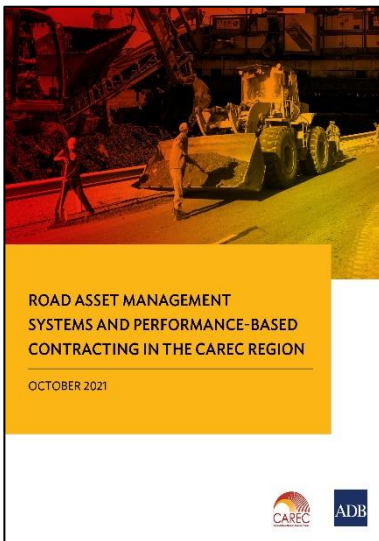


ROAD ASSET MANAGEMENT SYSTEMS

Review of Experiences in the CAREC Region



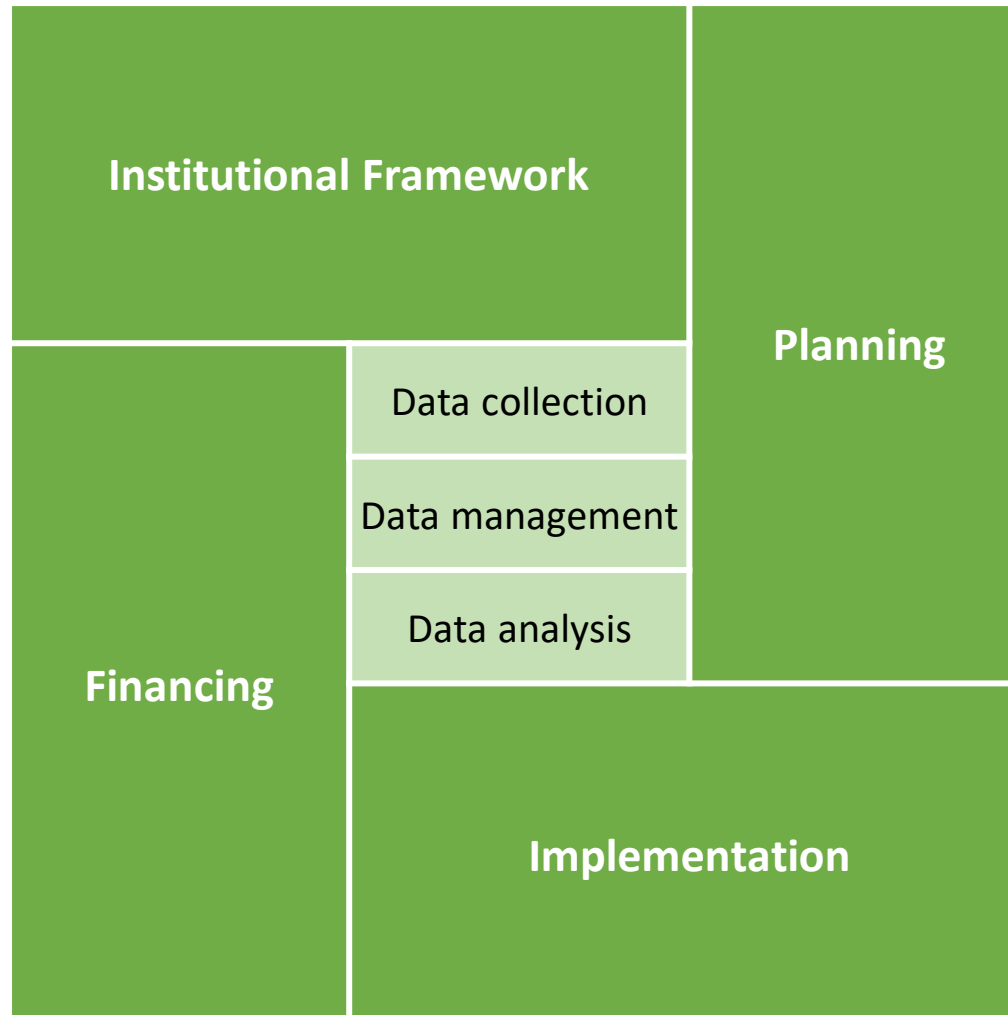
 **CARTIERCONSULT**

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Road Asset Management System

Any system that is used to collect, manage and analyse road data for road planning and programming purposes



Road Asset Management System

- **Data Collection**
 - Inventory, condition and traffic data
 - For entire network or a subnetwork (certain road classes, surface types)
 - Measuring equipment to increase accuracy and objectivity and reduce costs
- **Data(base) management**
 - Data storage and statistics (combining different datasets)
 - Presented as tables, graphs, maps
 - Preparation of standard reports
 - Exportable for other uses
- **Data analysis (for planning and budgeting)**
 - Identifying treatment needs
 - Estimating costs
 - Prioritizing interventions (roads or treatments)
 - Often uses software or algorithms

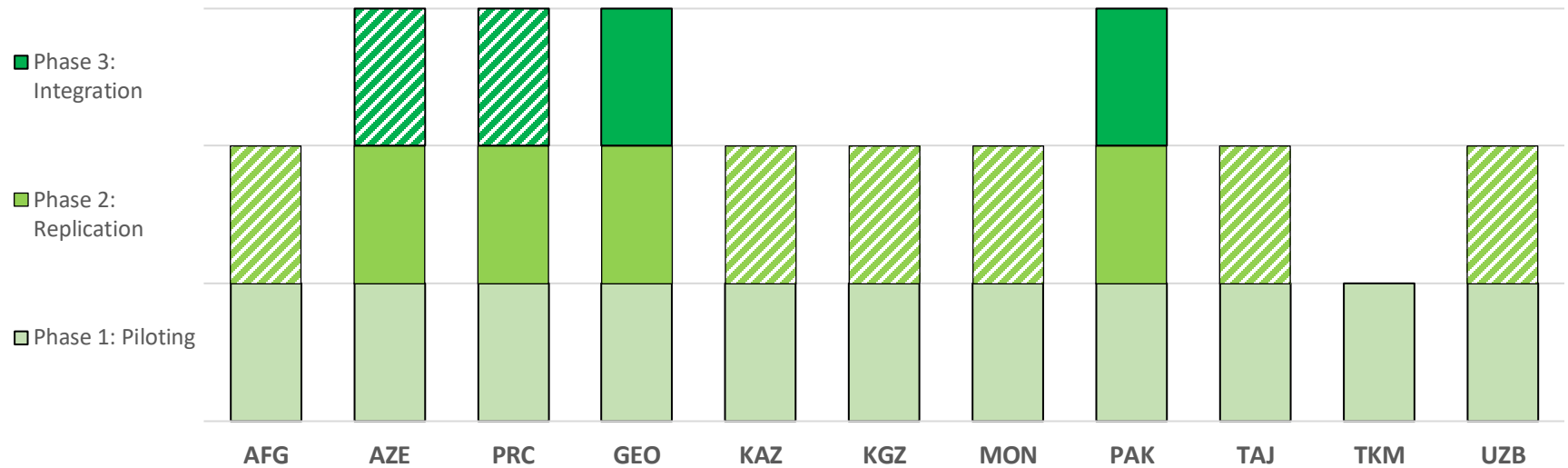
RAMS development varies by country

- Kyrgyz Republic
 - Initially an Excel-based RAMS was developed with World Bank support
 - Recently a web-based RAMS was developed with ADB support
 - Data collection and database management by central *Production Innovation Centre*
- Kazakhstan
 - Recently a web-based RAMS was developed with World Bank support
 - Data collection by oblast level laboratories using survey vehicles
 - RAMS managed by *National Centre for Quality of Road Assets*
- People's Republic of China
 - Centralized development of *China Pavement Management System*
 - Road management by provincial *Highway Administration Bureaus*
 - Data collection and entry by provincial *Highway Research Institutes*
- Azerbaijan
 - Comprehensive RAMS development and data collection with World Bank support
 - Data collection and RAMS operation by *Azeravtoyol*
 - System no longer being (fully) used

RAMS development – 3 phases

- **Phase 1: Piloting**
 - Data collected for (small) part of network, not on regular basis
 - Data entered into a (basic) database with limited functionality
 - Some data analysis carried out
 - Most work done by consultants with project support
 - All CAREC countries have reached or completed this phase
- **Phase 2: Replication**
 - Regular data collection for entire (sub)network
 - Data entered into a more comprehensive database with expanded functionality
 - Analysis of the data being carried out using specific algorithms or software
 - RAMS unit created, responsible for operating the RAMS
 - Most CAREC countries are in this phase
- **Phase 3: Integration**
 - Annual funding provided for data collection and RAMS operation
 - RAMS integrated into existing planning and budgeting procedures
 - RAMS analysis influencing plans and financing levels
 - Few CAREC countries have reached this stage

RAMS status



Data collection frequency	Intermittent	Intermittent	Annual	Annual	Intermittent	Intermittent	Intermittent	Annual, outsourced	Starting	Starting	Intermittent
Data collection extent	Partial Network	Network	Network	Network	Partial Network	Partial Network	Partial Network	Network	Partial Network	Partial Network	Partial Network
Database	Being prepared	Yes	Yes	Yes	Yes	Being prepared	Not used	Yes	Being prepared	Limited scope	Being prepared
Data analysis	Being prepared	Intermittent	Most provinces	HDM4	Being prepared	Being prepared	Not used	HDM4	Being prepared	-	Being prepared
Dedicated RAMS unit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-
RAMS influencing planning	-	Intermittent	Some provinces	Yes	-	-	-	Yes	-	-	-
RAMS influencing financing	-	-	-	Yes	-	-	-	Yes	-	-	-

Start simple, Expand later

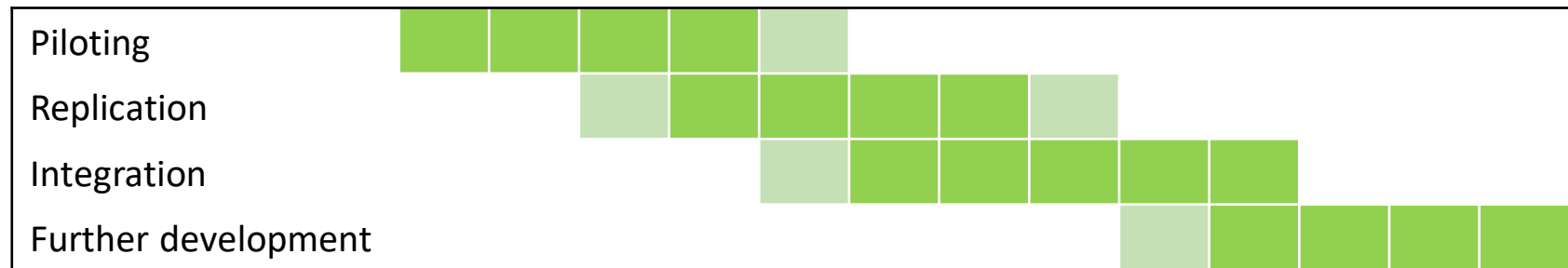
- There is a tendency to develop complex systems from the start
 - Often do not fit existing procedures
 - Difficult to understand and operate
 - Extensive data requirements make collection costly
 - Complex custom algorithms do not always work properly
 - Large risk of systems being left unused (or only partly used)
- Start with a basic system and further develop this at a later stage
 - Limit the initial data collection and use basic data collection equipment
 - Start with a simple database structure with basic functionality
 - Use tested algorithms and simple planning tools (decision matrix)
 - Expand later when additional needs are identified

Network Coverage

- There is a tendency to want to collect data for all roads
 - The cost of data collection can be high
 - Especially lower level (unpaved) roads involve large network with many short road sections
 - Often there is insufficient budget to address identified needs in lower level roads, and the collected data is not really used
- Start with the higher level (paved) roads (core network)
 - These roads make up a small part of the network, but carry most of the traffic
 - Data is easier to collect (less costly)
 - Funding primarily goes to these roads – identified needs can be addressed
 - RAMS can be tested and further developed for these roads
 - It is more important to have regular data collection than to collect data for the entire road network

Continued Development

- There is a tendency to support RAMS development through a standalone project
 - The duration of the support is too short
 - The support focuses on the RAMS system, with insufficient attention to the integration of the RAMS into the wider framework
- Continued support needs to be provided for approximately 10 years
 - Can involve subsequent projects or a longer-term program
 - Following the different phases of piloting – replication – integration



- RAMS Action Program can guide medium-term support
 - Defining steps and setting targets in RAMS development

Institutionalization

- Establishment of a dedicated RAMS Unit
 - With the entity responsible for road management
 - Some activities can be outsourced to state-owned company or private sector, but you will still need a RAMS unit
- Dedicated annual funding for data collection and RAMS operation
 - Survey equipment maintenance, per diems, fuel, etc.
 - Outsourcing of certain activities
 - Preferably a dedicated budget line (e.g. Kazakhstan)
- Annual data collection program
 - Part of the network each year
 - Minimum frequency of updating data
 - Varying by road class, road asset and data type
- Annual reporting based on collected data
 - Road network statistics and performance (e.g. China)

Planning and Budgeting

- RAMS needs to be integrated into (multi)annual planning procedures
 - RAMS analysis needs to influence annual plans and budget allocations
 - Without such influence, benefits of RAMS are minimal
- RAMS and existing procedures need to be aligned
 - Adaptation of RAMS to existing procedures (e.g. timing of data collection and analysis – can be complicated in view of seasons)
 - Adjustment of existing procedures to fit the RAMS
- Can involve a need for legal amendments
 - Legislation and standards requiring certain procedures
 - New legislation defining the role of the RAMS in planning and budgeting (e.g. Kyrgyz)
- Need for extensive training and capacity building
 - Training staff in the use of the new procedures
 - Developing the necessary manuals and guidelines

Appropriate Financing

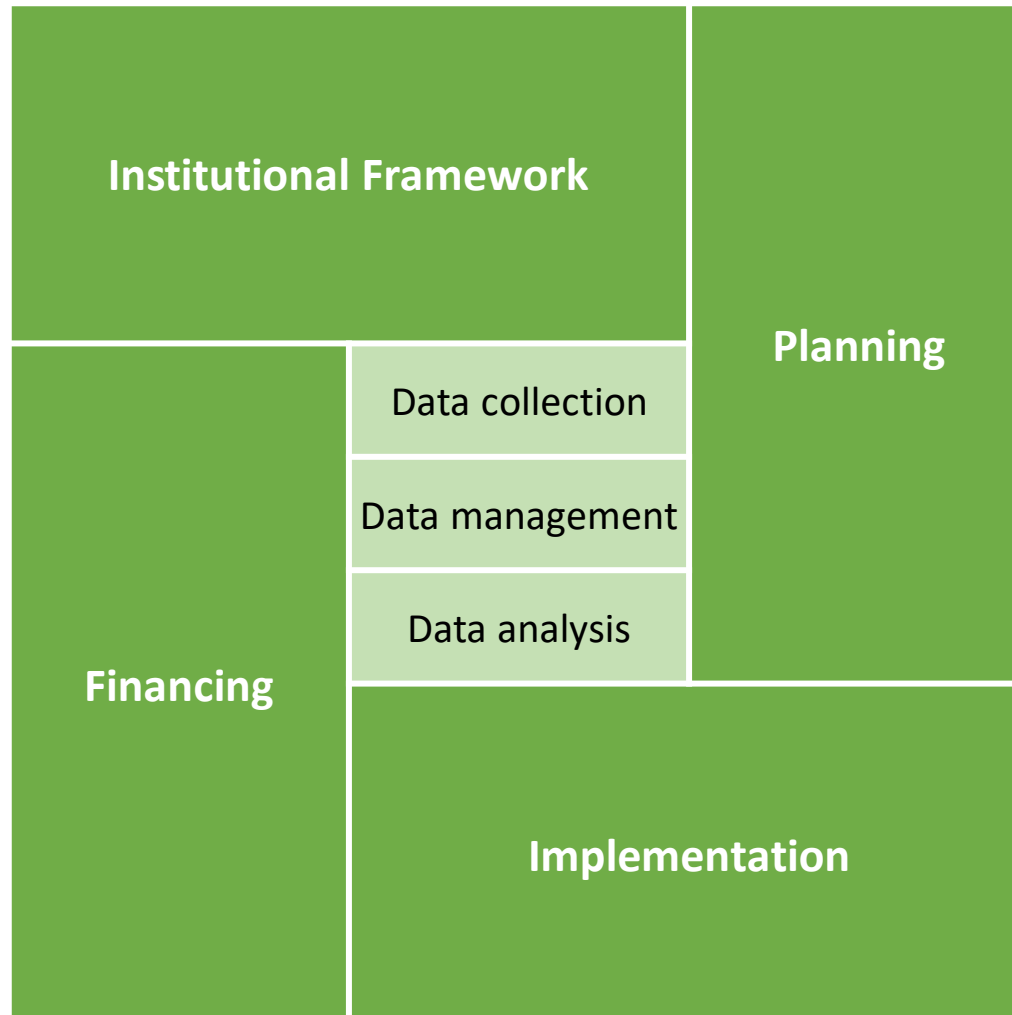
- Insufficient maintenance and repair budgets will always lead to a poor road network
 - A RAMS can only optimize the use of available funding
 - It cannot in itself increase the level of funding
 - It cannot increase the amount of work that can be done with a specific budget
- A RAMS can help identify suitable budget levels
 - Predict the impact of different budget scenarios on future road network conditions
 - Assist in negotiations with MOF on budget levels
- Often complemented by earmarking of road user charges
 - Fuel tax, vehicle purchase taxes and duties, vehicle registration fees, tolling, etc.
 - User pays principle – road users pay for maintaining the roads
 - Predictable funding – multiannual planning of maintenance and repairs

Works Implementation

- Introduction of a RAMS will generally result in a shift in the types of works being carried out
 - Priority to roads with higher traffic volumes
 - Priority to routine and periodic maintenance of roads in good/fair condition
 - Avoid that roads reach poor condition, rather than repair roads already in poor condition
- This will require different capacities from works implementers
 - Significant increase in periodic maintenance (mid-term repairs)
 - Reduction of rehabilitation (capital repairs)
 - Routine maintenance and current repairs remain more or less the same
- This provides an opportunity to introduce new implementation modalities
 - Outsourcing increase in periodic maintenance to contractors
 - Introduction of performance-based contracts

RAMS development

RAMS development needs to address all areas shown in the figure below – where any of these areas is not suitably addressed, there is a risk that the RAMS will fail



THANK YOU