PACIFIC REGION INFRASTRUCTURE FACILITY

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Infrastructure Maintenance:

Review of Labour-Based Approaches

May 2014

Cover photo: Solomon Islands Second Road Improvement Project (SIRIP) – co-financed by the Asian Development Bank (ADB), Australian Aid, European Union and the New Zealand Aid Programme

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Acronyms

ADB	Asian Development Bank
CPIU	Central Project Implementation Unit
CSP	Community Sector Programme (Solomon Islands)
DANIDA	Danish International Development Agency
DFAT (previously AusAID)	Department of Foreign Affairs and Trade (previously Australian Agency for International Development)
DFID	UK Department for International Development
DOW	Department of Works (PNG)
EB	Equipment-Based
EI	Employment Intensive
EIB	European Investment Bank
EIIP	Employment Intensive Investment Programme (under ILO)
EU	European Union
Forex	Foreign Exchange
GDP	Gross Domestic Product
GIZ (previously GTZ)	Deutsche Gesellschaft fuer Internationale Zusammenarbeit GmbH) (previously German Agency for Technical Cooperation)
HIV/AIDs	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HRRIIP	Highlands Region Road Improvement Investment Program (in PNG)
IE	Impact Evaluation
ILO	International Labour Organisation
JICA	Japan International Cooperation Agency
JPFR	Japan Fund for Poverty Reduction
Km	kilometre
kW	kiloWatt
LB	Labour-Based
LBAs	Labour-Based Approaches
LBAT	Labour-Based Appropriate Technology
LBES	Labour-Based Equipment-Supported
LBEST	Labour-Based Equipment-Supported Technology
LBRMC	Labour-Based Routine Maintenance Component
LI	Labour-Intensive
M&E	Monitoring and Evaluation
MID	Ministry of Infrastructure Development (in Solomon Islands)
NGO	Non-Government Organisation
NORAD	Norwegian Agency for Development Cooperation
NZMFAT	New Zealand Ministry of Foreign Affairs and Trade
OECD	Organisation for Economic Co-operation and Development
PMCBU	Project Management Capacity Building Unit
PNG	Papua New Guinea
RES	Rapid Employment Scheme (Solomon Islands)
RRMWP	Rehabilitation and Maintenance Works Project (Solomon Islands)
SBD	Solomon British Dollar
SIDA	Swedish International Developmental Cooperation Agency
SIEAP	Solomon Islands Emergency Assistance Project
SIRIP	Solomon Islands: Road Improvement (Sector) Project
STIs	Sexually Transmitted Infections
TSDP	Transport Sector Development Project (Solomon Islands)
PCO	PRIF Coordination Office
PIAC	Pacific Infrastructure Advisory Centre
PICs	Pacific Island Countries
PMC	PRIF Management Committee
PRIF	Pacific Region Infrastructure Facility
WB	World Bank Group

Executive Summary

This document reviews literature on labour-based approaches in infrastructure maintenance. It outlines the key attributes of labour-based approaches, their current applications in the Pacific and other regions, key success factors and outcomes. It offers recommendations for supporting successful implementation of labour-based approaches.

Definition

Labour-based approaches prioritise the use of labour (rather than larger equipment) in infrastructure rehabilitation and maintenance. Workers are essentially supported by limited (but appropriate) smaller equipment to meet the specified technical and engineering needs of the work. This contrasts with having a small labour force using heavy equipment or having labour-intensive methods that maximise employment of labour but use only hand tools.

Importantly, capacity building (in the form of training) and entrepreneurship (both planned and spontaneous) form part of labour-based approaches and often lead to more sustainable outcomes.

Benefits

There is a range of benefits resulting from labour-based approaches. This can include:

- infrastructure is created or maintained – often by local communities
- poverty reduction and pro-poor growth through job creation
- prevention of rural-urban drift
- improved transparency and accountability
- reduced corruption and waste, and
- provision of opportunities for both men and women, and for youth and the underprivileged.

Labour-based approaches can also produce downstream effects, including income 'multipliers' generated by spending of wages, impacts on local labour markets, micro-enterprise development, and enhanced employability of workers after the program finishes.

Studies have shown that project costs using labour-based approaches can be 10% - 50% cheaper than equipment-based methods, while acknowledging difficulties in comparing projects.

Risks

Risks associated with labour-based approaches include the time required to train the labour force, the additional time required for construction compared to equipment-based methods, projects being more management intensive due to the involvement of numerous small contractors, and the need for quality checks on the work. Further, resulting long-term employability is not assured unless formal processes are included.

Countries and Sectors

Labour-based approaches can be applied in a range of infrastructure sectors, but they seem to be most commonly used in road maintenance work in the Pacific. PRIF Partners have some experience implementing maintenance and rehabilitation projects using labour-based approaches, particularly in the Solomon Islands, Tonga and Timor-Leste.

In the Solomon Islands, labour-based approaches have been used since the 1980s and have proven to be an effective and sustainable method for road maintenance. In most other Pacific Island Countries, the use of labour-based approaches in infrastructure maintenance is limited. In Tonga, Vanuatu and Kiribati greater capacity for road maintenance has been created and, for the latter, routine road maintenance microenterprises are being introduced.

In Papua New Guinea, labour-based approaches are being introduced along with baseline surveys that are designed to support impact evaluation (including community self-evaluations).

In other parts of the world, labour-based approaches are used in agricultural and energy projects, in urban upgrading and climate change adaptation work (e.g. Bangladesh, Cambodia, China, Latin America, Lesotho, Madagascar, Nepal, Uganda and Viet Nam).

Successful Implementation

Identifying projects suitable for labour-based approaches is key for successful outcomes, requiring assessment of the economic and technical aspects, and also social and institutional issues.

Natural conditions including geography, geology and climate can also be determining factors.

Government policies and regulations can either support or deter use of labour-based approaches.

Similarly, Development Partners can contribute by considering labour-based approaches as an alternative to using heavy equipment, allowing time in the project schedule for training and supporting the local labour force.

In the Pacific, consideration of labour-based approaches is recommended for:

- projects on smaller and more remote islands where the cost of bringing in larger equipment may be prohibitive
- locations where substantial earthworks are not required or material does not have to be moved further than 300 metres, and
- projects where the social and institutional factors are as important as the economic and technical outcomes (e.g. to increase the long-term skill base rather than injecting funds in a short-term job creation scheme or to create jobs quickly in a post-conflict environment).

It is less likely to be suitable on larger islands (for example Samoa) due to higher wage rates and ease of access to equipment.

1. Introduction

1.1 Background

In 2013, the Pacific Region Infrastructure Facility (PRIF) released a report titled *Infrastructure Maintenance in the Pacific, Challenging the Build-Neglect-Rebuild Paradigm*. The report highlighted the need for better strategies for infrastructure maintenance and allocation of associated budgets. Following this, the PRIF Partners decided to commission this review of labour-based approaches in order to provide information on alternative options for ensuring timely maintenance of infrastructure assets.

1.2 Objective of Review

The objective of this review is to develop a regional perspective on the quantum and type of work done over the last 10 years. This serves as a reference tool, including when projects are being designed which include a maintenance component.

1.3 Scope of Review

This document reviews labour-based approaches in infrastructure maintenance, focusing on the Pacific Region. It synthesises information from projects PRIF Partners conducted over the last decade, as well as other literature discussing topics such as current labour-based approaches, key success factors, outcomes and recommendations for supporting successful implementation of the labour-based approach.

Labour-based footpath works (ILO, 2011)

The review firstly defines labour-based approaches. It then outlines key attributes including advantages and disadvantages, impacts and benefits, economic aspects, gender dimensions, national policy environments and key operational issues. Annex A details case studies, with recommendations based on these and other material reviewed.

Although PRIF Partners have been involved in construction and maintenance work for roads, airfields and inter-island shipping facilities, electrification, water supply and sanitation, they have used labour-based approaches mainly in the road sub-sector. Therefore, a few examples from outside the Pacific region are included to illustrate its broader applicability (e.g. in the agricultural sector, urban development or in the context of climate change adaptation). Lessons from the field are generalised, wherever possible, beyond the road sub-sector. In addition, it is recognised that some of the points made in this report refer not only to labour-based maintenance but also to infrastructure projects more generally. Even so, they are included because they are relevant to labour-based maintenance.

Photos: Road maintenance (ADB, SIRIP)

2. Labour-Based Approaches Defined

Key points:

Labour-based approaches prioritise the use of labour and contribute to poverty alleviation by creating job opportunities and income. Work is supported with limited (but appropriate) equipment to meet acceptable technical standards and often uses locally available materials.

Capacity building (in form of training) and entrepreneurship (both planned and spontaneous) are essential parts of labour-based approaches and often ensure that benefits are maintained in the long term.

In contrast to labour-based approaches, equipment-based approaches use a small workforce and heavy equipment, while labour-intensive methods maximise employment but only use hand tools. The labour-intensive method is used in order to create maximum short-term employment, usually as a response to a crisis or for social welfare purposes. However, the long-term benefits may be less than in labour-based approaches.

2.1 What is a Labour-Based Approach?

Labour-based approaches prioritise the use of labour rather than equipment in infrastructure construction and maintenance. Instead of using heavy equipment handled by a small labour force, they maximise labour supported by limited (but appropriate) equipment to meet the specified technical and engineering standards.

2.2 Dual Purpose to Labour-Based Projects

Labour-based approaches are often used where there is a dual purpose – to maintain a piece of infrastructure and to provide short or longer term employment.

By creating job opportunities and income generation for local communities (especially in rural areas where employment opportunities can be limited), labour-based approaches contribute to poverty alleviation. Capacity building (in form of training) and entrepreneurship (both planned and spontaneous) can also form part of labour-based approaches and often result in a more sustainable outcome. Further, labour-based approaches tend to use locally available materials.

2.3 Labour-Based Approaches in Small-Scale Infrastructure Work

Labour-based approaches are an important method in small-scale infrastructure development in developing countries. Development Partners have promoted their application in infrastructure projects (in construction, rehabilitation and maintenance), especially in the road sector in the Solomon Islands. Other organisations have also used the approach in irrigation, land development, forestry, water supply, sanitation, and construction of small buildings (Ogita, 2010).

2.4 Mix of Labour and Equipment

Generally, an appropriate mix of labour and equipment is required to provide adequate quality in a cost effective manner. Construction firms choose the best mix under specific conditions for each project (e.g. more labour is employed where wage levels are low), even though their decision usually reflects the likely profit margin combined with the lowest risk. Section 4.3 discusses this further. Labour-based approaches can increase employment and contribute to development objectives by intentionally limiting the use of equipment. Sometimes this happens because of deliberate policy, but it is often the de-facto approach when heavy equipment is not readily available.

2.5 Types of Contracts

Labour-based approaches used to be implemented through the use of force account operations i.e. where governments would hire labour directly and also provide the technical supervision themselves. Over the last two decades, there has been an increased use of private contractors and performance-based contracts. These contracts specify work in terms of the required output rather than how it is accomplished, placing the responsibility for quality performance on the contractor through formal and measurable performance standards. Unfortunately, the impact of performance-based contracts on labour-based maintenance has not been studied systematically, though it does highlight the critical importance of capacity building for the maintenance workforce.

2.6 'Labour-Based' as a Generic Term

'Labour-based' is the most generic and encompassing term to describe the approach. Employment-intensive (EI), labour–intensive (LI), equipment-based (EB) and labour-based and equipment-supported (LBES)/ labour-based appropriate technology (LBAT) are sub-categories. However, no one definition is consistently used in the literature, partly due to variation in the mix of labour and equipment between projects and partly due to preferences in organisations and institutions. Features of common labour-based approaches are summarised in Table 1 (overleaf).[1]

BEFORE DURING AFTER

Footpath construction and maintenance on Futuna Island, Vanuatu, can only be conducted using labour-based methods due to its remoteness (Dingen and Shone, 2007)

[1] This review did not differentiate the approaches in this Review since the literature does not provide that level of detail. It is important to note that the 'typical project labour content' (see right column) can vary widely from project to project due to the wage and productivity level and therefore the number of workers per method (Ogita, 2010, ILO).

Table 1. Features of different labour-based approaches

		Prioritise use of labour	*Hand tools only*	*Optimal* use of labour	*Maximum* use of labour	Use of small-scale equipment only and labour	Typical project labour content (*)
Labour-Based Approach **(LBA)**	Employment-intensive **(EI)**	**X**		**X**			**40-80%**
	Labour-intensive **(LI)**	**X**	**X**		**X**		**<80%**
	Labour-Based and Equipment-Supported/ Appropriate Technology **(LBES/LBAT)**	**X**				**X**	**<40%**
Equipment-Based **(EB)**							**5-15%**

(*) *Source: Guidelines for optimising local employment in infrastructure reconstruction and development programs in Iraq, ILO, 2005.*

Employment-intensive (EI) is the term used by the International Labour Organization (ILO) to describe the *optimal* use of labour to maximise poverty reduction, while recognising cost and quality issues.

Labour-intensive (LI) is the term used to describe *maximising* use of labour, often with hand tools only and the specific exclusion of equipment or very limited light equipment. The LI approach is premised on the maximising labour to maximum employment, usually as a response to a crisis or for social welfare purposes (ILO, 2010; Devereux, 2002).

Labour-Based and Equipment-Supported (LBES)/ Labour-Based Appropriate Technology (LBAT) achieves competitive productivity, cost, and quality by emphasising use of small-scale equipment. For example, plate compactors and pedestrian vibrating rollers will be used but bulldozers will not. LBES and LBAT are essentially the same, although LBES defines an appropriate cost-effective mix of equipment and labour, assuming the inclusion of design and application standards, while LBAT explicitly includes design and application standards, material use and contracting methods.

Equipment-based (EB) is often referred to as non-labour-based and relies significantly using machines supported by a relatively small amount of labour, optimised to construct and maintain quality infrastructure cost-effectively (ILO, 2010). In the Pacific, the approach is usually delivered by multinational companies or their affiliates, with limited use of local resources. Often non-local workers are employed (i.e. professionals employed by a contractor), so the project may not generate cash income directly to the local community. The approach cannot be considered as labour-based (Ogita, 2010).

3. Advantages and Disadvantages of Labour-Based Approaches

Key points:

There are a range of economic, social, technical and institutional advantages and disadvantages associated with labour-based approaches.

They include both direct and indirect benefits and risks, as well as downstream 'multiplier' effects.

The advantages (or benefits) and disadvantages (or risks) of labour-based approaches can be considered in terms of technical, economic, social, engineering and institutional factors (see Table 2 overleaf).

The main advantages include:

- infrastructure is created or maintained – often by local communities
- poverty reduction and pro-poor growth is achieved (including through job creation opportunities for youth and the underprivileged), and
- gender equity is supported in communities.

In addition, there is potential to mitigate rural-urban drift (in the case of long-term projects) as well as potential to improve transparency and accountability – if bidding for work is competitive and rates are set in advance and advertised during job selection.

Some of the downstream effects are equally important. This includes income 'multipliers' generated by spending of wages, micro-enterprise development[2], and enhanced employability of workers after the program finishes (OECD, 2005). Particularly for longer-term schemes or if workers are able to use their new skills to gain further employment once the project finishes, labour-based approaches can help address structural issues associated with lack of a skilled labour-force and underemployment. However, this depends on other factors in the local context particularly in the broader policy environment.

Labour-based approaches can provide a sense of ownership of local infrastructure and improve the sustainability of the infrastructure if communities are willing to maintain the infrastructure. Experience suggests it is best to negotiate this as part of the initial agreement to construct the infrastructure, particularly when there is inadequate financial support from the public sector for maintenance work (Ogita, 2010). Sometimes this works and sometimes it does not. If the scheme is based on voluntary labour contributions from local communities, then it will generally only be helpful where the infrastructure serves that specific community. Even then, there are varied results and sometimes maintenance is below the required level[3].

Beyond this, there are also indirect impacts from use of labour-based maintenance, including use of infrastructure for economic, educational, health and other outcomes.

[2] Research highlights the benefits of linking micro-financing/micro-enterprise activities with labour-based infrastructure initiatives (PIAC 4th Quarterly Report, May-September 2010).

[3] Serge Cartier, consultant, personal communication

The disadvantages must be carefully considered in deciding whether to use labour-based maintenance and they have to be mitigated or managed. These include:

- some projects only offered low wages and this undermines the overall intention of labour-based approaches being supportive of pro-poor development
- often it requires a lot of different contracts in order to include small contractors and locally-organised work groups which have an associated management and efficiency cost
- construction periods may be longer when labour-based approaches are used (as opposed to equipment-based methods) – including the need for time spent on capacity building, though delays can also result from low availability of equipment, and
- quality of work may be an issue, though studies show mixed results on this point[4]

Clearly, labour-based approaches are more suitable for some projects and they are not appropriate in all situations. The types of projects for which labour-based methods are appropriate are explored in more detail in Section 4.4.

Table 2 (overleaf) summarises advantages and disadvantages.

(Drainage works. ILO, 2011)

[4] For example, Ogita (2010) reports that in the Solomon Islands, routine maintenance work on unpaved roads (including pothole repairs on coronous and gravel surfacing) was satisfactory on most roads; culvert and protection work was well-constructed; and community contracting continued to be the preferred and appropriate approach for routine maintenance work. However, issues arose because coronous surfaces were very hard and difficult to work by hand, so use of hand-held compaction equipment was recommended to ensure the work would meet standard specifications.

Table 2. Advantages and disadvantages of labour-based maintenance

	Advantages/benefits	Disadvantages
Economic	Lowers project costs	Some projects pay low wages and undermine the global call for 'decent wages'
	Employs locally available unskilled workers and generates income	Projects may provide only short-term unskilled employment and therefore have little impact on structural unemployment and underemployment Unless the approach is formalised (i.e. not just ad-hoc) it is unlikely to substantially effect long-term employability or private sector development
	Furthers job creation for local communities through income multipliers	
	Improves employability of workers after the program finishes (capacity building)	
	Promotes private sector development, e.g. micro-enterprise development, income multiplier potential	
Social	Empowers local communities and encourages entrepreneurship	The labour-based approach is slow, including the time needed to educate and train employees
	Enables people to remain in their own communities for socio-economic reasons	Cultural issues may develop when different groups work together e.g. when workers are 'imported' to an area (as is typical in projects which are not laboured-based) or when men and women working in the same group
		People are employed short-term and earn money, but once the scheme ends there is often nothing and people may feel worse off
Engineering/ Technical	Suits areas where equipment cannot manoeuvre, is unreliable, or uneconomical	Less suitable for projects with bulk earthworks, mountainous areas, monsoonal areas and where local materials are not available
		Requires a longer work period
		Quality can be less than under equipment-based approaches
Institutional	Allows labour/contractors to organise themselves	The quality of work needs regular checking and supervision and is more management intensive
	Builds capacity and may incorporate life skills training	More administration and management due to involvement of numerous small scale contracts

4. Key Implementation Issues

Key points:

Some issues to consider in implementing labour-based approaches include the Government policy environment, the design of projects, availability of labour, contractor and contract issues, and capacity building requirements.

Choosing whether to use labour-based approaches depends on a range of factors, including:

- political, social, institutional and economic context
- current condition of the infrastructure
- technical suitability of each approach
- labour, equipment and other costs (including maintenance of equipment)
- availability of labour
- capacity of contractors, and
- experience and good judgement on the part of the contracting entity and the contractors.

The best solution in any given context may be a mixed approach where some aspects of maintenance are done using a labour-based approach and other aspects are done using heavier equipment.

In the Pacific, labour-based approaches may be particularly suitable in more remote locations.

There are a range of issues to plan for and manage in implementing labour-based approaches. Some of these are discussed below.

4.1 Government Policy Environment

The Government's policy environment can significantly affect the success of labour-based maintenance schemes. First and foremost, Governments can allocate sufficient budget for maintenance and make this transparent in their budget and expenditure frameworks. They can also specifically investigate and introduce schemes to fund maintenance work e.g. generating revenue through tariffs and user fee arrangements.

In respect to labour-based maintenance specifically, Governments have a critical role in ensuring a clear and appropriate policy framework that supports labour-based approaches and ensures they are effectively embedded in operations at both national and sub-national levels. This includes institutionalising and integrating labour-based approaches into regulations, development plans and programs – sometimes involving capacity building, reform or adaptation of existing systems and procedures.

4.2 Project Design

There are a number of ways in which the design of projects can cause problems during implementation – not only in labour-based maintenance, but more generally in infrastructure work of all kinds. These include:

- unclear program objectives, especially incoherence between short-term and long-term objectives within an integrated labour-based approach framework
- hastily prepared technical appraisals, often resulting from financial or time constraints (which may lead to unrealistic program targets and underestimation of potential constraints), and
- lack of participation of beneficiary communities and local government institutions in program design.

The project design must be clear about the institutional arrangements. Generally, labour-based projects use one of four institutional arrangements - force account, caretakers, small-scale private contractors, or community contractors. As mentioned earlier, a *force account* is when a government hires workers directly (on short or long-term contract) and provides all the technical supervision. A *caretaker situation* is when either executing agencies or contractors hire individual workers to maintain certain sections of a piece of infrastructure (e.g. one km of pipe or footpath). Governments can contract *small-scale private contractors* for maintenance work through a tender, expression of interest, or some type of negotiated process. For this, the contractor may be a sole operator or may organise a small local labour force. Depending on the size of the job, there may be multiple contracts with small-scale private contractors. In *community contracting*, a community or community group is contracted to ensure maintenance of a piece of infrastructure in their local vicinity e.g. clearing rubbish and debris from drains, irrigation canals or roadsides.

Design also needs to consider capacity of the target participants. Including community representatives and others who have previously managed projects in the same geographical area or sector can add value to the process. Where capacity is low, it may be possible to start with small projects and build on success[5].

One useful innovation in project design has been the adoption of performance-based schemes and linking payments to the amount of work completed and on productivity rates. Performance indicators can be developed during the design phase (such as the maximum level of sedimentation in a canal or the allowable vegetation growth) and, as long as these performance indicators are met, the payment is made. This simplifies planning and monitoring of maintenance work and makes successful implementation more likely (ILO, 2011).

Another important area concerns ensuring that the project design takes account of the need to mitigate workloads in executing agencies since labour-based approaches often require more workload, particularly if it involves direct contracting and monitoring of many small-scale contracts.

4.3 Labour Issues

Lack of labour mobility can be a significant issue in introducing labour-based approaches. It can be mitigated through a range of measures, depending on the local context, including:

- providing attractive remuneration, training and other opportunities
- increasing the labour pool catchment e.g. by recruiting labour from nearby communities and the closest/target communities

[5] ibid

- providing longer-term contracts and other incentives to make mobility attractive to workers
- scheduling temporary work at times when less labour is needed on farms[6], and
- treating labourers professionally and by paying them on time.

4.4 Contractor Issues

Ineffective systems for procurement and management of contracts are a key challenge in implementing labour-based approaches. This may be complicated by a lack of financial management acumen – both in Government agencies and contractors – and lack of a strong financial base among small to medium contractors. Mitigation measures can include:

- ensuring clear communication between the client and contractor
- providing training (both initially and throughout the project, as appropriate)
- simplifying tender and contract documents[7]
- using standard rates to simplify procedures
- simplifying payment procedures
- making payments on time (as not doing so can undermine contractor profitability)
- using longer-term contracts
- dividing work between different communities and contractors
- repackaging work into smaller contracts or supporting contractors to organise themselves under one capable overall contractor
- ensuring sufficient supervision with regular visits and inspections
- providing tools and equipment for contractors/workers as part of the contract (or with deductions from pay over time as a purchase arrangement), and
- screening work locations, so percentages of the total job can be calculated if needed.

4.5 Capacity Building

Capacity building (particularly training) is essential for the successful adoption and implementation of labour-based approaches. This takes commitment from EAs and participants alike. The training may involve both specific skills to carry out the work and also training about labour-based approaches – what they are, how to manage them or participate, roles and responsibilities, and how they different from other approaches. It is generally recommended that training include the private sector, community groups, government and non-governmental organisations (NGOs) – at national and subnational levels.

It should not be assumed that engineers and projects planners understand labour-based approaches as their education and training is often in equipment-intensive approaches. For small contractors, training is critical – including on bidding processes and standards, managing workers, financial management, and how to successfully execute infrastructure programs using labour-based approaches. In Zambia, the Roads Training School has been responsible for training private small-scale routine maintenance contractors since 1995.

Table 3 (overleaf) summarises operational issues and mitigation measures on a project in the Solomon Islands.

[6] ibid

[7] Including avoiding over-specification which tends to result in a move away from labour-based approaches

Table 3. Weaknesses, threats and mitigation measures for LBES methods in rehabilitation and roads maintenance in the Solomon Islands[8]

Weaknesses	Mitigation
Labour mobility problems	• Repackaging of contracts needed (smaller) • Work division needed between communities and contractors • Training and capacity building needed • Attractive remuneration essential • Localized tendering needed • Use machines where no labour available • Increase labour pool catchment if necessary
Lack of contract capacity in LBES	• Appropriate simplified contracts and standards essential • Opportunities needed over at least 3 years • Training and capacity building needed • Equipment provision may also be needed.
Unavailability & unwillingness of labourers	• Payments may need to offset the financial benefits of their normal "income" generated by fishing • EB methods may be necessary • Payments needed on time • Longer term contracts may be needed • Payment could be made on a productivity basis • People willing to work may need to work outside their village boundaries • Provision of incentives may be necessary
Weak provincial government capacity	• Contract out ex-MID staff to certify works • New MID staff to be placed in provinces and properly resourced • Use performance based contracts • Provide capacity building, HR and logistic support
Financial management capacity in contracts	• Technical training and capacity building needed • Simplification of contracts essential • Management training also needed • Longer term contracts needed as Bank "guarantees" • Standard rates could be adopted to simplify procedures
No specification in place	• Work on LBEST specifications needs to be give priority attention • Need to revisit pavement design and widths • Need for training and capacity building
Limited skill base**	• Training, training, training!

Threat	Mitigation
Limited financial resources (contractor)	• Govt should actively support/encourage small to medium local contractors • Paying on time essential • Providing longer term contracts desirable • Provision of tools and equipment desirable
Political interference in labour selection	• Public awareness campaign needed • Consider community outcome contracts
Lack of financial support	• Provide longer term contracts to satisfy securing of Bank "guarantees" • Chamber of Commerce could lobby Govt
Opposition from contractors	• Screen locations and roads for either EB or LBES approaches so market shares are known. • Use EB methods only where they are appropriate • Reasonable timeframe and medium sized contract value needed on LB contracts
Inappropriate worker selection	• Use contractors to negotiate and engage workers. • Consider performance based contractors • Leave community leaders to select workers • Use internationally accepted selection procedures involving ballots
Lack of information and communication	• An awareness campaign needed • MID should consult with communities well before works commence
Limited skill base**	• On-job training critical • Comprehensive technical and managerial training needed now
Management organisation structure not in place	• MID to review its structures and implement effective change • MID may need additional financial resources to be able to perform its functions
Insufficient critical mass – labour	• Recruit from nearby villages • Use EB methods if critical mass of labour not available • Let the contractors resolve this issue

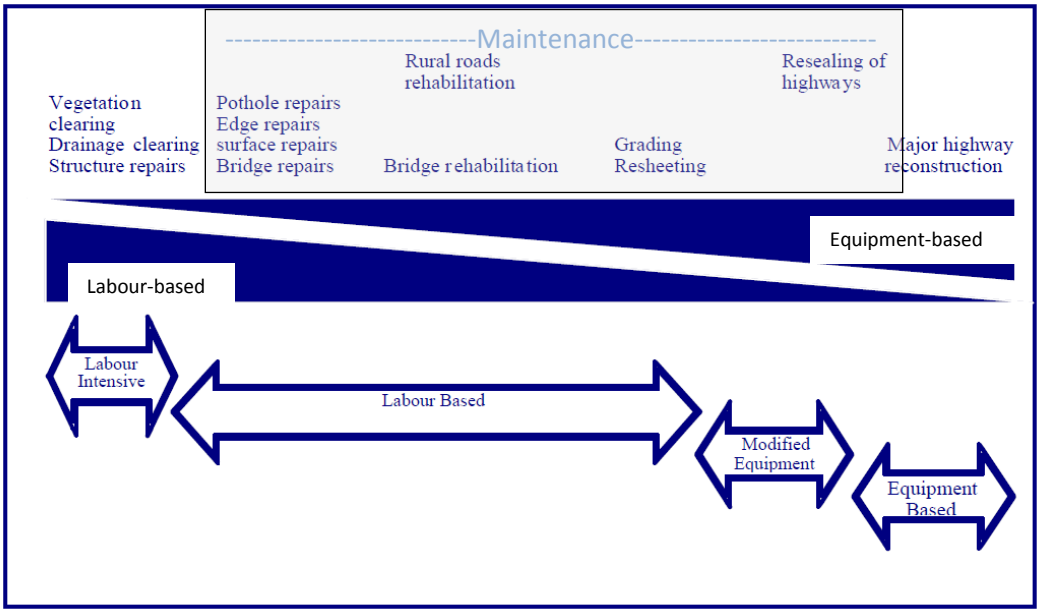
(Source: Dingen and Shone, 2007)

[8] EB = Equipment-based; LBES = Labour-based equipment-supported; LBEST = Labour-based equipment-supported technology (i.e. same as LBES), MID = Ministry of Infrastructure Development

4.6 Identifying Appropriate Projects for Labour-Based Approaches

Figure 1 (below) illustrates the different application of labour-based and equipment-based approaches in the road sector using different activities and technologies. It shows that for certain activities, labour-based approaches will be more appropriate (e.g. vegetation clearing, pothole and edge repairs) while, for other activities, equipment-based approaches will be more appropriate (e.g. resealing and major highway reconstruction). It also highlights the option of a mixed approach where some aspects of a maintenance job might be done using a labour-based approach while others are done using an equipment-based approach.

Figure 1. Range of technology options in roads sector



(Source: Dingen and Shone, 2007)

This matching of the approach to the project (or to tasks within a project) is a key factor in achieving success in a labour-based approach.

In addition to the examples above, experience in the road sector has shown that labour-based approaches suit unsealed roads that do not require asphalt pavements, areas where equipment cannot manoeuvre well, where substantial earth work is not involved, in situations where equipment is unavailable or unreliable, and in low traffic areas where traffic flow can be disturbed.

On the other hand, there are situations where it is less likely to work – often due to natural conditions such as geography, geology and climate. For instance, monsoonal climates can disadvantage labour-based approaches because of landslides and soil loss that require substantial earthwork to resolve. Likewise, in mountainous and hilly areas where vertical movement of soil is required, manual work can be too time-consuming or ineffective. The availability of materials such as gravel can also be an issue for labour-based approaches if hauling by hand is required beyond 300 metres. It is also recognised that higher specification standards can be achieved using heavy equipment and machinery, which can affect the longevity of some types of infrastructure.

Generally, the selection of the technology or mix of technologies will depend on a number of factors, including:

- current condition of the infrastructure
- technical suitability of each approach
- labour, equipment and other costs (including maintenance of equipment)
- availability of labour
- capacity of contractors
- experience and good judgement on the part of the Executive Agency (EA) or contractors.

However, it is important to recognise that, if key circumstances change, then the appropriate technology may also change. This includes social, institutional, financial, economic, technical, political and environmental factors. Hence, these elements need to be monitored regularly throughout the project to ensure there are no adverse effects on the work or that they can be adequately mitigated.

In the Pacific, labour-based approaches may be particularly suitable in more remote locations, since:

- they avoid transhipment of equipment to the many islands that are dispersed away from the capital cities and major towns in the Pacific
- heavy equipment does not manoeuvre well in some areas
- there is a high cost for spare parts for equipment and fuel and sometimes the waiting time for parts can be months, and
- the number of firms that own equipment can be limited.

Flood control works (ILO, 2011)

5. Impact of Labour-Based Approaches

Key points:

There are a range of economic, social, technical and institutional advantages and disadvantages associated with labour-based approaches.

Lack of evaluation hampers the ability to draw conclusions about the overall effectiveness of labour-based approaches; existing studies show considerable variation in results.

There are few systematic studies of community attitudes and impact at household level.

5.1 Economic Impacts

a. Direct Income Generation

Labour-based approaches stimulate the local economy through income generation. These methods can create two to four times more employment, mostly for unskilled workers (ILO). Income can be estimated by multiplying the average daily wages by total worker-days, with worker-days being an important indicator. Other indicators are also possible e.g. in the road, worker-day-per-kilometre-per-month indicates the amount of employment at a point in time or over a duration. Data such as this can indicate the income generated by local communities.

Further, different types of work requires different amounts of labour and therefore provides different levels of income to communities e.g. rehabilitation road works require four to fifteen times as many workers days as routine maintenance works (Ogita, 2010).

Ogita (2010) reports on a labour-based project in Timor-Leste that had the following financial benefits for community members:

- 10 times more savings than non-participants
- three times the rate of business ownership, and
- 35% reporting a significant increase in livestock ownership.

b. Multiplier effect

Under labour-based approaches, the term 'multiplier effect' refers to the way that funding for a project boosts the local economy – both directly and indirectly. The income that workers earn gets spent in the local economy and local business can increase profits through project and personal spending on goods and services. Examples are food, clothing, mobile phones, health services and rural financial services. Projects can specifically aim to support this by prioritising the use of locally available materials, tools and equipment, and local financing (where appropriate).

As an example, in the Solomon Islands, improved roads led to purchase of vehicles and provision of public transport as indirect benefits. In Temotu four vehicles were purchased and, in Makira, improved roads resulted in Parliamentarians using constituency funds to buy vehicles for transport in their communities.

The scale of the impact naturally depends on the income the project generates, so the more income received the greater the impact on the local economy. Equipment mostly depends on imports, so the

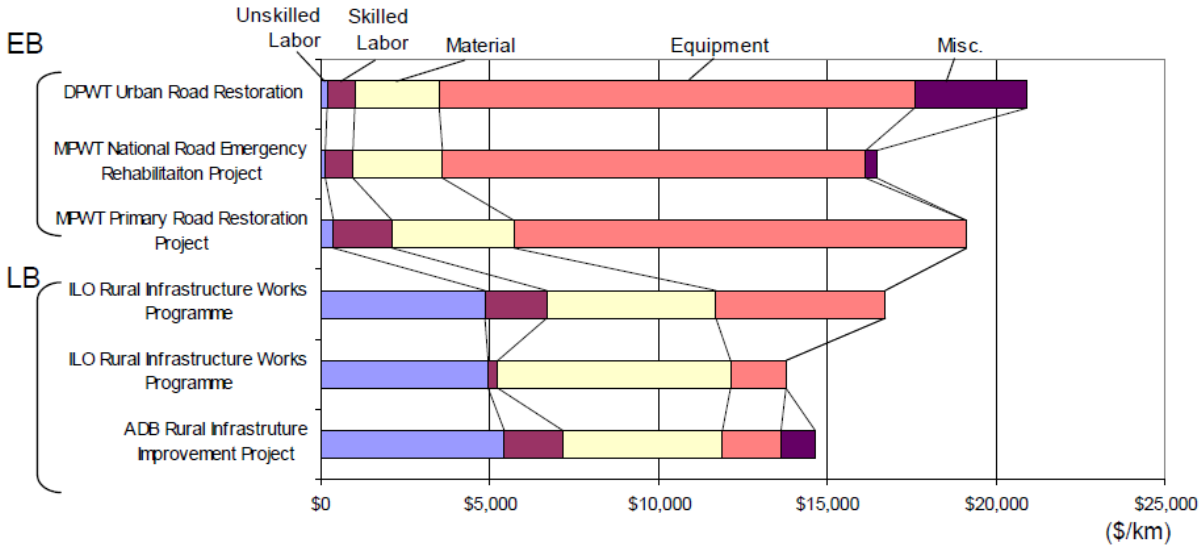
multiplier effect can be smaller than with wages. Further, savings earned from infrastructure projects can be used as start-up or working capital for business ventures.

Indirect employment generated by labour-based approaches has been estimated to range from 1.5 to three times the number of directly generated jobs. This can stimulate local entrepreneurship and community participation which helps expand local industries, through back-and forward-linkages with other sectors in the economy. For example, in one project, the promotion of small-scale contractors in road construction programs stimulated the domestic construction industry and the transport sector, especially in the sourcing and transportation of gravel materials (Train4Dev / OECD DAC POVNET). Fewer equipment purchases also results in foreign exchange savings with the ILO suggesting a drop in foreign exchange requirements by 50% - 60% through labour-based approaches.

c. Project Costs

Overall project costs have been shown to be 10% to 30% less by the ILO and 10% to 50% by Ogita (2010). Naturally, labour costs are generally greater in projects using labour-based approaches, while equipment costs are greater in projects using equipment-based approaches. Therefore, projects using a mixed approach are likely to cost less than projects which are wholly equipment-based. Although there has not been a detailed assessment of this in the Pacific, an estimated cost breakdown of labour-based and equipment-based road works in Cambodia illustrates this point (see Figure 2). Examining six projects, the data highlights the cost saving per kilometre that might be expected in labour-based projects.

Figure 2. Estimated cost breakdown of labour-based and equipment-based projects in Cambodia



(Source: Ogita, 2010)

However, the situation is not as straight-forward as this might suggest. There is a 'break-even wage' at which workers are not economic compared to machines. Ogita has reported that the cost per kilometre of using labour-based approaches in roadwork decreases according to increase in the length of the contract. However, as a general approach, smaller projects make more sense for labour-based maintenance than larger projects.

Table 4 provides cost comparisons for different tools used in labour-based and equipment-based approaches. Clearly, the equipment costs are greatly reduced in labour-based projects because of the type of equipment used.

Table 4. Equipment alternatives and costs

Labour-Based Approach	Equipment-Based Approach
Pedestrian Roller US$7,000	Vib-Roller (100 kW) US$75,000
Towed Grader US$3,000	Motor Grader (135 kW) US$200,000
Tractor US$15,000, Trailer US$2,500 Wheelbarrow US$30, Light truck US$5,000	Tipper Truck (6 m3) US$35,000

(Source: Dingen and Shone, 2007; ILO, Regional Office Bangkok, ASIST-Asia Pacific)

Table 5 provides some comparative data on requirements and costs for labour-based and equipment-based work. Here, costs are shown for labour versus a bulldozer, a wheel loader and a grader. It indicates that labour-based approaches would be cost-effective for those parts of the job where a wheel loader or grader were going to be used, but not where a bulldozer was needed (ILO, Regional Office Bangkok, ASIST-Asia Pacific).

Table 5. Labour productivity

Work Required	Allocated Time	Equipment Cost	Labour-based Cost and Required Workers
800m^3 of roadwork	1 day	Bulldozer US$0.60/$m^3$ (cost: US$480/800$m^3$)	200 workers: US$ <4.0/workday US$ 1.0/m^3 Task: 4m^3/worker (cost: US$800/800$m^3$)
400m^3 of roadwork	1 day	Wheel Loader US$ 0.60 m^3 (cost: US$240/400$m^3$)	80 workers: US$ <4.0/workday US$ 0.60/ m^3 Task: 5m^3/worker (cost: US$240/400$m^3$)
4000 m^2 of roadwork	1 day	Grader US$ 0.10 m^2 (cost: US$400/4000$m^2$)	80 workers: US$ <4.0/workday US$ 0.08/m^2 Task: 50m^2/worker (cost: US$320/4000$m^2$)

(Source: Dingen and Shone, 2007; ILO, Regional Office Bangkok, ASIST-Asia Pacific)

5.2 Social Impacts

Social impacts of labour-based approaches have not been as well-documented as financial and other impacts. It is generally understood that community empowerment may result from labour-based approaches. This can particularly be so for women. Some projects have found that women become more involved generally in decision-making in the community following their inclusion in labour-based projects. Similarly, in post-conflict situations, as well as providing income generation, labour-based projects can support rebuilding of social cohesion in communities. Further, the training and awareness-raising aspects of a project can usefully incorporate areas that impact on the smooth implementation of the project as well as the overall development of the community, even if they go beyond the strictly

technical skills needed for the work. Examples include life-skills and micro-business training modules as well as cross-cutting issues such as domestic violence, HIV/AIDs, child labour and children's rights, and environmental protection and management.

However, there have been few systematic studies of community attitudes, household impacts, and effects on road maintenance costs and quality (ADB, 2011). There can also be negative impacts from labour-based projects but these are impacts associated with infrastructure projects generally and not labour-based approaches per se (e.g. spread of diseases such as HIV/AIDs if external contractors are in the area).

5.3 Gender Dimensions

Gender is the area of social impact which has received the most attention in respect to labour-based approaches. Hence, it is reported here separately.

Labour-based approaches can contribute to gender mainstreaming by providing job opportunities for women, both through direct employment and multiplier effects. An increase in household income, resulting from employing women, is closely associated with improved household nutrition and access to educational and health services. These projects can empower women, particularly in rural areas, where cash income opportunities are limited because of housekeeping responsibilities and inability to commute far from their villages for work.

Still, there can be negative aspects to increasing women's participation in projects and the potential for this needs to be considered in project design and implementation. For example, this may add extra-heavy manual labour requirements to already overworked women. Further, women's participation in infrastructure projects has also been interpreted as having an adverse affect on their reproduction and the quality of care they can give to their children. There is also a suggestion that it can indirectly lead to child labour as children take over women's work. Up-front education and awareness is important. The construction of crèches in areas where infrastructure projects are being implemented would enable women to take up formal employment, without undermining the quality of care for children. Also, communities can find options for child care e.g. paying some to look after the children while the others work.

Overall, there is a need for gender sensitive employment policies in infrastructure projects (whether construction or maintenance), to ensure employment of both man and women in a range of technical and managerial positions (Train4Dev / OECD DAC POVNET; Devereux, 2002). At the same time, it is recognised that, in some countries, it is socially difficult for women to work or for men and women to be employed together in manual labour. Low-wage manual labour may be seen as 'men's work' or employing women can be interpreted as taking jobs away from men. Where women themselves want the opportunity to join the workforce but there are barriers to this in community attitudes, it is important to consult the community to address concerns.

5.4 Sustainability

Project sustainability can be divided into the sustainability of the physical works and sustainability of the capacity building that has taken place (TIM Works, 2012). It is important to consider both of these.

Research points to the need to:

- obtain political commitment and support from government, policymakers and local communities

- strengthen existing institutions to accept or implement labour-based approaches at national and local levels
- emphasise improving operations and maintenance of public infrastructure by using locally available resources and skills, and
- ensure affordable fees that reflect people's ability to pay for operating and maintaining the infrastructure.

Monitoring and evaluation (M&E) are also important in ensuring sustainability. Aspects to be monitored include acquisition and use of materials, technology used, quality of infrastructure created, direct and indirect job creation, wage rates, and private sector involvement. Quantitative data on the impacts of labour-based maintenance work is particularly difficult to obtain, resulting in a lack of comprehensive studies[9]. The findings of M&E work can be used to shape policy, planning and implementation processes and to ensure that the approaches are sustainable through replicating and expanding these labour-based approaches (Train4Dev / OECD DAC POVNET).

Women in the Solomon Islands (Malaita Province) making gabion baskets for the SIRIP Project (ADB, 2010)

[9] Daisuke Mizusawa, ADB, personal communication

6. Summary of Labour-Based Projects in Pacific Island Countries and Other Regions

Key points:

Labour-based approaches align with the pro-poor goals in Development Partners' programs.

In Kiribati, the Solomon Islands, Tonga, Vanuatu and Timor-Leste, labour-based approaches have been used for road maintenance work but, elsewhere in the Pacific, its use has been limited.

In Papua New Guinea, labour-based approaches are being introduced with baseline surveys to support an impact evaluation as well as community self-evaluations.

In other regions, labour-based approaches are used effectively in other sectors including the agricultural and energy sectors and for work in urban upgrading and climate change adaptation works. This includes in Cambodia, Madagascar, Lesotho, Uganda, Bangladesh, Viet Nam, Nepal, China, and Latin America.

Work that has the potential for increased use of labour-based approaches includes water and sanitation, irrigation, transport, housing, informal settlement upgrading, forestry and environmental interventions.

This section of the report focuses on projects in the Pacific that have employed labour-based approaches in road maintenance and rehabilitation of rural roads. It briefly describes some projects and lessons learned. Case studies from other regions and other sectors are also discussed to provide a more global context, including in both construction and maintenance work. More details on most of the case studies can be found in the Annexes and list of references.

6.1 Interest from Development Partners and Governments

Development Partners use labour-based approaches because they align with their pro-poor development goals and interests in value-for-money and sustainability. The ILO and the World Bank (WB) have strongly promoted the use of labour-based approaches since the 1970s including in more than 50 countries throughout Sub-Saharan Africa, Asia, the Pacific, and Latin America (ADB, 2011). After 2000, other Development Partners have incorporated labour-based approaches in some of their road development projects. This includes the Asian Development Bank (ADB), Danish International Development Agency (DANIDA), UK Department for International Development (DFID), German Agency for Technical Cooperation (GTZ), Japan International Cooperation Agency (JICA), Norwegian Agency for Development Cooperation (NORAD), and Swedish International Developmental Cooperation Agency (SIDA). JICA has published comprehensive guidelines on labour-based approaches (JICA, 2012).

In the Pacific, Development Partners and Governments have worked together to identify and manage appropriate projects. Generally, the labour-based approach is perceived as contributing to community engagement, rural employment, and private sector development. However, the benefits of labour-

based approaches have not been rigorously assessed and this may need more effort. Table 6 summarises the countries where PRIF Partners have worked with Governments on projects involving labour-based approaches.

Table 6. Use of labour-based approaches among PRIF Partners

Country/ PRIF Partner	ABD	DFAT (Australia)	European Union (EU)U/European Investment Bank (EIB)	NZMFAT	JICA	World Bank
Cook Islands						
Kiribati						✓
Marshall Is.						
Micronesia						
Nauru						
Niue						
Palau						
Samoa						
Solomon Is.	✓	✓	✓	✓	✓	✓
Tonga						✓
Tuvalu						
Vanuatu			✓			
Papua New Guinea*	✓				✓	
Timor-Leste*	✓	✓	✓			

(not currently a PRIF member country)*

As mentioned previously, Governments have a critical role in determining policy and regulation in regard to labour-based maintenance. In the Solomon Islands, for example, there has been some discussion about introducing a policy to have a certain percentage of labour-based workers on projects, particularly in the more remote islands. Initiatives of this kind may provide new innovations in the future.

6.2 Solomon Islands

Labour-based approaches have been used from the 1980s in the Solomon Islands. The Solomon Islands Road Improvement (Sector) Project (SIRIP 1 & 2) (see also Annex A.1) contained a labour-based component to rehabilitate and maintain roads and bridges. Awareness and training programs were provided for contractors and staff of the Ministry of Infrastructure Development (MID). They included issues such as understanding road maintenance works in a contract environment; winning bids at a profitable price; assessing bids; and implementing, supervising and managing road maintenance contracts.

Maintenance of roads was achieved using private sector contracts involving local communities, with emphasis on the inclusion of women in the work force. As a result of the project, household incomes increased significantly because more frequent trips to market and community centres were possible on

the improved roads. In addition, income generation supported female empowerment in decision-making at family and community levels.

LBES technology has proven cost-effective and a sustainable approach to road maintenance in the Solomon Islands. It is suitable in most road rehabilitation activities, but particularly in rural areas due to the relatively low traffic volumes and the amount of unsealed roads i.e. some 1,000 kms of gravel/earth roads in a total network of 1,390 kms (Gupta, M., ILO). Experience gathered from maintenance contracts from a number of projects highlights the importance of the following:

- sufficient supervision with regular visits and inspections
- prompt processing and payment of contractor's monthly claims
- a simple and transparent procurement process
- clear communication between the client (MID) and contractor, and
- continued training for contractors so that knowledge amongst the contracting community can continually improve (ADB SIRIP, 2013; DFAT SIRIP, 2013).

The Transport Sector Development Project (TSDP) aims to strengthen transport sector institutions. To ensure best use of local knowledge and local buy-in, it is important to consult with stakeholders where LBES and labour-based approaches are planned. Appropriate designs need to be standardised and developed in accordance with the proposed design life, country-specific weather conditions, and maintenance methods that will be used, particularly if LBES is to be employed. The project has found that design and implementation, including long term maintenance, need to carefully consider the existing and expected capacity of the executing agency (TSDP, 2010; TSDP Project Data Sheet, 2013).

The Community Sector Programme (CSP) engaged labour-based and labour-intensive road maintenance activities through community contracts i.e. private sector contracting, as developed under the SIRIP. The project found that manual excavation of drainage works is a viable labour-intensive activity. However, training effectiveness was low and many of those who had received training were still not able to bid independently for a contract (TSDP, 2010).

The Emergency Assistance Project (SIEAP) was a post-tsunami reconstruction effort that encouraged economic activity through creating local small–scale business opportunities in labour-based road maintenance. It strongly encouraged participation of women and female employment amounted to 30% with 32% of the income generated. An increase in costs of materials required design and scope changes, resulting in some works being transferred from rehabilitation to maintenance (SIEAP, 2011).

The Rapid Employment Scheme (RES) aimed to provide short-term employment in and around Honiara in response to the global financial crisis, youth unemployment and fragile post-conflict conditions. The project conducted labour-based public works activities (e.g. labour-based urban services such as garbage pick-up and removal, improvement of footpaths, drainage cleaning) as well as labour-intensive road maintenance. This led to a visible improvement of the environment in Honiara. In addition, participants were able to start small canteens, sell goods through skills learned from this scheme, and save money (World Bank, 2011, 2012, 2013 + Development Partner policy).

6.3 Other Pacific Island Countries

The **Tonga** Transport Sector Consolidation Project aims to create a greater domestic capacity for road rehabilitation and maintenance. To date, the project has created approximately 19,360 person-days of employment for road maintenance activities (periodic maintenance and general routine maintenance).

A national routine maintenance program has been introduced using a 'semi' performance-based approach (Bennett, 2013; Kingdom of Tonga, 2013).

ADB conducted a baseline survey to support the impact evaluation of labour-based road rehabilitation and maintenance in **Papua New Guinea** and the **Solomon Islands**. This now offers data for further specific analysis on the impact of those methods and it is likely that a more rigorous economic analysis in the Solomon Islands will be conducted (ADB, 2013b; personal communication, Daisuke Mizusawa).

In **Papua New Guinea**, the project on Extending the Socioeconomic Benefits of an Improved Road Network to Roadside Communities (see also Annex A.2) conducted a half-yearly community self-evaluation. As a result, an improved training approach and more effective community-based road rehabilitation and maintenance activities were developed. This proved an innovative formative exercise, directly involving community members (ADB, 2011; ADB, 2013a).

In **Papua New Guinea**, the Maritime and Waterways Safety Project, Community Engagement Program uses labour-based approaches for maintaining navigational aids (lighthouses) for maritime transport (ADB, 2012).

In **Kiribati**, as part of the Road Rehabilitation Project, routine road maintenance microenterprises are being introduced. Assistance is provided through training, procuring basic plants and equipment, and offering operational support for managing and monitoring of contracts, using performance-based contracting methodology. From the beginning of the financial year 2013, the Government was asked for at least US$1,500 per kilometre for sealed roads in its annual budget for national road maintenance and US$500 per kilometre for unsealed roads and to adjust this annually thereafter (World Bank, 2011a).

In **Vanuatu**, the Public Works Department Maintenance Training Programme (see also Annex A.3) aimed to improve managing road maintenance within the Public Works Department. Results were mixed. While there was some improvement in finance and planning skills, the program was unable to introduce a sustainable road maintenance management system. This meant that visiting experts cared of the management database and the supervision of community-based works, which undermined the sustainability of the work (Hydratec Consortium, 2009).

6.4 Other Regions and Sectors

Implementation of labour-based approaches in **Cambodia** (irrigation in the agricultural sector, see below and Annex A.5), **Madagascar** and **Lesotho** (both road sectors, see also Annex A.6 and A.7) was reviewed. This revealed that programs which promoted self-reliance and self-sufficiency in operating and maintaining infrastructure, and which funded training services, were better able to achieve sustainability of the infrastructure and the labour-based approaches. Enhancing community members' skills and capacity (including local private sector contractors) and socio-economic conditions (more generally) were significant factors in the success that was achieved (Train4Dev / OECD DAC POVNET).

Equally important is the need to build public sector capacity to delegate infrastructure execution to small contractors and for the public sector to play a contract management role. The contracting system for public infrastructure programs should be suitable for small contractors, for example by unbundling multi-million dollar contracts into smaller contracts. Modifying the contract system can enforce decent working conditions for small-contractors and promote women's access to work on national minimum wage standards (Train4Dev / OECD DAC POVNET).

Cambodia embedded labour-based approaches in infrastructure development and maintenance within its **irrigation system in the agricultural sector** (see also Annex A.5). Labour-based approaches are suitable for construction and rehabilitation of canals, including community contracting and small contractors (ILO, 2011). In this program, short-term unemployment was addressed by employing many people, paying them in cash or food. Increased irrigated agriculture and other related economic activities attributable to improved irrigation infrastructure addressed long-term unemployment. Overall, 43% of the labour force was female, creating one of the few opportunities for equal pay. This program was combined with road rehabilitation to ensure improved access to markets (for agricultural produce) and other services. Assistance was provided to provincial governments to develop a rural infrastructure maintenance strategy, local staff were trained in labour-based approaches and technology (including specific techniques for administration, planning, organising and supervising of labour-based works), and communities became more self-reliant in operating and maintaining the irrigation system (Train4Dev / OECD DAC POVNET; ILO, 2000).

Construction and maintenance of irrigation canals (ILO, 2011)

The sustainability of infrastructure development in rural areas in the **energy sector** in **Papua New Guinea** faces ongoing issues related to lack of community ownership. The Town Electrification Investment Program identified the opportunity to expand access to energy among rural communities along the proposed transmission lines. A trial of implementation models such as community-based civil works contracts is being conducted, with the aim of lowering the cost of implementation and improving community ownership (ADB, 2013c).

The Masulita **Urban Upgrading** Development Project in **Uganda** aimed to establish work methods suitable for community-based upgrading of the infrastructure in unplanned settlement areas and to test the use of community contracts in Kampala. The project assisted the community by improving drainage in an area prone to regular flooding. Construction work included 3.2 kms of lined flood drains. This work was undertaken in close collaboration with the Kampala City Council and the residents of the project area, who received on-the-job training and were employed to carry out all the construction work. The infrastructure improved notably and provided people with access to knowledge and capital. Due to lack of maintenance and cleaning of the drain, large parts of the main drain became blocked after the completion of the project. This shows the importance of establishing sustainable maintenance agreements with the relevant communities (ILO, 2009).

Construction and maintenance of dykes (ILO, 2011)

Flood control measures mitigate the impact of future **natural disasters and climate change**. Earthen flood control structures, such as dykes, embankments and levees offer substantial scope for the applying labour-intensive and labour-based approaches in their construction, rehabilitation and maintenance. Projects in **Bangladesh** and **Viet Nam** have used labour-based approaches in strengthening sea defences (e.g. improvement of dykes and providing and improving small dams). Also in Viet Nam, simple community contacts have been used to manage flood control infrastructure. Community groups maintain roadside drains and culverts through vegetation control and by de-silting drains and canals to allow unrestricted flow. (ILO, 2011).

In **Timor-Leste**, the Investment Budget Execution Support for Rural Infrastructure Development and Employment Generation (TIM Works) (see also Annex A.4) focused on construction, rehabilitation and maintenance using LBAT to reduce poverty and support economic growth and peace-building efforts. This project was the first opportunity for 83% of the people involved to earn cash from their labour. This provided income to buy food and items for household consumption, house materials, school needs, and starting new business (usually a kiosk). Road maintenance is ensured through a follow-on project, designed to ensure sustainability (TIM Works, 2012; ADB, 2011).

The **Timor-Leste** project Supporting Local Governance and Community-Based Infrastructure Works uses a labour-based approach which was built on achievements of the Road Sector Improvement Project. After 11 months from physical completion, the areas maintained by labour-based approaches remained usable, while adjacent stretches of road were in very poor or impassable condition. Existing project monitoring suggests the maintenance using labour-based approaches has limited deterioration of the roads and preserved the road asset value (ADB TIM, 2011; Phelps, R., 2013).

The **Timor-Leste** CARE Community Empowerment Initiatives Component of the ADB-supported Road Sector Improvement Project demonstrates that a community-based and gender-balanced approach to rehabilitating and maintaining roads is possible, and may be preferable in the Timorese context. The project empowered women, including a 55% female participation in the labour force (Delaney, P., 2009). Women and men had rarely worked together before the project, but they worked side-by-side without difficulty and there was no significant 'backlash' from men in these communities (although reverse trends have occurred in some other countries). A new contracting model was an important part of the exit strategy for reducing dependence on CARE for implementing routine maintenance activities. This included empowering those communities that built sufficient capacity over the 1.5 years of road work activities to manage their own road maintenance crew and evolve from the role of labour supply to a community contractor (CARE International Timor-Leste, 2009).

Continuous community-based routine road maintenance was carried out in **Nepal** and **China** in 2009 and 2010, demonstrating successful experiences in countries where issues of planning, funding and priorities have been adressed. In Nepal, mixed groups (35% women) were engaged full-time and, in China, women's groups were formed for part-time work to allow women to continue their other responsibilities (Dissel, S., 2011).

One of the approaches adopted in **Latin America** has involved promoting and creating microenterprises for labour-based routine road maintenance. The microenterprises typically consist of 10 - 15 workers, using labour-based methods and hand tools to improve and maintain roads between 15kms and 50kms long. This approach has been applied to all types of roads, except multi-lane highways and expressways (Dissel, S., 2010).

Data for **Latin America** and the **Caribbean** suggests that as a non-capital expenditure, rural road maintenance projects that employ micro-enterprises may generate between 200,000 and 500,000 annualised direct jobs for every US$1billion spent. These calculations estimate direct jobs for on-site workers and indirect jobs in providing material and equipment. They do not consider the effects of expenditure on consumption. Exact levels of employment generation per investments are highly sensitive to local wages, split between skilled and unskilled labour, the sectors considered, the technology being deployed, the degree of importation of inputs, and substitution effect where there is limited slack in the labour market. World Bank rural road maintenance programs in Peru (Second Rural Roads Project) and Guatemala (Second Rural and Main Roads Project) typically invest up to 90% of the total project costs in labour activities (Schwartz et al., 2009).

Most models suggest that when maintenance is below optimal level, it leads to higher costs overall. It may be preferable to divert some of the funding for new investment to maintenance in order to keep infrastructure functioning at an optimal level. Evidence from the deterioration of rural roads in **Africa** shows that the loss of road asset values between 1970 and 1989 was 4.5 times higher than the potential cost of maintenance to avoid the loss in asset value in the same period (Marcelo et al., 2009; Schwartz et al., 2009).

Women in the Solomon Islands (Choiseul Province) maintaining a road and verges for the SIRIP Project (ADB, 2010)

7. Recommendations

Based on the information reviewed, it is recommended to:

1. **Adopt and promote the use of labour-based approaches by including them in sectoral strategies, country programs and relevant projects, and in discussions between Pacific Governments and Development Partners.**
   Areas that have potential for increased use of labour-based approaches include water and sanitation, irrigation, transport, housing, informal settlement upgrading, forestry and environmental interventions.

2. **Ensure gender-sensitive employment practices in labour-based maintenance including at technical and managerial levels.**
   As well as empowering women, increasing household income by employing women is closely associated with improved household nutrition and access to educational and health services.

3. **Produce a summary and checklist for applying labour-based approaches at project level to help project teams match the construction approach to suitable projects.**
   This would include a quantitative and qualitative assessment and would be applied in project preparations. It could incorporate a more detailed, defined and consistent use of the labour-based sub-categories (employment-intensive, labour-intensive, labour-based and equipment-supported/appropriate technology).

4. **Collect data on the use and benefits of the labour-based approach in both construction and maintenance.**
   There is a need to improve data collection on labour-based approaches e.g. in regard to benefits on local communities, the impact of the approach, urban drift, longer-term employment, the best approaches to capacity building, and the challenges for micro-enterprises during maintenance work.

Annex A: Case Studies

A.1 Solomon Islands

Program	Solomon Islands Road Improvement (Sector) Project (SIRIP), labour-based component commenced in 2007
Development Partner (Budget)	ADB (USD350,000), DFAT (USD8,649,435) and NZMFAT (USD9,750,000)
Sector	Transport
Project Number	39581
Grant Numbers	48/49/50
References	ADB SIRIP, 2013; DFAT SIRIP, 2013
Description of Project	Rehabilitation and maintenance of roads and bridges across the country, providing continued access to services and markets for people in rural areas
Labour-based Approach	• Awareness and training programs for labour-based and LBES road work and maintenance work for sealed and unsealed roads • Maintenance of roads using labour-based approaches under national private sector contracts involving local communities
Achievements	• Established a LBES maintenance program • Established a process for procurement and implementation of the road maintenance contracts using LBES in 2008, combined with capacity building of national and community contractors for tendering, business management, and works supervision • Established and tested procedures for maintenance of provincial and secondary roads using routine and LBES methods • Established sound and sustainable road maintenance policies and practices • Trained 39 qualified contractors to be eligible to bid for maintenance contracts at project completion and established a small-scale private sector contracting industry in four provinces • Awarded 24 maintenance contracts to maintain 217kms of roads in seven provinces, including 13 contracts using LBES methods (creating over 23,170 person days of employment) • Reduced roughness on 86kms of unsealed roads and 90kms of sealed roads under regular pavement repairs • Completed 27 major water crossings in 2011 creating over 34,643 person days of employment and contributing over SBD2 million into the local economy in income for workers • Established LBES maintenance systems in four provinces under SIRIP, and then expanded into the remaining five provinces by MID, under SIRIP2, TSDP and SIEAP (see below) • Used national private contractors for all road maintenance contracts (who engaged only local communities in their workforce)
Features of Procurement	Small and medium contractors operated in one of two ways: • employ a few persons directly (e.g. supervisors, skilled workers and some other

Process	permanent labour) and then engage community members for labour-intensive work, or • engage a subcontractor directly through community groups.
Gender and Community Participation	It was considered culturally appropriate for each Province in the SIRIP catchment area to develop its own group of contractors. They were generally drawn from villages adjacent to the works. The project contained a subcomponent designed to enhance female participation, income and empowerment and this was included in the tender documents. Project contractors were encouraged to: • employ women in road rehabilitation and labour-intensive maintenance of selected national roads • pay men and women equally for work of equal type (in accordance with national laws and international treaty obligations) • provide safe working conditions, and • comply with labour laws (including no child labour). Measures to motivate contractors to employ women through incentives included removing any potential gender-bias within the local procurement processes; ensuring women were part of the pre-contract bidding (through pre-qualifying contractors that include women and/or awarding extra points according to the proportion of women); requiring contractors to ensure that at least a third of the labour force would be women; and requesting contractors to recruit new workforce at regular intervals to spread work opportunities and ensuring that women were not discouraged by excessive distances to the workplace. The main ways that women participated was through owning and operating small businesses (or being employed in one of those businesses) or as labourers (either as part of a community group or engaged as subcontractors by main contractors). Female labourers preferred to be employed for grass cutting, weaving gabion baskets and vegetation clearing while male labourers preferred to be employed for de-silting drains, excavation and laying cross culverts, and pothole patching. Achievements included: • improved participation of communities and women in road maintenance • road maintenance contractors using LBES methods were all encouraged to employ female workers and women groups • women comprised approximately 40% of the workforce • from 20 successful contractors for road maintenance contracts using LBES methods, 15 were male and five were female contractors and work supervisors • 17,564 person days of employment (with 55% of these taken by women) were generated in one year under the labour-based contracts • 152kms of the road network were maintained in Malaita Province. It was not without issues. However, women's participation in LBES road maintenance was one of the project's main impacts, exposing them to public life, and resulting in

	increased confidence and income-generation to improve the welfare of households. Some women reported that their husbands thought it was not culturally-acceptable for them to be involved (including wearing of trousers) and there were some examples of domestic arguments and violence. The Project Management Capacity Building Unit (PMCBU) went to some lengths to get contractors (especially community LBES contractors) to disaggregate employment data so participation of women could be monitored and reported through quarterly progress reports. Obtaining correct information on wage rates from the contractors using LBES methods was difficult due the type of community engagement for the works. Often money earned by community groups is used for community projects ranging from providing roofing for a church to fares for a cultural group to travel to other provinces or overseas.
Capacity Building	The PMCBU implemented a comprehensive program of capacity building in road and bridge maintenance and developed a cadre of competent small and medium sized contractors and community organisations. The training covered all aspects of program development through to final completion of maintenance contracts including: • understanding maintenance works in a contract environment • winning bids at a profitable price • providing support for preparation of expressions of interest • providing technical training on road maintenance for shortlisted contractors including associated activities of bid preparation, human resource management, procurement of equipment, work standards, supervision, billing and certification • raising community awareness to encourage community groups and national business entrepreneurs to participate • raising community awareness of cross-cutting issues including domestic violence, HIV/AIDs, children's rights and environmental management, and • providing training for on-the-job business management including cash flow management and basic accounting. In addition, three or four MID staff were trained in tendering and contracting, supervising and managing maintenance contracts, and reporting requirements.
Socioeconomic Impact	Surveys in 2012 showed a significant increase in household incomes from agricultural production and provision of labour compared to 2009. Income from copra increased by 48% and income from cocoa increased by 88%. Survey results confirm a switch from boat to road-based transport and more frequent trips to market and community centres, equally distributed among males and females. However, attribution of these results to SIRIP would need to be verified independently.
NGOs and Affected Communities	Affected communities were notified about the project and training opportunities so they could participate and be included in employment opportunities offered by the road maintenance contracts using LBES methods. No national NGOs were available with the capacity to implement the community training activities, so international NGOs were contracted to provide train-the-trainer support to national NGOs. The PMCBU provided pre-construction awareness-raising for communities and identified relevant landowners at specific worksites.
Lessons Learned	Experience gathered from maintenance contracts under LBES program highlighted the importance of the following in supporting implementation and sustainability:

	• having an appropriate enabling environment at national level • conducting an LBES pilot program to better estimate actual costs • learning from the problems in initial tenders and helping contractors avoid basic errors in subsequent tenders • packaging contracts to a size commensurate with the contracting capacity available in the local area • establishing an independent construction fund provided financial support to the local contracting industry • having sufficient levels of supervision with regular visits and inspections • ensuring prompt processing and payment of contractor's monthly claims • implementing a simple and transparent procurement process • developing clear communication between the client (MID) and contractor, and • providing ongoing training for staff and contractors so that knowledge developed in the contracting community improves, and • adjusting the technical complexity of the infrastructure (where possible) to accommodate available resource capacity and create business opportunities for national contractors.
Concluding Comments	Following SIRIP Stage 1, two further projects have been developed – a Second Road Improvement Project (SIRIP2) and a Transport Sector Development Project (TSDP), both incorporating labour-based approaches. In addition, the Government has been developing its own recurrent maintenance programs.

Program	Solomon Islands: Transport Sector Development Project (TSDP) commenced in 2010
Development Partner, Budget	Asian Development Fund (US$12m), Japan Fund for Poverty Reduction - JFPR (US$0.8m), Counterpart (US$12.5m)
Sector	Multisector
Project Number	41171
References	TSDP, 2010; TSDP Project Data Sheet, 2013
Description of Project	The project is designed to improve access to socioeconomic opportunities by rehabilitating and maintaining land, sea, and air transport infrastructure. It will strengthen transport sector institutions through establishing a central project implementation unit (CPIU) to provide support reforming the Government's institutional structure, implementing civil works, and conducting technical and managerial capacity development.
Labour-based Approach	Contracts using LBES methods
Achievements	• Trained 15 contractors (five were women) and 13 community contractors in LBES workshops • The National Transport Plan Board approved a subproject for rehabilitating and maintaining roads, wharves and airstrips
Lessons Learned	• Consulting with stakeholders is essential for making best use of local knowledge and achieving local 'buy-in' • Appropriate designs need to be standardised and developed in accordance with the proposed design life, country-specific weather conditions, and maintenance methods that will be used (particularly if using LBES) • Design and implementation, including long term maintenance, needs to carefully consider the existing and expected capacity of the executing agency
Concluding Comments	Following the SIRIP programs, TSDP continues to use LBES for maintenance.

Program	Solomon Islands: Community Sector Programme (CSP)
Development Partner	ADB and DFAT
Sector	Transport - Roads
Project Number	Unknown
Reference	TSDP, 2010
Description of Project	Following the emergency reinstatement of road connectivity in Malaita, a Road Rehabilitation and Maintenance Works Project (RRMWP) was established under CSP.
Labour-based Approach	The project initially concentrated on repairing and re-sheeting main roads in Malaita by machine-based force account operations. In 2006, the project started to engage community labour in the works and then introduced labour-based and labour-intensive road maintenance activities through community contracts.
Achievements	• Completed close to 50kms of road drainage works, using manual excavation with community groups
Capacity Building	The CSP identified during training that: • learning can be enhanced by using 'real life' contracts, but this should start from an appropriate level and build up to more complex issues as capacity develops • pre-bid training was limited in its effectiveness • contact during field supervision is insufficient to guide and mentor contractors as they focus on work progress measurement and certification, not on training.
Lessons Learned	• Capacity building needs adequate time allocated and can be an intense exercise that yields mixed results (i.e. sometimes candidates receive training without reaching the level at which they can independently bid for a contract) • Skills that are particularly hard for people to learn include managing and controlling inputs and resources; planning and business management; and pricing and bidding. • Field supervision requires intense effort, especially the control of vertical alignment of side (line) drains and mitre drains • Appropriate equipment is needed for LBES maintenance on gravel roads • Simple and short contracts are important to effectively engage communities in LBES maintenance • Expansion of LBES contracting can aggravate staffing shortages in EAs, particularly if there are only a few people equipped to fill Works Supervisor and Clerks of Works positions.
Concluding Comments	Both Government and contractor capacity are required for viable outsourcing of maintenance systems.

Program	Solomon Islands: Emergency Assistance Project (SIEAP), 2011
Development Partner, Budget	ADB and EU, US$13.4m
Sector	Transport - Roads
Project Number	41105-012
Grant Number	0078
Reference	SIEAP, 2011
Description of Project	Post-tsunami reconstruction effort for essential infrastructure and access to social services; construct infrastructure less vulnerable to climate change and natural hazards; and build capacity of contractors, consultants and Ministry staff
Labour-based Approach	• Capacity-building program that focused on road maintenance via labour-based approaches, labour-intensive and LBES (community participation) with training for national staff on contract management activities
Achievements	• Eight LBES contracts were issued for general, routine, and specific maintenance • 51kms of rural and town roads rehabilitated and maintained • Project costs were less than if equipment-based approaches had been used • Employment generated by maintenance related works was 21,321 person-days • Income generated amounted to SBD1,109,870 (approximately USD149,363) • Female employment amounted to 30% of the labour force (6,509 person days) and 32% of the income generated (SBD355,392 or approximately USD47,828) • Economic activity in the rural disaster-affected areas was stimulated through creating small–scale business opportunities in labour-based road maintenance
Lessons Learned	• Increased supervision can lead to an overall increase in kms of road rehabilitated and maintained. • Pay advances need to be carefully managed to avoid problems with cash flow and worker performance. • It is good to learn from other similar projects that have been implemented in the country or the local area.
Concluding Comments	The project provided a range of labour-based contracts and enabled a good percentage of female participation.

Program	Solomon Islands: Rapid Employment Scheme (RES), commenced in 2010, extended to 2015
Development Partner, Budget	WB (for which Australia provides funding to the WB through Pacific Regional Infrastructure Fund); US$6.9m
Sector	Transport - Roads; Urban Development
Project Number	P1149987
Reference	World Bank, 2011, 2012, 2013 + Development Partner policy
Description of Project	The project provides short-term employment in and around Honiara for 11,000 poor and vulnerable people over five years. The project was developed partly in response to the global financial crisis, youth unemployment that had led to unrest in the past, and the fragile post-conflict conditions in the country.
Labour-based Approach	• Labour-intensive road rehabilitation and maintenance • Labour-based public works activities (e.g. urban services such as garbage pick-up and removal, footpath improvement and drainage cleaning)
Achievements	• Generated 400,000 days of work for nearly 7,000 people at an average of almost 52 days per household • Provided pre-employment training and employment for 6,500 people, including vulnerable urban youth and women • Trained and employed about 3,770 (i.e. more than 50% of the labour force) • Provided 'life-skills' for the youth • Produced a visible improvement in the Honiara environs • Increased the number of small-scale and community-based contractors • Through saving and skills learned with this scheme, participants were able to start small canteens and sell goods.
Lessons Learned	• It is important to ask for feedback on the pre-employment training • Providing graduation certificates for pre-employment training supports workers in securing future jobs with Government agencies, businesses, companies, NGOs and consultancies • It is useful to collect baseline data on annual personal household income in order to calculate net income gains on projects • Sometimes the original services planned in the design of a project can be extended to incorporate other related services (e.g. in this case, garbage collection) • When there is an economic down-turn, there is usually an opportunity to increase in labour content of development activities • Development Partners can build at least some of the recurrent costs into project financing, taking into consideration the sustainability of project achievements, implied future costs, and the country's consolidated fiscal position and prospects. • Governments should begin planning recurrent costs and incorporating them into their medium-term budget planning as early as the project design stage or when finalising formal agreements for project construction.
Concluding Comments	An economic framework needs to be built simultaneously with other development investments to create sustainable and appropriate ownership of management and maintenance.

A.2 Vanuatu

Program	Vanuatu: Public Works Department Maintenance Training Programme
Donor, Budget	EU - Europeaid, Euro 1.995m, with allocation of more than 50% for the purchase of heavy equipment
Sector	Transport - Roads
Project Number	9.ACP.VA.02, 2009/205654/1
Reference	Hydratec Consortium, 2009
Description of Project	This program operated between 2004 and 2007 and involved procuring mechanical equipment, providing training and technical assistance, and developing demonstration works. The approach adopted by the Public Works Department is to re-construct the worst lengths of road in the country when funds allow. This means that maintenance is only a short-term strategy. Therefore, it was requested that training programs focus largely on road construction techniques.
Labour-based Approach	Introduction of community-based preventative road maintenance, as possible
Achievements	• The Maintenance Training Programme and demonstration works provided the agreed training • Annual maintenance work programming and budgeting were introduced as well as community-based contracts and better fleet management and maintenance.
Lessons Learned	• Assess the condition of the road before the program starts as re-construction work may be needed before routine maintenance can be meaningfully introduced. • Ensure adequate aptitude of people prior to formal training instead of targeting maximum numbers. • Ensure the importance of road maintenance is promoted and introduced within the relevant Government agencies. • Transfer maintenance of databases and supervision of community works from international advisers to Government personnel as soon as it is appropriate (and with capacity building support is needed). • A sustainable road maintenance management system is vital for road maintenance programs, including a basic road inventory and road condition data.

A.3 Papua New Guinea

Program	Papua New Guinea: Extending the Socioeconomic Benefits of an Improved Road Network to Roadside Communities
Development Partner, Budget	ADB-JPFR, US$2m, 2009
Sector	Transport - Roads
Project Number	40173-022
Reference	ADB, 2011; ADB, 2013a
Description of Project	The project was designed to upgrade or rehabilitate 80kms of unpaved access roads through community-based organisations. It was conceptualised as an extension of the socio-economic benefits for roadside communities that had occurred as part of the ADB's Highlands Region Road Improvement Investment Program (HRRIIP). The project included capacity building of labour-based approaches and maintenance strategy development.
Labour-based Approach	Community-based and labour-intensive or labour-based approaches
Achievements	• Each activity in the project included community participation as a core element • 400 local community members participated in consultation exercises, consensus-building training and health-related issues • 80kms of community-based rural feeder roads and eight rural infrastructure facilities (e.g. community centres, mini-markets, pathways) were rehabilitated or upgraded • Eight pilot interventions were conducted for gender-responsive transportation
Lessons Learned	• The implementing agency should consult with district administration, local governments and works departments, and communities impacted by the works. • Community self-evaluation (on the training approach and rehabilitation and maintenance activities) proved innovative and informative.
Concluding Comments	Papua New Guinea had indicated its willingness to cooperate with a rigorous Impact Evaluation (IE) of labour-based road maintenance and rehabilitation projects. Road projects applying traditional capital intensive construction methods would have also been underway. They would have provided sites from which the control group for the study could have been drawn. However, due to costs, security and issues with the baseline survey (ADB, 2013b), this is on hold at present.

A.4 Timor-Leste

Program	Timor-Leste: Investment Budget Execution Support for Rural Infrastructure Development and Employment Generation (TIM Works)
Development Partner (budget)	Government of Norway (US$2.5m), EU (US$2.3m), Government of Ireland (US$1.3m), Government of Australia (US$3.2m), Government of Timor-Leste (US$2.7m), ILO (US$0.2m)
Sector	Transport - Roads
Project Number	TIM/08/01/MUL
References	TIM Works, 2012; ADB, 2011
Description of Project	The project was designed to reduce poverty and support economic growth and peace-building through construction, rehabilitation and maintenance of rural infrastructure using LBAT.
Labour-based Approach	LBAT approach to road works and the ability to manage such programs
Achievements	• 304kms of rural roads rehabilitated, by a mixture of force account and contracting • 1500kms of rural roads were routinely maintained; 47kms of rural roads were periodically maintained • 50 Government staff, 20 companies/contractors, and 150 community members received training • 31,500 workers were engaged, with 27% of the labour force being female and 44% being young people • 1,370,000 work days of employment were generated • Over USD 3 million in cash was injected into the communities through the work on the road • There was an average income of USD281 per person engaged in the public works program, a significant amount for the rural poor. • For 83% of the people involved, this was their first opportunity to earn cash from their labour. • The project was cost effective even though the final costs were significantly higher than the original estimate: average cost achieved was USD22,000 per km (compared with USD15,000 per km estimate) - successor projects use USD40,000 – USD50,000 per km in project design estimates • Two further programs developed out of the project and the Government is allocating funding to continue road maintenance.
Lessons Learned	• Ensure that the equipment on site is reliable and that there is no shortage (this project used a mixture of bought and hired compaction equipment) • Formal partnerships proved the most effective (e.g. between ILO and the Timor-Leste National Directorate of Employment) • Having multiple (four) Development Partners causes additional administrative work (managing budget lines and preparing separate reports) • Providing follow-on projects is beneficial for sustainable maintenance work and capacity building and provides additional employment opportunities • Ongoing continuous training was important. The use of training and trial contracts was a good way to develop contractors. However, it was noted that contracting firms need be screened before they are accepted in a training programs.

A.5 Cambodia: Delivering irrigation systems using labour-based approaches

Within its policy framework in the 1990s, the Government of Cambodia embedded labour-based approaches in infrastructure development and maintenance for irrigation. This was designed to:

- assist provincial governments in developing a rural infrastructure maintenance strategy
- strengthen LBAT capacities in provincial departments
- rehabilitate and maintain essential infrastructure, and
- address high levels of unemployment and underemployment.

Importantly, the Government took a longer-term perspective on the issue and developed this program in conjunction with a number of other related programs to provide solutions to a range of issues facing local communities.

In the first program, short-term unemployment was addressed by employing large numbers of people to work on rehabilitation and maintenance of irrigation systems, using labour-based approaches and paying workers in cash or food. Longer-term unemployment was addressed through the increase in agriculture and other related economic activities attributable to improved irrigation infrastructure.

In the second program, rural roads were rehabilitated. This ensured improved access to markets for agricultural produce as well as access to other services e.g. health, education, social welfare and finance services).

The third program was an 'upstream' project which provided technical assistance and capacity building to the labour-based rural infrastructure works program. This aimed to improve the socio-economic conditions of irrigators and their self-reliance in operating and maintaining the irrigation system. It involved institutional capacity building as well as developing skills of local staff in labour-based approaches and technology, including specific techniques for administering, planning, organising and supervising labour-based works.

Achievements include the following:

Rehabilitation of canals	76.74kms	Total workdays generated over the life of the project (1992-2000), including direct and indirect employment: 1,738,274* 43% of the labour force was women; the project offered one of few opportunities for equal pay for men and women.
Construction of new canals	7.14kms	
Maintenance of canals	94.83kms	
Construction of new irrigation structures	81	
Rehabilitation of irrigation structures	214	

* *Assuming a workday equates to a person employed for one day, this means almost 1000 people were employed per day over eight years (Train4Dev / OECD DAC POVNET).*

A.6 Madagascar rural road construction and maintenance program

The use of labour-based approaches in public investment programs in the infrastructure and construction sectors was pilot-tested with the aim of simultaneously pursuing job creation and decent work conditions.

A training centre for labour-based works was established, providing training to Government agencies, small contractors and private sector organisations. This included training in labour management issues - such as conditions of recruitment, payment and work force safety.

The program became financially self-sufficient through introducing a system whereby major infrastructure investment programs operating in the country paid for the training. The Government then ensured that only contractors trained and properly qualified in labour-based approaches could tender for road construction and maintenance contracts. Labour management clauses were included in contract documents e.g. related to decent working conditions.
(Train4Dev / OECD DAC POVNET).

A.7 Lesotho/Africa -Rehabilitation and maintenance of roads

Complementary policies and processes enabled a successful implementation of labour-based approaches in the road sector through:

- establishing a Labour Construction Unit within the Ministry of Works
- introducing a broad policy change to support labour-based approaches
- providing Government funding to the sector
- ensuring favourable conditions for small contractors (e.g. provision of training, restructuring of contracts, and simplifying of procurement processes), and
- paying worker's wages on time and making health and safety part of the contractual obligation between the Government/small contractors and small contractors/workers (Train4Dev / OECD DAC POVNET).

Annex B: Acknowledgements

This report was prepared by Dr. Sandra Schuster (Project Officer) and Christine McMahon (Results and Research Manager) from the PCO.

The following people provided valuable information for the research:
Christopher Bennett (Senior Transport Specialist, WB); Serge Cartier van Dissel (CartierConsult); Chris Donnges (ILO); Michel Kerf (Sector Manager, WB); Anthony Maxwell (Senior Energy Specialist, ADB); Jordan Schwartz (Infrastructure Policy Manager, WB) and Tomomi Uchikawa (JICA).

Feedback on drafts of the report came from Rishi Ram Adhar (Senior Project Officer, ADB); Tamara Haque (Project Officer, PCO); Peter Kelly (Senior Infrastructure Adviser, DFAT); Daisuke Mizusawa (Infrastructure Specialist, ADB); Dr Julia Newton-Howes (Chief Executive, CARE Australia) and Sanjivi Rajasingham (PCO Director).

Editing work was undertaken by Stuart Sell.

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