COMMUNITY ACCESS PLANNING MANUAL

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Community Access

Manual A:
Community Access Planning

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Acknowledgement

These manuals have been prepared by the Ministry of Works, Housing and Communications, Uganda.

The aim of the manuals is to complement the Ministry's effort in providing guidance and building capacity of Local Governments to enable them handle their mandated roles in planning and management of the road sector development.

This manual is part of a set titled District Road Works. The set which originally constituted 5 volumes now includes volume 6 (community Access Support) The Community Access volume includes:
Manual A: Community Access Planning
Manual B: Standard Designs for Rural Transport Infrastructure.

The Community Access manuals are intended to assist lower local governments to plan, implement and maintain improvements to community transport infrastructure. These manuals should be read in conjunction with the district roads manuals especially Volumes 2, 3 and 5.

In line with the topics covered in these manuals, related training modules have been designed and are incorporated in the curriculum of the Mount Elgon Labour Based Training Centre.

The manuals are the property of the Ministry of Works, Housing and Communications, but copying and local distribution is not restricted.

We wish to acknowledge the invaluable support of the Danish International Development Agency for the financial assistance extended to the Ministry in preparing the manuals.

Engineer in Chief/DE

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Step 3

Place approved treated logs depending on the design or as recommended in design manual.

Step 4

Construct timber deck, fix hand rails and improve transition approaches to the bridge. The bridge is now ready for use and reliable access restored.

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The Construction sequence of a motor timber bridge.

Step 1

Excavate and prepare foundation for abutments.

Step 2

Construct abutments in stone gabion, stone masonry or concrete class 20 which ever is economically appropriate.

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Problem No.11 - Access across Permanent River:

Permanent river crossing

Permanent river crossing if not bridged can isolate communities from access to social services especially in rainy seasons when water flow increases; sometimes leading to flooding which makes it difficult for vehicles to cross. Such rivers are more common in hilly, rolling and flat terrains.

As a result of big water volume crossing the road, a bridge with a span commensurate with the river width is usually the best solution to ensure reliable access at such location shown in picture above.

The sequence for construction of simple motor timber bridge is shown on next page.

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Problem No.11 - Access across Permanent River

The Construction sequence of a motor timber bridge

Before

After

Planning for Community Access Infrastructure

Introduction

This manual outlines the steps to be undertaken in the identification, prioritisation and selection of investments in rural transport infrastructure on both community access roads and off-road interventions. The steps employ a participatory approach in which community members are given opportunity to identify, prioritise and select priority investments in community infrastructure improvement.

The manual is intended for lower local governments (LCIII) who, during the planning process will solicit the input of particular district officials (DE's, DCDO office) as necessary.

The entire planning process is tailored to the LGDP participatory planning procedures.

The Manual should be read in conjunction with other Community Access Manuals (Volume 6). Where needed, reference will be made to other Volumes (eg District Road Manuals Vol. 5 G:"Guidelines for pre-selection of isolated sub counties").

Access Planning Step by Step

Introduction

The proceeding chapter presents the steps to be followed in planning for investment priorities in community infrastructure improvement. Each planning step includes a sequence of activities covered under 5 major themes namely; Parish level prioritisation, Sub county level prioritisation, Technical assessment of investment priorities, Final priorities' selection, Pre-implementation preparations.
The diagram below presents the community access planning steps. These steps correspond with the main activities within the LGDP planning cycle.

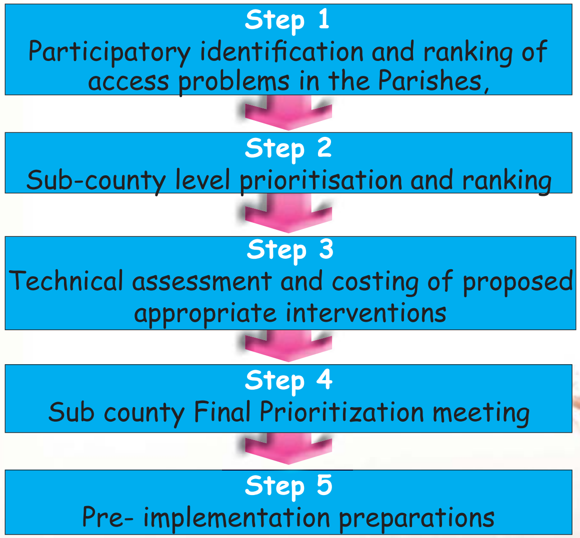

Figure 1: Access planning step by step

Step 3

To prevent scour on the immediate down stream vicinity of the checks, riprap packed stones are place to control the energy of the fast running water.

Step 4

An alternative effective method to prevent scour on immediate down stream vicinity of the checks, is to plant grass which is watered regularly until it is established to grow on its own.

Road section construction /correction sequence

Step 1

Re-excavate side ditches on both sides, form road camber to at least a camber slope of 6% and gravel the section with gravel or any other suitable material and compact.

Step 2

Experience shows that side ditches constructed in earth at gradients greater than 4% are vulnerable to scouring due to fast running water. To minimise water speed and hence erosion, Scour checks are installed at specified intervals within the ditches as shown in picture.

Step 1

Step 1: Participatory Parish level identification and ranking

At the Parish level a Parish meeting (LGDP prototype) will be convened.

The meeting shall constitute the following members:

- The Sub County Community Development Assistant(CDA)
- All Local Council 1 Chair persons in the parish
- All Local Council 1 secretaries for women in the parish
- Chair person youth council LC11/parish
- Chairperson PWD council LC 11/parish
- Chairperson Women council LC II/parish
- Parish Chief
- Members of the Parish Development Committee (PDCs); all female members must attend.

The meeting shall be chaired by the CDA assisted by the parish chief as the meeting secretary. The meeting shall go through the following:

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a. A brainstorming session with meeting participants that focuses on the different travel purposes in the community eg: to the health center, to the market, to the trading center, to the milling machine, to the water source, to the farm/ garden, to school, to the SC head quarters etc.

b. Meeting participants are then asked to identify the various transport infrastructure they use while making the above mentioned travel journeys eg CARs, major roads (district and national), Footpaths and tracks etc.

c. Members are then asked to identify and locate the most important CARs and tracks in their community with the entire SC as focus (identification should not be restricted to only within the parish boundaries but rather covering the entire SC). Identification should be judged/ determined by the importance of the respective transport infrastructure and not according to the type/grade of access infrastructure eg a footpath leading to the health center will constitute more access importance than a CAR that does not serve a big purpose. There after, the identified infrastructure, will be ranked. "Pair-wise ranking" (see Annex 1), technique will be used while ranking the priorities. The parish then compiles a ranked list of the most important access infrastructure.

d. Members are then asked to identify the kind of access constraints (infrastructure related) found on each of the prioritized CARs and tracks. Eg broken brigdes, and culvert crossings, stream crossings, water logged sections, gullied sections, slippery sections, steep sections, cliffs on footpaths etc (**Access "bottlenecks"**).

Problem No.10 - Access across deteriorated road section

A deteriorated gullied section of a community access road.

The picture above shows a deteriorated road section of a community access road. The section is rutted and gullied due to water running on the road as a result of blocked side ditches. The above situation can be corrected by reconstructing the whole section as shown in the next sequence pictures.

Problem No.10 - Access across deteriorated road section

Road section construction /correction sequence.

Before

After

The main reasons for adoption of the "bottleneck" approach include:

The need to attract community members to participate in the improvement/ maintenance of their infrastructure through the "self-help" scheme (since local government budgets do not provide for routine maintenance funds)

The need to spread investment funds to cover many beneficiaries in the community.

During this session, meeting participants are then educated on the concept of **"bottleneck"** approach in infrastructure improvement. By bottleneck is meant those sections on CARs and tracks that constitute an access constraint and are not within the means of the community members to work on/improve. Examples of such spots include river crossings (requiring culverts/bridges), cliffs and similar difficult spots. Infrastructure improvement would therefore concentrate on lifting bottlenecks on the infrastructure. Strict adherence to the "bottleneck" approach, means that the project will not carry out full road/track rehabilitation.

e. Thereafter members will compile a list of the 5 top priority infrastructure and the kind of bottlenecks associated with them. This will then constitute the parish infrastructure priority list

f. Lastly members are then asked to select among themselves, two members (at least one must be female) to represent the parish at the next stage of the planning circle at the SC.

Step 2

Step 2: Sub-county level selection and ranking of investment projects

The Sub County level planning meeting will constitute the following members:

a. The selected two parish representatives
b. Sub County Chief,
c. Local Council III Chair person,
d. Community Development Assistant (CDA)
e. Officials from District Engineer's office.
f. Members SCTPC

The meeting will be chaired by the CDA with one of the SCTPC members acting as secretary.

Step 3

Prepare bed, and lay culvert pipes

Step 4

Construct stone masonary/concrete deck above the culvert lines tide up site and access is improved for users.

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Construction sequence for a vented drift

Step 1

Prepare site by removing all stagnant water

Step 2

Excavate foundation up to appropriate culvert invert level.

The Sub County prioritization meeting will proceed as follows:

a. Parish representatives will be asked to present their respective parish priority lists generated during the parish level planning meeting (5 per parish)

b. The meeting will then grade the priority list from each parish by allotting value points to each individual CAR/track in descending order from 5. (see example). Values points for each individual CAR /track will then be added to determine the total value points per CAR/track. The final out come will be a list of the most important CARs/tracks in the sub county determined by value points

Example
Parish priority list

1. CAR a-g =	*5 points*
2. track c-f =	*4 points*
3. CAR d-g =	*3 points*
4. track m-o =	*2 points*
5. CAR m-f =	*1 point*

c. The meeting will then decide on the number of priorities to include in the final list to be submitted to the DE's office for planning step 3 (technical survey). The Number of priorities on the list would be determined by the cost of bottlenecks in relation to the sub county budget.

Step 3: Technical Assessment

Step 3

This will be the third step in the planning cycle. The District Engineer' office or other technical assistance will visit the various locations of the prioritized Sub County list. Such visits can be conducted with members of the community/ parish representative for easy identification of site locations.

Problem No.9 - Access across a seasonal flooding stream

The picture shows water crossing at the surface of the access road

The Picture above shows water crossing the surface of the road. This may occur when there is excessive rain causing floods.

One possible solution to the above problem would be culvert installation. However in periods of excessive rains, the culvert lines along may not hold the amount of water thus a stone masonry/ concrete deck is constructed ontop of the culvert lines to allow the excess water cross over without eroding the road surface.

Problem No.9 - Access across a seasonal flooding stream

Construction sequence for a vented drift

Before

After

Technical survey will assess the state of the infrastructure, identify/confirm the nature of the constraints/bottlenecks and suggest/ confirm possible alternative interventions to the bottlenecks. The illustrated list of alternative interventions will be used to guide the survey process (refer to annex 2).

While undertaking this technical assessment, attention will be put on the following screening criteria:

a. Access constraint improvement will be on the basis of bottleneck improvement and not full CAR/footpath rehabilitation. This concept will therefore be the focus of the technical survey.

b. Community Access Roads (CARs) will not be upgraded to district road standards using community access funding and footpaths remain footpaths.

c. The above also implies that only existing CARs can qualify for inclusion; no “opening” of new CARs is allowed

d. CARs will only receive spot improvements; lifting bottlenecks

Once the technical survey is completed the District Engineering team will cost the different alternative interventions suggested. The team then generates a list of access priorities that includes estimated costs of improvement.

Step 4

Step 4:Sub-county final prioritisation Meeting

The Sub County final prioritization meeting will constitute the following members

a. The selected two parish representatives
b. Sub County Chief,
c. LC III Chair person,
d. 5 members from the LC III women's council
e. Chair person PWD council LC III
f. Chair person Youth Council LC III
g. Community Development Assistant (CDA)
h. SCTPC members
i. Officials from District Engineer's office.

Step 3

Prepare bed, lay culvert pipe and construct end structures (Headwalls & Win walls).

Step 4

Back fill culvert pipe with suitable road material, tide up site and access is improved for users.

Construction sequence of a Culvert Crossing

Step 1

Prepare site by removing all stagnant water.

Step 2

Excavate foundation up to appropriate culvert invert level.

The meeting will proceed as follows:

a. The technical team will present the list of the costed priorities. Alongside this list, the team will also present illustrations of the different alternative interventions suggested and their respective costs. The team will make use of the illustrations list (see annex 2).

b. The members will then discuss the list and the suggested interventions and costs against the allocated Sub County budget.

c. Through consensus building, the members will come up with the final list of investment priorities on the basis of allocated budget.

From the different Sub County plans, the district will then prepare an overall district plan that is included in the 3 year rolling plan. The plan shows all (eligible) candidate roads and non-road transport infrastructure from the participating Sub-counties.

Step 5: Pre –Implementation Preparation

Step 5

This is more of a post - planning stage.
It will involve the technical team undertaking the preliminary activities preceding implementation.

The following set of activities will be undertaken:

a The technical team will undertake a detailed survey of the final investment priorities generated at the Sub County final meeting.

b. Detailed BoQs will then be prepared using the Technical manual C (standard design manual)

c. Once approved, (District/MoWT), tender documents will be prepared.

d. The tendering process will then be carried out in accordance with existing LG/MoWT procedures. Bidding, bid evaluation and contracts award will all follow existing government procedures.

After contract award and signing, implementation starts. Contracts' implementation will follow the same procedures as for contracts under district roads. This includes use of labour based techniques and adherence to contract documentation with prescribed performance.

Problem No.8 - Access Cross drainage

The picture shows water crossing at the surface of the access road

Causes:
Problems similar to the one in picture frequently occur in rainy season and when

- Road is constructed at or lower than the flood level.
- Inadequately designed drainage structures installed cannot handle the water volume crossing the road.
- No cross drainage structures at all are provided to allow water cross the road.

Possible solutions to solve the problem range from use of culverts, drifts to installation of small bridges depending on the **volume of water** expected or seen (experience) to cross the road during heavy rainy season.

Problem No.8 - Access Cross drainage

Construction sequence of a Culvert Crossing

Before

After

Annexes

Annex 1

Pair-wise ranking

Where there are more than four CARs to prioritise, it is advisable to use pair-wise ranking technique.
In this technique, each road/track is compared against each of the other roads/tracks in turn, to assess whether it is of greater or lesser importance/priority

Road or Track	A	B	C	D	E	F	Score	Rank
A		B	A	D	A	A	3	3
B			B	B	B	B	5	1
C				D	C	C	2	4
D					D	D	4	2
E						F	0	6
F							1	5

Example

On the vertical axis, identified CARs/tracks are written in any order in the space behind the capital index letter (A to E).On the horizontal axis, this listing is repeated in the same order but with omission of the CAR assigned to A. Road A (vertical axis) is compared against road B (horizontal axis). If B is considered more important than A, then “B” should be written in the box as shown in the above diagram; if A is considered more important than C then “A” is written in the box, and so the procedure continues. The score column counts how many times “A”, “B” etc., is noted in the whole diagram. The summary table can then be completed, listing the roads /tracks in order of priority. In the above example, road/track B had more scores, followed by D, then A, followed by C then road/track F and lastly E.

Step 3

Pack dry stones using stones with nominal size 150mm to a depth of 0.4m. . Build stone masonry (mortar mix 1:3) in cut off wall foundations and on top of dry stone layer in accordance with design drawings.

Step 4

Ensure that invert level of finished structure is at same level as the downstream surroundings. Improve approaches, tidy up site and pen road section to traffic after 28 days since completion.

Splash apron or drift construction sequence.

Step 1

Provide alternative water crossing way to stop water interference with work area. Rid the work area of any stagnant water.

Step 2

Excavate foundation for structure to a depth of at least 0.5m with cut off walls of depth at least 0.6m from surface. Place suitable material and compact to form bed 100mm.

Annex 2

Examples of different interventions to bottleneck improvement and their construction sequence

Problem No.1 - Access across shallow small streams

Construction sequence of a simple timber foot bridge

Before

After

Problem No.7 - Access across a shallow stream crossing

The picture shows water crossing at the surface of the access road

Like in Problem no.1, an alternative access solution to Shallow stream crossing the road at shallow depth is the use of drifts or splash aprons.

For the Culvert pipe to work effectively at such location, it will have to be laid on road surface thus necessitating a lot of fill to ensure better access as in Problem no.1.

However a lot of fill works increases the cost of construction and in such a situation like this, use of drifts/splash aprons is more appropriate. The following pictures show the sequence of solving the problem using splash apron/drift.

No motor vehicles should be allowed to cross the structure until it is 28 days old since completion of construction to ensure that the cement mortar used to build the structure sets to full strength other wise the structure will prematurely fail.

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Problem No.7 - Access across a shallow stream crossing

Construction sequence for a Splash

Before

After

Problem No.1 - Access across shallow small streams

Shallow small stream along a community path.

Occasionally many rural paths are intercepted by small streams such as that shown in the picture above. The depth of these streams varies from 0.5 ~ 2.0m.depending on the topography and geological formation of the area where the stream is located.

In dry Seasons, water stage in the stream tends to be low but can increase to reasonable depth during wet seasons when water flow increases. This makes access across the stream difficult as water may carry away people and sometimes animals attempting to cross the stream.

Access across such streams can be solved by use of simply built timber Foot Bridge provided that the stream span doest not exceed 10m long. Simplified construction stages of a simple timber foot bridge are shown on the next page.

Construction sequence of a simple timber foot bridge

Step 1

Locate stable ground on either side of the stream. Install and lock notched 250 ~ 300mm diameter log abutments using 100mm diameter wooden pegs driven into the ground.

Step 2

Place at least two straight 250 ~ 300mm diameter log beams on to notches made in the log abutments. Lock the logs using 100mm diameter wooden pegs driven into the ground to prevent displacement.

Step 3

Backfill the top of foundation with suitable material e.g. gravel to camber slope of 6% and compact with roller or hand rammers until firm surface is made. Ensure good approaches on either side of the structure to facilitate smooth transition to and from it.

Step 4

Construction complete and open to traffic.

Construction sequence for a turnpike

Step 1

Excavate foundation structure to a depth where the soil is firm. All bogy material shall be removed and disposed off.

Step 2

Pack by interlocking stones nominal size 200mm until they fill up to just about 100mm above the top of excavated soil foundation. The packed stones on the top periphery of either side of the foundation centreline should be boulders of size 300mm.

Step 3

Construct timber deck on to the log beams using 150mm x 50mm x 2m dry hard timber and nails. Improve approaches on either side of the footbridge using selected stable soil.

Step 4

Complete footbridge open to human and animal traffic. Care should be taken to ensure bridge is elevated quite clear the highest expected flood level to avoid bridge being washed away during high water flows level.

Problem No.2 - Access across steep slopes (Gradient < 100%)

The Construction sequence for stone Masonry steps

Before

After

Problem No.6 - Access across road sections with weak foundation soils

The picture shows a weak rutted/ potholed section surface of the access road.

The problem shown in picture indicates a weak section of the community access road due to weakened soil foundation not able to carry heavy loads from e.g. loaded trucks. Such problems commonly occur in places of excess moisture e.g. swamp crossings as seen in the picture bove.

The problem is also accelerated in rainy season when there is excess moisture that soaks the road foundation thus weakening its capacity to carry vehicle load.

The sections when used by loaded vehicles develop ruts and potholes (as symptoms) indicative of gradual premature failure of the road unless measures are taken to control the problem.

One of the methods used to solve such problems is the construction of Turn pikes whose construction sequence is shown in the next pictures.

Problem No.6 - Access across road sections with weak foundation soils

Construction sequence for a turnpike

Before

After

Problem No.2 - Access across steep slopes (Gradient < 100%)

A user carrying load ascends a steep section of a community path.

In hilly terrains, steep sections are very common along foot paths. Access along these sections can sometimes be difficult for users (especially women) who frequently carry loads while travelling.

In the rainy seasons, the sections become slippery due to the nature of soils thus causing instability to travellers. This in turn can lead to accidents especially when carrying loads on head.

To ease access along the steep section of the path, constructing steps has proven to be successful eliminating most of the problems mentioned above. The stone masonry steps may be built in stone or brick masonry for slopes < 100%.

The Construction sequence for stone masonry steps.

Step 1

Bench the slope such that each step can be constructed with a rise not exceeding 170mm.

Step 2

Construct stone masonry steps in succession beginning with the step at the bottom of the slope and ending at the top of slope.

Step 3

Place sizable stones at intervals to allow easy walk over

Step 4

Construction complete and flooded section on footpath is possible to use

Construction sequence for stepping stones

Step 1

Provide a well treated log across the footpath to block the flow of water.

Step 2

Back fill by packing interlocking stones

Step 3

Step construction complete and........

Step 4

Access across steep slope section improved for path users.

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Problem No.3 - Access across steep slopes (Gradient > 100%)

The Construction sequence for timber ladder steps

Before

After

Problem No.5 - Water logged footpath

A water logged section on a footpath.

Seasonal heavy rains may cause occasional flooding especially in low lying areas. As the above picture shows, a section on a foot path has been flooded. One solution to such occasional footpath flooding, maybe provision of stepping stones placed above the water level. Such stepping stones will allow movement along the footpath despite the occasional floods.

Problem No.5 - Water logged footpath

Construction sequence for stepping stones

Before

After

Problem No.3 - Access across steep slopes (Gradient > 100%)

A steep section (slope > 100%) on a community path.

In mountainous terrains, very steep sections (with slopes >100%) are very common along foot paths. Access along these sections can sometimes be difficult for users (especially women) who frequently carry loads while travelling.

In the rainy seasons, the sections become slippery due to either the nature of soils or because of algae that grows on rocks if the section is along a rocky section (see picture above) thus causing unstable and unsafe conditions to travellers. This in turn can lead to accidents especially when carrying loads on head.

Stone masonry steps cannot be used in these circumstances because very steep slopes result in increased step rises (>200mm) making users to walk uncomfortably.

To ease access along these very steep sections (gradient >100%) of the path, constructing ladder steps has proven to be successful eliminating most of the problems mentioned above.

The Construction sequence for timber ladder steps.

Step 1

Prepare site for foundation construction.

Step 2

Install ladder footings into foundation using class 20 concrete. After 28days ladder assembly begins.

Step 3

Landing deck constructed and joining of 1st platoon to the landing deck using ropes starts.

Step 4

The remaining platoons are joined in succession until the whole bridge is completed ready for use.

Construction sequence of a floating bridge

Step 1

Assemble Plastic drums.

Step 2

Construct timber deck on top of the plastic drum assembly to form a platoon. Several platoons are made sufficient to bridge the water crossing area.

Step 3

Ladder assembly complete with handrails ready for use.

Step 4

Access across steep slope section improved for path users.

Problem No.4 - Access across a permanent water body

Construction sequence of a floating bridge

Before

After

Problem No.4 - Access across a permanent water body

A still water body between community road and agricultural fields.

Access across water bodies such as in wet lands shown in picture above where rice growing is common can be difficult especially during rainy seasons when the water level increases in such places.

Such places are more common in low lying areas and relatively flat terrains especially in eastern and northern sub regions of Uganda.

Possible solutions to this type of access problem may include the use of floaters like;

- Small wooden constructed boats.
- Rafts made from a combination of plastic drums and timber deck.

This type of structure is a floating bridge.

The ideological construction sequences that follow are for the floating bridge since it construction is relatively simple and inexpensive compared to boats.