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Comparative evaluation of the development of labour-intensive works technology programme in Namibia

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CHAPTER 9

COMPARATIVE EVALUATION OF THE DEVELOPMENT OF LABOUR-BASED WORKS TECHNOLOGY IN NAMIBIA

9.1 Overview of the Chapter

A comparative evaluation of the labour-based works programme in Namibia is undertaken in this chapter. The programme is evaluated against its objectives, and comparison is made with programmes in Kenya, Ghana, Botswana and Lesotho. Some aspects of labour based programmes in Zimbabwe, Malawi and South Africa are also mentioned, for comparison purposes, where they are considered more refined than those in the reviewed programmes. The implementation process is also measured against generally established guidelines for good practice in the field. Some conclusions and recommendations are made.

9.2 Comparative Evaluation

A summary of comparison of programmes in Namibia, Kenya, Ghana, Botswana and Lesotho is shown in Table 9.1 below. Some aspects are discussed in the following sections.

9.2.1 The Country Environment

9.2.1.1 Socio-economic aspects

Socio-economic aspects considered for comparison are summarized in Table 9.2 below for Kenya, Botswana, Ghana, Lesotho and Namibia. Important parameters compared are the climate, the physical features, population density, unemployment, GDP and GNI per capita. It is concluded that labour-based works programmes can be implemented in varying socio-economic situations. The common denominators in all countries where it has been implemented are high levels of unemployment, poverty and the need for infrastructure.

Table 9.1: Comparative evaluation of labour-based programmes in selected countries.

Description	Namibia	Kenya	Ghana	Botswana	Lesotho
Period	1995-2005	1974-1983	1986-1995	1980-1989	1977-1987
Programme duration	10 years	10 years	10 years	10 years	10 years
Length of road constructed	350 km	8000km		2000 km	1400 km
Length of road rehabilitated	3.8 km		1395 km		404 km
Unit cost of construction/rehab	US$55 570/km	US$12000/km	US$10000/km		US$55000/km
%ge of Labour Cost	35%			65%	46%
Man-days per kilometre	3100	2140	2500		
Employment created					
Casual labour	3400 man-years	7000 man-years	16600 man-years	3000 man-years	2000 jobs
Supervisors		6000 man-years			
%ge of Women	42%		26%		
Contractors trained (total)					
Pilot Phase 1	5	9	7		
Pilot Phase 2	4	12	12		
Other phases			74		
Contractors equipped	0	0	54	0	0
Supervisors trained					
Supervisors	15		478	135	
Engineers	2	Many	64	0	
Duration of training	25 months	15-21 months	24 months		18 months
Productivity (Average)	0.76km/month		2.0km per month		
Casual wage rate	US$3.35/day	Approx US$1.00/day	US$1.00/day		US$4.50/day

	Namibia	Kenya	Botswana	Ghana	Lesotho
Climate	Hot and dry	Equatorial	Hot and dry	Tropical	Sub tropical
Physical	Flat lowlands	Mountainous	Flat lowlands	Lowlands	Mountainous
Population	2.0 million	31.9 million	1.7 million	20.7 million	1.8 million
Avg Pop density	2.43 / km^2	54.96 / km^2	2.93 / km^2	86.8 / km^2	59.3 / km^2
GDP (US$)	4.3 billion	14.4 billion	7.5 billion	7.6 billion	1.1 billion
GDP Growth	3.7%	1.8%	5.4%	5.2%	3.3%
GDP per capita $	2150	452	4412	367	611
GNI (US$)	3.9 billion	12.8 billion	6.1 billion	6.5 billion	1.1 billion
GNI per capita $	1930	400	3530	320	610
Unemployment	31%				
Forex rate /US$	6.50	75.75	5.46	9100	6.50

Table 9.2: Comparison of social economic aspects of selected countries (Source: World Bank, 2002 Data).

9.2.1.2 Political and government support

Programmes in Kenya and Ghana had high levels of political and government support in their implementation and expansion. This is one of the key factors for their success.

In Namibia, it is considered that the GON has not effectively spearheaded the expansion of LBW technology in other sectors of the economy. Most labour-based works activities undertaken are project oriented and are not part of a coherent national expansion programme. Discussions with some role players indicate that believers of the LBW technology in the bureaucracy are few, and commitment to the technology remains shallow and sceptical. In order to reverse the fortunes of LBW technology in Namibia, future efforts need to be directed at identifying and developing gaps of dissatisfaction and misunderstanding, that will lead the political bureaucracy and decision makers at all levels to have a stake in its continued success. In the absence of such an initiative, lack of a national champion and the continued freezing of the envisaged LBWF, the programme in Namibia can as well be assumed to have reached premature maturity, and if not guarded, will slowly slide towards decline.

9.2.2 Programme Objectives

Two sets of objectives were discussed in the preceding sections, namely the pilot projects objectives (Section 4.3) and labour-based works policy objectives (Section 6.3).

9.2.2.1 Pilot projects objectives

The objective of the pilot projects was to establish the viability of the application of labour-based works techniques with a view of ensuring their progressive adoption in the expanding programme of road construction and maintenance in the Ovamboland region and elsewhere in Namibia.

The viability and technical feasibility of the labour-based works technology in Namibia has been proven. The decision of the GON to expand labour-based construction of roads in the northern and north-eastern parts of the country is a testimony that the technology has been endorsed at policy and executive levels of Government. The continued support of stakeholders in the country is now derived from benefits which are seen to accrue to the communities involved, in terms of the poverty cushion provided by the temporary employment generated and the developmental impact registered. The active participation of the private sector is an indicator that labour-based works technology has permeated the construction industry.

9.2.2.2 Labour-based works policy objectives

The objectives of the labour-based works policy as described in section 6.3 of this report are broader, far fetching and long term. The success of the policy is premised on the promotion of the substitution of labour for capital and use of labour friendly technologies. It also includes the stimulation, enhancing and maintenance of the labour absorption characteristics of the various sectors of the economy that has the opportunity for utilizing labour in production, service provision and infrastructure development. These require total Government commitment in policies, promotion, funding, facilitation and alignment of its expenditure patterns

and priorities. The groundwork has been done in Namibia, expansion in the road sector is taking place, but other sectors have not yet taken concrete steps for policy implementation.

In addition, increasing and maintaining employment generation, the quality of the products and the cost-efficiency of the outputs require the efficiency use of labour-based works methods. The study found that efficiency levels are presently low in most projects executed. There were high incidences of the use of machines in some roadworks activities, where labour should have been used. Trained small labour-based contractors do not have adequate equipment for execution of construction work given to them. The current level of site supervision is also generally poor and capacity is lacking. These are issues which need to be tackled.

9.2.3 Programme Management

The Labour-Based Works Unit dispensation in the structure of MWTC and DOT was shown in Section 5.2, and its role was explained. It is considered that the LBW programme in Namibia was well managed, organized and implemented in a professional manner. The required technical and administrative support was provided to the Unit. Like programmes in Ghana, Kenya and Botswana, the planning process in the Namibia programme was taken through an inception phase, a feasibility review, planning and preparation, and implementation stages. Pre-feasibility and social economic studies were undertaken. Pilot projects for the establishment of feasibility and viability parameters were implemented. Progress monitoring and control was continuous, and reporting was done quarterly based on the logical framework analysis. This method allowed the measurement of achievement in line with the objective milestones.

The LBW programme implementation was however not without problems. For example, project implementation lapses and lack of expert facilitation were prominent in the last phase of small contractor development process. The commercialization of roads in Namibia also contributed to the reduced attention given to the last phase of LBW programme projects. In addition, lack of internal capacity in the public and private sectors in Namibia had an impact on the

programme efficiency and quality of project outputs as many projects implemented overlapped, stretching the available capacity.

9.2.4 Policy Development

Development programmes and projects are instruments of implementing policies. Policies are formulated before programmes and projects can be designed to implement the policy. It is the policy framework that provides an authoritative decision of Government and a legislative process precedes every development programme.

In Kenya the RARP took 20 years to become part of the mainstream policy. In Ghana, the labour-based programme was established as part of the mainstream policy right from inception.

By comparison, in Namibia operational decisions to embark on the LBPP were made at ministerial and departmental level, and the national policy formulation process only started three (3) years afterwards in 1995. The policy development process was completed five (5) years thereafter. The programme was therefore initiated to implement a broader government policy, as envisaged in NDP 1, without specific programme policy guidelines. The objectives of the new policy were thus formulated in a retrospective manner, with the hindsight of the actual implementation. To-date labour based works are yet to become part of the mainstream policy in all sectors of the economy.

The danger of the policy following a programme is that policy makers tend to justify the programme approach and actions. More than often, the policy tries to fit into the development focus of the programme and not vice versa.

9.2.5 Labour Characteristics and Wages

9.2.5.1 Casual labour characteristics

The availability of casual labour in labour-based works projects depends on the presence or otherwise of a competing industry in the locality and the level of pay in alternative employment opportunities available. The level of local participation, the participation of women, migrant and itinerant labour in a project reflects the characteristics of competing employment possibilities in the project influence area. In rural areas, labour availability varies with time or seasons of the year, particularly due to agricultural activities.

From the review of the projects executed in Namibia in the last decade, it is evident that the level of local participation was nearly 100%, with a small fraction of itinerant labour. The average daily casual labour for most projects was over 200 at peak periods and about 60 in low periods, and below that towards the contract closing period. Daily maximum levels of over 300 casual labourers have been reported on some projects. No work is reserved for women in all projects implemented. The participation of women varied from 16% to 61%. The average participation of women in the last 10 years was about 42%. In some projects the participation of women exceeded men. High levels of absenteeism were observed during the crop planting, weeding and harvesting seasons. The level of absenteeism was high for women and older workers. This shows that women do most of the farming work than men, and that the same is true for older men compared to younger men. High levels of absenteeism were also observed when tasks considered hard were executed, and when the walking distance to the work site increased.

In comparison, the average daily casual labour in the Ghana programme was about 65, with daily maximums of 100 on average. Some projects were executed exclusively by migrant and itinerant labour, with a zero local labour participation rate, due to the presence in the area of gold mines or plantations. The latter paid higher wages than labour-based works projects. Local labour participation levels were also seasonal, varying in farming and off-farming seasons. Female participation in Ghana varied from as low as 5% in some areas, to about 46% in others. In contrast with Namibia, certain activities such as grubbing and camber formation were the preserve of women. In most sites, women were generally not involved in gravel excavation, ditching, slopping and bush clearing.

9.2.5.2 Casual labour wage levels

Labour-based methods of construction have been found to be competitive with equipment-intensive methods when the average unskilled wage rate is about US$4.00 per day or less (World Bank, 1995, quoted in McCutcheon etal, 2003). This “break-even rate” or the wage beyond which workers cease to be economic compared to machines varies from one country to another and from one area to another or between projects within a country. It also depends on the employment situation in the country or area. For example, the break-even wage was found to be US$3.00 in Zimbabwe, while it as high as US$10.00 in Lesotho.

In Namibia, the idea was not necessarily to pay break-even wages for labour-based works, but rather non-exploitatory wages. For this reason the GON, in consultation with organized labour, determines the minimum wage payable. The wage rates levels are shown in Table 8.2. The wage rates are higher than those paid in Kenya and Ghana, but lower than that paid in Lesotho. It is considered that wage levels in Namibia were not self targeting to the poorest members of the communities in project areas. However, due to high levels of unemployment and poverty, and lack of alternative sources of cash income, people were willing to work for wages below the minimum rates. Whether the “people’s” rate were exploitatory is a subject of further debate.

9.2.6 Construction Issues

9.2.6.1 Construction standards

The geometric design standards for LBPP in Namibia are given in Section 5.2.1 and the design philosophy is discussed in Section 5.6.2. A construction width of 5.5m was used. In the expanded construction of roads using labour-based methods, the design speed was 100km/h and the roads were constructed with a 6.0m wide wearing course. It is considered that the standards in Namibia are higher than those used in Kenya, Ghana and Botswana.

By comparison, most of the roads built under Kenya's RARP had a road width of only 4.5 metres, with a narrow and deep ditch. Although specifications allowed for a road width of up to 6 metres where traffic was expected to exceed 30 vehicles per day, this alterative was rarely used. Some roads built to the 4.5 metres width are adequately carrying over 100 vehicles per day. Under the Minor Roads Programme, which dealt with a higher class of roads, the standard road width was 5.4 metres. In Botswana, a road width of 4.5 metres was initially adopted, but this was later increased to 5.5 metres due to a demand by road users, used to relatively high driving speeds. A standard camber of 5% used in Kenya was also initially adopted in Botswana, but it was soon found, probably because of the relatively poor compaction used, that actual cambers degenerated to about 2%. Even when un-compacted cambers of 8% were applied, the final camber was still often inadequate.

9.2.6.2 Haulage of materials

The Namibia programme has not yet taken the opportunity to make greater use of local resources in the haulage of materials for construction. While the combination of trailers and trailers mostly used can be more efficient for this type of work than tipper trucks, haulage by animal drawn carts is more efficient than tractors and trailers, and could make greater use of local resources (labour, donkeys, manufacture). There has been experience to this effect in the Botswana (McCutheon, 1988). Since local Ovambos use donkeys and carts for daily transport of water, crops etc, local knowledge regarding handling and harnessing carts exists. There are many donkeys in the Ovamboland area, and appropriate carts can be manufactured by local craftsmen. Considering capacity and efficiency, while the wheelbarrow capacity is about $0.05m^3$ and is inefficient beyond 200m, donkey drawn carts have a capacity of $0.7m^3$ and the combination is efficient between 100m-500m. Local conditions therefore warrant a serious examination of animal drawn haulage instead of tractors and trailers.

9.2.7 Employment of Women

A key focus of the LBW programme in Namibia was on employment women as labourers in labour-based road-works projects. Initially the participation of women was quite low, partly because waged manual work was viewed as men's domain, and partly because recruitment practices and the preference of the site mangers favoured the employment of men for the sake of "efficiency". However, programme donors required special efforts be made to recruit women. The proportion of women employed increased both in the pilot projects and in subsequent projects. Overall, the average participation of employed women was 42%, calculated over ten years of the programme. This was considerable achievement, considering that not many programmes in Africa have achieved such a high rate of women participation. In Ghana for example the women participation rate was only 26%.

There are however debates on the implications of employing women in LBW projects in Namibia. While from the programme point of view an employment ratio of 42% women in projects was a success, there are arguments that benefits to women were minimal. It is argued that a number of underlying gender issues were not sufficiently addressed by the programme, to ensure that women truly benefited. Although women from poor rural households gained access to cash income, the income level was not high, and women working on projects had still to attend to their regular domestic and food production duties. This meant additional workloads for most of the women involved.

It is true that access to cash for poor rural women addresses women's practical income needs, and has strategic benefits in terms of enhancing women's roles in resource allocation decisions within the household. However it is also argued that the issue of employment for most women on LBW projects is more for basic family survival than one of substantially enhanced quality of life or status for women. In addition, labour-based pilot projects were initiated at a time when Namibia was experiencing extreme drought, there was no food, and there was a desperate need for supplementary income. Under such socio-economic stresses, women were willing to work under severe conditions in order to help sustain their families in a crisis situation, despite the inherent disadvantages.

Socio-economic studies carried out for the pilot projects had given attention to gender issues as part of their data collection and analysis. Issues were raised concerning women's multiple work loads and reduced leisure time, expenditure patterns of men and women earning income from the project, and so on. These studies provided valuable information and opportunities to the programme managers for realigning the employment objectives for women in the projects, and identification of more appropriate gender related interventions. Unfortunately no effort was taken in any substantial way. A closer attention to women employment issues could be warranted in the expanded phase in all sectors.

9.2.8 Small Contractor Development

9.2.8.1 Selection of trainees

The main criteria for selection of trainees for labour-based contracting and supervision in Namibia were entrepreneurship and the regional location of the applicant. As a result, trainees selected for training as supervisors and contractors in the LBPP1 had no experience in roadworks, and had very low level education background. For the majority, the understanding of English, the training language of instruction, was difficult. In LBPP2, although trainees had some experience in roadworks, their level of education was also low. In similar programmes in other countries compared there were more requirements.

Trainee contractors in Kenya were chosen among those who were already established as equipment-based contractors with some level of equipment holding, and whose success as labour based contractors was not essential for their survival. The minimum education level admissible was GCE "O" level. For training as manager, preference was given to civil engineers. In Malawi, candidates for the foreman course were required to have a junior certificate (two years of secondary school) and four years training at a technical school. This training period was necessary to obtain a national trade qualification in a construction related field.

Small contractors trained in Ghana were also selected based on some previous involvement in civil engineering or building work. The education level required was also GCE "O" level education and higher. Fifty five percent (55%) of contractor's managers developed in Ghana had basic secondary education, 10% were civil engineers and graduates in other fields. The rest were technicians. A major lesson in the Ghana programme was that the minimum level of education of participants in the training courses should be GCE Ordinary level or its equivalent. In this level of education, trainees have a sound basic theoretical knowledge and qualifications well suited to the training to be given. They therefore adapt to the training better and participants are eager to advance.

Table 9.3 below compares the system used for evaluation of trainee contractors in some selected countries.

	Namibia	Kenya	Ghana	Lesotho	Tanzania	Uganda
Education	X	V	V	V	V	V
Equipment	X	V	-	V	V	-
Organization	X	-	V	V	-	V
Work experience	X	V	V	V	-	V
Entrepreneurship	V	-	V	-	V	V
Location	V	-	-	-	V	-
Starting capital (minimum)	X	V	V	V	V	V

Table 9.3: Evaluation systems for contractor trainees in selected countries
(Key: V=Criteria a requirement; X= Criteria not a requirement)

From the above comparison, it is concluded that trainee selection requirements in Namibia were the basic minimum and lower than in all other countries compared. It is accordingly considered that the low level of education of the selected and trained contractor's managers/owners and supervisors was the main reason for the failure or dismal performance of the trained small contractors. Some of the entrepreneurs trained were people who were either in or had failed in other business ventures, and took the opportunity to venture into labour-based contracting purely for financial reasons, and not as a career business of choice. The level of attention and seriousness paid to the training and contract implementation is a reflection of the opportunism attitude. In contrast, the criterion of higher level of formal education for

owners/managers of small contractors in Ghana and Kenya had a big influence on the level and rate of success and sustainability of the entrepreneurs and their programmes.

9.2.8.2 The need for entrepreneurship.

The removal of barriers to entry and handholding of small contractors does not in itself guarantee the success of small contracting enterprises. There are numerous cases of business enterprises that received full support from inception to implementation, with all forms of assistance: financial, technical, managerial and administrative; but failed miserably. At the same time successful businesses started and managed by people with no formal education or skills and without any assistance are all too common. Clearly, there is some other quite different resource required, which is almost a pre-condition, and which may be a sufficient one for business success. This elusive quality is known as entrepreneurship (Harper, 1983 cited in Ntja, 1992). Experience in Namibia has also shown that entrepreneurs cannot be created by training. Aspiring contractors who does not have entrepreneurial skills will not become successful contractors (Bicon, 2005).

Therefore, in the selection of potential small contractors' trainees, it is desirable to identify people who have a feel or flair for entrepreneurship. However, the problem is that entrepreneurship can only be definitively identified after it has been demonstrated in a practical business environment. In order to reduce the margins of error in such a selection process, it is necessary to examine in more detail the way entrepreneurs behave in order to isolate more familiar and measurable qualities, some of which may be induced and/or enhanced by proper training. The use of qualified experts and approved methods of selection in this regard may be necessary.

Schedule 9.1 below shows most of the behavioural attributes generally associated with entrepreneurship. The left hand column shows the positive entrepreneurial attributes while the right hand column lists contrasting forms of behaviour types which are commonly thought to contribute to chronic underdevelopment. It can be seen that there is a need for an objective selection technique which will identify

people with potential for entrepreneurial success. Such a system will guarantee that scarce resources are put in the hands of people who are most likely to use them most effectively (Harper, 1983 cited in Ntja, 1992).

Schedule 9.1: Behavioural attributes associated with entrepreneurship

The Entrepreneur	The Non-Entrepreneur
Desire to achieve	Un-ambitious
Resilient	Easily discouraged
Set own standards	Follows others lead
An optimist	A pessimist
Hard working	Lazy
Takes responsibility for success or failure	Believes fate or others can control him
A moderate risk taker	A gambler of overcautious
Receptive to new ideas	Conservative
Learns from his own experience	Stubbornly ignorant
Uses outside help	Resists assistance
Motivated by tasks not by rewards	Greedy
Autonomous and independent	Dependent
Defers gratification	Short sighted

(Source: Ntja, 1998)

In designing training programmes, it is equally important for the trainers and sponsors to recognize that the training given to entrepreneurs has to be that which will assist them to understand how to solve daily problems of organization, performance and management of enterprises. In addition;

i. Small entrepreneurs are not interested in general to invest in knowledge or skills development for use in some future time. The need for training to them comes when there is a problem to cope with, and even then they would want an appropriate training for the shortest time possible since they are also time constrained.

ii. Only a relatively small proportion of small scale entrepreneurs have the "classroom" skills of notes-taking needed to obtain the full benefit from a conventional training course.

9.2.8.3 Duration of training

The duration of training in small contractor's development programmes is largely determined by the level of skills required to be achieved, as defined in the training objectives, the level of education and skills of the trainees, the training methodology, and the delivery mechanism used for various training components. A review and analysis of the training undertaken in Namibia has shown that it was generally successful in imparting practical knowledge, but relatively unsuccessful in teaching basic theory, mainly because of the poor education background of the participants. It is further considered that the training of people who are not in any way currently engaged or connected with labour-intensive works was a lost opportunity.

In the Ghana programme, a complete contractor training cycle lasted for 24 months. Theoretical training for lasted about 18 weeks. Practical training on site was undertaken for about 14 weeks, followed by a trial contract period of 5 months. Fixed rate contracts were then executed for a year. In Kenya the training programme consisted of 3 months theoretical training and practical training for 12 to18 months. The total training period was nearly two years, including fixed rate pilot and trial contracts. In Lesotho, theoretical and field sessions lasted for about 10 months. A training programme undertaken In Tanzania between 1993 and 1995 consisted of classroom training (6 weeks), field training (14 weeks), and trial contracts (6 months). Training durations are summarized and compared in the Table 9.4 and Figure 9.1 below.

Table 9.4: Comparison of small contractor training durations in selected countries

	Namibia	Kenya	Ghana	Lesotho	Tanzania	Malawi
Classroom training	3 months	3 months	18 week	14 weeks	6 weeks	3 months
Onsite training	2 months	12-18 months	14 week	6 weeks	14 weeks	12 months
Trial contracts	5 months		5 months	3 months	6 months	3 months
Fixed rate contracts	12 months		12 month		12 month	
Additional training	3 months		3 weeks		2 weeks	3 months
Total training period	25 months	21 months	24 months	18 months	28 months	21 months

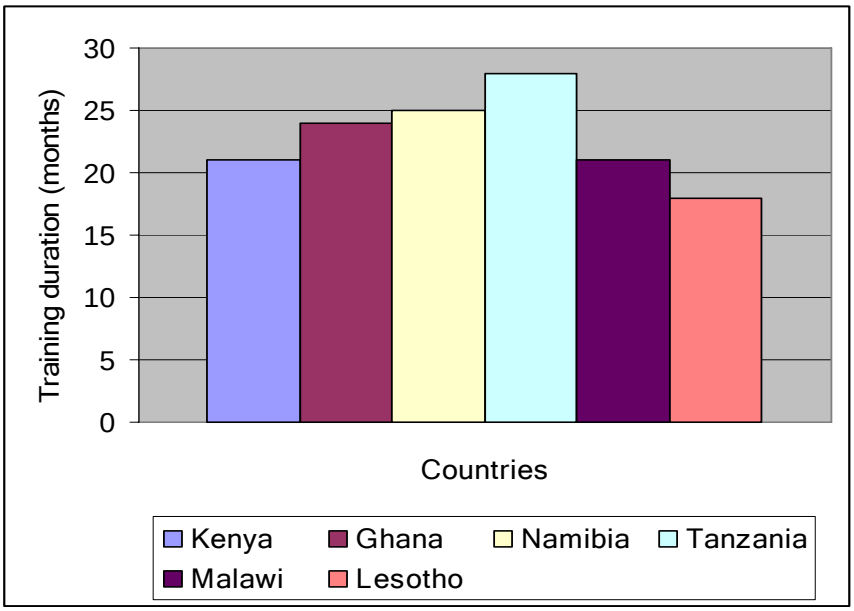

Figure 9.1: Small contractor training durations in selected countries

It can be concluded from the above comparison that the duration of training in Namibia is comparable to programmes in other countries.

9.2.9 Features of Labour-Based Works Contracts

The principal features of contracts awarded to small labour-based contractors in some selected countries are compared in Table 9.5 below.

It can be seen from the table below that labour-based contract features in Namibia has no significant variation from those in other countries. While contract requirements expose the small contractors to the contracting challenges, some requirements do not promote the development and growth of small contractors. The need for performance guarantee and long payment periods are some examples.

Table 9.5: Principal features of contracts awarded to small labour-based contractors in selected countries.

	Namibia	Kenya	Ghana	Lesotho	Tanzania
Max. Advance Payment	15%	15%	15%	15%	15%
Bank guarantee for advance required?	Yes	Yes	Yes	-	Yes
Performance guarantee	2.5%	10%	10%	10%	-
Works insurance needs	Yes	No	Yes		-
Third party insurance	Yes	Yes	Yes	Yes	-
Retention money	5% limit	0	5% limit	5% limit	Yes
Claim payment period	45 days	30 days		20 days	30 days
Liquidated damages	Yes	Yes	10% limit	Yes	Yes
Maintenance period	12 month			6 months	6 months
Price adjustment	Yes	Yes	Yes		Yes

9.2.10 Performance Issues

9.2.10.1. Productivity and labour input

Productivity rates are known to increase, within certain bounds as a country gains experience in the use of labour-based works technology (Coukis, 1983). However, productivity rates being used in Namibia today are mainly those generated during the pilot study phases about a decade ago.

Target average productivity rates in the Kenya, Ghana and Namibia programmes are compared in the Table 9.6. Bush clearing productivity rates in Namibia are high, probably because of the size and density of bushes in an arid climate. Other productivity rates are of the same order of magnitude with insignificant variations.

Table 9.6: Comparison of productivities in selected countries (maximum average productivities per man-day).

		Namibia	Kenya	Ghana	Lesotho	Botswana	*Recommended*
Activity	**Unit**						
Bush Clearing							
Dense bush	m^2/manday	150	50	-	50	-	100
Medium bush	m^2/manday	300	150	-	100	750	200
Light bush	m^2/manday	450	300	375	200	750	350
Grubbing	m^2/manday	180	100	375	65	150	175
De-stumping	No.						
Excavation							
Soft	m^3/manday	4	5	3.75	4.5	4.2	5
Medium	m^3/manday	3.5	3.5	3.75	3.5	3.8	3.5
Hard	m^3/manday	2	2.25	3.75	2.75	2.5	3.0
Wheelbarrow Haulage							
0-20m	m^3/manday	12	10.5		8	8.4	8.5
20-50m	m^3/manday	10	10.5		6	7	7
50-100m	m^3/manday	8	6		4.5	5.5	5.5
100-150m	m^3/manday	5	4.5		-	4.7	4.5
Loading	m^3/manday	5	10	6.7	5	12	8.5
Unloading	m^3/manday	10	9	10	-	-	10
Spreading	m^2/manday	100	90	-	105	100	90
Compaction							
Manual	m^3/manday		7.5	-	15	-	9
Equipment	m^3/rollerday		700	-	700	-	700
Finishing side slopes	m^2/manday	180					

The average input man-days per kilometre for completed operations on gravel roads are compared in the Table 9.7 for selected countries, for new construction, for upgrading and for gravelling. It can be concluded that although the average productivity figure for Namibia for new gravel road construction is the highest, it compares favourably with figures from other countries.

Table 9.7: Comparison of labour-input (in man-days) in selected countries

	Namibia	Kenya	Botswana	Lesotho	Malawi
New construction (lowland)	3100	2600	1981	2645	
Upgrading		1500	1370	2270	3000
Gravelling		1300	2157	2080	

9.2.10.2 Construction costs

There is a large variation of construction costs between Namibia and Lesotho (US$55000/km-US$58000/km) on the one hand, and those in Kenya and Ghana (US$10000/km – US$12000/km) on the other. Rising inflation between the years of implementation of the programmes has an effect on construction costs, but important factors relates to wages and project's features. Casual labour wage levels in Namibia and Lesotho were significantly high compared to those in Kenya and Ghana. Projects in Namibia and Lesotho were mainly for construction of new roads, while those in Kenya and Ghana included rehabilitation and upgrading. About 35% of the total project costs were injected into the local economies in project areas in Namibia. Based on assumptions made, the programme in Namibia was less labour intensive than those in Botswana, Lesotho and Ghana. There are also cost effects on the scale of the programme and projects. About 350km were constructed in Namibia, compared to for example 8000km upgraded or rehabilitated in Kenya.

The comparison between equipment-based and labour-based road construction is fraught with difficulties. The major problem is to compare like with like, not only in terms of the product being constructed, but also as regards the full costs ascribed to each method. Until recently, no attempts were made in Namibia to record costs in labour-based works projects in a way that permits reasonable analysis. Only financial records are normally available and well kept, because of statutory auditing requirements. The recording of activity costs and integrity of projects data needs to be improved in order to be able to derive meaningful conclusions from any analysis. This area requires further work.

9.2.11 Sustainability of Labour-Based Works Technology

9.2.11.1 Capacity for management of labour based works.

The programme in Namibia had a serious lack of local capacity at management and operational level. The current lack of continuity of the LBW programme activities in the MWTC and GON is primarily due to the lack of internal expertise and capacity. At Ministerial and Departmental level, two expatriate engineers managed the day to day activities of the programme. These have since left. Only two local engineers were formally trained in LBW technology since the the programme was implemented in Namibia. But, they were not utilized in any meaningful way in the development, promotion and management of the LBW programme due to personal constraints. For more than six years now none of them is involved in any labour-based technology work. In some local authorities, some work has been done on urban roads using labour-based methods, but no meaningful internal capacity was developed.

In addition, due to these capacity constraints, no training programmes have been implemented for new LBW contractors and supervisors, and in fact not even refresher courses for the existing ones since 2000. Further, there is still a very much one-client situation in Namibia. Only the Roads Authority lets out some labour-based contracts for roadworks annually, which are anyhow very few. Other institutions responsible for various types of national infrastructure, which are the target of the stalled LBWF, are still executing work using force account models and equipment-intensive methods of construction.

The human capacity problem in Namibia is comparable to that of Botswana and Lesotho. In Botswana the programme was also largely dependent on expatriates. Up to 1991, the Government of Botswana had not been able to provide a single Motswana engineer to the programme. This resulted in lack of continuity because continuously, one expatriate engineer was replaced by another (McCutcheon, 1988). In Lesotho, the LCU's initial training project also collapsed after the departure of an expatriate training engineer. In contrast, capacity has been built in

Kenya and Ghana for the sustaining of labour-based works technology. Many local engineers and consultants have been trained. Both junior and senior positions were localised and national experts ran the show. Continuous training programmes are in place for the training of contractors, supervisors, managers and engineers. The Kisii Labour-Based Training Centre in Kenya is an institution of international repute, used locally by central and local Government institutions, and also offers international courses. In Botswana, the Roads Training Centre as well offers training in labour-based technology to supervisors and road builders.

9.2.11.2 Equipping of small contractors

One of the reasons for the failure of most trained small labour-based contractors in Namibia is the lack of reliable equipment. Small contractors who were able to complete awarded contracts experienced severe problems with hired equipment. Problems included unavailability, exorbitant hire rates and unfavourable conditions of hire, since they hired mostly from established competitors. Equipment problems were responsible for losses suffered by some of the contractors awarded construction contracts. In some cases cash flow support from the client became necessary, and in others contracts were terminated or taken over.

The success of developed small labour-based contractors in Ghana and elsewhere (Another African case in point is the Uganda labour-based works programme) has been largely attributed to the provision of equipment made to the trained contractors. Ghana equipped 93 contractors with a set of equipment each costing US$150000. The Uganda model provided for equipping each contractor with equipment costing US$250000. In addition, in Ghana, contractors were guaranteed work until the equipment loan is repaid. No equipment was provided however to trained contractors in the case of Kenya, although work was available for contractors to repay loans, the application of which was supported by the programme.

There are no sufficiently equipped Government pools in Kenya and Ghana which can supply, on a hire basis, the needed equipment to small contractors. Reliance is made of the private sector. In Namibia, the Government plant and equipment pool

was transferred to the RCC during the commercialization of roads. RCC is now effectively a competitor in the construction industry, and has little surplus to supply to other contractors. Experience in Tanzania is also that small contractors cannot solely rely on the open market for plant hiring arrangements (Bental, 1999).

The value of the required basic equipment is normally beyond the means of the contractor and financing support is always necessary. In addition, contractors need to be assured of a stead workload to manage loan repayments and to get returns on investment. These strategic options need to be explored to address the equipment problem in Namibia for sustainability.

In a model tested in Tanzania, trained contractor firms were advanced 25% of the initial contract value to enable them to purchase the needed equipment in a facilitated process. Repayments were based on diminishing returns to provide an incentive for early repayment. Using this model and given a contract value of US$150000 which sufficient for rehabilitation of 10km of a rural gravel road, the contractor was able to pay back within a year, equipment costing US$21000 (Uriyo, GA and Osei-Bonsu, K. 1996). It has also been shown in Ghana that any nation with serious intentions to develop the domestic road contracting capacity has to create the right and enabling environment that should be geared towards supporting contractors until fully developed. Once the capacity is created, the support could be withdrawn since continued support could lead to support fatigue (Ashong, 1995).

9.2.11.3 Road maintenance

Maintenance of roads built using labour-based works methods is a major sustainability factor.

Although road maintenance in Namibia is executed mainly by contract, it is not done strictly using labour-based principles, even on roads built by labour-based methods. One big contractor, the Roads Contractor Company maintains about 80% of the national road network (by value) and the share of small entrepreneurs, both equipment and labour-based is about 20% (by value). It is mostly the choice of the

contractor to use the method most efficient, from the contractor's point of view, for the contract execution.

Length-men maintain roads in Kenya, while contractors also maintain roads in Ghana and Botswana. Length-men are considered to be more cost effective, but require more supervision. Maintenance execution in Ghana is strictly on labour-based technology principles. Additionally, in Namibia and Ghana, road maintenance is planned centrally by road agencies; while in Kenya District engineers do planning in a decentralised manner.

9.3 Conclusion

Labour-based works programmes can be undertaken in countries with differing socio-economic backgrounds. The programme for the development of labour-based technology in Namibia bear many similarities to other programmes implemented elsewhere. The design and implementation model used had been tested and showed success in other countries.

Comparing with programmes in other selected countries, it can be concluded that;

i. The Kenya and Ghana programmes were larger than Namibia. The length of roads constructed or rehabilitated, and employment created were proportionately higher.
ii. Labour-based contract features are similar in the countries compared, and contain requirements which are not conducive to the promotion of small contractors.
iii. Higher levels of education were required for selection into the training programmes in other countries reviewed, than in Namibia. Training durations and plans are comparable.
iv. Wage levels in Namibia and Lesotho are higher than those in Kenya and Ghana.
v. The average productivity of labour in Namibia compares favourably with productivities in Kenya, Ghana and Lesotho.

vi. Road design and construction standards are higher in Namibia than in Kenya, Ghana and Botswana.

vii. Women participation in labour-based works is higher in Namibia, compared to Kenya and Ghana.

viii. Unit construction costs for gravel roads are in Namibia are comparable to those of Lesotho, but are significantly higher than in Kenya and Ghana. It is considered that labour wage levels have a major influence on construction costs.

ix. Unlike the Ghana programme, there are no existing initiatives to support and provide equipment to small developed contractors in Namibia, Kenya and Lesotho. The success of small labour-based contractors in Ghana and Uganda has been largely attributed to the provision of equipment.

x. Road maintenance in Namibia is not done strictly according to labour-based principles, even on roads built using labour-based methods.

xi. Inability to develop local expertise in labour-based works technology has a major effect on the sustainability of the technology in Namibia.

The study is concluded in the following chapter.