Government of the Republic of the Union of Myanmar

National Strategy for Rural Roads and Access

FINAL DRAFT

February 2017

Ministry of Agriculture, Livestock and Irrigation

Ministry of Border Affairs

Contents

Acronyms and abbreviations

DOB	Department of Bridges
DOH	Department of Highways
DRD	Department of Rural Development
DSO	Development Supervisory Office
DSS	Development Supervisory Sub-Office
MMK	Myanmar Kyat
MOALI	Ministry of Agriculture, Livestock and Irrigation
MOBA	Ministry of Border Affairs
MOHA	Ministry of Home Affairs
MOC	Ministry of Construction
MOTC	Ministry of Transport and Communications
NRRA	National Rural Road Agency
SDG	Sustainable Development Goals
TDC	Township Development Committee
US$	United States Dollar
VDC	Village Development Committee

In this document an exchange rate of US$ 1 = MMK 1,350 has been used
(as per 01 January 2017)

Tables

Figures

1. Introduction

1. Nearly 15% of registered villages in Myanmar are not connected by road. Of the villages that are connected by road, more than 40% are linked by dry-season rural roads that quickly become impassable during the rainy season[1]. Altogether, half the existing registered villages are physically isolated during part or all of the year due to a lack of all-season rural road access, affecting over 14 million rural people. This lack of all-season rural roads is severely affecting rural people's access to health services, education, employment opportunities, markets, and other services and facilities, limiting their development and that of the country as a whole.

2. Poor transport infrastructure and related means of transport lead to unnecessary mortality, with an estimated 75% of perinatal mortality worldwide associated with inadequate transport. Better rural roads have internationally been proven to lead to better primary and secondary school attendance for boys and girls, better staffing and teacher attendance and better teaching facilities due to easier transport of educational and construction materials. Significant international evidence exists that providing road access leads to improved market access, greater use of fertilizers and agricultural inputs, enhanced agricultural production, higher employment, living standards and poverty reduction. Improved rural transport infrastructure greatly reduces the costs related to transporting people and goods, leading to increases in economic growth and reducing rural isolation and poverty as mobility rates are increased and interaction with markets and services is improved.

3. Without proper roads, rural people cannot access the services and facilities they need to improve their lives and to participate in the national economy. The Government of Myanmar considers improved rural roads to be key to developing rural areas and addressing rural poverty and inequalities in the country. This is in line with the 2030 Sustainable Development Goals (SDGs), which the Government of Myanmar has committed itself to achieving. Rural road development and the resulting improved access to services and facilities are expected to support the following SDGs:

- **SDG #1 related to poverty reduction** – Rural roads have been proven to provide access to employment opportunities outside the villages, while also providing access to markets for selling produce and purchasing inputs, and facilitating access to education to improve future income earning opportunities.

- **SDG #2 related to hunger reduction** – Rural roads have been proven to lead to higher incomes and related food consumption, while also facilitating access to knowledge and inputs necessary for increasing agricultural produce.

- **SDG #3 related to improved health** – Rural roads have been proven to provide access to health facilities and services and to health education, leading to improved health standards in rural areas.

- **SDG #4 related to improved education** – Rural roads have been proven to facilitate year-round access to education facilities and to lead to improved education standards, reducing the costs and difficulties of obtaining an education and reducing drop-out rates.

- **SDG #8 related to improved employment opportunities** – Rural roads have been proven to increase and facilitate access to employment opportunities outside the village, as well as increasing income earning opportunities within the village.

- **SDG #9 related to building resilient infrastructure** – Rural roads are increasingly being built to an all-season standard that provides year-round access, while sustainability is ensured both through appropriate designs that are adapted to climate impacts, and proper maintenance to prevent road deterioration and damage.

[1] A portion of villages are also connected by higher-level dry-season roads that are not covered by this strategy.

- **SDG #10 related to reduced inequalities** – The increased access to services and facilities resulting from rural roads has been proven to lead to a reduction in inequalities between (remote) rural areas and the rest of the country.

Figure 1 Sustainable Development Goals

4. This *National Strategy for Rural Roads and Access* was jointly prepared by the Ministry of Agriculture, Livestock and Irrigation (MOALI) and the Ministry of Border Affairs (MOBA) with technical support from the Asian Development Bank (ADB). It serves to guide investments in the rural road sector over the coming 15 years, ensuring that these investments contribute in an optimal manner to addressing the problems of limited access, providing as many rural people as possible with all-season access by 2030.

2. Objectives and guiding principles

5. In support of the Sustainable Development Goals (SDGs), the Government of Myanmar aims to improve the access of the rural population to services and facilities by providing rural villages with road access. To ensure that rural people can make use of this road access throughout the year, the Government of Myanmar will construct and upgrade the rural roads connecting these villages to an all-season standard.

6. The long-term development objective of the Government of Myanmar is to provide all-season access to all villages in Myanmar. In support of this long-term development objective, this *National Strategy for Rural Roads and Access* targets the next 15 years up to 2030, during which the Government of Myanmar aims to provide all-season road access to at least 80% of the villages in each state/region in Myanmar.

7. To maximize the number of rural people benefitting from all-season road access, the Government of Myanmar will give priority to providing road access to villages with larger populations. The Government of Myanmar will prioritize villages with more than 1,000 people, all of which will be connected by all-season roads by 2020[2]. The second priority for the Government of Myanmar will be villages with more than 500 people, with at least 95% of these villages to be connected by all-season road by 2025. The third priority for the Government of Myanmar will be to target villages with more than 250 people, connecting at least 75% of these villages by all-season roads by 2030. Villages with less than 250 people will also be included, with at least 50% of these villages connected by all-season road by 2030. To ensure that all states and regions will benefit equally, irrespective of their population size, the Government of Myanmar will connect at least 80% of all registered villages in each state/region by all-season road.

8. By prioritizing the villages with larger populations, the Government of Myanmar will connect an additional 10 million rural people by all-season road, providing year-round road access to approximately 90% of the rural population in the country by 2030. The Government of Myanmar will furthermore provide dry-season road access to an additional 6,700 villages, ensuring that at least 90% of the villages in each state/region and up to 95% of the country's rural population have some form of road access by 2030.

Figure 2 Strategy Objective

To provide year-round access to approximately 90% of the rural population in Myanmar by connecting at least 80% of all registered villages in each state/region by all-season road by 2030

9. **Eligible villages**. The Government of Myanmar aims to connect villages that have been formally registered in the Government Gazette by the General Administration Department (GAD) under the Ministry of Home Affairs (MOHA). As of March 2015, there are 63,860 villages spread over the 330 townships[3] and 74 districts that make up the 14 States and Regions, the Union Territory of Naypyitaw and the 5 Self-Administered Zones (SAZ) and 1 Self-Administered Division (SAD). A data collection exercise regarding the access levels of these villages concluded that approximately 6,600 villages no longer exist (were destroyed or deserted) or are managed by other entities (e.g. Yangon City Development Council). This strategy therefore focuses on the remaining 57,228 registered villages still in existence.

[2] Two-thirds of these larger villages are already connected by higher-level roads or by all-season rural roads.
[3] Of the total 330 townships, only 297 have registered villages. The remaining 33 townships involve urban areas. In 6 of the townships with registered villages in Yangon Region, the management of the roads has been taken over by Yangon City Development Council.

10. By 2020, all the registered villages with more than 1,000 people will be connected by all-season rural roads or higher-level roads. By 2025, at least 95% of the registered villages with more than 500 people will be connected by all-season rural roads or higher-level roads. By 2030, 80% of the registered villages in each state/region will be connected by all-season road, including at least 75% of all registered villages with more than 250 people, and approximately 50% of the remaining smaller registered villages with less than 250 people.

11. The large number of non-existing villages shows a need to update the GAD registration of villages. In addition, several villages have not been formally registered by GAD due to security concerns in the areas where they are located. Because of these security concerns, the Government of Myanmar is unable to effectively assist these villages in the development of their rural road networks. Accurate data regarding these villages is also lacking. These villages have therefore not yet been included in the scope of this strategy. However, the Government of Myanmar will continuously aim to resolve the security concerns, at which time these villages may be formally registered. Once the formal registration of the villages has been updated, the villages to be included in the scope of this strategy will be amended.

3. Rural road standards and specifications

12. **All-season standard**. The Government of Myanmar aims to provide registered villages with road access of an all-season standard. Such an all-season standard may still experience road closures during heavy rains or periods of flooding, but such closures will be limited to a maximum of a few days, as opposed to a dry-season road that is impassable for much of the rainy season.

13. **National Rural Road Standards and Specifications**. The minimum specifications of the all-season standard will be defined in detail in the *National Rural Road Standards and Specifications* (NRRSS) that are currently under preparation with support from development partners. The main objective of the standards and specifications to be applied under this strategy is that they must be appropriate in terms of current and foreseen future usage of the rural roads. Firstly, the standards and specifications must suit the road function and its traffic (both people as well as vehicles). The standards and specifications must furthermore be compatible with the capacities of the engineers and technicians that will design the roads, with the materials that are available for building the roads, with the capacities of the contractors and laborers that will construct the roads, and with the skill levels of the villagers and local contractors that will be involved in the maintenance of the roads. The standards and specifications furthermore aim to achieve a balance between the costs of road construction or upgrading, and the subsequent costs of maintaining the road, avoiding that excessive maintenance burdens are placed on local budgets or communities, but also avoiding unnecessarily expensive designs that quickly use up the available investment budgets. In this context, there will be some variation between different states/regions regarding the exact type of all-season standard to be applied, taking account of the various factors influencing the most suitable design and its maintenance (e.g. climate, topography, soil types, construction materials, traffic volumes, etc.). The main aspects of the all-season standard are summarized below, while further details will be provided in the NRRSS. Where there is a difference between this strategy and the NRRSS, the NRRSS will have precedence.

14. **Core Rural Road Network (CRRN)**. To ensure that available funding for rural roads and access is used efficiently and effectively in achieving the objective of this strategy, the concept of a Core Rural Road Network (CRRN) will be applied. The CRRN refers to the minimum rural road network in a township required to connect all villages to each other and to the higher-level road network. Through the CRRN, villages will be able to gain access to village tracts and the township capital, and connect to higher-level roads that link to the district capital, state/regional capitals and major cities of the country, thus providing villages with access to all services and facilities that the country can offer.

15. Villages directly connected by higher-level roads managed by the Ministry of Construction (MOC) or other higher-level roads managed by entities such as the Irrigation Department or the Ministry of Electricity and Energy, will be considered connected and will not be provided with a separate CRRN connection. All other villages will be connected by a single rural road that will be identified as a CRRN road. Where a village is connected only by one rural road, that road will be selected as part of the CRRN. Where a village is connected by more than one rural road, the best road will be selected to form part of the CRRN, taking account of the length, surface type, condition and traffic volumes in the different existing rural roads. Where a village is not connected by any road, a tentative alignment will be identified, which will be selected as part of the CRRN for new construction[4]. The CRRN will consist of the existing single road access for each connected village, as well as the tentative alignments for new construction linking unconnected villages. Locations with important economic or cultural importance may also be connected by the CRRN (e.g. temples, touristic places, important agricultural areas, etc.), taking into account the limitation of single road access.

[4] In some cases, a road connection for a village may be unfeasible due to the isolated nature of the village or its limited size. For such villages, no road connection will be included in the CRRN and instead other types of access may be provided.

Figure 3 Core Rural Road Network (CRRN)

The Core Rural Road Network (CRRN) is the minimum rural road network in a township required to connect all villages to each other and to the higher-level road network

- *If a village is connected directly by a higher-level road, it does not require a CRRN road*
- *If a village is connected by only one rural road, that road forms part of the CRRN*
- *If a village is connected by more than one road, the best road is selected to form part of the CRRN*
- *If a village is not connected by a road, a tentative alignment is selected to form part of the CRRN for new construction.*

16. **Rural road classes**. Rural roads will be classified into three administrative classes. The first two administrative classes involve rural roads that belong to the core rural road network (CRRN), while the third administrative class involves other rural roads. Class A rural roads include all core rural roads that connect village tracts or that connect rural populations of over 1,000 people with the higher-level road network. This may involve a road connecting a single large village, but may also involve a road (section) connecting multiple villages with a combined population of more than 1,000 people. Due to the larger populations served by class A roads and the importance of providing good connectivity for village development committees and for services and facilities provided in the village tracts, higher standards and specifications will be applied to class A rural roads. Class A rural roads generally connect directly to the higher-level roads or to towns and cities[5].

17. Class B rural roads include all other core rural roads connecting villages and serving populations of less than 1,000 people. These class B rural roads serve smaller villages or fewer villages, and will have lower standards and specifications than class A roads, but will be constructed and upgraded to an all-season standard. Class B rural roads will generally connect to class A rural roads, although it is possible that they connect smaller villages directly to higher-level roads or towns.

18. Class C rural roads include all other rural roads that are not defined as part of the core rural road network and that do not serve as the main connection to a village. Although these class C rural roads provide additional access to agricultural fields and link habitations that are located away from the main village, they do not contribute to the main objective of this strategy. As such, they do not have priority for upgrading to an all-season standard.

19. **Road surface type**. Class A and class B rural roads will be constructed and upgraded to have an improved, unsealed surface. In most cases this will involve a dry-bound or water-bound macadam surface, although gravel and other suitable materials may be applied in some areas in line with the National Rural Road Standards and Specifications (NRRSS). Such an improved unsealed road surface will allow the road to be used in most weather conditions and throughout the year (roads may be impassable during heavy rains and periods of flooding, but this should generally not last longer than a few days). Class A roads will gradually be further upgraded to have a sealed surface (cement concrete or bituminous) in line with their importance and the envisaged traffic levels of these roads. Class C rural roads will have an earthen surface and will not receive priority for upgrading to a higher surface standard under this strategy.

20. An approach of stepped upgrading will be applied, where class B rural roads that have traffic volumes that exceed the minimum threshold for sealing as defined in the NRRSS, will be eligible for a higher surface standard and will be upgraded to have a sealed surface. In built-up areas (through villages), roads may also be sealed to reduce dust pollution. In areas subject to frequent flooding, higher construction standards may be applied that are more resistant to flooding and that ensure the sustainability of the road (e.g. stone paving or cement concrete). Higher surface standards may also

[5] However, roads connecting smaller villages to the higher-level road network will not be considered class A roads, since they only benefit a small population and are likely to carry low traffic volumes.

be applied on steep slopes with the aim of reducing erosion and avoiding accelerated deterioration of the road surface (e.g. stone paving or sealed surfaces).

21. **Road carriageway width**. Class A and class B roads will have a minimum carriageway width of 12 feet. An approach of stepped upgrading will be applied, where for class A and B rural roads with larger traffic volumes that exceed the minimum threshold for widening as defined in the NRRSS, the width of the carriageway may be increased to 18 feet or more. Where topography requires significant cut and fill to achieve the defined carriageway width and in flood prone areas where road construction requires the use of more expensive flood resistant designs, a narrower carriageway width with single lane access of 6 or 9 feet may be opted for, ensuring sufficient passing places. Class C roads may have a carriageway width of less than 12 feet, depending on local conditions.

22. **Drainage system and bridges**. Class A and class B rural roads will include proper sidedrains and cross drainage. Sidedrains may be earthen, but must be lined where the risk of erosion is high (generally where slopes are greater than 6%) and where they go through villages. Cross drainage structures, including bridges, will be built from cement concrete or steel and have a load bearing capacity of at least 20 tons. In class A rural roads and in those class B rural roads where traffic volumes exceed the minimum traffic threshold for bridge strengthening as defined in the NRRSS, a load bearing capacity in line with AASHTO HS20-44 standards will be applied. Timber structures may only be used as temporary measures in class A and class B rural roads and should be gradually upgraded to concrete or steel structures. Class C roads may continue to make use of timber bridges.

23. **Slope protection**. Class A and class B roads will include proper protection of cut and fill slopes and embankments to avoid extensive damage from occurring to the road. Depending on the circumstances, this may vary from vegetative protection (bio-engineering) to retaining walls (concrete, masonry or gabion). Construction and upgrading works will identify and include adequate slope protection measures.

Table 1 Minimum rural road standards

	Surface type	Carriageway width	Side drains	Bridges	Bridge carrying capacity
Class A	Sealed surface	12 feet	Earthen/Lined	Steel / concrete	AASHTO HS20-44 (36 tons)
Class B	Improved, unsealed surface	12 feet	Earthen/Lined	Steel / concrete	20 tons
Class C	Earthen	6-12 feet	Earthen	Timber	
Traffic > NRRSS threshold	Sealed surface	18 feet		Steel / concrete	AASHTO HS20-44 (36 tons)

24. **Alternative standards and access solutions**. Although it is the objective of the Government of Myanmar to connect registered villages by all-season class A or class B rural roads with standards and specifications as described above, exceptions may occur where the prescribed standards and specifications are found to be economically unviable. This may be the case for exceptionally small villages with very few beneficiaries, or where the terrain makes the construction of all-season roads prohibitively expensive (for instance in very steep terrain or in flood prone areas). In these cases, lower standards and specifications may be applied to the roads concerned or alternative access solutions may be selected in negotiation with the population. Such alternative access solutions may include motorcycle tracks instead of roads, jetties and dredged channels to facilitate water transport where road construction is severely complicated by waterways, the use of footbridges to connect isolated villages to the rural road network, etc.

25. **Climate resilience and sustainability**. Under this *National Strategy for Rural Roads and Access*, use will be made of climate resilient designs that take account of the differences in climate vulnerability (flood risk, erosion risk, rainfall, drought, etc.) in the various parts of the country. Appropriate designs will be applied that find a balance between the risks of climate impacts and related repair and maintenance costs on the one hand, and the construction costs on the other hand.

This will result in different areas applying different standards in line with the expected climate impacts in those areas, reducing total lifecycle costs and increasing the sustainability of improved access. Climate resilient aspects in designs will primarily be evident in the level of the carriageway, the construction materials used (to withstand flooding and erosion), the types and dimensions of drainage structures (to deal with increased rain volumes and intensities and related peak runoff flows), and the slope and embankment protection measures (to avoid collapse due to flooding, erosion or landslides). In the preparation of the *National Rural Road Standards and Specifications*, suitable design standards for the different areas of the country will be identified and trialed. For existing roads, climate back strengthening will be applied, targeting possible vulnerable road sections through a spot improvement program, linking to planned periodic maintenance works where possible. Improved maintenance will also be introduced to reduce possible climate impacts and ensure that improvements in access levels are sustained.

4. Rural roads and bridges

26. **Rural roads**. Rural roads are defined as the lowest level roads managed by the Department of Rural Development (DRD) under the Ministry of Agriculture, Livestock and Irrigation (MOALI) and by the Ministry of Border Affairs (MOBA). These do not include the higher-level roads managed by the Ministry of Construction (MOC) or by other ministries and departments such as the Department of Irrigation, the Ministry of Electricity and Energy or the Army, nor do they include the urban roads managed by the City Development Councils and Town Development Councils.

27. As per August 2016, there are just under 60,000 miles of registered rural roads in Myanmar, jointly managed by DRD and MOBA. Only 6% of the rural road network has a sealed cement concrete or bituminous surface, while 28% has an improved dry-bound or water-bound macadam, gravel or laterite surface. Only a third of the rural roads currently have an improved surface, and most of these are likely to be passable all year round[6]. The remaining two-thirds of the registered rural road network consist of earthen roads that are generally only passable in the dry season.

28. In addition to the 60,000 miles of registered rural roads, there are nearly 6,000 miles of registered jeep and motorcycle tracks, ox-cart tracks and footpaths (these are mainly located in Chin State, where they form three-quarters of the registered network).

Table 2 Rural road lengths by surface type (miles)

State/Region	DRD			MOBA			Total roads	Tracks / paths
	Cement / Bituminous	Macadam / Gravel	Earthen	Cement / Bituminous	Macadam / Gravel	Earthen		
Naypyitaw	61	428	672	-			**1,162**	429
Kachin	96	421	1,512	13	482	744	**3,267**	-
Kayah	35	119	220	19	299	323	**1,015**	-
Kayin	80	528	532	113	318	222	**1,793**	-
Chin	19	63	1,630	8	92	1,199	**3,010**	5,292
Sagaing	245	1,466	5,655	43	480	646	**8,536**	-
Tanintharyi	220	392	1,513	39	536	524	**3,223**	-
Bago	156	1,620	2,438	-			**4,214**	-
Magway	111	1,373	4,241	-			**5,725**	40
Mandalay	338	1,838	2,460	-			**4,636**	-
Mon	185	266	389	55	194	385	**1,473**	-
Rakhine	99	520	1,011	38	288	330	**2,285**	-
Yangon	434	206	932	-			**1,571**	-
Shan	494	1,837	6,894	543	2,192	2,183	**14,142**	-
Ayeyarwady	245	810	2,353	-			**3,408**	-
Total	**2,817**	**11,886**	**32,450**	**871**	**4,881**	**6,556**	**59,462**	**5,761**
Percentage	5%	20%	55%	1%	8%	11%	**100%**	

Source: DRD August 2016 + MOBA December 2016

29. **Higher-level roads**. The rural roads connect to higher-level roads that provide access to township and district capitals as well as to other states and regions. These higher-level roads are managed by various other ministries and departments other than DRD and MOBA. The most important of these is the Ministry of Construction (MOC) that manages over 25,000 miles of higher-level roads connecting to other countries, connecting the different states and regions, and connecting to district capitals and towns. These roads are complemented by other higher-level roads managed by various sector agencies such as the Ministry of Electricity and Energy, the Department of Irrigation and the Army. Some of these roads currently have an earthen dry-season standard (e.g. 20% of

[6] This assumes that roads are not in very poor condition and that water crossings are provided for.

MOC roads). This strategy assumes that these roads will be upgraded to an all-season standard by the ministries and departments responsible for them.

30. **Rural bridges**. There are currently over 23,000 registered bridges and causeways in the rural road network, spanning a total length of over 574,000 feet. Timber bridges make up a third of the total number and nearly half the total length. Concrete bridges make up a quarter of the number and length, while box culverts make up 40% of the number, but only 11% of the length. Causeways are becoming increasingly important, forming 10% of the total length. Larger suspension bridges only form 1% of the number of bridges, but cover 5% of the total length. To ensure the sustained access, the timber bridges will gradually need to be replaced by more resilient infrastructure.

Table 3 Rural bridge data

State/ Region	Timber bridge		Concrete bridge		Box culvert		Causeway		Suspension bridge		Bailey bridge	
	#	feet	#	feet	#	feet	#	feet	#	feet	#	feet
Naypyitaw	58	5,479	23	1,229	129	678	11	718				
Kachin	282	10,977	176	3,498	149	2,426	1	400	49	10,646		
Kayah	175	3,654	176	2,933	250	1,471	25	744				
Kayin	88	3,473	402	10,601	415	2,610						
Chin	124	10,598	10	950	246	9,049	1	140	75	15,770	3	220
Sagaing	1,452	66,651	492	13,357	946	9,532	251	12,990				
Tanintharyi	382	10,806	137	7,833	285	1,542						
Bago	976	33,911	461	10,163	951	5,000	21	625			10	1,122
Magway	312	13,316	205	5,130	546	3,602	206	16,144	8	3,070		
Mandalay	496	17,482	386	8,095	755	4,174	230	22,895				
Mon	188	5,873	689	19,254	408	2,272	30	244				
Rakhine	300	7,201	639	17,982	1,269	6,131						
Yangon	170	7,975	281	9,390	369	3,197					6	1,110
Shan	1,709	24,750	1,004	16,822	1,574	8,030	66	402	1	140		
Ayeyarwady	592	36,627	447	23,910	1,042	5,834	6	280	1	320		
Total	**7,304**	**258,773**	**5,528**	**151,147**	**9,334**	**65,548**	**848**	**55,582**	**134**	**29,946**	**19**	**2,452**
Percentage	31%	45%	24%	26%	40%	11%	4%	10%	1%	5%	0.1%	0.4%

Source: DRD August 2016

5. Rural access

31. **Rural access**. The rural roads and bridges are a means to an end, the end being to provide rural people with access to services and facilities, allowing them to develop and improve their livelihoods and to participate in the national economy. A significant portion of the rural population in Myanmar still lacks road access, while an even larger portion of the rural population faces physical isolation during part of the year when dry-season roads become impassable due to rains and flooding.

32. **Village access levels**. In December 2016, data on village access levels was collected from all townships in Myanmar. This showed that 12,405 villages (22% of the 57,228 existing registered villages in Myanmar[7]) are connected by higher level roads, 16,238 villages (28%) are connected by all-season rural roads, 20,355 villages (36%) are connected by dry-season rural roads and 8,230 villages (14%) have no road access whatsoever. This means that half the existing registered villages have either dry-season road access or no road access at all, and are physically isolated for at least part of the year.

33. **Population access levels**. The village access level data has been cross-referenced with population data from the 2014 census. Villages connected directly by higher-level roads and by all-season rural roads tend to have larger populations, while villages connected by dry-season rural roads and especially the villages still lacking road access, tend to have smaller populations. The data shows that approximately 9.4 million people (28% of the village population) are connected by higher level roads, 10.2 million people (30%) are connected by all-season rural roads, 10.1 million people (28%) are connected by dry-season rural roads and 4.0 million people (11%) have no road access whatsoever[8].

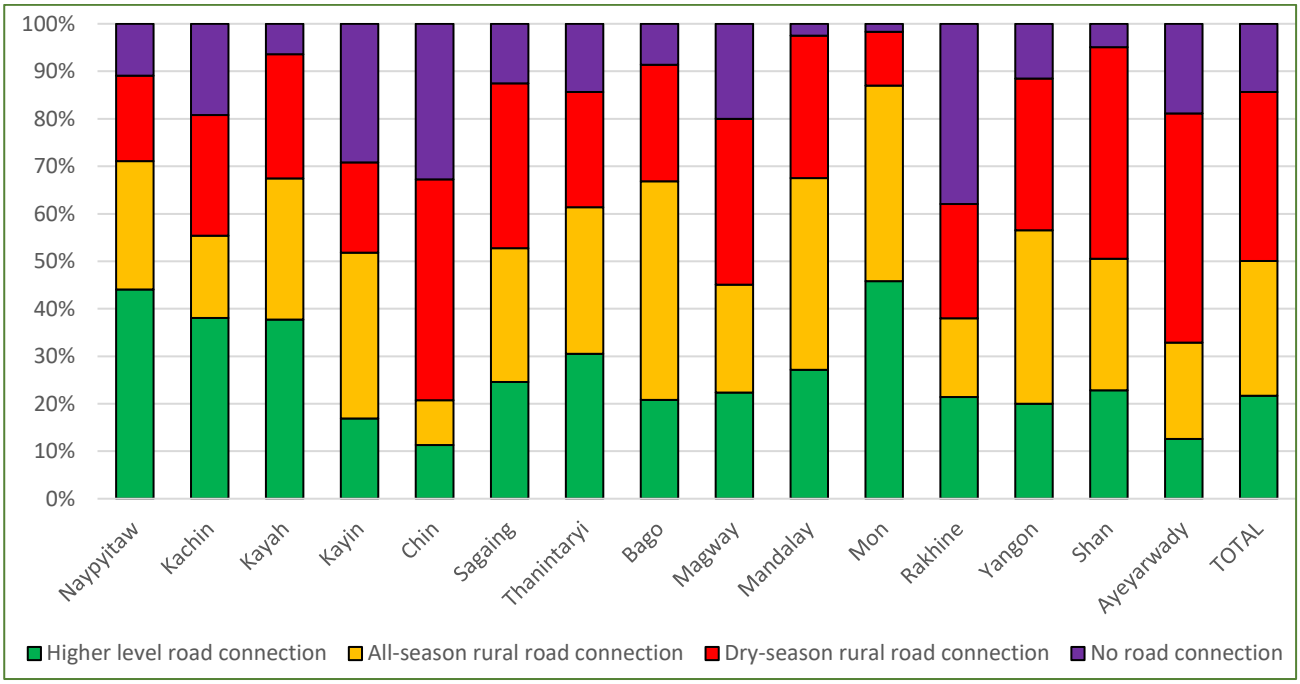
Table 4 Village access levels in December 2016 (#)

State/ Region	Total		Higher-level road connection		All-season rural road connection		Dry-season rural road connection		No road connection	
	villages	million people	villages	million people	villages	million people	villages	million people	villages	million people
Naypyitaw	788	0.8	347	0.4	213	0.2	142	0.1	86	0.1
Kachin	1,175	1.0	447	0.5	204	0.3	298	0.1	226	0.0
Kayah	501	0.2	189	0.1	149	0.1	131	0.0	32	0.0
Kayin	1,918	1.2	324	0.3	670	0.5	364	0.2	560	0.1
Chin	1,330	0.4	150	0.1	126	0.0	618	0.2	436	0.1
Sagaing	5,955	4.4	1,465	1.2	1,675	1.3	2,070	1.4	745	0.5
Tanintharyi	1,010	0.9	308	0.3	312	0.3	245	0.2	145	0.1
Bago	6,188	3.7	1,289	0.9	2,846	1.5	1,521	0.9	532	0.4
Magway	4,754	3.3	1,062	0.8	1,082	0.8	1,657	1.1	953	0.6
Mandalay	4,779	4.0	1,296	1.3	1,932	1.7	1,433	1.0	118	0.1
Mon	1,143	1.4	524	0.6	470	0.7	130	0.1	19	0.0
Rakhine	3,727	1.7	799	0.4	618	0.3	895	0.4	1,415	0.6
Yangon	2,017	1.7	404	0.5	736	0.6	645	0.4	232	0.1
Shan	10,140	3.8	2,315	1.1	2,812	1.1	4,511	1.4	502	0.2
Ayeyarwady	11,803	5.2	1,486	0.8	2,393	1.0	5,695	2.5	2,229	1.1
Total	**57,228**	**33.7**	**12,405**	**9.4**	**16,238**	**10.2**	**20,355**	**10.1**	**8,230**	**4.0**
	100%	100%	22%	28%	28%	30%	36%	30%	14%	12%

Source: DRD, 2014 census, ADB TA-8788

[7] Of the 63,860 registered villages, 6,167 villages (10%) were indicated to no longer exist (destroyed or deserted) or to be managed by other entities (e.g. Yangon City Development Council), and for 465 villages (0.7%) no data was received.
[8] No access level data was received for 465 villages with approximately 0.3 million people.

Figure 4 Village access levels in December 2016 (% of villages)



Source: DRD, 2014 census, ADB TA-8788

34. Half the villages (over 28,500 villages) and two-fifths of the rural population (14 million rural people) currently face physical isolation during at least part of the year. The rest of the rural population lives in the larger villages that are connected directly by higher-level roads[9] or by all-season rural roads (50% of the villages with 58% of the rural population).

35. This *National Strategy for Rural Roads and Access* sets an objective of providing at least 80% of all existing registered villages in each state and region with all-season access by 2030, providing year-round access to approximately 90% of the rural population. This is to be achieved by upgrading the rural roads connecting most of the 20,355 villages with dry-season access, and by constructing additional rural roads to connect some of the 8,230 villages currently lacking road access. In doing so, priority will be given to the villages with larger populations. The improved access will be further expanded by providing dry-season road access to some villages, expanding road access to a minimum of 90% of villages in each state and region and reaching an estimated 95% of the rural population in the country. The strategy further aims to introduce proper maintenance of the rural roads connecting the different villages, in order to sustain the improved access levels that have been achieved.

36. **Rural transport services**. Although this strategy focuses on rural transport infrastructure, particularly roads, the importance of rural transport services must also be highlighted. Many rural people do not own personal means of transport that they can use, and are dependent on public transport services. Without access to public transport services, many people are unable to reap the benefits of road access. These public transport services may vary from informal transport services provided by neighbors who have a motorcycle or other vehicle and can offer a basic transport service for passengers and/or goods, to formalized transport services that provide regular public transport along fixed routes. The formalized public transport services require a license from the Road Transport Administration Department (RTAD) under the Ministry of Transport and Communications (MOTC). A recent ADB study[10] found that rural transport generally responds well to demand, that transport fees are usually competitive and fair, and that the standard of rural transport services quickly improves once road access is provided. However, this will need to be continuously monitored to ensure that the expected benefits of improved rural road access are indeed achieved.

[9] It must be noted that some of these higher-level roads currently have a dry-season standard and become inaccessible during part of the year.
[10] *Myanmar Transport Sector Policy Note: Rural Roads and Access*, Asian Development Bank, 2016.

6. Core Rural Road Network

37. **Core Rural Road Network (CRRN)**. The CRRN has yet to be identified for most townships in Myanmar. A pilot study[11] covering 14 townships in the districts of Hinthada, Myingyan and Langkho, included the identification of the core rural road networks for these townships. Based on the results from these 14 pilot townships and the data from the village access level study, it is estimated that a core rural road network of approximately 69,000 miles is required to connect all existing registered villages in Myanmar (in addition to the higher-level roads that directly connect a portion of these villages and connect the CRRN roads with each other).

38. It is further assumed that approximately 90% of the existing rural roads form part of the CRRN (the other 10% are considered to be non-CRRN roads duplicating access to villages or connecting to other areas). This means that approximately 54,000 miles of CRRN roads already exist, including 20,460 miles of existing all-season rural roads (100% of the existing all-season rural roads that form 30% of the CRRN) and approximately 33,640 miles of existing dry-season rural roads that require upgrading to all-season access (89% of the existing dry-season rural roads that form 49% of the CRRN). To connect the 8,230 villages that currently lack road access, it is estimated that an additional 15,000 miles of new CRRN roads need to be constructed to complete the CRRN (22% of the CRRN)[12].

Table 5 Estimated CRRN lengths (miles)

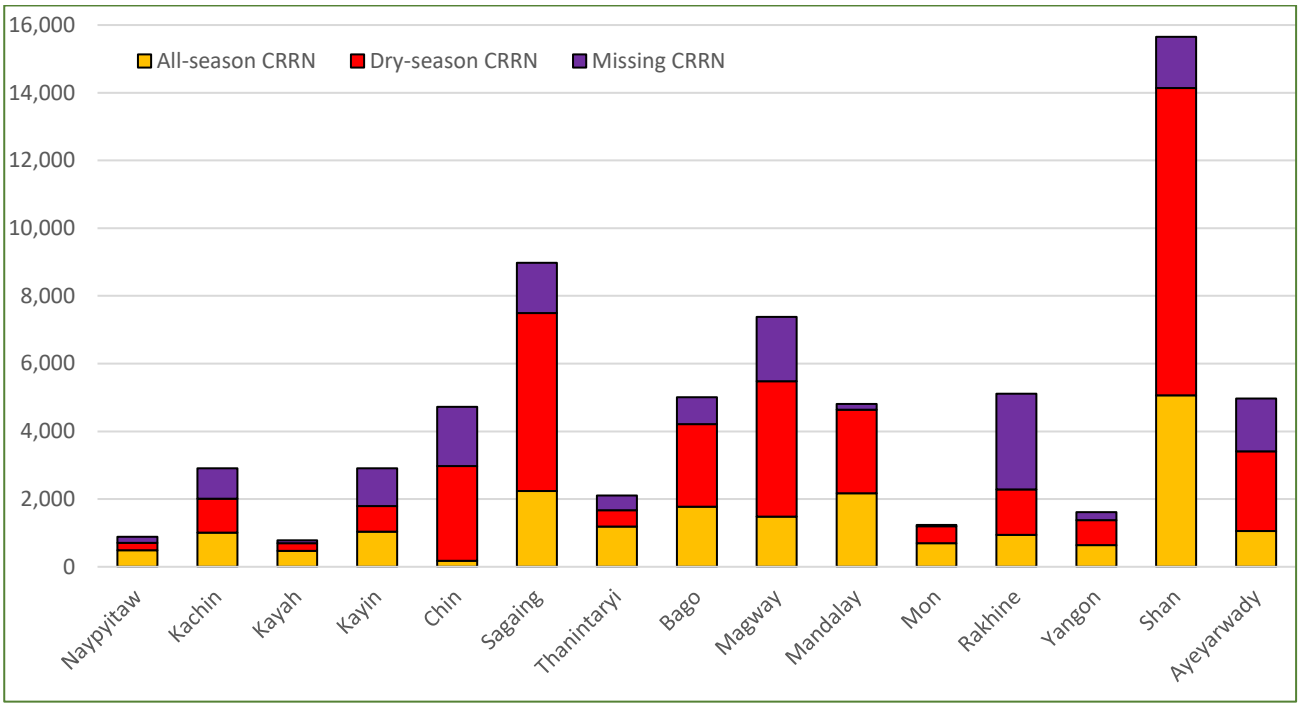
State/Region	CRRN length miles	Existing CRRN all-season standard		Existing CRRN dry-season standard		Existing CRRN miles	CRRN for new construction	
		miles	%	miles	%		miles	%
Naypyitaw	**880**	490	56%	220	25%	710	170	20%
Kachin	**2,910**	1,010	35%	1,000	34%	2,010	900	31%
Kayah	**780**	470	61%	230	29%	700	80	10%
Kayin	**2,910**	1,040	36%	750	26%	1,790	1,120	38%
Chin	**4,720**	180	4%	2,800	59%	2,980	1,740	37%
Sagaing	**8,980**	2,240	25%	5,260	59%	7,490	1,490	17%
Tanintharyi	**2,110**	1,190	56%	490	23%	1,670	440	21%
Bago	**5,010**	1,780	35%	2,440	49%	4,210	800	16%
Magway	**7,380**	1,480	20%	3,990	54%	5,480	1,910	26%
Mandalay	**4,810**	2,180	45%	2,460	51%	4,640	180	4%
Mon	**1,240**	700	57%	500	40%	1,200	40	3%
Rakhine	**5,120**	940	18%	1,340	26%	2,290	2,830	55%
Yangon	**1,610**	640	40%	740	46%	1,380	230	14%
Shan	**15,650**	5,070	32%	9,080	58%	14,140	1,510	10%
Ayeyarwady	**4,970**	1,060	21%	2,350	47%	3,410	1,560	31%
Total	**69,090**	**20,460**	**30%**	**33,640**	**49%**	**54,090**	**14,990**	**22%**

Source: ADB TA-8788

39. The Core Rural Road Networks in each township will be identified in the course of 2017. The CRRNs will be prepared by DRD and MOBA staff in collaboration with village tract leaders, and will be submitted to the township development committees and the state/regional governments for approval. The CRRN identification will be completed by 31 December 2017, and all identified CRRN roads will be entered into a rural road database. This database will identify the different existing and planned CRRN roads and their characteristics, as well as the villages connected by each road, allowing for proper monitoring of the progress of connecting all villages and of the status of the core rural road network.

[11] ADB TA-8788: *Core Rural Road Networks in Myanmar – A pilot study in 14 townships*. Asian Development Bank, 2016.
[12] This assumes connecting all existing registered villages by road. In practice, road connections may not always be possible or economically justifiable, reducing the length of CRRN road construction required.

Figure 5 Estimated CRRN lengths (miles)



Source: ADB TA-8788

7. Investment needs

40. **Estimated road construction and upgrading costs**. To achieve the objective of connecting at least 80% of all registered villages in each state/region by an all-season road, a large portion of the existing dry-season CRRN roads will need to be upgraded to all-season standard and several new CRRN roads will need to be constructed and upgraded to all-season standard. The secondary objective of ensuring that 90% of all GAD registered villages in each state/region have at least dry-season road access, will require additional new construction to dry-season standard in some states/regions. In total, it is estimated that just under 26,000 miles of existing dry-season CRRN roads will need to be upgraded to an all-season standard, that some 2,400 miles of new CRRN roads will need to be constructed and upgraded to an all-season standard to complete the all-season connection of 80% of villages in each state/region, and that a further 4,300 miles of new construction to a dry-season standard will be required to ensure that a further 10% of villages in each state/region have at least dry-season access. Exact upgrading and construction needs will be determined once the CRRN has been identified and investment plans have been prepared for each township.

41. The total costs of construction and upgrading of the core rural road network to connect at least 90% of all existing registered villages by road, including connecting at least 80% of all registered villages by all-season rural road or higher-level road, is estimated to be approximately US$ 2.5 billion (MMK 3,400 billion). This includes US$ 2.0 billion for upgrading the existing dry-season CRRN roads to all-season standard, US$ 131 million for the construction of new CRRN roads to earthen standard (excluding costs of land acquisition), US$ 199 million for upgrading approximately a third of these new CRRN roads to an all-season standard, and US$ 226 million for upgrading existing timber bridges in the CRRN (note that this does not include the costs of new bridges that may be required in existing or new CRRN roads[13]). All costs are based on DRD unit rates with a 30% markup in line with recent costs of works contracted out under development partner projects. It must be noted that the upgrading costs are based on unsealed macadam standard, and do not take account of possible other surface types that may be applied.

Table 6 Estimated 2017-2030 CRRN requirements for upgrading and construction

State/Region	Upgrading existing CRRN roads to all-season standard		Constructing new CRRN roads to dry-season standard		Upgrading new CRRN roads to all-season standard		Upgrading existing CRRN timber bridges		Total
	miles	$ million	miles	$ million	miles	$ million	feet	$ million	$ million
Naypyitaw	109	7	14	0	-	-	3,347	3	**11**
Kachin	967	89	434	11	-	-	6,746	6	**106**
Kayah	109	9	-	-	-	-	2,520	2	**12**
Kayin	754	48	736	11	353	23	3,473	3	**85**
Chin	2,795	255	1,212	25	680	62	10,478	10	**352**
Sagaing	4,123	256	299	5	-	-	58,483	56	**317**
Tanintharyi	372	31	132	3	-	-	5,602	5	**39**
Bago	1,307	116	-	-	-	-	33,911	33	**148**
Magway	3,994	240	955	16	4	0	12,743	12	**268**
Mandalay	1,022	61	-	-	-	-	17,482	17	**77**
Mon	-	-	-	-	-	-	4,784	5	**5**
Rakhine	1,341	114	2,085	46	1,339	114	7,201	7	**281**
Yangon	544	74	30	1	-	-	7,008	7	**81**
Shan	6,006	440	-	-	-	-	24,750	24	**463**
Ayeyarwady	2,299	240	734	14	-	-	36,627	35	**288**
Total	**25,741**	**1,979**	**6,632**	**131**	**2,376**	**199**	**235,155**	**226**	**2,535**

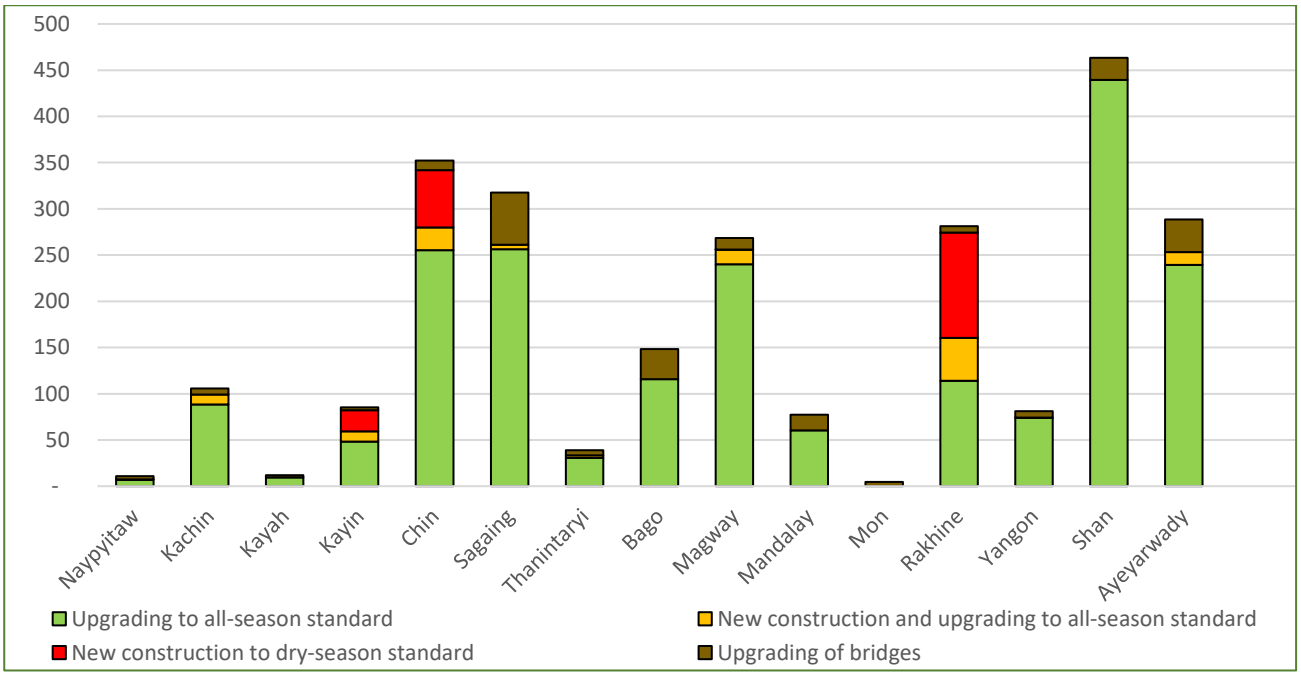
Source: ADB TA-8788

[13] The exact cost will become evident once the CRRN has been identified for each township, including bridge upgrading and construction needs.

Figure 6 Estimated 2017-2030 CRRN upgrading and construction lengths (miles)

Source: ADB TA-8788

Figure 7 Estimated 2017-2030 CRRN investment needs (US$ million)



Source: ADB TA-8788

42. This investment of US$ 2.5 billion will result in over 48,500 miles of CRRN roads having an all-season standard, providing all-season access to approximately 33,500 villages and 19.8 million rural people. Existing higher-level roads will provide access to an additional 12,400 villages and 9.4 million people. A further 12,200 miles of existing and new dry-season CRRN roads will provide dry-season road access to an additional 6,700 villages and 2.7 million rural people. By 2030, 88% of the total required CRRN will have been completed to at least dry-season standard, resulting in 92% of all registered villages and 95% of the rural population having road access. Approximately 70% of the total required CRRN will have an all-season standard, resulting in 80% of all registered villages and 87% of the rural population having all-season access[14].

[14] This assumes that higher level roads will also be brought to an all-season standard.

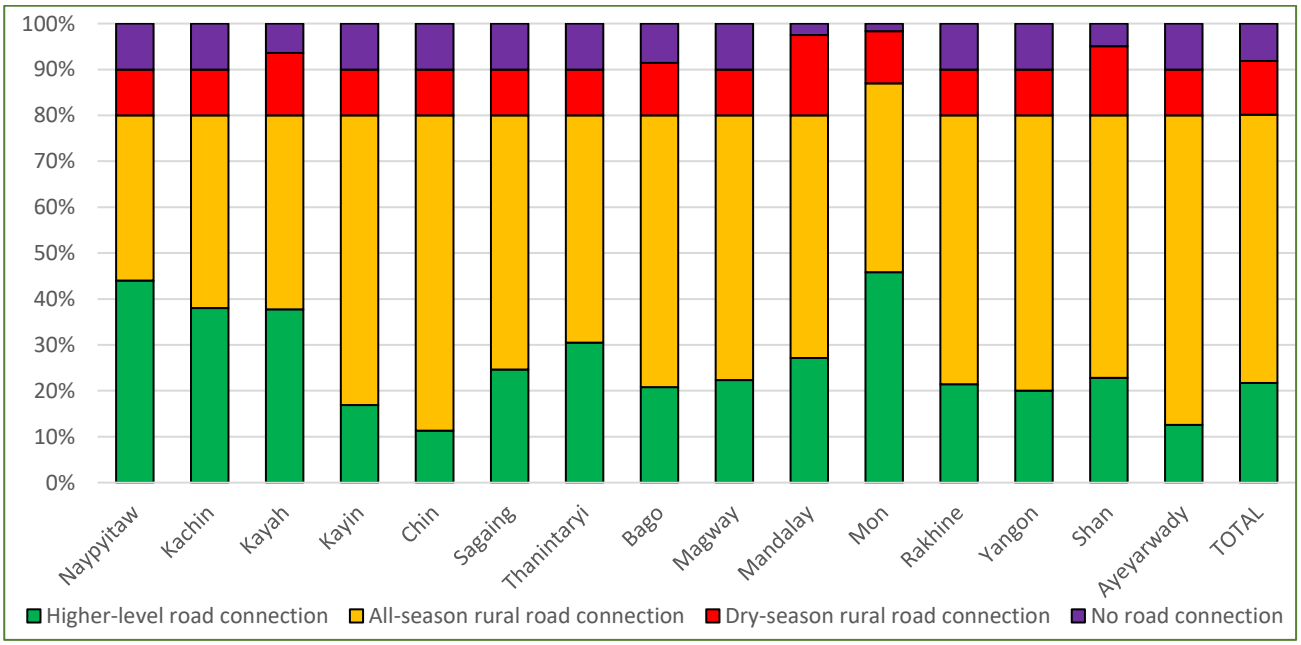
Table 7 Estimated CRRN and access status by 2030

State/Region	Higher-level road or all-season rural road			Dry-season rural road			Unconnected by road		
	CRRN miles	villages	million people	CRRN miles	villages	million people	CRRN miles	villages	million people
Naypyitaw	599	630	0.69	125	79	0.04	158	79	0.04
Kachin	1,978	940	0.98	464	118	0.02	470	118	0.01
Kayah	582	401	0.20	118	68	0.01	80	32	0.01
Kayin	2,146	1,534	1.10	384	192	0.04	384	192	0.02
Chin	3,656	1,064	0.33	532	133	0.03	532	133	0.01
Sagaing	6,358	4,764	3.84	1,431	596	0.25	1,191	596	0.30
Tanintharyi	1,558	808	0.74	245	101	0.09	303	101	0.08
Bago	3,083	4,950	3.07	1,131	706	0.23	798	532	0.38
Magway	5,482	3,803	2.68	951	475	0.45	951	475	0.17
Mandalay	3,198	3,823	3.58	1,438	838	0.36	177	118	0.09
Mon	700	994	1.31	500	130	0.07	38	19	0.02
Rakhine	3,624	2,982	1.51	745	373	0.14	745	373	0.06
Yangon	1,184	1,614	1.53	227	202	0.07	202	202	0.11
Shan	11,072	8,112	3.43	3,070	1,526	0.20	1,506	502	0.17
Ayeyarwady	3,354	9,442	4.18	788	1,180	0.74	826	1,180	0.32
Total	**48,573**	**45,862**	**29.18**	**12,152**	**6,715**	**2.72**	**8,360**	**4,651**	**1.77**
Percentage	70%	80%	87%	18%	12%	8%	12%	8%	5%

Source: ADB TA-8788

43. The CRRN will not yet be completed by 2030, with over 8,000 miles of new construction still required to connect the remaining 4,650 villages. However, this will only affect an estimated 1.8 million rural people (5% of the rural population). Providing road access to these remaining 1.8 million people can only be achieved after 2030. For some of these villages road access may not be possible or economically justifiable, and alternative access solutions will need to be sought.

Figure 8 Expected 2030 village access levels (%)



Source: ADB TA-8788

8. Sustainability and maintenance

44. **Sustainability**. To ensure the sustainability of the core rural road network and to protect against climate impacts, climate resilient and sustainable design standards will be applied. After construction and upgrading works have been completed, maintenance will be carried out in all CRRN roads with the aim of further increasing the sustainability and lifespan of the roads. This will include annual routine maintenance aimed at avoiding damage, complemented by periodic maintenance every few years to renew the road surface and carry out spot repairs.

45. **Routine maintenance**. Routine maintenance includes the cleaning and clearing of the different road elements to ensure they function properly, as well as small repairs to the road surface and structures. Particular attention will be given to clearing the drainage system and avoiding erosion, clearing any landslides or other obstacles on the road, and repairing small damages to the road surface and any structures that could lead to more significant damages.

46. Routine maintenance works in rural roads will be contracted out to community-based road maintenance groups that have been formed and trained to carry out these maintenance activities. These road maintenance groups will receive remuneration for this service. In the case of sealed roads or damages to concrete or steel structures, the routine repairs will be contracted out to private sector contractors who have the required skills and equipment. To reduce management costs and the need for frequent inspections, contracts will generally be paid on a performance basis, against the resulting condition of the road and its compliance with predefined performance standards. To avoid complications with the procurement of maintenance works, term-based contracts may be used that cover one or more years and use agreed unit costs, with work orders to indicate the exact works to be carried out.

47. **Periodic maintenance**. Periodic maintenance will be carried out every few years to repair and rejuvenate the road, especially the road surface. This may include regravelling, spot repairs of macadam or concrete roads, bituminous seals or overlays. This will be complemented by spot repairs where necessary, including back-strengthening of road sections that are vulnerable to climate impacts. Periodic maintenance works will be contracted out to private sector contractors who have the required experience and equipment. Contracts will generally be paid on a volume basis, against the volume of work completed.

48. **Maintenance planning and prioritization**. All CRRN roads will receive routine maintenance, except where these are not in a maintainable condition (requiring rehabilitation[15]) or where upgrading works are planned. DRD and MOBA, through their local offices, will award (performance-based) routine maintenance contracts to road maintenance groups or maintenance contractors each year. These contracts may cover single roads or packages of several roads, and even entire networks within a specific area.

49. To determine the additional maintenance needs beyond general routine maintenance, DRD and MOBA staff will carry out a rapid condition assessment at the end of the rainy season to determine which roads require periodic maintenance and if any roads require emergency maintenance aimed at opening up the road and making the road passable, or spot improvements to address vulnerable sections.

50. Where available funding is insufficient to cover all maintenance needs, emergency maintenance will receive priority (to open up roads and allow traffic to pass), followed by routine maintenance and periodic maintenance. Where necessary, required periodic maintenance and spot improvement works will be ranked based on the usage of the road (according to traffic volumes or to the population served per mile of road.

[15] Rehabilitation is included under upgrading and is not treated as a maintenance activity.

51. **Estimated road maintenance costs**. The all-season CRRN roads will require periodic maintenance every 5 years or so. With an average minimum cost of US$ 10,000 per mile every 5 years, the average annual cost for periodic maintenance of the existing all-season CRRN roads will start at US$ 40 million/year and gradually increase to approximately US$ 100 million/year as the length of all-season CRRN roads increases. The total costs of periodic maintenance for the 15-year period up to 2030 is estimated to be just over US$ 1.0 billion.

52. In addition, the routine maintenance of all existing CRRN roads (both all-season and dry-season standard) at an average minimum cost of US$ 400 per mile every year will require an investment of US$ 330 million over the 15-year period, with an average annual cost of just over US$ 20 million per year.

53. Total maintenance costs over the 15-year strategy period are estimated to be in the order of US$ 1.4 billion, growing from just over US$ 60 million per year currently to US$ 120 million per year in 2030. It is important that allocations to rural road maintenance are in line with these needs to ensure that roads do not deteriorate and that the achieved access levels are sustained.

Table 8 Estimated 2016-2030 CRRN requirements for maintenance

State/Region	CRRN 2016		CRRN 2030		Periodic maintenance	Routine maintenance
	All-season miles	Dry-season miles	All-season miles	Dry-season miles	$ million	$ million
Naypyitaw	490	220	599	125	16	4
Kachin	1,011	997	1,978	464	45	12
Kayah	472	228	582	118	16	4
Kayin	1,039	754	2,146	384	48	12
Chin	182	2,795	3,656	532	58	20
Sagaing	2,235	5,255	6,358	1,431	129	45
Tanintharyi	1,186	485	1,558	245	41	10
Bago	1,776	2,438	3,083	1,131	73	25
Magway	1,484	3,994	5,482	951	104	33
Mandalay	2,176	2,460	3,198	1,438	81	28
Mon	700	500	700	500	21	7
Rakhine	944	1,341	3,624	745	69	18
Yangon	640	741	1,184	227	27	8
Shan	5,066	9,077	11,072	3,070	242	85
Ayeyarwady	1,055	2,353	3,354	788	66	20
Total	**20,455**	**33,637**	**48,573**	**12,152**	**1,035**	**332**

Source: ADB TA-8788

54. **Maintenance funding**. Maintenance of CRRN roads will receive priority over the upgrading of CRRN roads to an all-season standard or the construction of new CRRN roads. For this purpose, a minimum of 20% of the available rural road funding will be reserved for maintenance. As the existing CRRN is upgraded to an all-season standard and new CRRN roads are constructed, the maintenance costs will increase (especially for the periodic maintenance of all-season roads), while the required investments for upgrading and new construction will gradually decrease. The funding allocation for maintenance will therefore need to be gradually increased, with an estimated minimum of 35% of available rural road funding reserved for maintenance by 2030. Maintenance costs will to be covered by the state and regional budget allocations and the Road Fund allocations.

9. Financing

55. The total funding needs for the 15-year strategy period come to US$ 3.9 billion, including US$ 2.5 billion for upgrading and new construction of roads and bridges, and US$ 1.4 billion for maintenance. These funding needs will be covered by financing from three main sources.

56. **Government budget**. The main source of funding for rural roads is currently the union budget allocations made to both MOALI (DRD) and MOBA. The union budget allocations for DRD have averaged nearly MMK 160 billion per year over the past three years, while for MOBA the union budget allocations to rural roads have averaged just over MMK 30 billion per year. The average funding from the union budget to rural roads over the past three years therefore amounts to approximately US$ 150 million per year (MMK 190 billion). Although the union budget allocations are decreasing, this is going hand in hand with the introduction of budget allocations for rural roads from the state and regional budgets, with MMK 70 billion in state and regional budget allocations planned for the 2017/2018 fiscal year. It is therefore expected that the level of combined government budget allocations from the union budget and the state and regional budgets can be sustained at US$ 150 million for the strategy period, but that it will be difficult to significantly increase these allocations due to the needs in other sectors that will put a strain on the government budgets. The government budgets are expected to provide a total funding of at least US$ 2.1 billion for the period 2017-2030, forming just over half the required funding.

Table 9 Annual budget allocations to rural roads and bridges for DRD and MOBA

Fiscal year	DRD MMK million	MOBA MMK million
2014-2015	199,334	N/A
2015-2016	174,317	35,270
2016-2017	102,980	31,073
Average	**158,877**	**33,171**

Source: DRD and MOBA

57. **Road Fund**. To increase the amount of funding available to the road sector, the Government of Myanmar will create a Road Fund. This Road Fund will provide financing for the rural road network managed by DRD and MOBA as well as for the higher-level trunk road network managed by MOC and the urban road networks managed by City Development Councils and Township Development Councils. The Road Fund will obtain its main revenue from road user charges, including existing tolls and vehicle fees, as well as new road user charges that will be introduced with the creation of the Road Fund, specifically a fuel tax or levy. Subject to approval by the parliament, the Government of Myanmar will create the Road Fund by 2020 at the latest, including a fuel tax or levy to finance it.

58. Through the Road Fund, an additional US$ 1.0 billion (25% of the required funding) will be made available to DRD and MOBA for the management of the rural road network during the period from 2020 (when the Road Fund and the fuel tax are introduced) to 2030. Given current fuel consumption and expected increases in the coming years, a fuel levy of 1.5-2.0 dollar cents per liter (MMK 20-25 per liter) would already generate enough revenue to cover the above-mentioned budget for DRD and MOBA. The total fuel levy will be higher in order to also cover the allocations for higher-level roads and urban roads.

59. **Development partners**. The Government of Myanmar will request the development partners to provide financial support to cover the remaining funding needs for the implementation of the strategy. Development partners are increasingly providing funding for rural roads and bridges, and currently include the Asian Development Bank (ADB), the Japanese International Cooperation Agency (JICA), the German development bank (KfW)[16], and the World Bank. Others may join in the future. Over the coming 15 years, the Government of Myanmar will request development partners to

[16] Kreditanstalt für Wiederaufbau.

provide a total of US$ 800 million in funding to help fill the gap for financing this strategy. This requires an average annual financing from development partners of just over US$ 60 million per year, growing from approximately US$ 40 million per year initially to approximately US$ 85 million per year by 2030.

Table 10 Expected funding levels by source of funding

Source	Budget US$ million
Union budget	2,100
Road Fund	1,000
Development Partners	800
Total estimated funding	**3,900**

60. **Budget scenarios**. The expected funding of US$ 3.9 billion up to 2030 will allow the main strategy objective to be achieved of connecting 80% of villages by all season road. This will ensure that approximately 87% of the rural population in Myanmar is provided with all-season road access. This is a significant improvement from the current situation where only 50% of villages and 58% of the rural population are connected by all-season rural roads or higher-level roads. This impact is very much dependent on the expected funding levels being realized in practice. Any reduction in the funding levels will reduce the number of villages and the number of rural people that will be provided with all-season road access. Similarly, an increase in available funding will increase the impact and expand all-season road access to a greater number of villages and rural people.

61. Rural road allocations from the union budget may be reduced in favor of other sectors. Budget allocations from the states and regions may be lower, or may not be allocated to CRRN roads. The Road Fund may not be created or its revenue and allocation to rural roads may be lower than foreseen. Funding from development partners may prove to be lower than expected. A reduction in the available rural road funding of US$ 1.0 billion between now and 2030 will result in the number of villages connected by all-season roads being reduced by 10%, and the number of rural people connected by all-season roads being reduced by 8% (nearly 2.5 million people). A budget of only US$ 150 million per year (equal to the current allocation from the union budget), would only allow 60% of all registered villages to be connected by all-season roads (20% less than the target of this strategy), reducing the number of people connected by all-season road by 15% (approximately 5 million people).

62. Rural road allocations from the union budget, from the states and regions, from the Road Fund or from the development partners may also turn out to be higher than expected. This may lead to significantly higher budgets becoming available in the period up to 2030, allowing the impact to be increased. An additional allocation of US$ 1.0 billion would allow up to 90% of villages to be connected by all-season roads, and 94% of the rural population to be provided with all-season road access (an additional 2.5 million people).

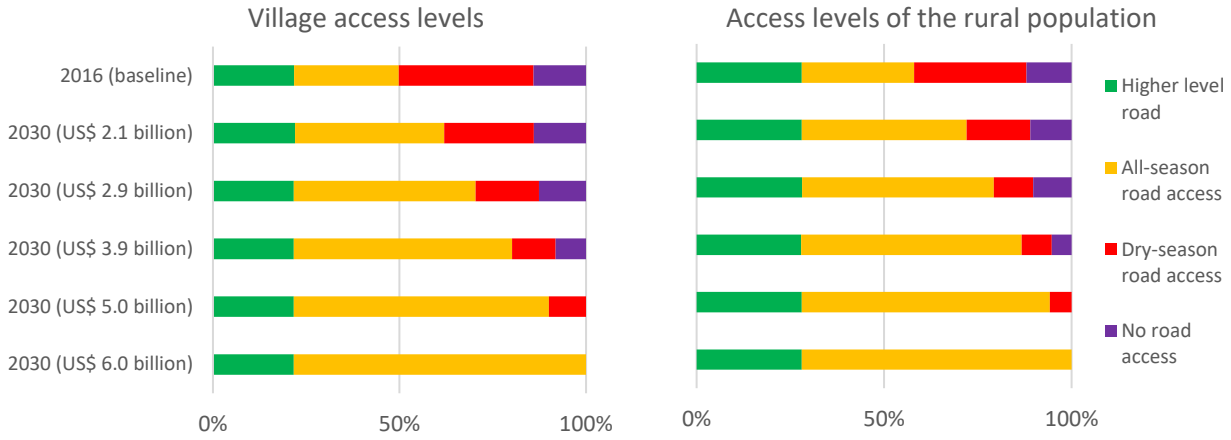
63. Connecting all villages and the entire rural population by all-season road would require a total estimated budget of US$ 6.0 billion, 55% more than what is expected to be available under this strategy. The following table shows the impacts of these different budget scenarios. The scenarios all assume an additional 10% of villages will be connected by dry season road (except where all villages are connected by all-season roads).

Table 11 Impact of different budget scenarios on access levels

Investment strategy	Budget 2016-2030 US$ billion	Higher-level road or all-season CRRN		Dry-season CRRN		No road	
		% villages	% people	% villages	% people	% villages	% people
2016 situation	-	50%	58%	36%	30%	14%	12%
2030 situation (60% villages)	2.1	62%	72%	24%	17%	14%	11%
2030 situation (70% villages)	2.9	70%	79%	17%	10%	13%	10%
2030 situation (80% villages)	**3.9**	**80%**	**87%**	**12%**	**8%**	**8%**	**5%**
2030 situation (90% villages)	5.0	90%	94%	10%	6%	-	-
2030 situation (100% villages)	6.0	100%	100%	-	-	-	-

Source: ADB TA-8788

Figure 9 Village and rural population access levels



Source: ADB TA-8788

10. Budget allocation

64. **Budget allocation to states and regions**. The available funding from the union budget is currently shared amongst the different states and regions based on the rural population of each state/region, with additional funding sometimes allocated to very poor states/regions. The investment needs presented in the previous sections show that the required investment varies strongly by state/region depending on the existing village access levels, the number of villages and the distance between them. Although states/regions with larger rural populations will generally require larger investments, this is not necessarily a direct relationship as can be seen in the table below.

65. Future allocations under this strategy from the union budget and from the proposed Road Fund will therefore take account of existing village access levels in the different states/regions and of the required investments[17] to achieve the strategy objectives of connecting at least 90% of villages in each state/region by road, with at least 80% of villages connected by all-season road. This will mean that a relatively larger portion of the available funding from the union budget will be allocated to those states/regions with lower village access levels and higher investment needs. This will ensure greater equitability between the different states and regions in terms of the level of access of the different villages and their respective rural populations. The table below shows how the share of the budget going to different areas will change slightly when the allocation also takes account of the investment needs instead of only the rural population size. The allocation may initially be based on the investment needs reflected in this strategy, but this will be gradually replaced by more exact investment estimations as identified in the definition of the CRRN for each township (to be completed by December 2017) and regularly updated as the CRRN is further constructed and upgraded.

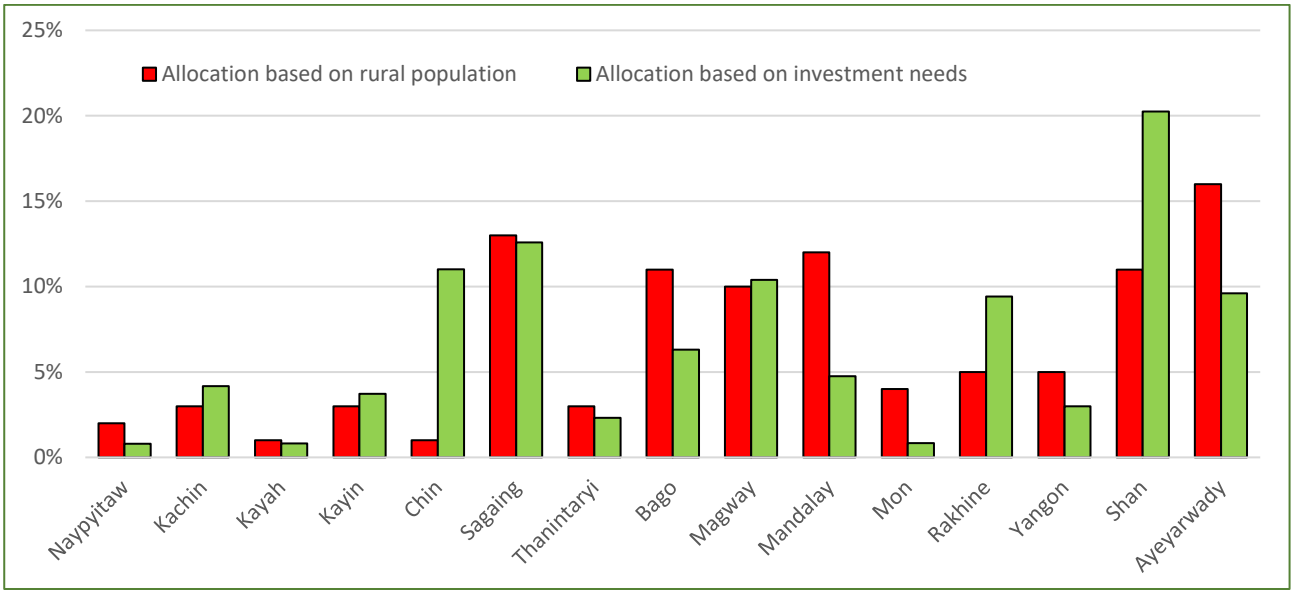
Table 12 Estimated CRRN requirements

State/Region	Rural population		Estimated investment needs	
	people	%	US$ million	%
Naypyitaw	772,153	2%	31	1%
Kachin	1,005,093	3%	162	4%
Kayah	214,209	1%	32	1%
Kayin	1,154,692	3%	145	4%
Chin	368,711	1%	430	11%
Sagaing	4,381,529	13%	491	13%
Tanintharyi	904,400	3%	90	2%
Bago	3,683,575	11%	246	6%
Magway	3,302,547	10%	406	10%
Mandalay	4,022,287	12%	186	5%
Mon	1,404,634	4%	33	1%
Rakhine	1,705,657	5%	368	9%
Yangon	1,708,332	5%	117	3%
Shan	3,798,554	11%	790	20%
Ayeyarwady	5,248,991	16%	375	10%
Total	**33,675,364**	100%	**3,902**	100%

Source: ADB TA-8788

[17] This takes account of the upgrading and construction needs, the road standards to be applied and the related unit costs, and also considers the size and makeup of the CRRN network and the impact on maintenance costs.

Figure 10 Budget allocation by state/region



Source: ADB TA-8788

66. Development partner funding will be targeted towards specific states/regions to complement allocations from the union budget, the states/regions, and the proposed Road Fund, with development partner allocations focusing on those states/regions where access levels are low (in terms of the percentage of the villages or rural population that has been connected by an all-season road) and investment needs are high.

67. The annual allocations from the union budget, the Road Fund and from development partners will be determined by the *Regional Road & Bridge Implementation Committee* at national level (see also section 13), and approved by the national parliament.

68. **Budget allocation to townships**. At state/regional level, the available funding from DRD and MOBA is currently allocated to the different townships based on their rural population. Here also, the budget allocation will start taking account of village access levels of the different townships and the required investments to achieve the strategy objectives. Additional funding will be provided to townships where a high percentage of villages and rural people are not connected by all-season road and where investment needs are higher. This will ensure greater equitability between the different townships in terms of the level of access of the different villages and their respective rural populations. The allocation of the available rural road funding from the union budget, the proposed Road Fund and from development partners to the different townships will be decided and approved by the *Regional Road & Bridge Implementation Committee* after consultation with the *Regional Road & Bridge Supervision Committee* in each state/region (see also section 13).

11. Township planning and prioritization

69. **Investment plans**. Once the budget allocations have reached the township level, allocation of the budgets will follow investment plans that have been prepared based on specific selection and prioritization criteria. Based on the identified CRRNs in each township, rural road investment plans will be prepared at township level. These investment plans will be consolidated at state/regional and at national level. The main plan will be the investment plan up to 2030, identifying all the investment needs to provide at least 80% of all registered villages in a township with all-season road access. This will be complemented by 5-year investments plans to identify current investments in support of the 2030 investment plan. The plans will include construction of new CRRN roads to link unconnected villages, upgrading of existing CRRN roads from dry-season to all-season standard, and allocations for maintenance of the CRRN.

70. **Targeting of CRRN roads**. Under this *National Strategy for Rural Roads and Access*, the Government of Myanmar will target investments in rural roads exclusively towards CRRN roads with the aim of achieving the strategy objective of connecting at least 80% of registered villages by all-season road at the lowest cost and within the shortest timeframe. The identified CRRN list will form the basis for any rural road investments by the Government of Myanmar, including those financed through loans from development partners. Rural roads that have not been identified as being part of the CRRN, will not be eligible for receiving funding from the Government of Myanmar until all CRRN roads have been constructed and upgraded to an all-season standard.

71. **Prioritization of CRRN roads**. This strategy aims to connect at least 80% of the registered villages in each state/region by all-season roads by 2030. Investments will be spread over several years, by the end of which the grand majority of villages will have all-season road access. However, some villages will only receive dry-season road access or will continue to lack road access even after 2030. To ensure transparency in the selection of CRRN roads to be upgraded and the villages to receive all-season road access during the strategy period, and to maximize the number of rural people to be connected by all-season road, the construction and upgrading of all-season road connections to the different villages will be prioritized based on the size of the population served by each CRRN road. The following prioritization criteria will be applied at township level to determine which roads will receive priority within each township.

- The **first priority** will be given to CRRN roads connecting single registered villages with more than 1,000 people. This involves 12% of all existing registered villages, two-thirds of which are already connected by a higher-level road or an all-season rural road. These larger villages will all be connected by all-season road by 2020 through the upgrading of existing dry-season CRRN roads. This first priority will also apply to CRRN roads connecting multiple villages with a combined population of more than 2,000 people.

- The **second priority** will be given to CRRN roads connecting single registered villages with more than 500 people. This involves 32% of all existing registered villages, 85% of which are already connected by road and 54% of which are connected by a higher-level road or an all-season rural road. At least 95% of these medium-sized villages will be connected by all-season road by 2025 through the upgrading of existing dry-season CRRN roads and limited construction of new CRRN roads. This second priority will also apply to CRRN roads connecting multiple villages with a combined population of more than 1,000 people.

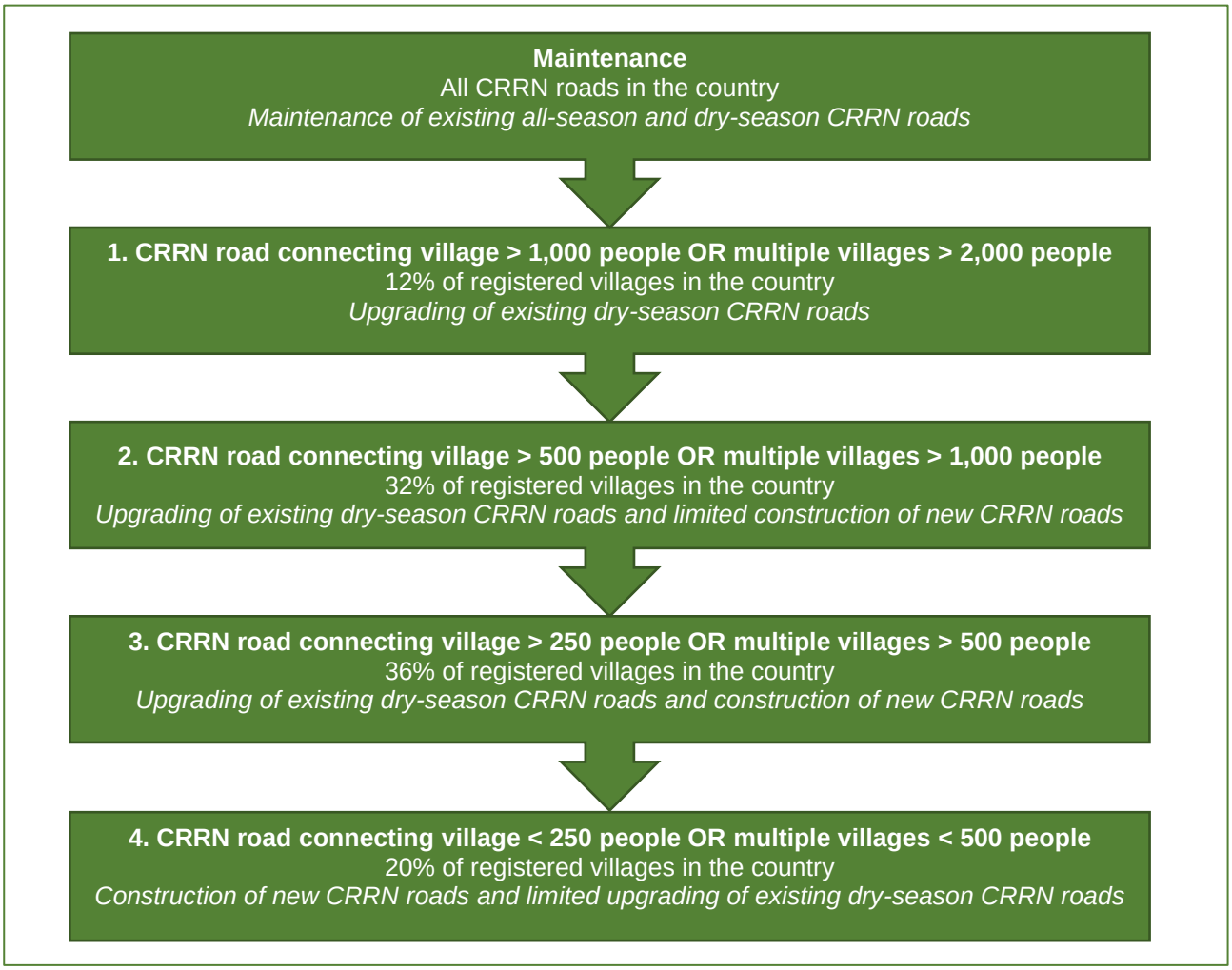
- The **third priority** will be given to CRRN roads connecting single registered villages with more than 250 people. This involves 36% of all existing registered villages, 85% of which are already connected by road and 47% of which are connected by higher-level roads or all-season roads. At least 75% of these smaller villages will be connected by all-season road by 2030 through the upgrading of existing dry-season CRRN roads and the construction of new CRRN roads. This third priority will also apply to CRRN roads connecting multiple villages with a combined population of more than 500 people.

- The **fourth priority** will be given to single registered villages with less than 250 people. This involves 20% of all existing registered villages, 20% of which lack road access and only 38% of which are connected by higher-level roads or all-season rural roads. At least 50% of these smallest villages will be connected by all-season road by 2030 through the construction of new CRRN roads and the upgrading of existing dry-season CRRN roads. This fourth priority will also apply to CRRN roads connecting multiple villages with a combined population of less than 500 people.

72. Within each category of CRRN roads, DRD and MOBA in consultation with the township development committees and the state/regional governments will be responsible for selecting the CRRN roads to be prioritized each year. Use will be made of additional socioeconomic criteria to introduce a ranking of road investments within each category. A common set of socioeconomic criteria will be developed by the Government of Myanmar in collaboration with the states and regions and with the support of development partners. CRRN roads from a lower category should only be selected if the CRRN roads from the higher categories have all been constructed or upgraded to all-season standard.

73. By 2020, all villages with more than 1,000 people will be connected by all-season roads. By 2025, at least 95% of villages with more than 500 people will be connected by all-season roads. By 2030, 80% of registered villages in each state/region will be connected by all-season road, including all villages with more than 500 people, at least 75% of villages with more than 250 people, and approximately 50% of villages with less than 250 people.

Figure 11 Prioritization of CRRN roads



74. **Maintenance**. Timely maintenance of all existing CRRN roads, both all-season and dry-season, is required to avoid accelerated deterioration and costly repairs. In the allocation of funding, priority will therefore be given to maintenance of all existing CRRN roads, irrespective of the size of the villages they connect.

75. **New construction**. New construction of prioritized CRRN roads will require land acquisition, which is the responsibility of the states/regions and the villages concerned. Land may be purchased by the state and regional governments or may be donated by the villages benefitting from the proposed road. Land acquisition will not be financed by the Government of Myanmar. New construction works will only be financed under this strategy if the required land acquisition for the proposed alignment has been completed by the states/regions and villages concerned. Where land acquisition has not yet been completed, construction may be postponed and funding may be allocated to lower priority CRRN roads. Only once the land acquisition has been completed, will the concerned road become eligible for financing under this strategy.

76. New construction will only be to a dry-season standard with the aim of providing road access to at least 90% of all villages in each state/region by 2030. New construction to an all-season standard will only be carried out where this is required to achieve the main strategy objective of connecting at least 80% of all villages in each state/region by all-season road, or where this concerns high priority villages with more than 500 people.

12. Monitoring and Key Performance Indicators

77. To monitor the progress in achieving the strategy objective of connecting at least 80% of all registered villages by all-season road and at least 90% of villages by any kind of road, use will be made of the following key performance indicators and targets. The baseline values are calculated based on the results of the village access level study carried out in December 2016. The baseline will be updated using exact data regarding the CRRN and its makeup that will be collected for all townships by 31 December 2017.

78. The 2030 final targets listed below have been defined based on the objectives of this strategy, with stepwise targets set for achievement in 2020 and 2025. These key performance indicators will be calculated on an annual basis in December each year using data collected at township level, and compared to these targets. The calculated indicators will be reported to the *Regional Road & Bridge Supervision Committees* at state/regional level, the *Regional Road & Bridge Implementation Committee* at national level, and the *Regional Road & Bridge Steering Committee* at national level, as well as the state/regional and national parliaments. The calculation and presentation of these indicators in December each year will allow the rural road funding and program for the following fiscal year to be adjusted where necessary, with the aim of achieving the stepwise and final targets of the strategy.

Table 13 Key performance indicators for rural roads and access

Key Performance Indicator	Baseline 2016*	Target 2020	Target 2025	Target 2030
Percentage of registered villages connected by any kind of road	86%	88%	90%	92%
Percentage of registered villages connected by all-season CRRN road or higher-level road	50%	60%	70%	80%
Percentage of registered villages > 1,000 people connected by all-season CRRN road or higher-level road	67%	100%	100%	100%
Percentage of registered villages > 500 people connected by all-season CRRN road or higher-level road	55%	70%	95%	100%
Percentage of registered villages > 250 people connected by all-season CRRN road or higher-level road	47%	56%	65%	75%
Percentage of rural population in villages connected by road	88%	90%	92%	95%
Percentage of rural population in villages connected by all-season rural road or higher-level road	58%	67%	77%	87%
Percentage of villages served by public transport services	N/A	60%	70%	80%
Percentage of the total Core Rural Road Network that has been constructed to at least dry-season standard	78%	81%	84%	88%
Percentage of the total Core Rural Road Network that has been constructed to all-season standard	30%	40%	55%	70%
Percentage of the existing Core Rural Road Network with an all-season standard	38%	52%	66%	80%
Length of rural roads upgraded	0 miles	9,000 miles	18,000 miles	28,000 miles
Length of rural roads constructed	0 miles	2,000 miles	4,000 miles	6,500 miles

79. To facilitate the monitoring, a rural road database will be developed with regular data inputs from DRD and MOBA. This will include data on all CRRN roads, as well as data on the registered villages, their populations and their access levels. This database will be developed by December 2017 to incorporate the data on the identified CRRN in each township.

13. Institutional responsibilities

80. There are several institutions involved in the rural road sector. The most important of these are the Department of Rural Development (DRD) under the Ministry of Agriculture, Livestock and Irrigation (MOALI), and the Ministry of Border Affairs (MOBA). Important roles are also played by the Department of Highways (DOH) and Department of Bridges (DOB) under the Ministry of Construction (MOC), and the Road Transport Administration Department (RTAD) under the Ministry of Transport and Communications (MOTC). To improve the coordination between these different ministries and their departments, the following three committees were created in 2016: a national level *Regional Road & Bridge Steering Committee*, a national level *Regional Road & Bridge Implementation Committee*, and state/regional level *Regional Road & Bridge Supervision Committees*. These committees are together responsible for implementing this *National Strategy for Rural Roads and Access*.

81. **Ministry of Agriculture, Livestock and Irrigation (MOALI)**. Under MOALI, rural roads are managed by the Department of Rural Development (DRD) through its Roads & Bridges Division. DRD has offices at state/regional level, district level, and in each township, which look after the different sectors that DRD is responsible for, including rural roads.

82. **Ministry of Border Affairs (MOBA)**. MOBA works through Development Supervisory Offices (DSO) at state/regional, district and township level. These offices look after the different sectors that MOBA is responsible for, including rural roads.

83. **Regional Road & Bridge Steering Committee**. The *Regional Road & Bridge Steering Committee* is chaired by the ministers from the different ministries, and includes all the state/regional ministers of transport, the director generals for DRD and MOBA, and the permanent secretaries for MOC and MOTC. It is responsible for approving and issuing this *National Strategy for Rural Roads and Access* and for ensuring that its objectives are achieved. The Steering Committee will also be responsible for approving the multiannual investment plans, negotiating (multi)annual rural road financing levels, introducing the Road Fund, creating a National Rural Road Agency, and issuing the Rural Road Standards and Specifications.

84. **Regional Road & Bridge Implementation Committee**. The *Regional Road & Bridge Implementation Committee* is chaired by the permanent secretaries for MOC and MOTC and includes the director generals for DRD, RTAD, DOH, DOB and MOBA. It is responsible for preparing rural road standards, for quality control of rural road works, for coordinating and facilitating land acquisition, and for preparing progress reports regarding the rural road sector indicators. It will also be responsible for approving annual plans and budget allocations to the different states and regions.

85. **Regional Road & Bridge Supervision Committee**. The *Regional Road & Bridge Supervision Committees* exist in each state/region and are chaired by the State/Regional Minister for Transport. Other members include the state/regional director generals for DRD, DOH, MOBA and RTAD. This committee will be responsible for preparing the state/regional investment plan for rural roads in the different townships within each state/region, and for coordinating between the different road related ministries.

86. **Other line ministries**. Where rural roads run through environmentally sensitive areas (forests, protected areas) or culturally important areas (religious sites, historical sites), or where they cross railways or impact other infrastructure, MOALI and MOBA with support from the *Regional Road & Bridge Supervision Committees* will ensure proper coordination with the line ministries and other entities involved (e.g. Ministry of Religious Affairs and Culture, Ministry of Natural Resources and Environmental Conservation, Myanma Railways, Department of Irrigation, etc.).

87. **Plan preparation and approval**. With support from village tract leaders, the township staff of DRD and MOBA will define the CRRN and prepare investment plans identifying the new construction, upgrading and maintenance works to be carried out each year in line with this strategy,

and the required funding. The plans will be consolidated by the state/regional offices of DRD and MOBA, submitted to the state/regional governments and the *Regional Road & Bridge Supervision Committees* for consultation, and subsequently to the central government ministries and the *Regional Road & Bridge Implementation Committee* for approval.

88. **Financing and budget allocation**. DRD and MOBA will allocate the available financing from the union budget and the proposed Road Fund to the different states/regions according to the budget allocation criteria presented in this strategy. These allocations by the union government will be complemented by budget allocations from the respective state and regional governments. In some states/regions and townships, development partner funding will also be available for the rural road sector. The allocation of available union budget, Road Fund and development partner funding to the different states and regions and their respective townships will be approved by the *Regional Road & Bridge Implementation Committee* at national level. The allocation of the state/regional budget allocations to the different townships will be approved by the *Regional Road & Bridge Supervision Committees* at state/regional level. At township level, the available rural road sector funding will be allocated in accordance with the investment plans and the prioritization criteria set out in this strategy.

89. **Procurement**. The implementation of all rural road works financed from the union budget and the proposed Road Fund will be outsourced to private sector contractors or community-based groups. Procurement will be carried out in line with *The Directive on Execution of Works by Contract* (2014, updated 2016) issued by the Ministry of Construction or any national procurement legislation that may replace it. DRD and MOBA will only have a very limited amount of equipment for in-house execution of emergency maintenance, which may be used for other maintenance works when available. However, DRD and MOBA will aim to carry out as much maintenance work as possible through outsourcing. Innovative contracting modalities will be introduced to facilitate procurement and the timely execution of maintenance works (e.g. performance-based contracts, term-based contracts, etc.).

90. **Supervision and quality control**. A three-tier system of supervision and quality control will be introduced. The township staff of DRD and MOBA will carry out regular inspection visits to check the quality and overall performance of the works before approving payments. This will be complemented by independent third-party quality control consultants that will visit at least 50% of all rural road projects during implementation. These consultants will be hired by the state/regional offices of DRD and MOBA, and will verify the regular quality control and supervision by township staff. Results of this state/regional quality control will be presented to the *Regional Road & Bridge Supervision Committees* on a three-monthly basis. Lastly, the national offices of DRD and MOBA will carry out a random sampling of rural road projects and carry out a quality control in at least 1% of all rural road projects. Results of this central level quality control together with a summary of the state/regional quality control will be presented to the *Regional Road & Bridge Implementation Committee* on a six-monthly basis.

91. **Research and Development**. DRD in collaboration with MOBA will set up a research and development unit that will be responsible for material testing, quality control, and the development and trialing of new standards. Laboratories will be set up and proper procedures will be developed for material testing, quality control and trialing of new standards. Development partners will be requested to support the setting up of the laboratories and the development of procedures, to assist in the trialing and development of new standards, and to build the capacity of DRD and MOBA staff.

92. **Monitoring**. Data on the length of roads constructed, upgraded and maintained will be collected by township staff of DRD and MOBA and presented to the *Regional Road & Bridge Supervision Committees* on a three-monthly basis. Data related to the percentage of villages and the percentage of the rural population connected by (all-season) road will be collected by township and state/region staff of DRD and MOBA and presented to the *Regional Road & Bridge Implementation Committee* on a six-monthly basis. Copies of these different data types will be provided to the national offices of DRD and MOBA for entry into the rural road database. In December of each year, the key performance indicators for each township and state/region will be

calculated using the data from the rural road database. The results will be consolidated by state/region and for the country as a whole. These results will be presented to the *Regional Road & Bridge Steering Committee* to assist in determining budget allocations to the rural road sector and to the different states and regions for the subsequent financial year.

93. **Rural transport services**. It is expected that the private sector will respond to improved road access by providing improved public transport services to respond to demand. However, this will need to be monitored to ensure that the objectives of improved access are indeed achieved and that public transport services are appropriate in the type and quality of service they provide and the cost of this service. Where necessary, additional effort may be needed to improve the quality and cost of the service. RTAD will be responsible for monitoring the quality and costs of rural transport services, with support from DRD and MOBA. Information on the number of villages served by public transport services will reported to the *Regional Road & Bridge Implementation Committee* on an annual basis.

94. **National Rural Road Agency**. By 2020, an autonomous *National Rural Road Agency (NRRA)* will be created that will become responsible for managing the rural road sector and for preparing and implementing the rural road investment plans. The NRRA will prepare investment plans and maintenance plans based on this strategy and other government policies. The investment plans and maintenance plans will be consulted with the *Regional Road & Bridge Supervision Committees* and subsequently submitted to the *Regional Road & Bridge Implementation Committee* for approval. The NRRA will be responsible for overall management of the implementation of the approved investment and maintenance plans, and for reporting progress to the *Regional Road & Bridge Supervision Committees* and the *Regional Road & Bridge Implementation Committee*. The NRRA will also be responsible for managing the rural road database.

95. At state/regional level, the day-to-day management of the planned works will be appointed to a government organization with proven experience, presence and capacity in the different townships (multiple organizations may be appointed, but each township will be under the responsibility of a single organization). All works implementation will be outsourced to the private sector or to community-based groups, with contracts managed and supervised by the appointed government organizations.