.1 The planned monthly compensation for the **Maintenance Group** will be based on the monthly workplan according to the specific activities and work amounts indicated in the workplan, using the unit costs indicated in the table below.

3.2 Upon signing the contract, the **Maintenance Group** will receive tools and safety equipment from the **Communications Bureau**. The **Maintenance Group** will be responsible for replacing and repairing them if they are lost or damaged.

3.3 The **Maintenance Group** will receive an allowance of CNY20 per kilometer upon signing the contract to cover the costs of repairing and sharpening the tools.

3.4 The **Maintenance Group** will receive an allowance of CNY250 per kilometer upon signing the contract to cover the costs of communications and transport of both group members and materials.

3.5 The **Communications Bureau** will obtain accident insurance for all members of the **Maintenance Group**.

Activity	Unit	CNY/unit (average)
1. Clearing landslides	m^3	40
2. Clearing side drains	100 m	20
3. Clearing culverts	unit	20
4. Clearing bridges	unit	40
5. Clearing vegetation	100 m^2	10
6. Repairing unpaved roads	10 m^2	25
7. Repairing stone pavement	10 m^2	20
8. Repairing the road shoulder	m^3	20
9. Repairing the drainage system	m^3	15
10. Repairing retaining walls	m^3	15
11. Creating side drains	10 m	10
12. Creating water bars	10 m	10
13. Creating paved crossings	m^2	20
14. Creating retaining walls	m^3	40
15. Planting vegetation	10 m^2	20
16. Additional activities	Lump sum	To be determined

Clause 4 Work Discipline and Penalties

4.1 The **Communications Bureau** will inspect the road or road section each month and assess the condition of the road elements according to the performance indicators mentioned in Clause 2 with respect to the maintenance activities and road sections indicated in the workplan for that month.

4.2 The actual monthly compensation will be based on the percentage of the workplan completed to the satisfaction of the **Communications Bureau** (according to the performance indicators). If the **Maintenance Group** does not complete the work indicated in the workplan or does not comply with the performance indicators as stipulated in Clause 2 for the activities and road or road sections indicated in the workplan, a deduction from the monthly compensation will be made in line with the amount of work not carried out and the performance indicators not fulfilled.

4.3 The **Maintenance Group** should follow the relevant safety regulations while working on the road.

Clause 5 Agreement Variation, Termination, and Repeal

5.1 Both parties should perform the obligations of the agreement. Neither party can vary the agreement by itself.

5.2 When the agreement expires, or the promissory termination condition appears, the agreement will terminate.

5.3 If the **Communications Bureau** ceases to exist, the agreement will be terminated.

5.4 The agreement will be terminated when the two parties agree on the termination.

5.5 The **Communications Bureau** may terminate the agreement under the following conditions:

a) The **Maintenance Group** repeatedly disobeys the **Communications Bureau's** regulations and guidance.

b) The quality of the road maintenance is assessed to be below standard in three monthly inspections during the contract period.

Clause 6 Other Matters

6.1 Other related matters not covered in this agreement will be solved based on negotiations between the two parties.

6.2 This agreement will be signed in three copies, the **Communications Bureau** will keep two copies, the **Maintenance Group** will keep one copy. The agreement will be effective after the two parties have signed it.

Communications Bureau	Maintenance Group
_____	_____
Date:	Date:

COMMUNITY-BASED ROUTINE ROAD MAINTENANCE BY WOMEN'S GROUPS

GUIDE FOR COMMUNICATIONS BUREAUS

The ***Guide for Communications Bureaus*** describes how to implement a system of community-based rural road maintenance involving groups of women, specifically in Yunnan Province, the People's Republic of China. The first chapter explains the need for road maintenance, with a focus on routine maintenance of unpaved roads (including earthen, gravel, and stone-paved roads), which make up 96% of the township and village road network in Yunnan Province (and 62% of Yunnan's total road network). This chapter delves into the processes of road deterioration and the maintenance activities needed to counteract them. The second chapter explains why the organization of maintenance groups is recommended and describes how these groups should be formed, registered, and trained. The third and final chapter explains the contracting arrangements in detail, including those for planning, inspections, and payment. This chapter also looks at the costs of routine maintenance by these groups and how the system may be financed.

This guide was written as part of a pilot project supported by the Gender and Development Cooperation Fund of the Asian Development Bank. The objective of the pilot project is to show that women can participate effectively in the maintenance of rural roads and that, by doing so, they can create better road conditions, earn extra income, increase their skills, and contribute to local development. The pilot project has also identified specific problems regarding the participation of women in rural road maintenance and found solutions to those problems.

The pilot project has also published a complementary manual, the ***Manual for Maintenance Groups***, which is aimed at the maintenance groups themselves. It explains the various activities to be carried out by these groups in order to keep rural roads in good condition, and discusses the management of a maintenance group, the planning and organization of the group's activities, and the procedures by which its members are hired by the communications bureaus responsible for the roads to be maintained.

ADB