

Executive Summary

Background

The objective of this assignment was to prepare a strategy document for labour-based road works technology in Lao PDR.

This document is intended to assist the Lao Government in its efforts to effectively and efficiently manage and coordinate labour-based initiatives in the rural roads sector. It is an attempt to draw together the main aspects of the application of labour-based methods in Lao PDR. The document provides:

- (i) a review of current as well as previous experience with labour-based works in the road sector,
- (ii) an assessment of the potential for the use of labour-based technology in future rural road works programmes,
- (iii) a discussion of the major aspects of labour-based technology, and
- (iv) an identification of the issues to be addressed in the development of the technology in Lao PDR.

This is an appropriate moment to carry out this assignment, as significant changes are currently taking place in the country with regards to the Government's priorities in relation to rural infrastructure development. The donor community has responded to these changes and are now in the process of shifting their attention from assistance to major highway projects to supporting the development of the rural road network.

In addition, the Government is rightly concerned with the overall socio-economic development of the rural population. The use of labour-based methods could play a part in this development.

Labour-based Methods

An "appropriate" technology is defined as one that is both technically and economically efficient for a defined level of quality. Thus, appropriate construction technology exists over the entire range of methods. In each case, the appropriate mix of labour and machines will be determined by the technical nature of the project, available resources, prevailing prices and the socio-economic environment in which the project is executed.

Labour-based technology can be defined as the construction technology which, while maintaining cost competitiveness and acceptable engineering quality standards, maximises opportunities for the employment of labour (skilled and unskilled) together with the support of light equipment and with the utilisation of locally available materials.

Numerous studies carried out by several agencies including the World Bank and the ILO in many countries including Lao PDR, have demonstrated that when the right conditions are present in a given area, labour-based technology is the most cost-effective approach to rural infrastructure development. These conditions include:

- o sufficient numbers of under- or unemployed persons in the areas where the work is required plus local availability of construction materials;
- o low wage levels (under US\$4.00 per day according to World Bank studies);

- o shortage of conventional construction equipment and high capital costs;
- o Government commitment to the development of employment and generation of income in the rural areas;
- o small contractors skilled in labour-based technology and capable of supervising the work efficiently; and
- o competence of the public sector agencies responsible for rural infrastructure works in the areas of contracting and supervision of contractors' performance.

Lao PDR would generally fall into that group of countries where the use of labour-based methods should be seriously considered.

Labour-based technology is not new to Lao PDR. However, there has been a tendency to view these techniques as methods of necessity and as methods that are only used where no equipment is available. In recent years, however, the programmes implemented by the ILO and the UNDP have demonstrated that they have a role to play in the development of the rural road network of Lao PDR.

The experience from the labour-based projects in the Provinces of Oudomxay and Savannakhet demonstrates that road construction and road maintenance can be implemented using labour-based methods at competitive costs and providing a standard which is totally comparable with the use of equipment.

Policy

To be effective and to be accepted, any technology has to be in line with the policies and needs of the government. Labour-based technology is not stated as an explicit policy of the government. On the other hand neither is the use of imported equipment. What is clear is that the government is concerned to increase income and employment in the rural areas. It is anxious to reduce the dependence on foreign imports and to take measures which lead to import substitution and thereby conserve vital foreign exchange.

On all the above counts a technology which relies to the maximum extent possible on the use of local resources scores highly.

The Government has stated that one of its policies is to improve rural communities' access to the main road network. They intend to do this through the development of a national programme for feeder road construction in the provinces and districts with funds provided through a national programme budget. This will be done by measures designed to:

- o introduce a systematic planning process for feeder roads,
- o increase the allocation of funds for feeder roads and bridges, and
- o promote the development of private sector construction and maintenance capabilities.

The National Transport Study commissioned by the Government made clear recommendations on the use of labour-based methods to improve rural roads and to carry out road maintenance. They concluded that "As the main national roads are successively completed, an increasing share of the future construction work will be concerned with rural road construction, rehabilitation and spot improvements. This will lead to a rapidly expanding role for labour-based methods in the country and at the same time a reduced need

for equipment-based methods. The continued development and application of labour-based methods is therefore strongly recommended."

Given the economic situation of the country and the need to develop and rely on the countries own resources, labour-based methods would seem, a priori, as a logical approach to the development of rural infrastructure.

A major proportion of the budget for infrastructure in the country is provided from external, donor funds. In line with the Government's concentration on rural development, these donors are starting to reorient their emphasis away from major infrastructure programmes to those of rural infrastructure. The World Bank, ADB UNDP, SIDA and several others are in the process of defining programmes of rural infrastructure development.

The Framework

Past efforts to improve the road network in the country have concentrated on upgrading the national road network. The next step is now to improve the secondary and tertiary road network to all-weather standards. Due to the current poor condition of secondary roads and the resulting limited access to the districts, any future road improvement programme in the provinces will first need to address the secondary road network. This implies that the first task will be to provide all-weather access to all of the country's 133 districts.

Of the total provincial road network of nearly 6000 km, less than 35 percent is thought to be passable in the wet season, and only half of the population is estimated to have road or river transport access throughout the year. Only 51 district centres of the total of 133 have all-weather access, and 15 have no road access even in the dry season.

From the above figures it is evident that the need for rural road development are enormous and varied. In the rural road sector, the needs are not just for development of village and district roads, but also of provincial roads. In some provinces, the most immediate need is building roads to connect the isolated provinces to the main road network. As the network of rural roads (provincial, district and village roads) is small and in an unmaintainable state, the needs also include reconstruction of roads to a maintainable state and extension of the network to reach isolated district and major villages particularly in the mountainous regions. Labour-based methods do provide a serious alternative for the rural road sector. Estimates have been made of the likely benefits which would accrue from the use of these methods for the upgrading and maintenance of the rural road network. This suggests that from a cost point of view, labour-based methods would be well within the provision for road expenditure. In addition, the output required to carry out the programme over the next ten years would be feasible. This relates both to the level of production already achieved under existing labour-based programmes and also to the expected level of output of small scale contractors.

In addition, of course a major portion of the \$180 million expected budget for such a 10 year programme would be spent on local labour and local resources, rather than on foreign exchange.

Nevertheless, one should not give the impression that the development of such a programme would not be without its difficulties. In brief it will require a major effort in terms of:

- training at all levels and for the private sector,
- the development of effective management and administrative procedures,
- improved financial procedures at the local level, and

- more participatory processes for the planning and selection of roads.

Technical Aspects

In terms of route identification and selection, the choice of technology does not have a major influence. However, it is necessary to assess the labour availability along the route if labour-based methods are under consideration.

More generally, there should be a concern with community participation and an involvement of the community from the start of the process. This is not so much in relation to the use of labour-based methods, but more in relation to ensuring that the communities needs are being addressed and to enhancing the potential for their involvement in both the implementation and the maintenance of the projects.

The selection of design standards is related to road function, volume of traffic and terrain. The selected design should be justified economically and the optimum choice varies with the construction and road user costs.

MCTPC has recently developed a design manual which has now been officially approved, however, on a provisional basis to be tested out before a final version is established. This manual has been developed for the use of traditional equipment-intensive work methods without major concern to the use of labour-based methods and other locally available resources. It is important that the use of labour-based technology is properly incorporated in the design standards before a final version of this manual is prepared.

In relation to the design standards proposed there are two important issues which should be considered when choosing the exact design of the rural roads viz: (i) the cross-fall gradient of the camber should be increased from 3-4% to 8% and (ii) the MCTPC design guidelines propose relatively wide shoulders with an unprotected sub-base for low-volume roads. An effective way of solving this problem would be to expand the wearing course to also cover the shoulders, and to provide turfing of the side slopes.

Maintenance

Road maintenance, whether periodic or routine, is an activity which lends itself to labour-based methods. There are a whole variety of systems, from the simple lengthman system for routine maintenance to small contractors with simple equipment for periodic maintenance, which can be used. The basic concept, however, is that maintenance is an activity which must involve the local communities to the fullest extent possible. For it is clear that even in the long term the Government is not going to have sufficient financial resources to pursue a policy of equipment-based maintenance.

In general, it is proposed that routine maintenance of low volume laterite surfaced roads is most easily and effectively done by labour-based methods, using hand tools only. This labour component (lengthman) could be fully organised and paid under contract to the DCTPCs. Periodic maintenance would need to be organised under a contract system, the works carried out by small-scale private contractors (with a limited amount of equipment), and supervised and managed by staff of the DCTPCs.

Labour

Whilst Lao PDR is considered a sparsely populated country, there seems to be little problem in recruiting sufficient labour for road work activities. A labour-based programme should therefore have no problem in labour supply if the programme activities are planned such that large numbers of labour are engaged on full time basis only during the dry season, and a smaller full-time work-force during the wet season.

Serious attention will have to be given to the motivation of the labour force. This is ensured by various measures such as appropriate wages, proper supervision, secure working conditions, timely payment of wages and the use of incentive schemes.

Payment can be organised in various forms, depending on the nature of work and type of funding. This would include daily paid, task work, piece rate and payment in kind.

The recruitment and payment procedures would need to be strengthened to ensure both transparency and an understanding by the workers of their rights. This would be particularly important in relation to the use of small contractors where there is more danger of worker exploitation.

Women can be encouraged to be involved in labour-based programmes. In Lao PDR it is culturally acceptable for women to do this work.

Contractors

Experience from other countries would support a move to small contractors taking over the main responsibility for road rehabilitation and maintenance using labour-based methods. Local contractors will not provide an easy solution to road construction and maintenance problems. The development of small-scale contractors entails a series of new support activities such as training in business management, development of user-targeted training material, development of appropriate contract procedures, streamlining of payment procedures, developing banking facilities, and last but not least providing interested contracting firms with attractive market prospects and a conducive environment in which they can operate efficiently.

It is important to provide a framework for the selection, training and certification of these small contractors in order that a professional cadre of contractors is developed in the provinces.

One important issue is the support mechanisms to supply the minimum amount of equipment required to the small contractors. Several options are available, however, it is recommended that a hire purchase arrangement through local banks presents the greatest advantages.

Small contractors will not be able to operate effectively if the environment in which they work is working against them. Attention needs to be paid to the application of tendering procedures and the definition of contract documents which are conducive to the development of the local contracting sector. Certain initiatives have been taken by the World Bank and the ADB. There is still need for reconciliation of the two approaches.

Finally, small contractors cannot grow unless there are good and secure market prospects. In the case of labour-based contractors, this therefore means a defined programme of labour-based works to which the contractors can have access.

Training

Training needs to be provided at several levels to disseminate and sustain labour-based road works technology in Lao PDR.

The most immediate demand will be to provide training to the current actors in the road sector and in particular to the institutions which is expected to be involved in future rural road works programmes, i.e. the provincial road authorities and domestic small-scale contractors. In addition, a more limited training programme is needed for managers, decision makers and planners involved in rural infrastructure development.

If labour-based road works technology will be used on a large scale in the future, the capacity of CTC needs to be expanded. In a large programme, training is a continuous activity, which requires training staff and related resources committed to the programme on a permanent basis.

Secondly, to sustain the technology in the country on a long term basis, labour-based construction and maintenance technology should be integrated into the regular training courses provided by the university, technical colleges, and the in-house training facilities of the MCTPC.

Training and education in labour-based technology at the higher learning institutions in the country is an important aspect. The SCT in Savannakhet provides a three year training programme for road supervisors. The School's interest in including labour-based methods in its regular courses should be supported.

Finally, a larger-scale application of labour-based technology in the country would require an appropriate research capacity, preferably in conjunction with a training institution.

Training is generally accepted as an important component in any capacity building programme. However, for it to become effective, it is important that the training provided, is purpose-oriented and address subjects which are relevant to the duties and responsibilities of the various cadres of staff.

Capacity Building

In terms of the development of the rural areas and the provision of economic opportunities, a rural road works programme can be designed to contribute to the development objectives through a series of interventions:

- o enhancing access to and from the rural areas,
- o providing direct income from the labour-based construction and maintenance of roads,
- o developing the local small-scale contracting industry, and
- o improving the efficiency of local authorities.

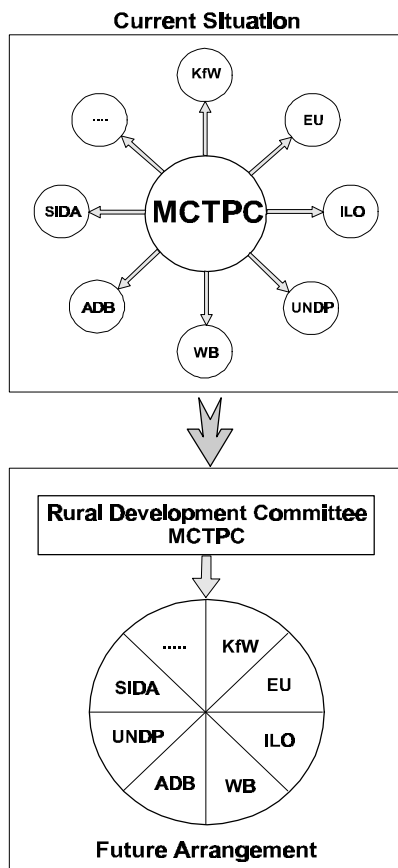
If labour-based methods are to play a major part in the development of the rural road system then the right environment has to be created so that they can effectively achieve their potential. The main responsibility for this will fall on the MCTPC.

The Rural Development Committee of MCTPC will need to set an example in relation to the development of the use of labour-based techniques.

Future rural road works programmes should be designed to develop capacity at headquarters and in the provincial departments by assisting them step by step through the process of the implementation of the interventions mentioned above.

Organisation

There are several rural infrastructure programmes presently being developed in Lao PDR. The government needs a coordinating body which can effectively monitor the performance of various programmes. The government is currently establishing a Rural Development Committee within the MCTPC which, amongst other tasks, will address this issue.



A coordinating body for rural road works in MCTPC will also provide a regular channel for discussions and dialogue with the donor community relating to identification and formulation of future donor funded rural roads projects.

In order to effectively utilise the management resources available to MCTPC, there will be a demand for streamlining and standardising ongoing and future rural road works into one coherent programme. Today, the various projects operate independently with very little coordination and exchange of information. One of the immediate tasks for the Rural Development Committee will be to pull the various projects together, creating *one* national programme consisting of all the various actors. In order to achieve this, the Government needs to establish a set of general standards and procedures relating to rural road works.

These efforts will streamline and improve the efficiency of the overall management and monitoring of rural road works in Lao PDR. It may also streamline project negotiations between the government and donors when a standard mode of implementation has been established. Negotiations with donors can then concentrate on which part of a national rural road works programme they wish to support.

Finance

The rural road construction and rehabilitation works are estimated at an average total cost of US\$ 15,000:- per kilometre. Based on-going labour-based road works, local supervision and administration costs are estimated to be 10% of the total costs. The annual cost of routine maintenance is estimated at US\$ 300:- per kilometre, including supervision and inspection costs.

Funds for rural roads should be directed to and controlled by the provincial authorities as they would be expected to manage and supervise future improvement of the rural roads. This implies that contracts should be managed at provincial level and that funds are at disposal for payment of works through local banks in the provinces. A solution could be to provide an advance transfer of funds from central level to the provinces, based on the agreed annual rural road works programme. Based on progress and expenditure reports from the provinces, the funds could be replenished on a quarterly basis.

At central level, the Rural Development Committee would monitor the physical progress of works, and based on this information advise the finance authorities on the advance disbursement of further funds to the provincial departments of finance, thereby ensuring a healthy cash flow to the provinces and avoiding any disruptions of works progress.

When donors are involved in financing rural road works, separate budget lines and accounts should be established, thereby ensuring that expenditure financed from external assistance can be monitored separately.