

# LABOUR BASED WORKS METHODOLOGY

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## Objectives of the paper

### Abstract

Using labour-based methods for road works has been an important part of the strategy to improve rural transport infrastructure in Sub-Saharan Africa over the past twenty five years. These methods not only produce gravel roads of equal quality to those produced using equipment-based methods, they also generate rural employment in a cost-effective manner. In addition, labour-based methods save on foreign exchange, inject cash into the local economy, transfer knowledge about road works to the local community – knowledge that will be useful for later maintenance – and reduce damage to the environment.

### Key issues

- Labour-based methods have proved to be a cost-effective alternative to equipment-based methods in low-wage countries that have an adequate supply of underemployed labour. But in many developing countries, applying these methods on a large scale has proven difficult. Addressing this difficulty is critical for future rural development in Sub-Saharan Africa. Using local resources to improve rural transport infrastructure is essential for developing strong rural economies, increasing incomes, and facilitating access to markets and social services.

### Key topic areas

- Definitions of labour based technology
- Employment intensive investments in transport
- Macro-economic policy considerations
- Strategic importance of the infrastructure and construction sector
- The macro-economic potential of the labour-based approach
- Sectoral and multi-sectoral infrastructure investments
- Road sector
- Equipment ownership and utilisation
- Flexibility of the labour-based approach
- Use of contractual procedures for employment
- ‘AGETIPE’ approaches
- An enabling environment

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## 1. INTRODUCTION

The main section of this presentation is taken from a paper entitled “Employment Intensive Investments in Transport: An entry point to employment generation and poverty alleviation”. Jean Majeres and Jan de Veen of the Development Policies Department of ILO, Geneva, prepared this paper. Colleagues in ILO/ASIST, notably Mr. Gamelihle Sibanda, provided additional contributions to this presentation.

Before looking at investment policies, it is perhaps advisable to look at some definitions, to be sure that there is a common understanding of what labour-based technology is.

### 1.1 Definitions

Labour-based technology is the use and management of locally available human and material resources for the construction and maintenance of infrastructure. For a number of activities, an appropriate mix of labour and equipment is required to provide products of adequate quality in a cost-effective manner. Appropriate labour-based technology aims at applying a labour/equipment mix that gives priority to labour but supplements it with light equipment where necessary for reasons of quality or cost. This is the case, for example, with certain activities such as long distance hauling, compaction, or high quality surfacing works that are difficult for labourers. The term labour-based thus indicates that a flexible and optimal use is made of labour as the predominant resource, while cost effectiveness and quality aspects are ensured.

It is important to distinguish between the optimal (and efficient) use of labour and the maximisation (and possibly inefficient) use of labour. The latter may occur in projects where income generation and job creation are the principal objectives. This category includes, for example, disaster relief or food for work, which are temporary and where quality and productivity are generally low. The ILO emphasises the sustainability of labour-based approaches by optimising the use of labour and ensuring that programmes do not degenerate into “make-work” approaches where cost-effectiveness and quality aspects are ignored.

## 2. EMPLOYMENT-INTENSIVE INVESTMENTS IN TRANSPORT

### 2.1 Macro-economic policy considerations

The ILO has been associated with employment intensive investment programmes, mainly in the African and Asian regions, for nearly two decades. The main purpose of these programmes has been to influence investment policies so as to maximise their impact on employment generation and to alleviate poverty. For the ILO, employment policy and investment strategies relate closely to structural poverty alleviation.

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Schematically, one can say that there have been, until now, two approaches to accelerate economic development and reduce poverty:

- (i) the first gives absolute priority to economic growth, expecting that the benefits of that growth will eventually trickle down to the entire population. Too optimistic, this approach has not been confirmed by the facts;
- (ii) the second approach attempts to add a social component to economic policy, examples are the “social safety nets” or special programmes to alleviate poverty. These programmes often also include “special” public works or employment creation schemes, viewed by governments only as short-term, temporary job creation and income distribution measures, largely disconnected from mainstream economic policy. For the ILO, such programmes may be necessary in specific relief or in specific emergency situations, but they cannot be considered as sufficient.

In the ILO’s view, employment programmes need to be linked more explicitly to economic growth. What are required for longer-term employment generation, poverty alleviation and more equitable income distribution are investments for the poor, not compensation.

In other words, employment-intensive works programmes should lead to the development of the local productive capacity through cost-effective investments targeted at the poor and be placed in the perspective of longer-term economic growth. Investment policies should thus be steered towards employment creation and social objectives, and -most importantly- be accompanied by measures to ensure cost effectiveness, quality results and local capacity building in both public and private sectors.

But is an employment-intensive growth strategy really feasible? Can employment-intensive works schemes be cost-effective and competitive in terms of quality and rate of production? What would be the potential impact on the economy, particularly with regard to employment creation and poverty alleviation?

## **2.2 Strategic importance of the infrastructure and construction sector, feasibility and comparative advantages of the use of labour-based approaches.**

Before trying to answer these questions, it is necessary to explain why the ILO has attached so much importance to the infrastructure sector. There are at least three reasons for this choice:

- the first is well known: the lack or degradation of productive, social and access infrastructure retards economic development;
- the second, often less known, relates to the weight of this sector in the economy; in developing countries,

- infrastructure construction accounts for 3 to 8% of the gross domestic product;
  - 50% or more of domestic Gross Fixed Capital Formation consists of construction output;
  - up to 70% of public investment expenditure is in this sector;
  - in the least developed countries, donors finance a considerable proportion of these investments, generally more than 50%, but often up to 80 or 90 per cent, such as in the sahelian countries or Madagascar;
  - about 40% of loans from financial development agencies are for this sector.
- the third reason is that the variations in labour requirements for available technological options are particularly important in this sector. For example, in the road sector, for which experience is well documented, the situation is as follows:

Unpaved roads Construction	Equipment-based option	Labour-based option
	(% of total cost)	
– cost of equipment	80 - 82 %	30 - 40%
– cost of labour	10 - 12 %	50 - 60%

The conclusions, drawn from pilot and large-scale programmes in countries as different as Ghana, Lesotho, Madagascar, Rwanda, Zimbabwe, Cambodia, Laos, Thailand, etc., are that the labour-based option:

- (i) is generally in financial terms about 10 to 30% less costly than the more equipment-intensive option;
- (ii) it reduces foreign exchange requirements by 50 to 60%;
- (iii) it creates, for the same amount of investment 2 to 4 times more employment.

The latter point concerns particularly unskilled and semi-skilled labour, thus contributing to the monetisation of the rural economy and opening of possibilities for targeted poverty alleviation.

Of course, labour-based methods should not be seen as a panacea, and certainly cannot be applied in all situations. For major infrastructure projects such as paved highways, technical standards require sophisticated heavy equipment. Here, labour can generally not cost effectively be substituted for machinery, although labour-based methods can often still be usefully employed for selected construction activities and the maintenance of the created assets.

In the *Ghana* Contracting Development Programme, the benefits derived from the programme are as follows:

- 320% more employment
- 10% less costly in financial terms

- Reduced foreign currency needs with 50%
- Comparable in terms of quality standards

### **2.3 The macro-economic potential of the labour-based approach.**

Concerning the economic impact potential of the labour-based approach, it is of great interest to estimate what proportion of total infrastructure investments can be executed with labour- and local resource-based methods. Based on certain rather conservative working hypotheses, the potential impact in selected countries has been estimated as follows:

In *Ghana*, if 20% of public investment and 10% of private investment in infrastructure would be executed with labour-based methods, this would amount to a labour-based investment budget of about 100 million US dollars per year; this would create 50,000 direct and 75,000 indirect jobs more than those that would be created by conventional construction methods. These figures should be compared to the country's employment creation objective of 50,000 jobs per year, for the whole economy.

In *Senegal*, assuming that the labour-intensity in the infrastructure and construction sector only could be increased from currently 15 to 25% of total costs, this would increase the annual wage bill by 6.5 billion FCFA (i.e., US\$13 million), equivalent to 11,000 direct and 15,000 indirect jobs. This figure of 26,000 additional jobs should also be compared to the government's job creation objective, which is 20,000 per year for the whole economy.

Similar estimates exist for other countries; the conclusions are on the safe side, as they are based on the assumption that 1 directly created job would be at the origin of 1.5 indirect jobs. A recent macro-economic study on *Madagascar* has shown that indirect jobs could amount to 2 times the directly created jobs.

Another interesting macro-economic indication from a study on *Rwanda* (1991) is that labour-based investments in rural roads increase national returns by a factor of 2.8, while the same investment implemented with equipment-intensive methods has a multiplier effect of only 1.2, mainly because of the transfer of a large proportion of expenditure abroad.

It is important to note that these high employment creation potentials do not result from additional investments, but from different choices of technology made in the framework of existing investment budgets. In other words, the introduction of labour-based methods into current mainstream investment policy creates employment and reduces poverty in a structural and sustainable manner.

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## 2.4 Sectoral and multi-sectoral infrastructure investments

In order to translate employment policies into action different approaches have been developed by the ILO for sectoral (e.g. roads or irrigation) investments and multi-sectoral, community-based infrastructure development schemes.

Sectoral investments, e.g. in the road sector, are basically Government controlled and supply-driven. Sectoral programs are supply-driven in the sense that they are normally initiated and managed by the specific sectoral line ministries. They have a national or regional dimension generally reflected in the size of the budgets made available through public expenditure or financial assistance from donors. There has been a tendency recently to shift from government execution of sectoral programs to private-sector execution.

Local-level multi-sectoral investments such as a combination of e.g. small irrigation schemes, land development, minor dams, water-supply schemes, afforestation, environmental protection works, schools and health centres generally are, or should be, demand-driven, benefiting clearly identified communities, villages or community-based organisations. Multi-sectoral area-based programs involve local communities and local government more directly. Demand-driven projects reflect a variety of needs felt at the village or community level. Local populations seek and expect to find financial or technical support at the nearest level of public administration - generally the commune, ward, or district in rural or urban areas.

Employment-intensive work methods can be introduced in both sectoral and area-based multi-sectoral programs. While the two types of programs should be seen as complementary, the objectives and the approach to implement each category of works or to create the local capacity to do so differ substantially. For sectoral works such as roads, the emphasis is on the introduction of labour- and local resource-based policies in the responsible line ministries such as Public Works or Local Government. Projects will focus on the establishment of training of small contractors, clients and local consultants and the creation of an enabling environment for private-sector execution and decentralised contract management. For multi-sectoral, community based works, the emphasis is on promoting participation, people's organisations, decentralisation, area-based funding facilities, and local government capacity.

In *South Africa* the Community-based Public Works Programme have re-oriented the community project designs to move away from the single project (i.e. a school or crèche or community hall) to a cluster approach which includes infrastructure that is directly productive. The cluster approach is as its name suggests the grouping of infrastructure together to increase the impact of the investments. Therefore, directly productive infrastructure is linked to improved access and marketing, as well as social cohesion, human capital, and environmental infrastructure. (i.e. a community vegetable garden and

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poultry project linked to improved market facilities with improved access and parking together with a community hall, school building, and erosion control works. The community then has the opportunity to earn additional income and improve their livelihoods in the longer term, as well as gaining from the direct employment created through the construction and maintenance work.

## 2.5 Road sector

In this sector, the Employment investment Programme (EIP) of the ILO, is involved with technical co-operation projects in some 20 countries, mainly in Africa and Asia. Its current focus is the development of domestic small-scale contractors able to execute labour-based works and, in parallel, the establishment of administrative and financial procedures enabling such contractors to compete for and execute public works contracts.

In this context, recent initiatives include further development of appropriate systems and procedures for labour-based road contract award and management; the development of guidelines and training for the establishment of domestic public and private sector capacities; the choice and introduction of good quality, well designed tools and equipment and the promotion of the local manufacture of such implements; and starting a discussion between the line ministries, the ministry of Labour, Employers and Workers on the introduction of fair labour standards and conditions of work in this field. New guidelines on the management of labour in employment-intensive programmes draw upon on experience obtained with labour management, conditions of work and the application of labour standards in employment-intensive works programmes. These guidelines discuss key issues related to the management of temporary workers in infrastructure projects, emphasising the need for an adapted labour legislation for this category of temporary village workers and the need to promote workers' rights and conditions of work while safeguarding employers' interests through appropriate contractual procedures and documentation.

An example of the development of a labour-based programme can be found in the Labour Construction Unit (LCU) in *Lesotho*. From early relief - food for work type activities started in another section of government, the LCU has grown from a pilot project in 1977 to be a recognised department institutionalised within the Ministry of Works in 1988. The programme was started using force account (direct labour) operations but has changed to using the private sector for implementation of labour-based works. The training division has trained contractors in routine maintenance, periodic maintenance, and rehabilitation and is presently running a course for contractors to enable them to undertake full construction and up-grading. A training/re-orientation for consultants has also begun to increase capacity in the design and supervision of contracts. The programme is responsible for a designated section of the Lesotho gazetted road network (777km out of a total network of 4,500km, 17%). Up to 5,000km of gazetted and non-gazetted gravel roads have been identified for further expansion of the programme.

From a study on cost comparisons done in 1995, the following table gives a comparison of labour-based and equipment-based methods

<i>Lesotho</i>	Labour-based	Equipment-based	difference
Financial cost/km US\$ *	50,950	80,990	37% cheaper
Labour component	44% (22,418)	6% (4,859)	78% more
Reduction factor for labour component costs	2.6/5	2.6/5	
Economic costs/km*	40,190	78,660	49% cheaper

\*1995 costs

In *Lao*, the labour-based rural roads construction and maintenance project which was completed in 1996, produced the following results:

- 40 to 50% of the direct costs of the road improvements had been paid in wages to unskilled workers;
- for an average village taking part in the improvement of 2 – 3km of road this has meant a cash injection into the village in the order of US\$10,000 to 15,000;
- employment was generated at 1,740 workdays per km;
- there will be a yearly income to the village in the order of US\$100 – 150 per year for routine maintenance activities;
- the project encouraged the recruitment of women who represented between 20 and 40% of the workforce;
- items of light tools and equipment were manufactured at local workshops, thereby adding to the income remaining in the locality;
- the direct cost per km of road amounted to US\$9,500 - 10,000 in the first construction season, but in the second season they were reduced by 20 to 30% partly due to increased productivity of the workforce.
- Although no scientific study of the cost comparison between labour-based and equipment –based methods was carried out during this project it was considered that the labour-based methods would be cheaper especially with the increased productivity in the second year of implementation.

### 2.5.1 Equipment ownership and utilisation

Although labour-based methods are designed to optimise the use of labour, the use of light equipment is a necessity to ensure quality and cost effective construction. In sub-Saharan Africa the main pieces of equipment used on labour-based sites are tractors, trailers, water bowsers, and pedestrian or towed rollers. With agriculture playing an important role in the economy of the country, agricultural tractors are an obvious choice as the basic unit for the equipment. There are suppliers, and given the choice of a locally distributed make and model, spare parts and servicing should be more reliable than for large specialised equipment. In addition the mixture of construction work and agricultural work should provide the contractor with a sufficiently high utilisation rate for the tractor, the most expensive equipment he/she uses. There are some exceptions to this general rule. It can be argued that 7 ton trucks would be more effective if gravel haulage distances exceed 10 kms.

In *South East Asia* scrap trucks are recycled by local enterprise to produce a slow moving but reliable means of transport for as little as US\$4,000 – 6,000. The engines are replaced by commonly available engines, and chassis and bodywork adapted to suit the future use of the truck. The result is a very cheap truck with a 3 to 7 ton payload capacity, which has successfully been used by labour-based projects.

For all equipment utilisation is a key factor in determining the cost of equipment ownership and the hire rates that should be prevailing. “It is not usually economical for contractors to own plant unless they can ensure at least 75 - 80% utilisation factor based on the contractor’s normal working hours”. The following factors have a significant effect on real equipment costs:

- Ownership costs;
- Foreign currency component;
- Exchange rate fluctuations;
- Inflation;
- Cost and availability of finance;
- Economic life of the piece of equipment;
- Utilisation rate; and
- Market considerations.

If not all of these factors are considered a contractor and/or plant hirer will cost their equipment too cheaply and lose the value of their asset, thus making replacement impossible. However it must be said that often distortions are caused due to equipment being gifted to organisations. In general the financial burden of low utilisation of equipment increases with the cost of the equipment.

In *Zimbabwe* where the bank lending rate is approximately 50%, and inflation is running at a similar figure, choice of plant, and the decision to purchase or hire, becomes critical for the financial health of the contractor and other road sector organisations.

### **2.5.2 Flexibility of the labour-based approach**

With funding for road maintenance needing to stretch as far as possible, there needs to be more innovation on the part of engineers and managers as to techniques and methods of road improvements. Very much at the forefront is the discussion on the standards of road that should be designed and built for low volume access roads. Should they be built to a high standard, thus reducing future maintenance commitments, or should they be built to a lower standard with a recognised lower level of service and only basic maintenance. Part of the discussion is focused on the use of spot improvements, rather than full rehabilitation of a road from start to finish. Local, labour-based contractors are ideally placed to deal with spot improvements due to their low costs to establish on site compared with bringing heavy equipment to rural areas.

The Roads 2000 programme in *Kenya* is based on the idea of using spot improvements to bring roads up to a maintainable condition, then putting them under routine maintenance.

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There are however several question marks. What level of service is expected on these roads? Will the only partial improvement of the road affect the image of labour-based works when compared with fully rehabilitated roads? What are the longer-term effects on maintenance?

A study has been proposed in the region to look at these issues and others, including the use of appropriate seals and surfacing for spot improvements such as the sealing of sections with steep gradients. With gravel sources becoming scarcer in many countries, labour-based approaches can utilise smaller gravel pits than it would be economical to open for machine-based operations. Perhaps more importantly the testing of inexpensive seals, which can be laid by labour-based methods, might prove the better solution.

## **2.6 Use of contractual procedures for employment and social objectives**

The operational system which the ILO's Employment-intensive Programme has been trying to set up for the sectoral road programmes executed by private sector is based on capacity building in the private and public sectors and on a "strategic" use of the tendering and contract system:

- (i) The tendering system can be targeted towards social objectives such as employment creation, local participation and sub-contracting/training of small local entrepreneurs. While the technological approach is left open, the tender will be awarded by additional bonus points when the offer shows that the proposed implementation approach responds to the social objectives specified by the client.
- (ii) More directly, the contract system and documentation can be adjusted by introducing labour-based technology in contract specifications, thus giving a comparative advantage to trained and qualified labour-based contractors (method specification).

At the same time, specific clauses on conditions of work are also included in the contract documents. Whether or not a contractor will be kept on the short-list of labour-based enterprises would depend on the actual application of these clauses. It should be recalled that the most relevant labour standards in the infrastructure construction sector include minimum wage; minimum age; non-discrimination (affirmative action in favour of women); workers' compensation for work accidents; safety and health; and conditions of work for casual labour.

- (iii) A training programme in labour-based techniques is offered to interested small and medium enterprises, the successful ones being pre-selected and allowed to tender.
- (iv) In parallel, training is also given to client agency staff and consulting engineers to enable them to fulfil their (new) functions: setting up of a transparent and efficient

tendering system; preparation, supervision and payment of contracts; implementation of contractual procedures, etc.

The advantages to the various actors are as follows:

- Advantages to employers:
  1. access to public markets
  2. effective payment system
  3. transparent bidding process (elimination of favouritism and corruption)
  4. cost of social improvements covered in the bid
- Advantages to workers:
  5. jobs (3-5 times more on labour-based than on equipment-based with same amount of investments)
  6. working conditions improved
- Advantages to governments and donors:
  - more value for their money
  - improved balance of payments (World Bank, governments)
  - employment and poverty objectives
  - increased incomes and standards of living
  - strengthened construction sector
  - domestic market development, inter-sectoral linkages
  - local governance
- New and constructive role of Labour Ministry and social partners (employers and workers' organisations)
  - concrete basis to collaborate with influential technical line ministries
  - policy tool to introduce social policy objectives into economic (investment) policy
  - social dialogue

Given the fact that this approach secures the interests of the various partners, a large social consensus for an employment-intensive investment policy is likely to emerge.

## 2.7 “AGETIPE” approaches

Within the context of the social dimension of structural adjustment, the World Bank has become increasingly involved in the setting up of multi-sectoral public works and employment projects executed by non-government Agencies. An example of such an Agency in West-Africa is the "Agence d'Exécution des Travaux d'intérêt Public pour

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l'Emploi (AGETIPE)"in Senegal. The main objective of these Agencies is to create employment through infrastructure works, which are sub-contracted to the private sector. An issue of concern has been the need to augment the training, capacity building and sustainable employment promotion elements in this approach. In order to promote these aspects the ILO collaborates with the World Bank and the agencies concerned in the establishment of a sub-regional support programme to provide technical assistance, training and advisory services.

### **3. AN ENABLING ENVIRONMENT**

The changing socio-economic climate in many developing countries in the 1990s strongly reinforces the need to create productive employment and to give priority to programmes, which utilise local resources including small labour-based contractors for infrastructure construction and maintenance. Labour-based skills developed during construction and rehabilitation works can subsequently be used to establish decentralised maintenance approaches which rely to the maximum extent possible on local funding, local management and execution with locally available resources. For this purpose a decentralised organisational framework is necessary in order to ensure local participation (local communities/contractors/NGO's) in funding, planning and implementation of routine and periodic maintenance.

The worldwide experience also indicates that there is a growing need for institutional and capacity building in this field. Both international and local consultants and contractors will need to know how to design and implement different technology options. Government agencies need to be able to monitor and control different technological approaches. An analysis of the best practices and lessons to be learnt from the implementation of the different projects and programmes should allow the development of several models for labour-based road contractor establishment for countries in different stages of experience with private sector works.

The growing popularity of employment-intensive methods to infrastructure development and maintenance however also has its risks. First, a neglect of institutional and capacity building work and of modifying the working environment to allow the effective use of these methods, will inevitably lead to inferior results and failure in the long term. Policy advice and policy decisions need to move forward on technology choice and on the creation of an enabling environment in which labour-based road contractors can effectively compete within an open market economy. Policy alone without demonstrations of best practice or best practice with out supporting policies in place will not produce a lasting increase in the use of labour-based methods, but a combination of the two is required, each to reinforce the other.

Initiatives need to continue to expand the knowledge of alternative technological approaches through collaboration with Universities and learning institutions.

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The real challenge now being faced by Governments is to facilitate real market driven growth and competition for the contracting industry. This means setting up programmes and incentives to encourage truly independent and autonomous contractors that could be a viable option to the force account or Government driven "contracting" in many countries. For this to take place Contractor Associations that would be serious partners in development, must take on responsibilities in developing structured training and mentorship programmes and be fully professional self-funding operators.

#### **4. CONCLUSION**

Both the large-scale sectoral and the local-level multi-sectoral infrastructure investment programmes present a largely untapped potential for employment creation and poverty alleviation policies, through labour-intensive work methods, private sector development and participatory contractual approaches with community-based organisations. The policy tools and operational systems already tested and introduced, at various levels, in a growing number of developing countries can provide a crucial link to ensure follow-up and implementation at national level of policy statements by global initiatives or world conferences, such as those of the World Summit on Social Development (Copenhagen, 1995). While it is clear that employment-intensive infrastructure investment policies can only contribute to a limited extent to the attack on un- and under-employment and poverty, their potential is such that it would appear unreasonable to neglect this approach.

A final word - "we know that employment is the first step towards escaping from poverty" - Juan Somavia, Director General of the ILO.