

Poverty alleviation of labour-based infrastructure delivery: the case of Dar es Salaam (Tanzania)

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Abstract

Labour-based technology (LBT) is a strategy popularised by international organisations such as the International Labour Organisation (ILO), United Nations Development Programme (UNDP) and the World Bank, to address poverty, unemployment and infrastructure provision especially in informal urban settlements. More emphasis has been placed on using the LBT approach in sub-Saharan countries where unprecedented urbanisation is taking place leading to the formation of informal settlements, high levels of unemployment accompanied by poverty. The LBT approach has been implemented in many developing countries. However, there is little available evidence of the long-term impact of LBT on poverty alleviation and employment creation opportunities. This article reports on employment creation opportunities and poverty alleviation while delivering infrastructure using LBT in informal settlements in Dar es Salaam, Tanzania. A qualitative research approach was used which included personal interviews of the residents who were directly involved in infrastructure provision in the Hanna Nasif informal settlement using LBT. The infrastructure delivery project in Hanna Nassif commenced in 1994 and was completed in 2000. The research was conducted four years after the project had been completed, namely in 2004. The findings reported in this article provide base line data for policy makers and researchers, while contributing to understanding the long-term impact on employment creation opportunities and poverty alleviation using LBT. The article concludes with a proposal for a LBT-Poverty Alleviation framework.

Keywords: Informal settlements, infrastructure, job creation, LBT, poverty alleviation

Abstrak

Arbeidsgebaseerde tegnologie (AGT) is 'n strategie wat gewild geraak het onder internasionale organisasies soos die *International Labour Organisation (ILO)*, *United Nations Development Programme (UNDP)* en die Wêreldbank, om armoede, werkloosheid en infrastruktuurvoorsiening spesifiek in informele stedelike gebiede aan te spreek. Meer klem is geplaas op die gebruik van die AGT benadering in sub-Sahara lande waar ongekende verstedeliking plaasvind

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wat lei tot die vorming van informele woongebiede, hoë vlakke van werkloosheid gepaardgaande met armoede. Die AGT benadering is geïmplimenteer in baie ontwikkelende lande. Desnieteenstaande, is daar min beskikbare bewyse van die langdurige impak van AGT op armoedeverligting en werkskeppingsgeleenthede. Hierdie artikel doen verslag oor werkskeppingsgeleenthede en armoedeverligting gedurende die voorsiening van infrastruktuur deur die gebruik van AGT vir informele woongebiede in Dar es Salaam, Tanzanië. 'n Kwalitatiewe navorsingsbenaderings is gebruik wat persoonlike onderhoude met inwoners, wat direk betrokke was by infrastruktuurvoorsiening in die Hanna Nasif informele woongebied deur AGT, ingesluit het. Die infrastruktuurvoorsieningsprojek in Hanna Nassif is in 1994 begin en is voltooi in 2000. Die navorsing is gedoen in 2004, vier jaar nadat die projek voltooi is. Die bevindings in hierdie artikel gee aan beleidsmakers en navorsers basislyn data en dra terselfdertyd by om die langtermyn impak op werkskeppingsgeleenthede en armoedeverligting deur middel van AGT te verstaan. Die artikel gee 'n voorstel van 'n AGT-Armoedeverligtingsraamwerk.

Sleutelwoorde: Informele woongebiede, infrastruktuur, werkskepping, AGT, armoedeverligting

1. Introduction

Labour-Based Technology (LBT) is a construction technology, which aims to apply a labour/equipment mix that gives priority to labour, but supplements labour with appropriate equipment where necessary for reasons of quality or cost. While producing or maintaining infrastructure to a specified standard in a cost-effective manner, people are employed with fair working conditions (ILO, 1996). The ILO has promoted LBT over several decades under employment-intensive programmes (EIPs) as a means of creating employment opportunities and alleviating poverty. Further, these programmes also pursued the creation of infrastructure and other assets (Jinchang, 1997; ILO, 2003). In the late 1980s, the ILO in Tanzania transferred its experience in LBT rural works programs to the urban sector through its Special Public Works Programme using community participation and small-scale enterprises (Miller, 1995; ILO, 1996; Kedde-man, 1998; Jinchang, 1997).

The definition of poverty is a matter of considerable controversy with differing views that partly revolve around the personal perspective taken. According to Mbughuni (1994), one may take the global, continental, national, regional or the individual perspective. Accordingly, poverty is perceived on the basis of indices, which define the social status of a person or a group of people relative to the others or other social groups and social organisations of the respective community (Liviga & Mekacha, 1998). Poverty has also been described in terms of being as ability or inability to attain an accepted minimum standard of living (World Bank, 2000). In the urban context, it refers to those families, who fail to meet basic needs and enjoy

adequate access to social services and capital, which leads them to live below the official urban development standards (earning less than US \$1 per a day). Poverty alleviation can, therefore, be regarded as the creation of a social, economic, and political environment that enhances and promotes entrepreneurial activities particularly among the poorest and most deprived persons while at the same time eliminating the inequalities that have diminished their life chances (Mbaku, 2007).

This paper examines whether the primary objectives of employment creation and poverty alleviation, as defined, were indeed achieved in the execution of infrastructure projects in Dar es Salaam and particularly the project in the Hanna Nassif informal settlement. With this in mind the study was carried out in 2004, more than four years after its completion in 2000. The intent was to determine whether there were any medium- to long-term impacts on the overall quality of life of the participating community residents either in terms of poverty reduction and/or the creation of sustainable employment. Further, the study sought to determine whether there were any relationships between the levels of education, gender or ethnicity of the participants and the overall outcomes of using the LBT approach relative to these two objectives.

2. Literature review

Several in-depth studies by the ILO and other agencies such as the World Bank, have suggested that the utilisation of the labour-based approach to design, construct, operate and maintain infrastructure is cost effective particularly when compared to the equipment-based technology approach (Keddeman, 1998; ILO, 1998; ILO, 2003). The experiences of using LBT for infrastructure provision in countries such as Ghana, Lesotho, Madagascar, Rwanda, Zimbabwe, Cambodia, Laos and Thailand, indicate that the approach is generally, in financial terms, about 10 to 30% less costly than the more equipment based option. It potentially reduces foreign exchange requirement by 50% to 60% and creates for the same level of investments two to four times more employment (ILO, 1998; Majeres & Veen, 2001; Islam, 2001; ILO, 2003). In the context of this study this last reported benefit, namely that of employment creation, is of interest.

Other studies have compared labour-based projects with equipment-based projects and found a transfer of knowledge in labour-based road works to local communities - knowledge useful for later maintenance and employment creation. Other benefits of labour-based construction methods include their potential environmental

advantages. These include the use of less fuel, emission of less exhaust fumes, raising of less dust, less serious damage to the terrain bordering a construction site, and requiring less manoeuvring space which in itself is preferable in informal settlements (ILO, 1996; ILO, 1998; Islam, 2001). Further, LBT encourages the development of the local industry for manufacturing hand tools and light road construction equipment. Additional benefits include savings in foreign exchange, injection of cash into the local economy, increasing skills in local people, and the enhancement of future sustainability through a higher sense of local ownership and through familiarising people with the necessary operations for road maintenance (ILO, 1996; Islam, 2001; Majeres & Veen, 2001).

Arguably, poverty is associated with lack of employment opportunity. Employment creation is seen as one of the most effective means of poverty alleviation (Keddeman, 1998). Poverty reduction using labour-based technologies lies in the economic concept known as the 'multiplier' (Hillebrandt, 1999). In effect, this multiplier effect means a boost to the purchasing power of workers created by the injection of cash into the local economy. For instance, when people are employed, they spend portions of their wages or income on goods and services produced in other sectors of the economy which in turn generate employment and spending elsewhere. In this way an upward spiral of increasing employment is created (Keddeman, 1998; Devereux, 2002; Thorndahl, 2003). The theoretical background is based on a wide range of economic theories and the 'circular flow of economy' approach, which uses wages generated from employment gained into propping up the local economy and employment creation for others.

However, the most important determinant of the extent to which earnings from LBT projects generate income multipliers is probably the level or value of income transferred (ILO, 2002). Direct income benefit accrues to the poor through income transfer (ILO, 2002). The income transferred to the participants during construction project attracts business investments around the sites due to the fact that people will spend their wages on goods and services inducing a multiplier effect to the other economic sectors. The study by ILO (2002) in India found that the direct income transferred to the participants in infrastructure provision was high and provided substantial alternative employment opportunities. In another Indian study it was observed that EGS projects generated net income gains to the participants. These direct transfer benefits arguably led to the reduction of poverty (Gaiha, Imai, & Kaushik, 2001).

Although this type of employment paid low wages and was temporary it was possible for workers to derive long-term income benefits (Devereux, 2002). Sustainable poverty reduction and income transfer through LBT can potentially be achieved in several ways. These ways include expanding coverage to increase the number of poor people who benefit, raising the wage rates, and extending the duration of employment to allow participants to accumulate sufficient income to graduate out of poverty with transferable skills (Devereux, 2002). The strategy of targeted wages has been used to provide employment for vulnerable people. A certain amount of income is transferred to each worker during a given period of time. The focus of the wages was to directly alleviate the economic aspects of poverty. At the lowest level, the minimum average employment period was 100 days with an estimated minimum daily wage level of US\$1 (Devereux, 2002; Thorndahl, 2003).

Some critics argue that LBT programmes should be used to enhance the value of labour by improving the human capital of participants through training (Islam & Majeresh, 2001; Watermeyer, 2000). However, Devereux (2002) and Thorndahl (2003) emphasise that the main product component of LBT is the transfer of skills that enhances the potential for workers to find better employment after completion of the particular project than they were able to secure before or to apply their new skill in the informal sector or become self-employed. The study of Teklu (1995) indicated that participants in infrastructure projects in Botswana were given the opportunity to upgrade their skills. For the poor who had previously engaged in low paying marginal wage employment, access to infrastructure projects allowed them to move to better paying jobs. Effectively the projects contributed to moving some households to the middle-income group. A study in South Africa on public work programmes found that there was a superior benefit from employment created particularly through indirect benefits such as training and empowerment compared to cash transfers (Lawrence & Michelle, 2002).

3. Research methodology

Given the investigative nature of the study a case study method seemed appropriate (Yin, 1988). Since the primary objective of the study was to identify the potential for poverty alleviation through the usage of LBT, residents from the community having worked on the infrastructure projects were considered as the most appropriate data source. Semi-structured interviews were held with the residents of the Hanna Nassif settlement who had directly participated in the

provision of infrastructure in their area. This infrastructure included access roads; storm water drains and a tap water system. In order to obtain a representative sample of the participants in the infrastructure provision projects, the list of residents who had participated in the projects was obtained from the community based organisation (CBO) office in Hanna Nassif. A total of 470 participants were on two lists, namely separate male and female lists. The lists formed the population frames from which a sample selection was made. A total of 47 participants were selected on a non-probabilistic basis, thus representing a convenience sample. The instrument used during the interviews contained a total of 52 questions grouped into three sections. Part One of the interview guide was used to gather information about the demographics of respondents including gender, marital status and age, kind of job they were currently involved with, average income earning per month and whether they had construction experience before they participated in the project. Part Two investigated the participation of residents in infrastructure delivery. Questions were designed to determine the basis of their employment on the project, duration of this employment, the amount of money earned on the project, the extent and nature of any training received, duration of this training and how they used the money which they were paid. Part Three of the instrument investigated the benefits of participation of residents in the infrastructure projects especially after these infrastructure projects had been completed. The impacts after completion of the infrastructure projects particularly investigated were their employment status, their average income levels, and their subsequent living conditions or quality of life.

4. Hanna Nassif

Hanna Nassif is one of the oldest unplanned settlements in Dar es Salaam. It is located in the Kinondoni District - 4 km to the north of the City Centre. The settlement covers an area of 46ha with a population of 32,000 inhabitants with 8,230 households representing an average of 3.9 inhabitants per household (URT, 2002). Before 1994, the settlement had no roads, drainage, tap or water supply system and/or solid waste management system in place. Moreover, the settlement experienced seasonal flooding due to the absence of proper drainage systems. Until 1992 the road network was very poor in the entire area to the extent that a large number of houses lacked vehicular accessibility. The drainage condition in the settlement was very poor. For example, on 10 May 1991 it rained heavily, 72 houses collapsed and the whole of the central depressed area was flooded.

Pit latrines were flooded and human excreta mixed with rainwater. Together with uncollected solid waste, the settlement was reduced to an unhealthy living environment (Kyessi, 2002; Nguluma, 2003).

The settlement was then upgraded with ILO, UNDP and the Ford Foundation support in two phases. The first phase lasted from March 1994 to March 1996 while the second phase lasted from 1996 through 2000. The upgrading programme included the construction of a 2 km access road to a level of murrum, 1,2 km main storm water drains including 150m gabions, 3,7 km side drains, 10 road drifts and 10 vehicular culverts crossing the main drains, two major outlets for drainage discharge into the Msimbazi Creek, 16 road crossings, 128 foot bridges, 2,5 km of water pipes and 7 water kiosks, three of which had a capacity of 10,000 litres each and the other four a capacity of 5,000 litres each- a total of 50,000 litres.

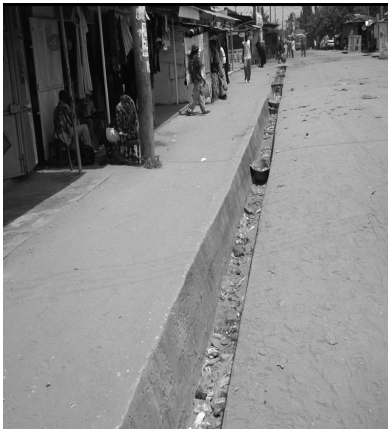


Figure 1: Murrum road with storm water drain (January 2005)
Source: Authors



Figure 2: Reserve tank at Hanna Nassif (January 2005)
Source: Authors

The upgrading programme was carried out with the primary intention of not demolishing any houses while creating employment opportunities and alleviating poverty. It involved the community, using a labour-based approach. One critical element was that the community was involved in all phases of planning, designing and implementation. Subsequent to these projects, Hanna Nassif stands as an upgraded informal settlement with a relatively improved and conducive living environment (Nguluma, 2003). The murrum road with storm water drain and one of the reserve tanks for the waste water supply system are visible in Figures 1 and 2 respectively. These installations were constructed by the residents themselves.

5. Analysis of findings

5.1 Sample Demographics

The sample for the interviews of community participants comprised of 47 community members who had been involved in the infrastructure improvement projects with females representing 32%. Their demographic status at the time of the commencement and subsequent completion of the projects had largely remained unchanged. Half (50%) of the respondents were married suggesting that most of them had family responsibilities. Additionally, less than half (43%) of the respondents were heads of their households. Consequently, they bore the responsibility of providing for the daily needs of their families. Furthermore, 10% of the respondents, while being household heads were the only employed person in their households. The highest level of education of most (66%) of the residents who participated in the infrastructure project was primary or elementary school suggesting that they were most likely to be affected by high levels of unemployment and poverty. Evidently the profile of the sample was such that the purported benefits of using the LBT approach could be optimized with respect to offering employment to poor people who were not in formal employment (Thorndahl, 2003).

5.2 Participation in infrastructure project

5.2.1 Type of employment

Of the 47 participants, 49% had been employed during the project as labourers, 30% as 'fundi's' and the remaining 21% in other categories, namely treasurers, storekeepers, foremen and semi-skilled/skilled labourers. The employment profile of the sample is shown in Figure 3.

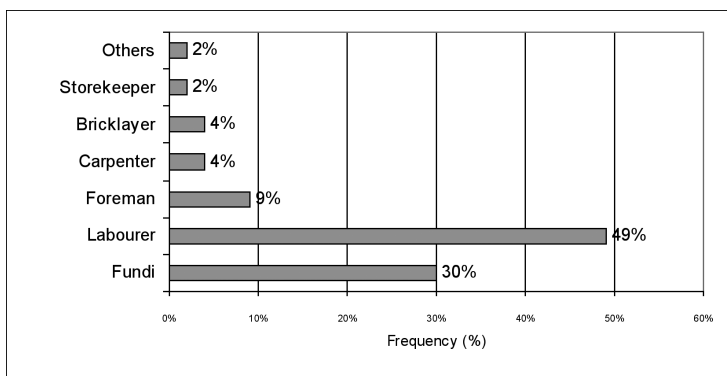


Figure 3: Employment profile of participants in infrastructure project

The LBT literature suggests that this profile is typical for labour force composition in LBT programmes, which require extensive excavation and construction activities that are done by labourers. The Hanna Nassif infrastructure provision project lasted for six years in two phases of three years each. The distribution of the length of employment of residents on the project is presented in Table 1.

Table 1: Length of Employment

<i>No of years</i>	<i>Frequency</i>	<i>Percentage</i>
<1	7	12%
1-5	26	74%
6-10	3	9%
Total	36	100

However, given that most (88%) of the respondents were employed for more than one year the employment period was higher than the 100 days suggested in the literature. Arguably, these findings suggest that most residents had worked sufficiently long enough to accumulate income and work related experiences. They were, therefore, hypothetically positioned to be better able to improve their living standards and benefit positively from the LBT initiative to alleviate poverty in terms of sustained employment and income generation.

5.2.2 Skills transferred

The infrastructure project targeted skill enhancement and transfer as the vehicle for sustainable employment creation and poverty alleviation. This strategy is based on the premise that if existing skills are enhanced and honed and new skills transferred, the beneficiaries would be able to use these to obtain employment after completion of the project and be able from the income subsequently derived to improve their living standards and overall quality of life. Residents were presented with several questions relative to training. More than half (54 %) of the residents had previous construction experience. Both men and women had been taught new skills relative to preparing pre-cast moulds for drains, mixing ratios of materials and other relevant construction skills during the implementation stages of the project. Almost two-thirds (61%) of the residents had received training in the CBO office before the project commenced. Most (85%) had been given on-the-job training in specific construction activities. The duration of training ranged from one week to six months. Each participant had to attend between three and four training sessions

at various intervals throughout the project. The topics addressed in the training sessions included:

- Construction health and safety;
- Handling of equipment;
- Mortar mixing;
- Gabion construction;
- Drain maintenance and plumbing;
- Masonry and carpentry;
- Steel fixing;
- Record and book keeping (treasurer); and
- Issuance of materials and equipment (storekeeper).

For 47% of the participants this was their first opportunity to participate in infrastructure-type projects. The on-the-job training they received would potentially help them to secure better employment after the project was completed.

5.2.3 Income earned from the project.

Residents who had been employed as labourers were paid Tsh 900 per day while those employed as 'fundi's' were paid Tsh 1,200 per a day (In 1997, Tsh 900 was equivalent to U.S. \$1) (URT, 2001). Most participants had been employed for more than one year. However, the impact of the income earned on the alleviation of poverty is related to how the earned income was spent. Table 2 provides an indication of the spending patterns of project participants, given that respondents distributed their income across multiple expense categories.

Table 2: Spending pattern of project participants

<i>Expenses</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Ranking</i>
Family expenses	33	70%	1
Investing on business	15	32%	2
Personal savings	12	26%	3
Home improvement	10	21%	4
Insurance policy	1	2%	6
Others	3	6%	5

The findings from Table 2 suggest that expenditure on family expense items such as food, clothes, medical and rent dominated. For many of the respondents, income from the project was their only source of income from which they had to provide for their basic needs. On the other hand, almost one third (32%) of the residents were able to invest in their own businesses such as stalls, hair dressing salons, and small clothing shops. Others (21%) used their income to improve their homes which, arguably, in turn contributed to improving their quality of life.

5.2.4 Impact of level of education and spending patterns during and post project

The findings were cross tabulated to determine whether the level of education of participants affected their spending patterns and, thereby, the overall impacts of the LBT approach to their project. The results are presented in Table 3. These findings suggest correlation between the level of education and spending pattern. Most participants (74%) with primary school level education spent their income on family expenses followed by 23% including spending on business investments and home improvement. On the other hand, most (54%) residents who had high school level education invested their income in businesses followed 46% investing their funds in personal savings. About one-third (38%) spent their income on family expenses and 23% on home improvements. Further, residents who had college level education spent most of their income on insurance cover, while those who had university level education spent their income evenly on personal savings, investing in businesses and family expenses.

Table 3: Cross tabulation of spending patterns and levels of education

Spending pattern	Levels of education							
	PS	Rank	HS	Rank	CL	Rank	UL	Rank
Family Expenses	74%	1	38%	3	0%	2	33%	1
Business Investment	23%	2	54%	1	0%	2	33%	1
Home improvement	23%	2	23%	4	0%	2	33%	1
Personal savings	16%	4	46%	2	0%	2	0%	4
Insurance policy	0%	5	0%	5	100%	1	0%	4

PS: Primary school level HS: High school level CL: College level UL: University level

5.2.4.1 Impact of gender on spending pattern

To determine whether there was any correlation between spending patterns and the gender of residents, the data on spending patterns and gender were cross tabulated. The cross tabulation is shown in Table 4.

Table 4: Cross tabulation of spending pattern and gender

Spending pattern	Gender			
	Male	Rank	Female	Rank
Family expenses	37%	1	26%	2
Personal saving	34%	2	-	
Business	31%	3	53%	1
Home improvement	22%	4	-	
Insurance Policy	3%	5	-	

Findings from Table 4 suggest that there is correlation between gender and spending pattern. Males spent most of their income on family expenses, followed by personal savings and business investments. On the other hand, females mostly invested in businesses followed by family expenses. Arguably, males focused on the short-term responsibility of providing for the needs of their families while females took a longer-term view by pursuing sustainable sources of income such as from businesses.

5.3 Impacts of participation of residents in infrastructure project

With respect to how they personally benefited from participation in the project, various benefits were highlighted by respondents. These benefits included:

- The acquisition of skills and experience which helped them to secure employment;
- The earning of income used to improve their lifestyles and quality of life;
- The use of funds to start their own businesses;
- Increased knowledge of infrastructure and construction activities;
- Solving community problems of flooding and lack of infrastructure; and
- The procurement of fixed assets such as plots of land and farms.

Relative to how their participation impacted them and their families, respondents reported as shown in Table 5. Several cited multiple impacts. It is evident that the participation of residents in the infrastructure works allowed them to improve somewhat their family's standard of living and to effectively cover their basic needs which could not otherwise have been attained. Moreover, as a result of the project, the skills acquired helped some respondents to secure better employment to better provide for the basic needs of their family. In addition, income earned from the project helped several respondents to invest in new businesses, thereby ensuring sustainability of income to their families.

Table 5: Impact on personal lives of participating residents

<i>Impact</i>	<i>Frequency</i>	<i>Percentage (%)</i>	<i>Ranking</i>
Improve living standard	23	49%	1
Acquire skills to secure more employment	22	47%	2
More income to make investments	14	30%	3
Others	1	2%	4

Comparison of Type of Employment Before and After the Project

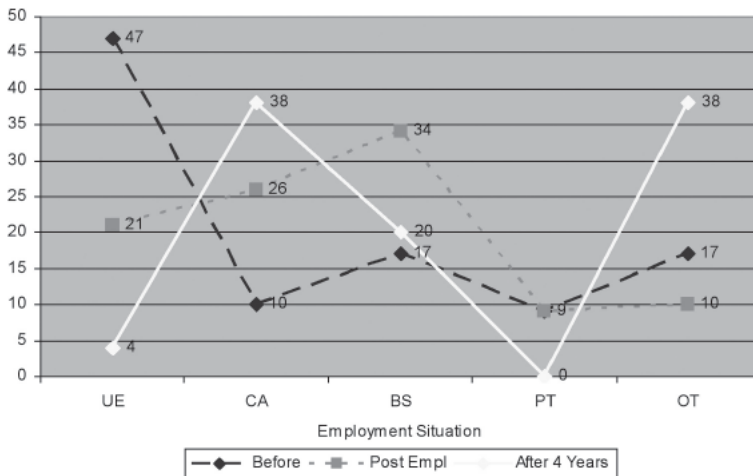


Figure 4: Comparison of employment situation before and after the infrastructure project (Note: UE: Unemployed CA: Construction activities BS: Business investment PT: petty trade and OT: Employed in other sectors as drivers watchmen cleaners)

6.4 Employment status after infrastructure project had been completed

Various questions were asked regarding the employment status of participants. They were asked to indicate their employment status before they participated in infrastructure, and whether they had managed to secure employment after the infrastructure project had been completed. Further, they were asked whether they were still employed in jobs they had secured after the infrastructure project was completed some four years previously. These findings are shown in Figure 4.

An examination of Figure 4 reveals that the overall level of unemployment in Hanna Nassif had been reduced after the project was completed. Before the infrastructure project commenced, 47% of respondents reported that they were unemployed. After the completion of the project the unemployment rate had been reduced by almost half to 21% reporting that they were unable to secure a job. Four years later the reported level of unemployment had further reduced to 4%. It could be argued, therefore, that either directly or indirectly, as a result of participation in the infrastructure project, the overall unemployment rate dropped by 43% (from 47% to 4%), creating sustainable employment of the residents. The number of residents who secured employment in construction activities increased by 28% (from 10% to 38%) while the number of residents who were self-employed by investing in their own business increased by 3% (from 17% to 20%). It would also appear that many of those residents (14%) who had invested in businesses either during or immediately after the project had either lost or closed these businesses. On the other hand, residents who secured employment in other sectors as drivers, carpenters, storekeepers increased by 21% (from 17% to 38%).

6. Discussion

6.1 Impact of LBT on employment creation opportunities

Four years after completion of the infrastructure project, more employment opportunities had been created for the residents of the Hanna Nassif settlement due to the skills they acquired and income they derived by participating in the infrastructure project. The level of unemployment had been substantially reduced to almost two-thirds of the previous level. The income earned during the project allowed many residents to make investments and re-investments in small businesses or in farming. Several residents used their income to do home improvements, inducing a multiplier effect for entrepreneurs in the area through increased demand for renovation works. Moreover, a number of residents had as a result of the training they

had received on the project either found permanent jobs or had become self-employed in the construction sector.

The numbers of residents increased almost fourfold who worked on numerous construction sites in different parts of the city or had launched their own independent construction enterprises. The number of residents which invested their funds in business ventures increased by 3%. Other residents secured employment in other industries as drivers, watchmen, storekeepers, and treasurers. These trends highlighted the significant potential of the LBT approach to create sustainable employment opportunities.

6.2 Impact of LBT on poverty alleviation

The essence of poverty relates to deprivation. Put simply - poverty is measured as the shortfall from a minimum acceptable standard of consumption or income. Income level is an indicator of socio-economic status and is, therefore, an important determinant of resources for obtaining access to health care, education, and adequate housing (Murphy, 1998). Evidently, the infrastructure delivery project in Hanna Nassif enabled residents to improve their living standards. The income earned by the workers improved the quality of their family lives by enabling them to improve their homes, and invest part of their savings to start or expand other economic activities. The provision of training and consequent transfer of technical expertise through on-the-job training at the construction site empowered the community to secure better employment and therefore enhancing income. After completion of the infrastructure project, most residents earned between Tsh 50,000 and Tsh 100,000 (equivalent to R333 to R667) per month. This income level is higher than the minimum salary/wage set by the government, which was Tsh 45,000 (R300). Further, the amount earned per day ranged between Tshs 1,533 and Tshs 5,000. This income is higher than expenditure per capita per day for Dar es Salaam, which was about Tshs 1,100 (equivalent to US \$ 1) (URT, 2001). These results suggest that the levels of poverty to most of the residents in the settlement were reduced. Additionally, the income derived from their business activities and the subsequent employment which others secured after the project had improved the situation.

7. Conclusions

This paper employed a case study and interview methodology to investigate whether there was potential for poverty alleviation and employment creation through the use of labour-based technology.

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Analysis of the responses of a sample of 47 residents in an informal settlement, namely Hanna Nassif in Dar es Salaam, suggests that there is some potential. Any impact of LBT on poverty alleviation could appear by two ways:

- (1) Creation of employment opportunities; and
- (2) Use of earned income to improve the quality of life.

The findings of the study suggest that the LBT approach has the potential to create sustainable employment and alleviate poverty. The income earned by the workers in the infrastructure project improved the quality of their family lives by enabling them to improve their homes, and earn returns on their invested savings through expanded economic opportunities. The provision of training and acquisition of technical expertise through on-the-job training at the construction site had empowered community members to secure better employment and consequently, advance their income earning capacity. Unemployment had reduced. The number of residents involved in the construction sector had increased fourfold. There was evidence of the correlation between levels of education and gender on the spending patterns of residents. In this study, it was evident that residents with a primary school level of education spent most of their earned income on basic household expense items such as food and clothing whereas those with secondary level education spent larger portions of their income on business investments and personal savings.

Arguably, employment accompanied by on-the-job training was the catalyst for poverty alleviation. Consequently, it makes good business sense to recognize that in implementing LBT approaches,

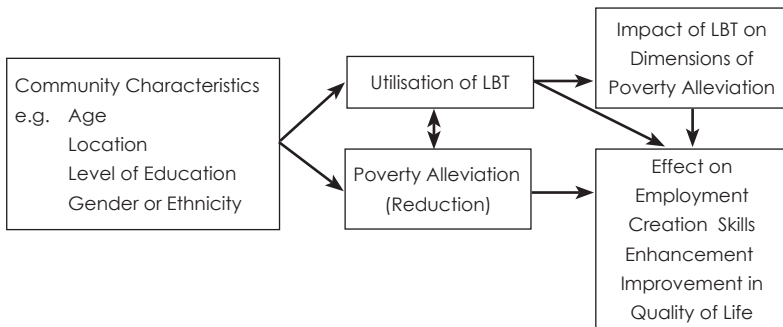


Figure 5: Proposed LBT-Poverty Alleviation framework
Source: (adapted from Dewhurst *et al.* 2003)

the levels of education within communities, payment of appropriate wage levels and on-the-job training must be considered.

Clearly, the potential of poverty alleviation by labour based infrastructure delivery will have an effect on employment creation, skills enhancement and improvement of quality of life. However the extent of LBT on alleviating poverty should be of interest to researchers particularly in identifying the direct and indirect effects. This is summarised in the general framework shown in Figure 5.0. Further investigation is also required to identify the extent of the impacts through a refined statistical analysis such as Structural Equation Modelling as it would take into account the moderating effects of time lag.

While this study was limited to the Tanzanian experience it has implications for South Africa and Africa given that the issue of infrastructure delivery in informal settlements is one of the major challenges facing the sub-Saharan region. The lessons learnt from the Dar es Salaam experience could be tested for applicability in the South African context and Africa in general. Furthermore, to explore these issues further a larger survey is required to investigate the extent of the potential and impact of LBT on the alleviation of poverty.

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