

JICA 2024年度 道路アセットマネジメントプラットフォーム 技術支援に関する情報収集・確認調査

～ 成熟度評価の新たな評価シートの作成～

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1. 新たな評価シートについての基本方針、作成に留意した点

1.1 基本方針

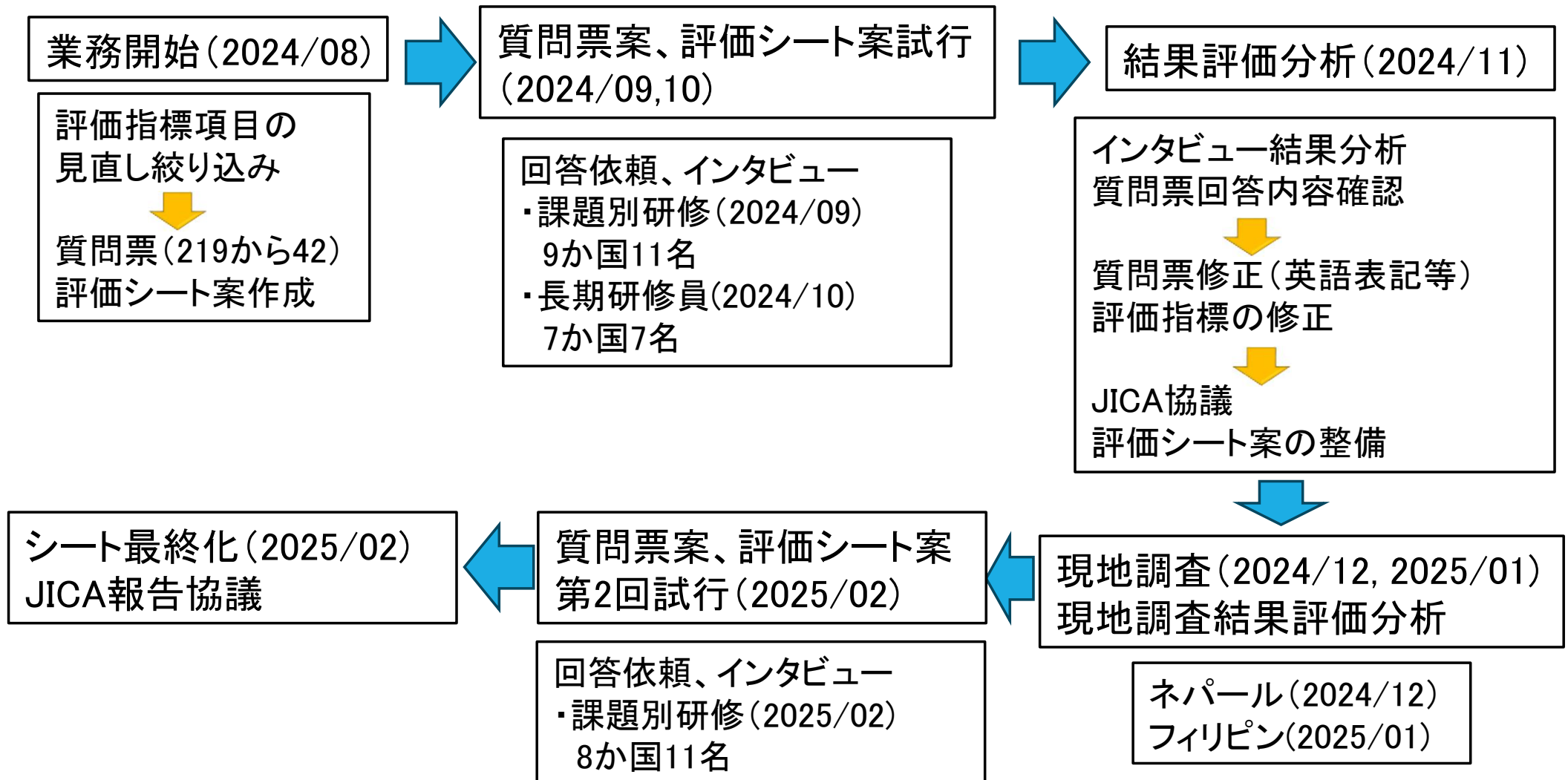
- JICAクラスター事業戦略シナリオ基本方針に基づく。
- 多くの途上国の成熟度の状況及び課題の概要を広く速やかに把握する。
- 課題別研修および長期研修員への質問票を通じて国の成熟度を把握し
- 今後のJICA事業における新規案件形成時の基礎情報に活用できる。
- 技術協力プロジェクトのベースライン・エンドライン調査の指標として活用する。
- 長期研修員事業の中で、自国の道路インフラの状況や維持管理状況について、留意すべき観点を研修員自らが評価できるようになる。

1.2 作成に留意した点

- 評価者の主観が入る要素を極力排除しつつ、できるだけ評価項目の定量化を図る。
- 評価精度を最低限維持しつつも、評価項目を縮減し、より簡便に評価・分析する。
- インプットベース(道路維持管理予算)、アウトプットベース(点検記録やマニュアル、予算計画の有無)、アウトカムベース(道路サービス水準、維持管理水準等)の3つの観点を包含する。

2. 評価指標見直しプロセス

- 新たな評価シート作成にあたっては、具体を確認する質問票およびその評価シートについて、以下のような手順を実施
- 評価シートの項目等は案が完成版ではなく、複数回トライを繰り返してブラッシュアップしながら最終化



3. 新たな評価シートについての全体構成

- 基本コンセプト:できるだけ平易で分かり易い質問、容易に回答、自ら評価ができる
①質問票、②評価シート、③総括表とする。

表2. 新たな評価シートの全体構成

概要	内容
①質問票	所属機関の基本情報および維持管理の状況把握のための各種質問、カテゴリとしては、以下の5項目を設定 ・General Information、 ・Initial Quality、 ・Maintenance Management Cycle、 ・Budget and Organization、 ・Road Condition
②評価シート	上記質問結果を受け、維持管理のレベルや達成度について、4段階の評価を実施 L1: Corrective maintenance(No maintenance)、 L2: Corrective maintenance(Partial maintenance)、 L3: Corrective maintenance(Full maintenance)、 L4: Preventive maintenance (LCC: Life cycle cost)
③総括表	評価シートの内容を1枚で整理し、対象機関の維持管理のレベル、今後、JICAが支援すべき内容などを記載

3.1 質問票の構成内容

- 所属機関の基本情報を分離して入手する。回答は、できるだけ平易に選択できるように Yes, No 選択方式を採用。用語は、出来るだけ分かり易く平易で一般的な単語を使用。回答できない場合でも次の回答へ進めるよう評価すべき項目をベースに作成した。

表2. 質問票の構成内容

Category 1	Category 2	Points to be Evaluated	Number of Questions	
General Information	—	Name, Organization, Budget, Road Length and Bridges Information		6
Initial Quality	Planning and Survey	Road network plan existence and execution of preliminary surveys.	2	6
	Design	Design standard existence.	1	
	Construction	Existence of code or standards for construction and quality control, construction qualification system, and inspection.	3	
Maintenance Management Cycle	Inspection	Existence of inspection evaluation standards and execution of inspections.	4	11
	Assessment/Diagnosis	Execution of inspection evaluation, and existence of management classification.	2	
	Repair/strengthen/renovation/rehabilitation	Existence of repair method standards and execution of repairs.	2	
	Record/Documentation	Storage, application, and update of records.	3	
Budget and Organization	Budget	Existence of maintenance budget plan and funding.	4	13
	Management Organization	Existence of a maintenance management organization.	2	
	Basic Planning	Existence of a basic budget plan.	1	
	Bidding and Contract System	Existence of maintenance classification, estimation standards, contract system for routine maintenance, and contract system for repair and reinforcement.	3	
	Development of Human Resources	Existence of civil engineering universities, memorandum of understanding (MOU), and training programs.	3	
Road Maintenance Service	Utilization of road structure	Improvement of road structure, and identification of overloaded vehicles.	2	6
	Road maintenance condition	Execution of Maintenance Works, International Roughness Index (IRI) Measurement.	2	
	Disaster	Existence of disaster prevention system and equipment.	2	
		Total No. of Questions		42

3.2 評価シートの内容 維持管理レベルの設定方法

- 維持管理のレベルの設定にあたっては、JICAクラスター事業戦略「道路アセットマネジメント」を参考とし、維持管理されていない→事後措置段階→緊急措置型→早期措置段階→予防保全型というように、技術支援によって、底上げが可能なように4段階の評価を設定

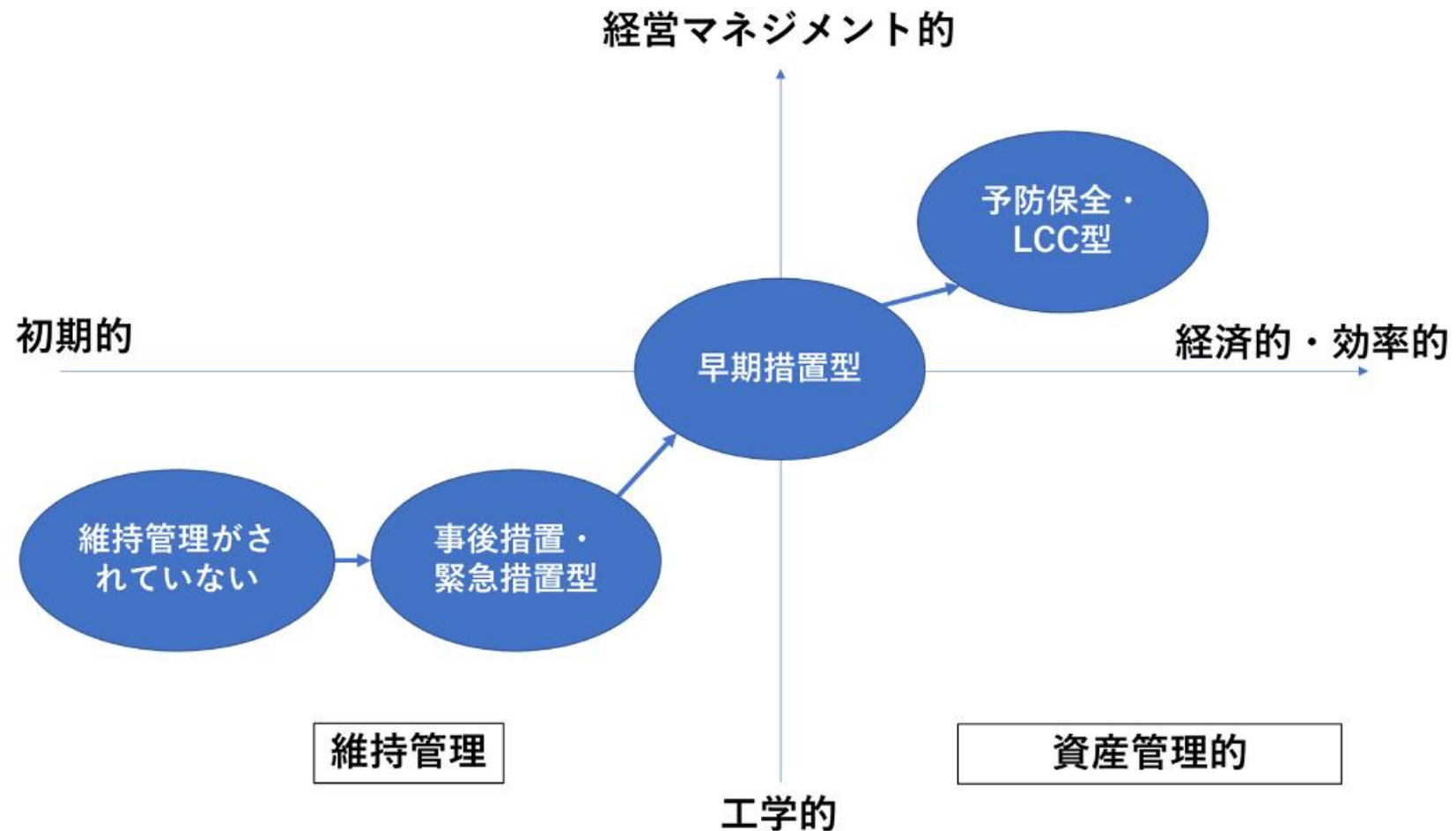


図2.維持管理レベルのイメージ図

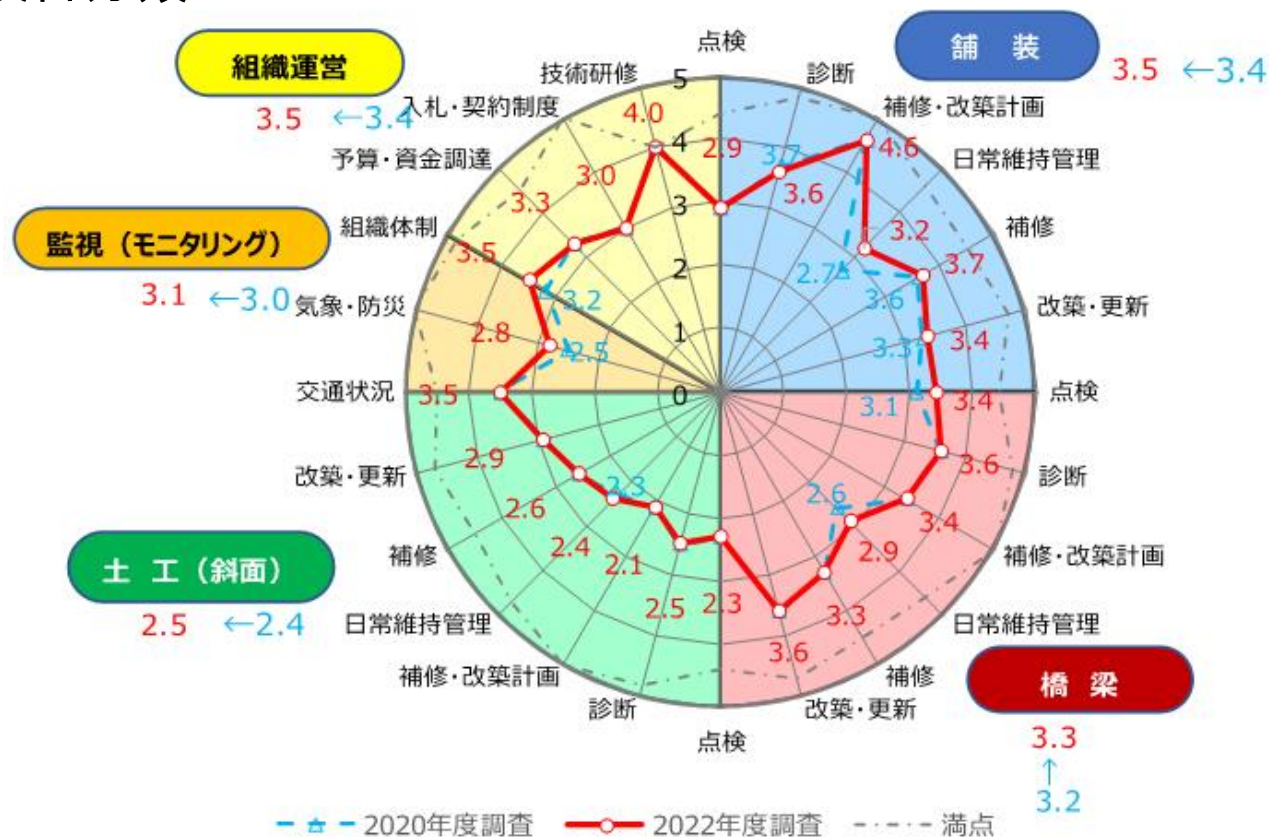
道路アセットマネジメントの状態およびその定義

状態	各状態の定義
事後措置型	点検がほとんど実施されず、落橋および交通安全の支障となる著しい損傷等が発生した後に、通行規制、補修、架け替え等の措置が行われている状態。
緊急措置型	危険橋梁(落橋の危険性が想定される橋梁)等の危険な道路インフラを発見次第、大規模な修繕、更新を行い、安全確保を行っている状態。
早期措置型	管理する道路インフラに対し定期点検による損傷の有無を確認し、可能な措置の優先度を判断し、早期に修繕を行うことで、橋梁の交通機能を維持している状態。
予防保全・LCC 型	<p>損傷原因を特定し、軽微な損傷から大規模損傷・落橋への進行の可能性を予測し、予防的な措置を講じることにより、道路インフラの延命化と最適なアセットマネジメントを達成している状態。</p> <p>また道路のサービス水準を低減させることなく LCC(ライフサイクルコスト)の最小化、構造物の長寿命化を図られている状態。</p>

3.3 旧評価シートと新評価シートの成熟度指標の変更点

- 【量的な課題】実際の調査・評価に際して、評価項目数の多さ(219項目)が被評価者／評価者双方にとって負担 ⇒【工夫した点】42項目に削減
- 【評価の課題】今後、JICAが支援すべき内容も評価結果やレーダーチャートだけでは、わかりにくい点 ⇒【工夫した点】総括表を作成し、維持管理レベルと支援内容を整理

2023年度までの評価項目分類



・旧評価シート評価項目分類

カテゴリー1	カテゴリー2
舗装	点検
	診断
	補修改築計画
	日常維持管理
	補修
	改築更新
橋梁	点検
	診断
	補修改築計画
	日常維持管理
	補修
	改築更新
土工(斜面)	点検
	診断

カテゴリー1	カテゴリー2
土工	点検
	診断
	補修改築計画
	日常維持管理
	補修
	改築更新
監視(モニタリング)	交通状況
	気象防災
組織運営	組織体制
	予算・資金調達
	入札・契約制度
	技術研修

・新評価シート評価項目分類

カテゴリー1	カテゴリー2	評価項目
基本情報		
初期品質	計画調査	道路網計画の有無、事前調査実施の有無
	設計	設計基準の有無
	建設	施工・品質管理基準の有無、施工資格制度、検査の有無
維持管理サイクル	点検	点検評価基準の有無、点検の実施の有無、実施率、方法
(舗装・橋梁・その他)	診断	診断の実施、対策区分の有無
	補修改築	補修工法基準の有無、補修工事の実施
	記録	記録保管の有無、運用・更新の有無
予算・組織	予算	維持管理予算計画の有無、資金調達、要求・承認比率
	組織運営	維持管理組織体制の有無、維持管理部門の所掌の有無
	基本計画	基本計画の有無
	入札・契約制度	積算基準、契約方式、等級区分の有無
	人材確保・育成	大学教育、研究機関との開発協定(MOU)、研修制度の有無、
サービス水準	道路利活用水準	道路構造改善、過積載車両把握
	保守管理水準	維持作業実施の有無、IRI測定
	災害	災害対策制度の有無、災害対策設備の有無

3.4 各カテゴリーの評価シート内容

3.4.1 カテゴリー#1 Initial Quality

- 質問票の結果から、維持管理の状況L1～L4の達成状況をチェックし、各項目での評価をとりまとめ、総括表に反映する方式とした

Step #1 → Flag the Asset Management Evaluation Status level L1 to L4 from the questionnaire responses

Step #2 → Update the evaluation for each item

Step #3 → Update each item in the summary

Step #4 → Update the maintenance level score

Step #2



Step #1: Flag the Evaluation Status level L1 to L4 from the your answer



Category 1	Category 2	Asset Management Evaluation and Indicators		Asset Management Evaluation Status			
		Evaluation	Monitoring Indicator	L1 : Corrective maintenance (No maintenance)	L2 : Corrective maintenance (Partial maintenance)	L3 : Corrective maintenance (Full maintenance)	L4 : Preventive maintenance (LCC : Life cycle cost)
Initial Quality	Planning and Survey	L2	National Road Network Plan	There is no road network plan.	<input checked="" type="checkbox"/> There is a road network plan partially.	There is a road network plan in nationwide.	
			Preliminary survey (Feasibility Study)		<input checked="" type="checkbox"/> Preliminary survey is not conducted.	Preliminary surveys are being carried out.	
	Design	L2	Design standards	There is no design standard.	<input checked="" type="checkbox"/> There are a few design standards other than road and bridge .	There are all required design standards.	ISO9001 and ISO27001 certified.
	Construction	L2 Due to implementation is not properly	Construction/supervision and quality control guideline	There are no construction/supervision guideline or quality control guideline.	<input checked="" type="checkbox"/> There are either construction/supervision or quality control guideline. <ul style="list-style-type: none"> There are guidelines but not properly applied. 	There are both construction/supervision guideline and quality control guideline and properly utilized.	
			Inspection of quality assurance	The inspection is not being carried out.	<input checked="" type="checkbox"/> As-built inspections are being carried out.	Both as-built and quality control are being carried out.	

3.4.2 カテゴリ#2 Maintenance Management Cycle

- 質問票の結果から、維持管理の状況L1～L4の達成状況をチェックし、各項目での評価をとりまとめ、総括表に反映する方式とした

Category 1	Category 2	Asset Management Evaluation and Indicators		Asset Management Evaluation Status			
		Evaluation	Monitoring Indicator	L1 : Corrective maintenance (No maintenance)	L2 : Corrective maintenance (Partial maintenance)	L3 : Corrective maintenance (Full maintenance)	L4 : Preventive maintenance (LCC : Life cycle cost)
Maintenance Management Cycle	Inspection	L2	Inspection Assessment Standard	There is no standard.	☑ There are several standard partially.	There are several standard.	
			Execution of Inspections	No inspections are being carried out.	☑ Inspections are carried out irregularly.	Inspections are carried out regularly.	
			Inspection Execution Ratio ※From general information	No inspection execution.	☑ Inspection Execution Ratio is Less than 100%. Not all bridges were inspected. No special bridge and slope were inspected	Inspection Execution Ratio is 100%. All bridges were inspected.	Inspection data has been published and regular inspections have been carried out at least twice.
			Inspection Method	None	☑ Visual Inspection Not function of Bridge Inspection Vehicle	Visual inspection with the use of equipment.	
	Assessment/ Diagnosis	L2	Execution of Diagnosis	No Diagnosis were executed.	☑ Diagnosis are being carried out sometimes.	Diagnosis are being carried out.	
			Category of countermeasure	There is no category of countermeasure.	☑ Emergency countermeasures are determined based on the diagnosis results.	Early countermeasures are determined based on the diagnosis results.	Preventive countermeasures are determined based on the diagnosis results.
	Repair/ strengthen/ renovation/ rehabilitation	L2	Standards on the Selection of Countermeasure Method	No standards were established.	☑ Partial Design standards are established.	Design standards are established.	Long-term maintenance is planned and continuously improved.
			Execution of Repairs and Renovations	Only emergency countermeasures after a disaster were implemented.	☑ Repairs and renovations are carried out several times,	Repairs and renovations are carried out as planned.	
	Record/ Documentation	L2	Storage Status	No storage of records.	☑ Inventory, Inspection data is stored partially.	Database (BMS, PMS, RSMS) is utilized.	
			Utilization Status	No utilization.	☑ Utilized only for record keeping.	Utilized for preparation of the planning of repairs and renovations.	Utilized for asset allocation, cost management, and performance management.
			Update Status	Not updated.	☑ Records are updated partially and whenever necessary.	Records are updated regularly.	

3.4.3 カテゴリ#3 Budget and Organization

- 質問票の結果から、維持管理の状況L1～L4の達成状況をチェックし、各項目での評価をとりまとめ、総括表に反映する方式とした

Category 1	Category 2	Evaluation and Indicators		Evaluation Status			
		Evaluation	Monitoring Indicator	L1 : Corrective maintenance (No maintenance)	L2 : Corrective maintenance (Partial maintenance)	L3 : Corrective maintenance (Full maintenance)	L4 : Preventive maintenance (LCC : Life cycle cost)
Budget and Organization	Budget	L2	Maintenance Budget Plan	There is no maintenance budget plan.	☑ Maintenance budget plan for next year is prepared annually and/or partially.	There is annual, mid or long-term maintenance budget plan.	
		L2 Funding of Maintenance Budget Ratio, 20-50%	Funding of Maintenance Budget ※Enter Basic Information	※Adjust the level upon collection of data.	☑ Funding is not being provided at a fixed rate and fixed amount funding for budget requests	Funding is being provided at a fixed rate and fixed amount funding for budget requests.	
		L2	Achievement Rate between Prospective Requirements and Prospective Recognition	Less than 50 %	☑ 50% - 80%	More than 80%	
	Management Organization	L3	Availability of the maintenance and management organization	None	☑ Head Office only	Head office and regional offices	There is an organization for road asset management, and the organization is being continuously improved.
		Number of Engineers, %	Number of Engineers ※Enter Basic Information				
	Road Asset Basic Planning	L2	Availability of Basic Plan	None.	☑ There is basic plan partially as annually.	There is basic plan as Mid term and Long term	
	Bidding and Contract System	L2	Guideline for Cost Estimation	None	☑ There is a cost estimation standard partially. Except Road Slope, Special bridge Tunnel	There is a cost estimation standard	
			Contract Agreement for Maintenance work	Maintenance contract agreement is not institutionalized	☑ There is a contract agreement less than one-year.	There is a one year or multi-year contract agreement.	
			Classification of Contractors	No classification.	☑ There is a classification partially.	There is a classification of contractors for all type of maintenance work.	
	Development of Human Resources	L2	Availability of Universities or institutes where knowledge and techniques about maintenance can be acquired.	None.	☑ There is an existing university or institute.	There is an existing university or institute.	
			Availability of Memorandum of agreement, MOU with a university or institute.	None.	☑ There is an MOU but maintenance (pavement, bridge, slope) is not included	There is an MOU that includes maintenance.	
			Availability of Training program.	There is no training program about maintenance.	☑ There is a maintenance training program but not conducted regularly.	A maintenance training program is conducted periodically.	A maintenance training program is being continuously implemented and the content of the training is being continuously improved.

3.4.4 カテゴリ#4 Road Maintenance Service

- 質問票の結果から、維持管理の状況L1～L4の達成状況をチェックし、各項目での評価をとりまとめ、総括表に反映する方式とした

Category 1	Category 2	Evaluation and Indicators		Evaluation Status			
		Evaluation	Monitoring Indicator	L1 : Corrective maintenance (No maintenance)	L2 : Corrective maintenance (Partial maintenance)	L3 : Corrective maintenance (Full maintenance)	L4 : Preventive maintenance (LCC : Life cycle cost)
Road Maintenance Service	Utilization of road structure	L2	Road structure improvement of arterial roads connecting the capital and the neighboring cities.	The arterial roads have one or less than one lane.	☑ The arterial roads have two lanes.	There is a multi-lane arterial road or bypass.	
			Identification of overloaded vehicles.	Not being observed.	☑ Observed irregularly. Not under jurisdiction of DoR	Observed regularly.	Always observed.
	Road maintenance condition	L2 IRI Value Condition Ratio, Average 4-6 Bridge Soundness Level, *** (Bad Ratio 10%)	Execution of routine maintenance works.	Carried out on urgent situations only.	☑ Carried out irregularly, when necessary.	Carried out regularly (daily, weekly or monthly).	
			International Roughness Index, IRI measurement.	No IRI measurement.	☑ IRI measurement is carried out irregularly and partially.	IRI measurement is carried out regularly.	
			Bridge Soundness ※from general information	No data	☑ Bridge Soundness Level, less than 50% is good Critical condition of special bridge	Bridge Soundness Level, more than 50% is good	
	Disaster	L2	Availability and Utility of Disaster prevention system.	No existing system.	☑ There is a system partially. The system is utilized partially.	There is a system. The system is utilized regularly	There is an organization that responds to disasters, and disaster response is being continuously improved.
			Disaster response facilities or equipment.	No existing facilities or equipment.	☑ There is a slight facility or equipment.	There is an existing facility or equipment.	

3.4.5 総括表（例：ネパール）

■New Evaluation Sheet : Summary

Country	Nepal	Organization	Ministry of Physical Infrastructure and Transport, Department of Roads	Population	29.1 million	National Road Length	14,725km	Number of bridges	1,927 bridges
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■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

	Category 2	Evaluation	Status	Score	The weighting of the Score
Initial Quality					
	Planning, Surveying	L3	There is a network plan.	8	20/30×10 =7
	Design	L3	There are no design standard for special bridge, Tunnel	8	
	Construction	L2	The system and Implementation is different condition.	4	
Maintenance Management Cycle					
	Inspection	L2	All bridges including special bridges are not inspected. No inventory data for road slope.	4	16/40×50 =20
	Assessment/Diagnosis	L2	Diagnosis are not carried out and no countermeasures are determined for road slope, special bridge	4	
	Repair	L2	Repair works for bridge are carried out sometimes, but no standard of selection of countermeasure method	4	
	Record	L2	Inventory data for Road slope are not recorded	4	
Budget and Organization					
	Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests	4	24/50×30 =14
	Management Organization	L3	Head office and regional offices	8	
	Basic Planning	L2	There is annual basic plan.	4	
	Bidding and Contract System	L2	There is no cost estimation manual and guidebook for road slope	4	
	Development of Human Resources	L2	There is no MOU specifically for maintenance.	4	
Road Maintenance Service					
	Utilization of road structure	L2	There is multi-lanes arterial road or bypass but overloading control are not regulated properly.	4	16/30×10 =5
	Road maintenance Condition	L3	IRI is carried out regularly, but there are partially data for soundness of bridges. But reported bridge condition having bad is 10%.	8	
	Disaster	L2	There is no sufficient existing facility or equipment.	4	

■JICA support goals

	Evaluation				What we need to support to the next level	Score
Initial Quality	L1	L2	L3	L4	Quality assurance shall be conducted	7
Maintenance Management Cycle	L1	L2	L3	L4	Regular bridge inspection shall be conducted, Special bridge, slope inspection should be conducted. The repair selection standards shall be established, and database shall be established for making repair plan	20
Budget and Organization	L1	L2	L3	L4	Make a basic plan. Classify contractors by the type of maintenance work. Make a training program for maintenance	14
Road Maintenance Service	L1	L2	L3	L4	Prepare the disaster response facilities	5
Overall	L1	L2	L3	L4		46 < 60 → L2

L1 : Corrective maintenance (Overall Score<30) , L2 : Corrective maintenance (Score<60) , L3 : Corrective maintenance (Score<90)

4. 現地調査(ネパール、フィリピン)結果

4.1 実施方法

国内での課題別研修生、長期研修員への質問回答、インタビューを通じて得た結果をもとに加筆修正した評価シートをもとに、成熟度が高いと思われる国、低いと思われる2か国を選定し現地調査を実施した。

4.2 対象国

フィリピン国: 公共事業道路省 (DPWH)

ネパール国: インフラ運輸省 (MOPIT), 道路局 (DOR)

4.3 調査方法

フィリピン国: 事前に質問票送付し、現地にて回収しインタビューを行いながら回答内容を確認

ネパール国: 事前に収集した研修生回答書を送付し、現地においてインタビューを行い回答書内容を確認

4.4 調査結果

フィリピン国: 急激な維持管理予算減により日常維持管理作業が十分できない状況が判明。維持管理予算申請額、承認額、執行額を確認することが必要。舗装、橋梁との分類の他、特殊橋梁維持管理の評価が必要。

ネパール国: 維持管理予算申請額、承認額に対して執行率が低い。維持管理予算申請額、承認額、執行額を確認することが必要。舗装・斜面は維持管理サイクル化を図りつつあるが橋梁維持管理がおざなりになっている。

ネパール現地調査概要および評価シートへの反映(例)

- 研修生と現地調査の結果に関しては、大項目に関しては一致していたが、中項目・小項目の細部において一部違いがあった。これは研修生が国全体の状況を把握できなかったことによる。
- 研修生の回答内容を、現地のアセットマネジメント実施組織に対して回答結果の確認を行うことで、評価の信頼性を向上することができる。



斜長橋の火災によるケーブル損傷状況



アスファルト舗装の損傷状況

写真1.ネパール維持管理状況

③総括表サンプル ネパール版

技プロ投入により、ある程度の維持管理サイクル改善が始まった段階。全体評価はL2。

■New Evaluation Sheet : Summary

Country	Nepal	Organization	Ministry of Physical Infrastructure and Transport, Department of Roads	Population	29.1 million	National Road Length	14,725km	Number of bridges	1,927 bridges
JICA TCP	<ul style="list-style-type: none">• The Project for Capacity Building for Countermeasures against Disaster and Landslide on Major Highways in Nepal (Started)• Inspection survey for damaged Sindhuli Road (To be planned)								

■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

	Category 2	Evaluation	Status	Score	The weighting of the Score
Initial Quality					
	Planning, Surveying	L3	There is a network plan.	8	20/30×10 =7
	Design	L3	There are no design standard for special bridge, Tunnel	8	
	Construction	L2	The system and Implementation is different condition.	4	
Maintenance Management Cycle					
	Inspection	L2	All bridges including special bridges are not inspected. No inventory data for road slope.	4	16/40×50 =20
	Assessment/Diagnosis	L2	Diagnosis are not carried out and no countermeasures are determined for road slope, special bridge	4	
	Repair	L2	Repair works for bridge are carried out sometimes, but no standard of selection of countermeasure method	4	
	Record	L2	Inventory data for Road slope are not recorded	4	
Budget and Organization					
	Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests	4	24//50×30 =14
	Management Organization	L3	Head office and regional offices	8	
	Basic Planning	L2	There is annual basic plan.	4	
	Bidding and Contract System	L2	There is no cost estimation manual and guidebook for road slope	4	
	Development of Human Resources	L2	There is no MOU specifically for maintenance.	4	
Road Maintenance Service					
	Utilization of road structure	L2	There is multi-lanes arterial road or bypass but overloading control are not regulated properly.	4	16/30×10 =5
	Road maintenance Condition	L3	IRI is carried out regularly, but there are partially data for soundness of bridges. But reported bridge condition having bad is 10%.	8	
	Disaster	L2	There is no sufficient existing facility or equipment.	4	

■JICA support goals

	Evaluation				What we need to support to the next level	Score
Initial Quality	L1	L2	L3	L4	Quality assurance shall be conducted	7
Maintenance Management Cycle	L1	L2	L3	L4	Regular bridge inspection shall be conducted, Special bridge , slope inspection should be conducted. The repair selection standards shall be established, and database shall be established for making repair plan	20
Budget and Organization	L1	L2	L3	L4	Mak a basic plan. Classify contractors by the type of maintenance work. Make a training program for maintenance	14
Road Maintenance Service	L1	L2	L3	L4	Prepare the disaster response facilities	5
Overall	L1	L2	L3	L4		46 < 60 → L2

L1 : Corrective maintenance (Overall Score<30) , L2 : Corrective maintenance (Score<60) , L3 : Corrective maintenance (Score<90)

フィリピン現地調査概要および評価シートへの反映(例)

- 研修生と現地調査において、具体的に見直した項目は、【研修生】道路整備計画は部分的に有レベル2 →【現地調査】整備計画有レベル3に見直し
- 【研修生】大学とのMOUありレベル3 →【現地調査】大学とのMOUはないレベル1に見直し



特殊橋梁維持管理の状況



4車線拡幅舗装の状況

写真2.フィリピン維持管理状況

③総括表サンプル フィリピンDPWH版

技プロフェーズ3まで実施済み。総合評価は、L3。特殊橋梁については課題が残る。

■New Evaluation Sheet : Summary

Country	Republic of the Philippines	Organization	Department of Public Works and Highways	Population	2 million	National Road Length	35,526.358 km	Number of bridges	9,007 bridges
JICA TCP	<ul style="list-style-type: none"> Improvement of Quality Management for Highway and Bridge Construction and Maintenance Project for Road Disaster Preventions and Other Countermeasures on Mountainous Roads 								

■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

	Category 2	Evaluation	Status	Score	The weighting of the Score
Initial Quality					
	Planning, Surveying	L3	There is a mid- to long-term road network plan.	8	24/30 × 10 = 8
	Design	L3	There are road and bridge design standards.	8	
	Construction	L3	Both as-built and quality control are being carried out.	8	
Maintenance Management Cycle					
	Inspection	L3	Inspection Execution Ratio is 100%. 11 bridges were inspected.	8	32/40 × 50 = 40
	Assessment/Diagnosis	L3	Early countermeasures are determined based on the diagnosis results.	8	
	Repair	L3	Design standards are established. Repairs and renovations are carried out as planned.	8	
	Record	L3	Database (BMS, PMS) is utilized.	8	
Budget and Organization					
	Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests(Less than 100%) Routine maintenance budget is shortage,	4	32//50 × 30 = 19
	Management Organization	L3	Head office and provincial office	8	
	Basic Planning	L3	There is a basic plan.	8	
	Bidding and Contract System	L3	There is a one-year or multi-year contract agreement.	8	
	Development of Human Resources	L2	A maintenance training program is conducted periodically. But there is no MOU.	4	
Road Maintenance Service					
	Utilization of road structure	L3	There is a multi-lane arterial road or bypass.	8	24/30 × 10 = 8
	Road maintenance Condition	L3	Carried out regularly.	8	
	Disaster	L3	There is an existing facility or equipment.	8	

■JICA support goals

	Evaluation				What we need to support to the next level	Score
Initial Quality	L1	L2	L3	L4		7
Maintenance Management Cycle	L1	L2	L3	L4	The basic maintenance level is L3. However, there is a lack of support for special bridges. Inspections with new technology are recommended. It's better to develop the leading organization for road asset management.	40
Budget and Organization	L1	L2	L3	L4	Although a PDCA cycle for maintenance has been established, there is a lack of budget. In particular, there is a lack of technical capabilities to maintain special bridges.	19
Road Maintenance Service	L1	L2	L3	L4		8
Overall	L1	L2	L3	L4		74 < 90 → L3

L1 : Corrective maintenance (Overall Score<30) , **L2** : Corrective maintenance (Score<60) , **L3** : Corrective maintenance (Score<90)

5. 短期研修生および留学生インタビュー結果

- ・ 質問票は概ね理解している。国全体の基礎情報を入手するのに苦労している。
- ・ インドネシア、ザンビア、技プロ実施済み、まさに評価L2とL3の狭間にある状況
- ・ 東ティモール、技プロの経験を知らないためか、評価L1が多い

■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

Step #4 → Update the maintenance level score

Category 2	Evaluation	Status	Score	The weighting of the Score
Initial Quality				
Planning, Surveying	L3	There is a road network plan in nationwide.	8	20/30×10 =7
Design	L3	There are all required design standards.	8	
Construction	L2	There are guidelines but not properly applied.	4	
Maintenance Management Cycle				
Inspection	L2	There are inspection standards, but not execution ratio is less than 100%	4	24/40×50 =30
Assessment/Diagnosis	L3	Diagnosis is carried out, also maintenance planning in the next year	8	
Repair	L2	Repair works for road and bridge are carried out several times	4	
Record	L3	Inventory data previous maintenance/treatment for road, bridge or slope are not recorded	8	
Budget and Organization				
Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests	4	20/50×30 =19.2
Management Organization	L3	Head office and regional offices available nationwide.	8	
Basic Planning	L2	There is annual short term basic plan for road maintenance.	4	
Bidding and Contract System	L3	There is a cost estimation standard, and type of contract can be single year or multi-years contract.	8	
Development of Human Resources	L3	There are MOU between university, but not for the whole year contract.	8	
Road Maintenance Service				
Utilization of road structure	L2	There are multi-lanes arterial road or bypass but overloading control are not regulated properly.	4	16/30×10 =5
Road maintenance Condition	L3	PCI, IRI is carried out regularly, and bridge soundness is higher than 50%	8	
Disaster	L2	There are existing facility or equipment, but the disaster management system is still need much to be improved.	4	

■JICA support goals

Evaluation	What we need to support to the next level	Score
Initial Quality L1 L2 L3 L4	Quality assurance shall be conducted properly.	7
Maintenance Management Cycle L1 L2 L3 L4	Make a maintenance historical database and also other informative road data, for example: PSS. The repair selection standards shall be established, and database shall be established for making repair plan. Also the manual for daily and periodic shall be updated.	30
Budget and Organization L1 L2 L3 L4	Make a long-term plan based on the road condition demand.	19.2
Road Maintenance Service L1 L2 L3 L4	Make a training program for maintenance, especially for supervisory consultants. The maintenance services shall be carried out properly so there were not gonna be recurrent damage on the same location. The disaster management system is still need much to be improved.	5
Overall L1 L2 L3 L4		61.2 <90→L3

L1 : Corrective maintenance (Overall Score<30) , L2 : Corrective maintenance (Score<60) , L3 : Corrective maintenance (Score<90)

■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

Step #4 → Update the maintenance level score

Appendix 2 Update the Maintenance Plan (2020)				
Category 2	Evaluation	Status	Score	The weighting of the Score
Initial Quality				
Planning, Surveying	L2	There is a network plan.	4	16/30×10 =5
Design	L3	There are no design standard for special bridge, Tunnel	8	
Construction	L2	The system and implementation is different condition.	4	
Maintenance Management Cycle				
Inspection	L2	All bridges including special bridges are not inspected. No inventory data for road slope.	4	20/40×50 =25
Assessment/Diagnosis	L3	Diagnosis are not carried out and no countermeasures are determined for road slope, special bridge	8	
Repair	L2	Repair works for bridge are carried out sometimes, but no standard of selection of countermeasure method	4	
Record	L2	Inventory data for Road slope are not recorded	4	
Budget and Organization				
Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests	4	24/50×30 =14
Management Organization	L3	Head office and regional offices	8	
Basic Planning	L2	There is annual basic plan.	4	
Bidding and Contract System	L1	There is no cost estimation manual and guidebook	0	
Development of Human Resources	L3	There is no MOU specifically for maintenance.	8	
Road Maintenance Service				
Utilization of road structure	L3	There is multi-lanes arterial road or bypass but overloading control are not regulated properly.	8	20/30×10 =7
Road maintenance Condition	L3	IRI is carried out regularly, but there are partially data for soundness of bridges. But reported bridge condition having bad is 10%.	8	
Disaster	L2	There is no sufficient existing facility or equipment.	4	

■JICA support goals

Evaluation	What we need to support to the next level	Score
Initial Quality L1 L2 L3 L4	Quality assurance shall be conducted	5
Maintenance Management Cycle L1 L2 L3 L4	Regular bridge inspection shall be conducted. Special bridge, slope inspection should be conducted. The repair selection standards shall be established, and database shall be established for making repair plan	25
Budget and Organization L1 L2 L3 L4	The Agency has no guideline for cost estimation of determined works. There is need to device a training program for cost estimation and perhaps develop a subjective system for estimating costs for works	14
Road Maintenance Service L1 L2 L3 L4	Prepare the disaster response facilities	7
Overall L1 L2 L3 L4		51 <60→L2

L1 : Corrective maintenance (Overall Score<30) , L2 : Corrective maintenance (Score<60) , L3 : Corrective maintenance (Score<90)

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■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

Step #4 → Update the maintenance level score

Step #4 → Update the maintenance level score					
	Category 2	Evaluation	Status	Score	The weighting of the Score
Initial Quality					
	Planning, Surveying	L3	There is a network plan.	8	20/30×10 = 7
	Design	L3	There are no design standard for special bridge, Tunnel	8	
	Construction	L2	The system and implementation is different condition.	4	
Maintenance Management Cycle					
	Inspection	L3	Inspections are carried out regularly.	8	28/40×50 = 35
	Assessment/Diagnosis	L2	Diagnosis are not carried out and no countermeasures are determined for road slope, special bridge	4	
	Repair	L3	Design standards are established.	8	
	Record	L3	Database (BMS, PMS, RMS) is utilized.	8	
Budget and Organization					
	Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests	4	28/50×30 = 17
	Management Organization	L3	Head office and regional offices	8	
	Basic Planning	L3	There is annual basic plan.	8	
	Bidding and Contract System	L2	There is no cost estimation manual and guidebook for road slope	4	
	Development of Human Resources	L2	There is no MOU specifically for certain maintenance	4	
Road Maintenance Service					
	Utilization of road structure	L2	Observed irregularly. Not under jurisdiction of DoR	4	16/30×10 = 5
	Road maintenance Condition	L3	IRI measurement is carried out regularly.	8	
	Disaster	L2	The system is utilized partially.	4	

■JICA support goals

Evaluation	What we need to support to the next level	Score
Initial Quality L1 L2 L3 L4	Quality assurance shall be conducted	7
Maintenance Management Cycle L1 L2 L3 L4	Prioritization of Maintenance Works due to the limited maintenance budget	35
Budget and Organization L1 L2 L3 L4	Classification of contractors by the type of maintenance work, cost estimation for special bridge and tunnels, and strategy for an alternative road preservation funding	17
Road Maintenance Service L1 L2 L3 L4	Monitoring the overload and overdimension vehicles, and developing the Disaster Prevention System	5
Overall L1 L2 L3 L4		64 <90→L3

L1 : Corrective maintenance (Overall Score<30) , L2 : Corrective maintenance (Score<60) , L3 : Corrective maintenance (Score<90)

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■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

Step #4 → Update the maintenance level score

Category 2		Evaluation	Status	Score	The weighting of the Score
Initial Quality					
Planning, Surveying	L2	There is a network plan.		4	20/30×10 =5.3
Design	L3	There are design standard for special bridge, Tunnel		8	
Construction	L2	The system and implementation is different condition.		4	
Maintenance Management Cycle					
Inspection	L1	All bridges including special bridges are not inspected. No inventory data for road slope.		0	4/40×50 =5
Assessment/Diagnosis	L1	Diagnosis are not carried out and no countermeasures are determined for road slope, special bridge		0	
Repair	L2	Repair works for bridge are carried out sometimes, but no standard of selection of countermeasure method		4	
Record	L1	Inventory data for Road slope are not recorded		0	
Budget and Organization					
Budget	L2	Funding is not being provided at a fixed rate and fixed amount funding for budget requests		4	12/50×30 =7.2
Management Organization	L2	Head office and regional offices		4	
Basic Planning	L1	There is annual basic plan.		0	
Bidding and Contract System	L2	There is no cost estimation manual and guidebook for road slope		4	
Development of Human Resources	L1	There is no MOU specifically for maintenance.		0	
Road Maintenance Service					
Utilization of road structure	L2	There is multi-lanes arterial road or bypass but overloading control are not regulated properly.		4	12/30×10 =4
Road maintenance Condition	L2	IRI is carried out regularly, but there are partially data for soundness of bridges. But reported bridge condition having bad is 10%.		4	
Disaster	L2	There is no sufficient existing facility or equipment.		4	

■JICA support goals

Evaluation	What we need to support to the next level	Score
Initial Quality L1 L2 L3 L4	Quality assurance shall be conducted	5.3
Maintenance Management Cycle L1 L2 L3 L4	Regular bridge inspection shall be conducted. Special bridge, slope inspection should be conducted. The repair selection standards shall be established, and database shall be established for making repair plan	5
Budget and Organization L1 L2 L3 L4	Mak a basic plan. Classify contractors by the type of maintenance work. Make a training program for maintenance	7.2
Road Maintenance Service L1 L2 L3 L4	Prepare the disaster response facilities	4
Overall L1 L2 L3 L4		21.5 <30→L1

L1 : Corrective maintenance (Overall Score<30) , L2 : Corrective maintenance (Score<60) , L3 : Corrective maintenance (Score<90)

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6. 新たな評価シート

6.1 評価シートの修正、最終化

上記、調査結果及び課題を踏まえ、評価シートについて下記の項目について加筆修正を行い、最終化した。

- (1) 維持管理サイクル対象項目追加 舗装・橋梁は共通必須項目として実施し、斜面、特殊橋梁、トンネル等は、その国の状況に合わせて追加する。
- (2) 「対策工計画策定」追加
Countermeasure(対策工)Plan として、Repair の中項目に追加する。
- (3) 中項目の、基本計画Basic Planを道路維持管理における目標設定に変更、
Transportation Sector Plan に変更
- (4) 中項目の予算(Budget)に予算要求、予算承認の比率を追加する。

6.2 評価シートの有用性確認

- (1) 評価シート案は、多数の国の維持管理成熟度(概要)を短期間で把握収集するには活用できる。
- (2) 研修員への調査結果と現地調査結果の大項目結果に差はなかった。ただし、中項目や小項目の評価結果は一部異なっている部分があることから、今後、より調査精度を向上するため、数か国を選定し今回と同様に現地にて相手国関係者との確認作業を行う方が良い。
- (3) 相手国政府が自ら回答し、Questionnaire を基に評価シートを作成することによって、国の道路AM の長所・短所が明確になり、今後どの領域取り組むべきか理解することができる。
- (4) 研修員を通じて政府関係組織に調査シート記入を依頼する場合、可能な限り事前に情報を収集し、適切な依頼先を選別する。
- (5) 研修者が回答者に該当しない場合は、同一国の複数の研修者で情報収集し回答する。
- (6) 維持管理サイクル評価については舗装、橋梁を必須領域とし、さらに国の維持管理に大きく影響する項目があれば、より正確に評価するため項目を加えて評価する。
- (7) 評価シートは、項目が多岐にわたっており、対象国のRAMP 現状を俯瞰し概要把握するには十分活用できるシートである。

6.3 評価シート総括表(最終版)

■New Evaluation Sheet : Summary

Country		Organization	
Population		Road Length	Num of bridges
JICA TCP			

■Status of each Category ※Score : L1→0pt, L2→4pt, L3→8pt, L4→10pt

Category	Evaluation	Status	Score	The weighting of the Score
Initial Quality				
Planning, Surveying				
Design				
Construction				
Maintenance Management Cycle				
(Pavement)				
Inspection				
Assessment/Diagnosis				
Repair				
Record				
(Bridge)				
Inspection				
Assessment/Diagnosis				
Repair				
Record				
(Others)				
Inspection				
Assessment/Diagnosis				
Repair				
Record				
Budget and Organization				
Budget				
Management				
Organization				
Transportation Sector Plan				
Bidding and Contract System				
Development of Human Resources				
Road Condition				
Utilization of Road Structure				
Road Maintenance Condition				
Disaster				

■JICA support goals

Category	Evaluation	What we need to support to the next level	Score
Initial Quality			
Maintenance Management Cycle			
Budget and Organization			
Road Condition			
Overall			

L1 : Corrective maintenance (Overall Score<30) , **L2** : Corrective maintenance (Score<60)

L3 : Corrective maintenance (Score<90)

7. 成熟度調査の継続実施について

- 研修生へのトライアルの結果、研修生自ら、①質問回答⇒②評価シート⇒③総括表まで一連で記入することで、自国の維持管理状況の把握のツールとして有効である
- 所属機関、本部事務所、地域事務所、地方事務所など、勤務先、立場によって、回答が異なる場合があった
- シート結果は、途上国の成熟度概要を広く把握でき、今後の支援方針検討に十分活用できる
- ただし、対象国全体像の把握やJICAの支援内容の整理については、引き続き、JICA専門家による、アドバイス、整理が必要である

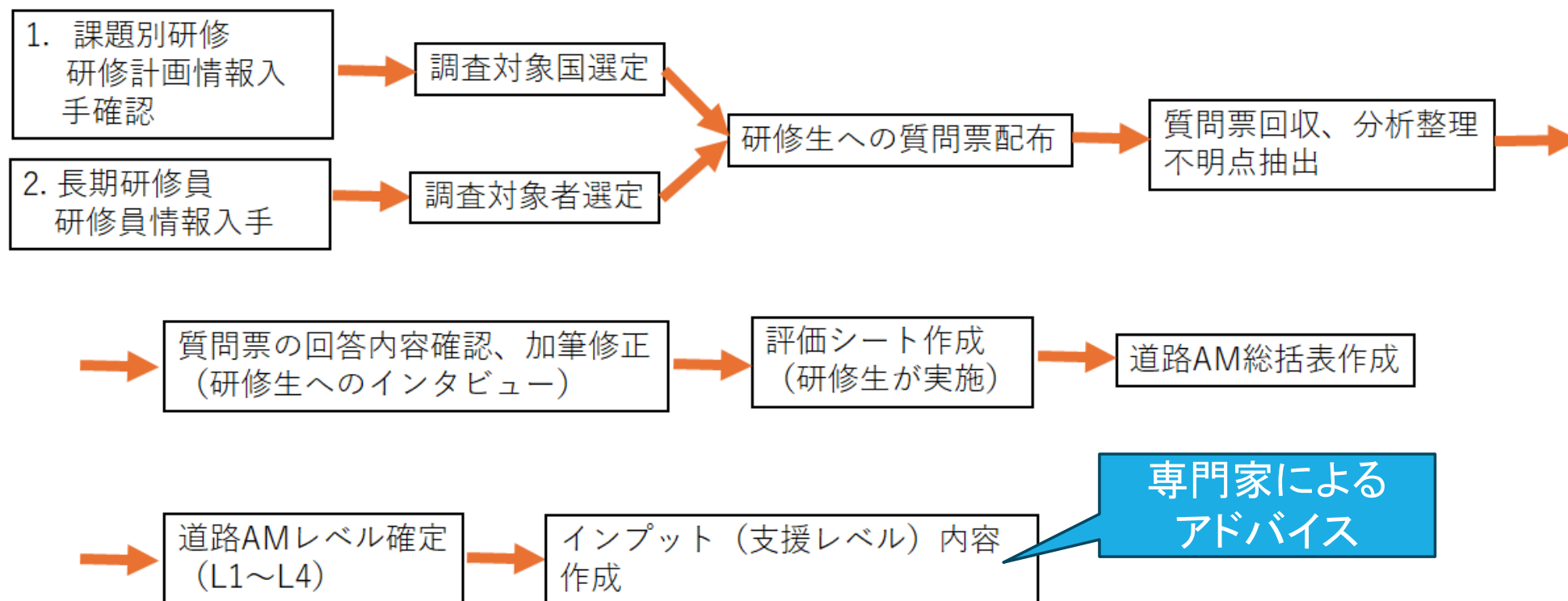


図2.JICA支援のためのフロー