**The Paving Project in Burundi**

The "Economic and social development through paving" project (Paving Project) is managed by the Government of Burundi and the Belgian development agency (BTC). The budget granted is 16 million euros; the project is planned for a duration of five years (2009-2014); it is financed by Belgium and the UNDP.

The Paving Project consists in the construction of about 30 kilometres of paved roads through on-site training programmes in the municipalities of Kinama, Kamenge and Cibitoke, north of Bujumbura. The construction sites apply the employment-intensive (EI) method. The Paving Project has already provided about 3,000 inhabitants of these communes with employment for between six and nine months. Technical and organisational support has also been provided to stonemasons who work in quarries that have concluded a partnership with the project.

In addition to renewing the infrastructure, the Paving Project aims to contribute to boosting the economic and social development of these municipalities, which were badly affected by the 1993-2004 war. The trainees in the on-site training programme do indeed benefit not only of training in the paving profession, but they are also taught a series of skills to help them with later social and professional insertion. On top of that they are entitled to early entrepreneurial training. At the term of their learning cycle, they receive an installation grant so they can launch their own income-generating activity. Next, a trainee can be further coached personally and follow additional training to learn to set up and manage her or his own business.

**Employment-intensive: local added-value workforce**

Pierre-Yves Dubois

**Key points**

- Paving (and ensuing improvement of sanitation) is an Employment-Intensive (EI) method to resurface roads that can boost urban development more than other methods. It strengthens the feeling of ownership of the works built.

- The Paving Project has developed the new concept of a **social EI method**: This is an EI undertaking throughout (and even after) which workers benefit of social support through social skills and professional training.

- Paving is a more sustainable solution than asphalting (30 to 40 years instead of 15 years). In addition, paved roads can still be changed or improved easily.

- When comparing EI methods with equipment-intensive methods, the EI method turns out to be:
  - about between 10 to 30% cheaper,
  - requiring 50 to 60% less cash,
  - creating, for the same amount of investment, 2 to 5 times more jobs.

- The social EI method may be applied to other sectors such as agriculture, the supply of drinking water and sanitation, the construction of rural dirt roads, the construction of small infrastructure… It is important to raise awareness among policy makers and financial decision makers and have them consider this method.
Doing construction work with modern tools, which replace a large workforce, is fine for places where manual labour is missing. But where many people have no work at hand it is better to use EI methods because they bring money to households and in the end the same results is achieved, a road is built. However, with machinery, especially a company and its management make money.

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Technical options for building roads in urban areas

Urban roads are usually located in densely populated areas. In Bujumbura city and especially in the popular neighbourhoods population density can reach 500 inhabitants per hectare and population growth is at about 4% annually. Such population density means there is a lot of traffic. So, it is best to use an appropriate technology to build sustainable roads, for instance for road drainage and drainage of adjacent land, rain water storage, traffic and heavy vehicles that require hard surfaces.

Hard surfaces have significant advantages in quite a few areas. From a transports point of view, the smooth flow of traffic and easier access foster the economic development of local enterprises. Also, at the time of construction, temporary jobs are created. Works of this type bring about benefits in terms of public health and sanitation: There is less dust and water is flowing instead of stagnant, which reduces water-borne diseases. Better drainage of water reduces the risks of flooding. Road construction is an essential part of urban development. So, choosing for hard surface roads is an important decision to take. There are several types of hard surfaces: concrete, asphalt or natural or concrete paving.

Concrete roads last longest. Concrete roads and asphalt roads can be built fastest but they are more expensive, require machinery and there is a risk of complication when modifications need to be made (placing conducts) and/or repairs.

Why paving roads?

Paved roads have a longer lifespan, efficiently use manual labour, cost relatively little and are easily modified or repaired even though construction is sometimes significantly slower.

Compared to the two other types of roads, the paved roads require little machinery. Except for compaction, all other work can be done by manual labour with little or no qualification, which is readily available in the area of construction. Nearby quarries, like in Bujumbura, considerably reduce raw material costs. The use of natural materials that have been quarried locally also stimulates the local economy and does not require foreign currency.

It is easy to dig up and repair a paved road to place new water conducts or electricity, telephone or optical fibre lines, which is especially useful in a city that is fully expanding and developing like Bujumbura or where sanitation or water or electricity supply works still need to be done. Repairs can be conducted very quickly with little investment and with cheap manual labour with little qualification. This is not the case for concrete or asphalt roads where repairs require expensive equipment and skilled labour. Also, if repairs are not done correctly the road’s lifespan is affected.

Paved roads have a long lifespan, even with little maintenance: They last for about 30 to 40 years instead of 15 years for asphalt roads. Paved roads also have the advantage of being more permeable than asphalt or concrete, which reduces runoff. In addition, the minimal need for fossil fuels is an environmental aspect to be considered.
Paved roads do not allow high speeding and implicitly protect the more vulnerable road users such as children, pedestrians and cyclists. This protection can be strengthened by placing speed bumps.

But the decisive factor for choosing for paving for Bujumbura’s roads is no doubt the fact that paving is a surfacing method that is Employment-Intensive (EI). Paving, improved sanitation and developing neighbourhoods boost urban development more than road works only. It strengthens the feeling of ownership of the works built.

**Employment-Intensive (EI) method versus Equipment-Intensive method**

**Employment-Intensive (EI) method** stands for all methods that combine light equipment and manual labour in an optimal way to ensure quality at a minimal cost.

**Equipment-Intensive** stands for all methods where most works are done with heavy machinery and tools and little labour (Olivier, 1998).

The EI method consists in using a maximum of local manual labour to build infrastructure instead of using the Equipment-Intensive approach which is imported from developed countries and uses machinery for most tasks. This does however not mean that EI works do not use machinery. The EI method aims to optimally combine the use of manual labour and equipment with the priority given to manual labour and to complement it where necessary with light machinery to ensure quality and profitability.

While using often local manual labour infrastructure can be built in places that are inaccessible to machines and the negative environmental impact of construction is reduced.

The EI method can be implemented locally by small and medium enterprises under the supervision of study bureaus and thus contribute to the development of the private sector. Private-sector performance and follow-up of the works liberates the government of certain tasks so it can focus on more important tasks (ILO, 2002, pp. 17-19).

Mind however that the weak management capacity of local enterprises and study bureaus can impede performance.

The table below lists the advantages and disadvantages to both methods, which can be combined on a same construction project:

**Table 1: Advantages (+) and disadvantages (-) of Employment versus Equipment-Intensive methods.**

<table>
<thead>
<tr>
<th>Employment-Intensive</th>
<th>Equipment-Intensive</th>
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<tbody>
<tr>
<td>+ Cost reduction</td>
<td>+ Quick construction</td>
</tr>
<tr>
<td>+ Job creation (workforce with little qualification)</td>
<td>+ Quality of construction</td>
</tr>
<tr>
<td>+ Enhanced ownership of the works</td>
<td>+ Easier organisation and planning of work</td>
</tr>
<tr>
<td>+ Less foreign currency needed</td>
<td>+ Less follow-up</td>
</tr>
<tr>
<td>+ Impact on the environment</td>
<td>– Quality of workforce</td>
</tr>
<tr>
<td>– Quality of workforce</td>
<td>– More expensive</td>
</tr>
<tr>
<td>– Slow performance</td>
<td>– Little impact on the economic and social development of the area</td>
</tr>
<tr>
<td>– More organisation and follow-up</td>
<td>– Little ownership by public and private sector</td>
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</table>

In a broader sense the EI method uses local resources and especially the available workforce but also raw materials and the capacity of enterprises and local authorities in a rational way (Olivier, 1998, pp. 2-3).

The ways in which the EI method can be applied depend on country-specific technical, economic, social and institutional factors (Tajgman, 2000, p. 13).

However, comparative studies in such differing countries as Cambodia, Ghana, Lesotho, Madagascar, Rwanda, Thailand and Zimbabwe show that the EI option:
- Is about 10 to 30% cheaper than an equipment-intensive method;
- Requires 50 to 60% less cash;
- Creates, for the same amount of investment, 2 to 5 times more jobs.

The Employment-Intensive option in Burundi

For Bujumbura there are no precise indicators available to compare both methods, because the EI method has been the one used for most paving projects.

For instance the Chaussée de l’Agriculture (a 6-metre broad asphalt road in the city of Bujumbura) was built in 2008 with European Union funds under the “Urban roads” project and cost about 500,000 euros per kilometre without any sanitation infrastructure. This is definitely more than a paved road which costs, depending on the implementation modality, between 180,000 and 300,000 euros per kilometre. The money saved may be invested in improving rain water management and/or training.
However, to apply the EI method certain specific competencies must be available to follow up job performance. To manage many staff members with little qualification, one must indeed have stronger logistics backing (follow-up of construction site equipment) and human resources specialists (control of attendance, salaries, training). These specific competencies are often harder to find and force the contracting authority to spend time and energy on training local supervisors.

Employment-intensive paving by a business versus employment-intensive paving under own management

Employment-intensive paving by a business: Paving work is entrusted, through a call for tenders, to a company that will do the construction work and use either manual labour or equipment, or both in function of purely financial criteria. The enterprise is supervised by a study bureau, selected via a call for tenders dossier, or by an on-site representative, appointed by the contracting authority.

Employment-intensive paving under own management: The supervisor or the project behave like an actual enterprise that directly implements and supervises the construction works through its own employees and by using local workforce which is usually directly benefiting from the works constructed.

It is important to be aware that these two concepts, even though they may seem relatively similar, require very different financial means and human resources. In addition, the follow-up by project managers differs greatly.

Construction under own management can reduce costs and boost the local workforce, which leads to stronger ownership by the population of the works constructed. Slow performance and the stronger need for follow-up may however often hinder the use of this method. Employment-intensive construction work under own management allows for greater flexibility in implementation and therefore allows more time for training the workforce.

Relying on an enterprise that is selected through a call for tenders allows for the usually faster delivery of quality work. The two main disadvantages in this case are higher costs and weaker ownership.

Employment-Intensive paving in Burundi
Following the simultaneous application of both methods to paving construction sites both could be compared and improved.

Based on current know-how and taking into account the on-site training of the workforce, a paved road built under own management would cost about 180,000 euros per kilometre. This amount does however not fully correspond to actual expenditure. It does not take into account, among other things, the amortization of construction equipment or all project staff involved (in particular administrative and financial staff); yet the social aspects of the programme are taken into account.

The cost of the workforce, mainly unqualified staff and inhabitants of the municipalities of the intervention, is estimated at 70,000 euros per kilometre, or about 40% of the cost of the paved road.
About 20% of attendance time of the workforce is dedicated to professional and social skills training.

Certain related works such as building culvert bridges, protecting river banks by means of gabions and anti-erosive plants or adding water-capturing gutters have been taken into account in the cost per kilometre of road.

So we dispose of a reliable measure to compare both methods as the table below shows.

<table>
<thead>
<tr>
<th></th>
<th>Paving by a business</th>
<th>Paving under own management</th>
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<tr>
<td>Number of mandays per kilometre built</td>
<td>17,100</td>
<td>+/- 29,000</td>
</tr>
<tr>
<td>Estimated price per kilometre (in euros)</td>
<td>320,000 (2008)</td>
<td>180,000 (2011)</td>
</tr>
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In addition of being cheaper, paving under own management offers many advantages, especially when one faces unforeseen technical constraints (like weather conditions). Not being bound to a business under a formal contract allows technical decision makers to be more flexible and react quickly in case of emergency (in particular in response to rain conditions).

The experience with works under own management in Bujumbura, which was designed to test several implementation techniques, helped with improving the quality of the technical specifications of call for tender dossiers. This allowed for a reduction of about 10% of the price per kilometre for a paved road. Works under own management also allowed for more flexibility with employing the workforce.

By spending more time on training the workforce, the project has developed a new social Employment-Intensive method. This new method can be defined as an Employment-Intensive construction job where workers benefit from social support through professional and social skills training during and/or after construction work hours. The goal is to maximize the impact of the infrastructure construction project on the economic and social development of the area.

**Different implementation techniques and methods**

The figure below compares the different implementation techniques and methods for road construction works in function of the three main criteria: equipment needed, workforce needed and training needed.

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Application to other domains

Most public investment in developing countries is dedicated to infrastructure projects or agriculture and food security projects. To improve infrastructure and the quality of life or food security, priority projects include rural roads, food networks, irrigation works and the fight against flooding and erosion or...
The Employment-Intensive method is not quoted in Burundi’s National Agricultural Investment Plan (PNIA). This means it is not included in the nation’s strategies even though it makes really sense in a post-conflict situation. However, this should be included when supporting construction work. An agricultural engineering workshop held in June 2013 aimed to help the Ministry of Agriculture to set up an action plan to steer rural donor initiatives and to provide a framework for construction management. The possibility of applying an Employment-Intensive method in this context was discussed because 45% of planned investments under PNIA are dedicated to watershed management, which can often be done through the Employment-Intensive method. This could be included in procurement, by stating that when the Ministry of Agriculture launches a call for tenders, in such or such situation Employment-Intensive methods should be used.

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the installation of warehouses. Most projects that directly influence the rural economy are small-size works, which are geographically spread and which can be built with relatively simple techniques. This type of project has characteristics where using the social Employment-Intensive method will prove to be effective since it combines concrete achievements, access to employment and training and having an impact on the local economy.

Possible applications
- Agriculture: installation, rehabilitation and maintenance of irrigated perimeters, irrigation channels, watershed planning, fighting erosion.
- Drinking water supply and sanitation.
- Installation, rehabilitation and maintenance of rural access roads.
- Construction of paved roads, including rain water management.
- Small community infrastructure (warehouses, dispensaries, class rooms, lodging).

Inclusion of the Employment-Intensive method in call for tender files

Well-designed and well-implemented programmes that apply the Employment-Intensive method offer specific advantages for social partners (governments, employers and workers) because they facilitate the access to public contracts, have positive effects on employment and improve the profitability of investments. Such programmes also offer better perspectives to small entrepreneurs who want to enter the local domestic public works market, which in most developing countries is dominated by large foreign companies. Procurement procedures can force enterprises to apply an Employment-Intensive method for the construction work. However, when demanding an Employment-Intensive method, one must remain realistic with performance deadlines and the technical specifications required.

Essential elements to establishing an environment that favours the awarding of Employment-Intensive public works contracts.
- Flexibility of performance deadlines
- Rationalisation of the cash payment procedures
- Support role of the control mission
- Planning/matching work and training
- Simplified award procedure (flexibility)
- Capacity development of entrepreneurs
- Technical specifications and adapted concessions
- Adapted performance modes

It is fundamental for Employment-Intensive programmes that the entrepreneurs are regularly paid by the contracting instance. Because they employ many temporary workers the Employment-Intensive entrepreneurs are especially vulnerable to late payments.
Political will is required to increase the number of EI works in Burundi. The state must understand the EI method before it can be vulgarised at the level of network concessionaires, for instance, so for certain types of works the population can be called upon. It is a comprehensive tool for development. But the problem is that it is contradictory to policies. There is a need for broad awareness-raising at the top of the state. With the experience of our project, the policy makers start to see things differently.

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**Sustainability of infrastructure built through the EI method**

In general, through the EI method the local population takes ownership of the infrastructure and sustainability can be guaranteed. However, municipal administrations that are to maintain the road network in Burundi in general do not have the technical competencies and financial means needed and so they are often unable to support the local population with maintenance.

So it is, at first, important to support and provide structure to the local administrations (by putting in place a technical municipal service, for instance) so they can take up the maintenance of the road network with the population or possibly by means of community works.

Next, one could figure that the municipal administrations implement themselves EI projects and pave roads and build community infrastructure. Several financing (public or private) and implementation (contracting authority, delegated commission, assisted commission) schemes should be possible depending on local contexts. It is important to raise awareness among both political and financial decision makers about the EI method for building infrastructure. Especially the social EI method should be promoted in countries that have been through a conflict or in countries with high unemployment rates.

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**Sources**

