



**REPORT NO. 06184/3**

**QUANTIFICATION OF  
LABOUR SUPPLY  
RESPONSE TO A “DEMAND  
DRIVEN” EXPANDED  
PUBLIC WORKS  
PROGRAMME**

**By  
Kirit Vaidya & Farhad Ahmed**



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## **ABBREVIATIONS**

EPWP	Expanded Public Works Programme
EGA	Employment Guarantee Act
EGS	Employment Guarantee Scheme
GHS	General Household Survey
IC	Industrial Council
KMP	Khayelitsha/Mitchell's Plain (survey)
LFS	Labour Force Survey
OHS	October Household Survey
SALDRU	Southern Africa Labour and Development Research Unit
WB	Wages Board

## EXECUTIVE SUMMARY

In response to the seriousness of the rural unemployment situation, a proposal to extend the EPWP to provide welfare support through paid work entitlement to non-urban households is under consideration. The likely response to such an extension of the EPWP and the related cost implications are clearly important questions. This study makes some preliminary estimates of the non-urban labour supply response at a range of wage rates and the likely size of the wage bill.

Because of time and resource limitations, the brief was to arrive at some broad estimates based on available data. GHS 2004 conducted by Stats SA was found to be the best suited source for the study because of the variables it included and the distinction it made between urban and non-urban respondents. The concept of the reservation wage rate (i.e. the wage rate below which a person would not accept employment) was central to the approach adopted. However, direct evidence on reservation wages was not available. By examining the distribution of reservation wage rates revealed by the evidence on employment and earnings reported in GHS 2004 and making assumptions on the distribution of the reservation wages of the unemployed based on this, it was possible to arrive at some broad estimates of labour supply for an extended EPWP. We refer to the estimated labour supply as the EPWP labour supply since it is based on the assumption that employment would be limited to one member per household. The actual labour supply without the rationing to one per household is likely to be much larger. The results are summarised in the following table.

### Estimated EPWP labour supply, supply elasticities and the wage bill: South Africa non-urban

Daily wage rate (2004 prices)	Equivalent daily wage rate (2006 prices)	Labour supply (Millions) [a]	Elasticity (%change in supply / % change in wage rate)	Wage bill (Million ZAR) [b]	Wage bill (Million ZAR) [c]
15	16.1	1.15		1,483	1,853
20	21.5	1.69	1.32	2,899	3,624
30	32.2	2.37	0.84	6,113	7,642
40	42.9	3.27	1.11	11,219	14,023
50	53.6	3.70	0.55	15,863	19,829
60	64.4	3.89	0.29	20,052	25,065
70	75.1	4.05	0.26	24,331	30,414

Notes:

[a] Estimated number of persons willing to work at the given wage rate based on a limit of one person per household.

[b] Ass 1 (Assumption 1) - 80 days of work offered by EPWP

[c] Ass 2 (Assumption 2) - 100 days of work offered by EPWP

At ZAR 30, the EPWP labour supply response is likely to be about 2.4 million and the wage bill about ZAR 6 billion if 80 days of employment entitlement per year is offered to non-urban households. As would be expected, it rises to much higher levels at higher wage rates. Province level estimates of EPWP labour supply and wage bills have also been made. We made some plausible assumptions to arrive at these estimates but they need to be tested. Therefore some margin of error should be allowed. Studies before the inception or during the

early stages of the extended EPWP will be essential to test the validity of the assumptions. Ideally, there should be a pilot stage when the proposed programme is tested, information on supply response is collected systematically and studies are carried out.

An important issue is the extent to which EPWP would provide employment to those who are unemployed and the extent to which those in low paid earning activities switch to EPWP employment. The study suggests that about 53 per cent of EPWP jobs created at a wage rate of ZAR 30 would be taken by unemployed persons with the rest being taken by those in other employment. If those earning very low incomes take up EPWP employment instead, there should not be serious concerns. However if the EPWP wage rate is high, possibly any rate above ZAR 40 per day based on our estimates, there is serious risk of damaging effects on other economic activities.

The problem of too high wage rates distorting the labour market and their implications for the EPWP wage bill raises the need to make special arrangements for exemption for the extended EPWP from existing minimum wage regulations. EPWP has been permitted to pay wage rates below the relevant sectoral minimum rates in return for provision of training for workers. Given the scale and scope of the proposed extended EPWP, provision of training for workers to gain this exemption may not be feasible. However, a strong case could be made out for the exemption based on: (a) the extended EPWP's objective of providing welfare support to the poorest households through employment, and (b) extended EPWP employment not displacing existing formal sector jobs.

Important challenges for a large scale programme are creation of sufficient worthwhile EPWP employment to absorb the expected large labour supply response and efficient and effective management to ensure that those who are in need of access to the programme do get access and that there are no serious abuses.

In spite of the various limitations that have been pointed out, the labour supply response and wage bill estimates have been based on plausible assumptions and appear to be reasonable, especially within the middle range of wage rates between ZAR 20 and ZAR 50.

The model can also be further developed and tested with empirical evidence to improve its soundness and applicability and the reliability of the results it produces. Empirical evidence on reservation wage rates is essential for improving the reliability of results and studies using preference methods to estimate reservation wage rates either before the programme starts or during its early stages are strongly recommended.

## 1.0 INTRODUCTION

### 1.1 Extending the EPWP and the labour supply study

A proposal to extend the Expanded Public Works Programme (EPWP) to provide welfare support to unemployed persons from poor households is currently under consideration. The aim would be to provide a specified amount of paid work close to the homes of those who need it. The likely response to such an extension of the EPWP and the related cost implications are clearly important questions. This study makes some preliminary estimates of the labour supply response at a range of wage rates and the implied size of the wage bill. This section starts by setting the context for the study.

It is generally accepted that large scale unemployment in South Africa is a problem which will take many years to solve. In the meantime there is a need for the state to take action to alleviate the situation especially since the incidence of poverty is also closely correlated with unemployment<sup>1</sup>. The Expanded Public Works Programme [EPWP] is a nationwide government led initiative aimed at providing productive employment to poor unemployed South Africans.

Public Works Programmes (PWP) are not new to South Africa. The EPWP was preceded by the National Public Works Programme (NPWP) which was set up after the election in 1994. The NPWP had two components, a community based PWP and a reorientation of mainstream public expenditure on infrastructure towards labour intensive methods to increase its employment generation potential (Phillips, 2004). The public expenditure component of NPWP failed to gather momentum because of a variety of reasons. In view of the seriousness of the chronic unemployment problem, in July 2002 the Cabinet Lekgotla decided to “massively” expand the PWP and the Expanded Public Works Programme (EPWP) was initiated in 2004 with the objectives of poverty reduction, employment creation and infrastructure provision. Within the EPWP, reorientating public infrastructure investment towards labour intensive techniques has an important role.

However, it is now recognised that EPWP is supply driven in the sense that it is dependent on the supply of public sector projects. It seeks to maximise employment creation by restructuring projects undertaken by government bodies and state owned enterprises to make use of labour intensive methods. As a model for creating employment, this approach has limitations. It depends on the availability of suitable public sector projects, the willingness of the implementing officials to apply labour intensive methods and the time frame in which the projects reach the implementation stage. The approach does not lend itself to responding to the level of unemployment and its geographical distribution.

The Cabinet Lekgotla in late 2005 recognised this problem and made a decision to increase the employment creation impact of the EPWP while continuing all the current initiatives. In line with this policy decision, the feasibility of introducing a model based on the Indian

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<sup>1</sup> See Section 2 below for more details on unemployment in South Africa and the relationship between unemployment and poverty.

Employment Guarantee Act [EGA]<sup>2</sup> and associated Employment Guarantee Schemes (EGSs) currently being rolled out in India is being explored. The so called “demand driven approach<sup>3</sup>” being considered would provide a given level of unskilled employment to a specified number<sup>4</sup> of members of all households who wish to take advantage of the scheme (EPWP, 2006). The focus will be on rural employment creation because of the seriousness of the unemployment problem and very limited employment opportunities in some rural areas, notably in the former Homelands.

The initiative under consideration is clearly a major departure from the current situation requiring a major redesign of the programme. Two of the aspects which require particular attention in developing the initiative are:

- (a) the organisation of the redesigned programme given the proposed change from the “supply driven” to the “demand driven” mode and the anticipated increase in the size and scope, and
- (b) the increases in the financial and administrative and technical implementation resources required for the redesigned and extended programme.

As noted earlier, in order to address these aspects, it is necessary to assess the likely demand for employment on the redesigned EPWP.

## **1.2 Scope of the study**

IT Transport (ITT) has been commissioned to make an initial assessment of the likely demand for low wage unskilled manual employment on the redesigned EPWP. Such an estimate is clearly essential for estimating the financial resources required for a sustainable programme and for designing the programme and assessing the administrative and technical resource requirements.

It is assumed that the programme will target the rural<sup>5</sup> unemployed and for whom it will provide unskilled manual work. Subject to appropriate approvals, agreements and conditions, the programme will have the flexibility to offer wage rates below the nationally negotiated industry wage rate and below the minimum wage rate. An assessment of the likely demand for employment at alternative wage rates within a range is needed to set wage rates which fulfil a number of criteria. They must (a) provide adequate reward for the work required, (b) provide acceptable level of welfare support, (c) be affordable, and (d) minimise the disruption of labour supply for other productive activities.

As mentioned earlier the terminology “demand driven” refers to the demand for employment which is effectively the supply of labour which responds to the wage level and is dependent

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<sup>2</sup> The incoming Indian Government passed the National Rural Employment Guarantee Act (EGA) in 2005 with the aim of generating productive employment in the most deprived areas of India. EGA was initiated in February 2006 in 200 districts. The plan is to extend it to the whole country within five years.

<sup>3</sup> Under such an approach, the government would provide a minimum level of employment for the unemployed South Africans based on the demand for such employment which is effectively the supply of labour (see Section 1.2 below for more discussion of this).

<sup>4</sup> Under the EGSs, one member per household is guaranteed employment or a welfare payment if employment cannot be provided within a given period of time.

<sup>5</sup> More precisely, non-urban since the available sources do not provide data on the rural situation.



on factors such as the type of work on offer, the socio-economic characteristics of the target population and other work opportunities available. In economics terminology, the wage rate elasticity of labour supply is required to obtain an estimate of the likely labour supply at a given wage rate. Within the limitations of time and resources, the study has estimated the likely supply response of unskilled labour for a range of wage rate levels which fulfil the other criteria identified in the previous paragraph. As noted earlier, the extended EPWP will put an upper limit on the employment entitlement of participants. Such a limit is understandable given the scale of the unemployment problem and is in line with the Indian EGSs. More precisely, the options under consideration are a maximum of 80 or 100 days of employment entitlement per household in any year.

The study was carried out in three phases:

- an initial assessment phase;
- data collection, analysis and modelling phase, and
- reporting phase.

The initial assessment phase included the following components:

- initial review of the labour market;
- investigation of data availability for the study, and
- based on the available data, recommendation of a detailed methodology for the study.

The output of the initial assessment phase was the Inception Report. Following data collection, analysis and modelling and submission of the Draft Final Report, the results and their implications and possible further developments and actions were discussed at a workshop at Shisaka on 8<sup>th</sup> March. This final report completes the assignment.

### **1.3 Structure of the report**

The Inception Report introduced the study context in Section 1 and provided the background for the study by briefly reviewing the unemployment and labour market situation (Section 2). These sections have been retained in this Report with some amendments and updating. As we show later, the material in Section 2 in the Inception Report was essential for formulating the questions and developing the model and assumptions in the study.

Section 3 in the Inception Report examined data availability and approaches to modelling. This section has also been retained with some modifications and updating as background. Section 4 describes the approach adopted and the data analysis and Section 5 sets out the results, conclusion and qualifications.

## 2.0 UNEMPLOYMENT AND LABOUR MARKET IN SOUTH AFRICA

### 2.1 Unemployment: Dimensions and nature of the problem

Based on a review of studies (Kingdon and Knight, 2005, De Wet, 2003, and Natrass, 2002 amongst others), the rest of this section summarises some of the features of the labour market and unemployment situation in South Africa relevant for this study. Unemployment is one of the most pressing problems facing the South African government. Table 1 shows estimates of narrowly and broadly defined unemployment rates from selected Labour Force Surveys (LFS) undertaken since 2000<sup>6</sup>. The narrow definition of unemployment includes persons aged 15 to 65 who did not have a job or business in the seven days prior to the survey interview but were seeking gainful employment<sup>7</sup>. The broad definition includes discouraged work seekers who are unemployed persons “available to work but who say that they are not actively looking for work”<sup>8</sup>.

**Table 1: Narrowly and broadly defined unemployment rate (per cent) in South Africa**

Date	Narrow definition	Broad definition
September 2000	25.8	36.9
September 2002	30.5	41.8
September 2004	26.2	41.0
March 2006	25.6	39.0

*Source: Labour Force Surveys, Statistics SA*

The evidence shows that the levels of unemployment, by both definitions have been high and persistent. According to the March 2006 LFS, 4.28 million persons were unemployed according to the narrow definition and 7.96 million according to the broad definition. Before deciding on whether the narrow or the broad definition is more appropriate in relation to EPWP employment, it is necessary to examine evidence on the nature of discouraged unemployed. The March 2006 LFS summarises evidence on the main reasons given by discouraged workers for not seeking work or starting a business. Some reasons (e.g. ill health / injury / physical disability, pregnancy and family considerations / child care) could be interpreted as withdrawal from the labour force. However just under 90 per cent of the discouraged unemployed appeared to be genuinely discouraged, giving reasons for not seeking work such as “no jobs available in the area”, “lack of money to pay for transport to look for work” and “lost hope of finding any kind of work”. Given that a “demand driven” EPWP would provide employment in rural areas close to the households of potential participants, it is likely that a large proportion of discouraged workers will take advantage of the programme and therefore the broader definition of unemployment is more appropriate in assessing the likely labour supply response.

Unemployment is highly inequitably distributed in South Africa. Young uneducated Africans living in homelands and remote areas are the most vulnerable. A large proportion of the

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<sup>6</sup> LFSs are biannual rotating sample surveys undertaken by Statistics SA.

<sup>7</sup> More precisely, “had looked for work or taken steps to start a business in the four weeks prior to the interview and were able to take up work within two weeks of the interview”.

<sup>8</sup> In order to estimate the broad definition unemployment rate, the estimated number of discouraged workers is added to the number of unemployed according to the narrow definition. The number of discouraged workers is also added to the narrowly defined labour force.

discouraged unemployed are young. More than half are below 30 years old and about 27 per cent are in the 20 to 24 years age group. The majority of unemployed have never held a job before, i.e. they entered unemployment from the time of entering the labour force. About 68 per cent of the unemployed have not been working for more than an year. Given the importance of employment income in total household income in South Africa, there is a high correlation between unemployment and poverty. Rural unemployment rates are higher than urban rates in South Africa<sup>9</sup>, a feature which is atypical of countries at a similar level of development.

There are also significant differences in unemployment between provinces (see Table 2). To some extent these reflect percentages of population groups within the total population since unemployment is much higher in the black population than the other groups. The three provinces with the highest unemployment in March 2006 are Limpopo, North West and Kwazulu-Natal. These provinces have also shown the largest increases in unemployment between March 2001 and March 2006. They contain the largest former Homeland areas and therefore the current development and unemployment situation in them is likely to have its roots in policies prior to 1994 (Burger, 2005). The highest levels of unemployment are among rural unskilled women and the young.

**Table 2: Unemployment rate (per cent) by province, March 2001 to March 2006**

Province	Mar-01	Mar-02	Mar-03	Mar-04	Mar-05	Mar-06	% Change: Mar-01 to Mar-06
Limpopo	28.1	35.1	39.4	31.2	32.4	35.6	26.7
North West	27.9	30.3	32.3	30.8	28.8	31.8	14.0
KwaZulu-Natal	26.2	35.9	36.3	33.0	31.7	29.9	14.1
Free State	27.4	31.1	31.2	26.0	30.6	28.3	3.3
Mpumalanga	26.3	29.9	30.8	25.7	27.4	27.4	4.2
Northern Cape	23.8	27.7	28.9	22.4	29.4	23.5	-1.3
Gauteng	28.2	29.8	30.8	27.7	22.7	23.3	-17.4
Eastern Cape	28.4	26.4	29.8	32.6	27.1	22.1	-22.2
Western Cape	19.0	18.4	19.9	16.8	17.6	15.9	-16.3
Total	26.4	29.7	31.2	27.9	26.5	25.6	-3.0

## 2.2 Labour markets, unemployment and poverty

A number of factors contribute to the chronic unemployment. The first is the growth of the labour force. According to Kingdon and Knight (2005), the narrowly and broadly defined labour force grew by 4.2 and 4.8 per cent per year respectively between 1995 and 2003, though these very high estimates are disputed and thought to be because they are based on comparison over time of household and labour force survey data which are not consistent. Another contributory factor is increase in labour force participation, especially of women possibly because of a decline in female access to male income as a result of increasing male unemployment and an increase in the number of female households. Over the same period, wage employment grew by 1.8 per cent per year though self employment (including in the informal sector) grew by 5.1 per cent. The faster growth in self employment was from a lower

<sup>9</sup> According to Kingdon and Knight (2005), the broadly defined rural unemployment rate rose from 37.9 per cent in 1995 to 49.7 per cent in 2003. Urban rates were 24.1 per cent and 36.8 per cent respectively.

base and therefore while wage employment grew by 1.3 million, self employment grew by only 0.7 million.

Two important features of the South African labour market are the sharp separation between the formal and informal sectors and the role of trade unions and other institutions in formal sector wage setting. Unionised workers' wages are substantially higher than those of non-unionised workers. In addition, in large parts of the formal sector, there are Industrial Councils (ICs) and Wages Boards (WBs) which negotiate minimum wage agreements for specific sectors at the province or sub-province levels. These negotiated minimum wages effectively become the minimum for unionised and non-unionised employees. These arrangements clearly limit wage flexibility. Nevertheless, since ICs and WBs function at the province and sub-province levels, there is scope for the negotiated wage minima to reflect local labour market conditions to some extent. For construction employees, a minimum wage is typically negotiated at the province level. There is evidence of employers paying wage rates below that negotiated at the provincial level in rural areas suggesting that the rate negotiated at the provincial level is too high for rural areas with high unemployment (Taylor, van Seventer and McCord, 2005).

Between 1997 and 2003, real earnings in wage employment fell by 1.6 per cent per year while those in self employment fell by 11.4 per cent per year. The relatively small fall in real earnings for those in wage employment hides disparities between the formal sector in which wages and employment are protected by the bargaining power of trade unions, employment laws and minimum wages and the informal wage sector and self employment. Over the period, formal sector wages fell by 0.5 per cent while informal sector wages fell by 7.8 per cent per year<sup>10</sup>. If the formal employment sector was more open to market forces, there would be some scope for expanding employment in this sector through downward adjustment of the wage rate<sup>11</sup> though there are disagreements on the scale of this effect and whether it would be desirable.

Arguably, the absence of formal labour market flexibility sharpens the difference between the two sides of the dual economy, the formal sector on the one side and the informal sector and the unemployed on the other. Partly because of lack of employment-intensive economic growth and partly because of labour market flexibility, the growth in the demand for labour has been insufficient to match the rapidly growing supply of labour. The relatively high wage rates in the formal sector limit the growth of demand for labour in the formal sector<sup>12</sup> while the continuing growth in the labour supply depresses wages in the informal sector (wage employment and self employment) and maintains unemployment at a high level.

The dual nature of the labour market is reflected in the urban vs rural differences in unemployment and poverty because a higher proportion of the urban labour force is in the formal sector. As noted above, the broadly defined rural unemployment in 2003 was 49.7 per cent (about 35 per cent higher than urban unemployment). Increases in unemployment and the

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<sup>10</sup> Implying that recorded informal sector wage employment is about 15 per cent of total wage employment.

<sup>11</sup> The wage – employment elasticity (i.e. the proportionate fall in employment in response to a rise in the wage rate) is relatively high, probably about -0.7 on average implying that a 10 per cent reduction in the wage rate would increase employment by about 7 per cent. The wage - employment elasticity is discussed further in the next section as statistical studies on labour markets.

<sup>12</sup> Section 3.2 provides some empirical evidence on this.

decline in real earnings in the informal sector have contributed to increasing poverty. According to Casale et al (2004), on the \$2 per day poverty line, poverty rose from 9.6 per cent to 18.8 per cent among all employed persons and from 18.1 per cent to 42.0 per cent among the informally self employed between 1995 and 2000. There was also a sharp urban vs rural disparity in the changes in poverty. On the \$2 per day poverty threshold, poverty rose from 45 per cent to 55 per cent in rural areas and from 15 per cent to 18 per cent in urban areas between 1995 and 2000 (Hoogeveens and Ozler, 2004). From his analysis of LFS data for 2004, Meth (2006b) found a strong link between unemployment and poverty. Of the 18 million poor, 14 million lived in households with no person employed.

Another feature of the labour market is the relatively small informal sector. With the rapid growth in labour supply and the limits on formal sector employment growth, the informal sector would be expected to grow rapidly. While there has been some growth in the size of the informal sector in recent years, it remains small, especially in comparison with other developing countries. The ratio between informal sector employment and unemployment is about 1.0 in South Africa. The averages for Sub Saharan Africa, Latin America and Asia are 4.7, 7.0 and 11.9 respectively.

The most commonly accepted economic explanation of unemployment in developing countries is that much open unemployment is voluntary. Individuals have the choice between searching for better paid employment (e.g. in the formal sector), entering the informal sector or remaining unemployed. According to this explanation, the high unemployment and small size of the informal sector would imply that the unemployed prefer searching for better paid formal sector employment or leisure to entering the less well paid informal sector. These are unlikely to be the explanations for unemployment in South Africa since a large proportion of the unemployed have been in this state for long periods and are “discouraged” and there is a high correlation between unemployment and poverty incidence (Kingdon and Knight, 2005; Meth, 2006b).

More likely explanations are high entry costs, such as the difficulties of raising capital and limited training opportunities and obstacles to operating businesses successfully, such as the incidence of crime. For larger informal enterprises, labour market regulations which are more suited to large formal enterprise may also be a problem. In addition, in rural areas, opportunities for setting up informal businesses may be severely limited by low local purchasing power and level of development. The large and persistent excess labour supply, especially in the non-urban areas, and the involuntary nature of this unemployment form the basis of the modelling approach adopted in this study.

### **2.3 The reservation wage and labour supply response**

The reservation wage concept is important for understanding the labour supply response. It can be defined as the lowest wage rate at which an unemployed person will participate in wage employment. In principle, the distribution of individual reservation wage rates determines the labour supply response to employment at a given wage rate and the labour supply response at alternative wage rates can be used to estimate the elasticity of labour supply. In practice, there are a number of complexities related to the application of the concept and measurement. The reservation wage clearly varies with the specific features of (a) the individual and his/her household (e.g. preference between the type of wage employment on offer and other activities, level of household income, the education status and

previous work experience of the person), and (b) labour market conditions and available employment opportunities.

There are two broad approaches to measuring the reservation wage rate at the individual level. The first is to ask individuals to state their reservation wage. The second is to examine the evidence revealed by the employment undertaken by individuals. There are some obvious problems related to the first approach (e.g. the difference in response to a hypothetical as opposed to an actual choice, element of bargaining and possible unfamiliarity with market conditions, especially for the long-term unemployed and those who have never been employed). In South Africa, the relatively high formal sector wages may also create a bias. Nevertheless, carefully designed “stated preference” experiments can reduce biases (Walker, 2003). This approach would require primary data collection and therefore is beyond the scope of this study because of time and resource constraints. Estimating reservation wages from the revealed evidence from secondary data<sup>13</sup> on employment accepted at given wage rates also has its problems since it does not reveal the lowest wage rate at which employment would have been accepted. Nevertheless, examination of such evidence alongside data on household characteristics under simplifying assumptions has been a feasible and productive approach in this study.

## **2.4 Implications for the study**

The main implications for the study which arise from this brief overview of the labour market and unemployment situation are listed below.

1. There is clearly a need for initiatives such as the “demand driven” EPWP in view of the high unemployment which is likely to persist for some time.
2. The rural focus of the proposed programme is also justified because of the higher rural unemployment and the strong link between unemployment and poverty. Given the differences in unemployment between provinces, there will be substantial differences in the scale and scope of programme activities between provinces.
3. Since the target population includes a large proportion of low income long-term unemployed, the capacity of the informal sector to absorb unemployment is limited and the employment will be provided close to the target populations, the supply response to a “demand driven” initiative even at low wage levels is likely to be substantial. Nevertheless, the wage rate offered will have an effect on the supply response. The notion of the reservation wage rate is relevant for understanding this response.
4. There is currently an exemption from paying the agreed minimum wage for Special Public Works (Taylor, van Seventer and McCord, 2005). For the extended EPWP with the function of providing employment combined with a welfare element for the poor unemployed, the wage rate flexibility is essential to ensure that the programme does not disrupt other economic activities and is affordable.

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<sup>13</sup> Primary data collection for this approach was not feasible for the same reason as for the “stated preference” approach.

<sup>14</sup> The Ministerial Determination for Special Public Works Programmes allows for derogation from the minimum wage in return for provision of training for workers. The rules are set out in the Code of Good Practice for employment and conditions of work for Special Public Works Programmes issued by the Department of Labour in January 2001.

## **3.0 DATA AVAILABILITY AND THEIR SUITABILITY FOR LABOUR SUPPLY ELASTICITY ESTIMATION**

### **3.1 Some sources of labour market data in SA**

#### **3.1.1 Introduction**

As noted earlier, the study is limited to using secondary data. Therefore, likely sources of data were identified. Labour Force Survey and General Household Survey databases<sup>15</sup> were examined to assess their usefulness for the study. This sub-section starts with a brief introduction to the possible sources of data and ends with the choice of data sources.

#### **3.1.2 Labour Force Surveys (LFSs) and Quarterly Employment Surveys**

The main official sources of labour market data in South Africa are the Labour Force Surveys and the Quarterly Employment Surveys. The latter report on formal sector employment trends and are therefore not relevant for this study. The Labour Force Surveys are six monthly sample surveys which collect a range of data across the provinces on employment and unemployment, respondents' earnings and sources of incomes of households of respondents. The sampling unit is a household, the total sample size is about 30,000 households and the survey provides data on the labour force status of more than 65,000 adults in the sample households. A rotating panel methodology is used with 20 per cent of the sample changing every round enabling tracking changes for the same households over a period of time and longitudinal and cross-section analysis.

The last three LFSs (March 2005, September 2005 and March 2006) also included questions on whether the respondent has participated in the EPWP or other job creation projects though the number of such respondents is too small for meaningful analysis.

#### **3.1.3 General Household Surveys (GHSs)**

The annual GHSs have a broader scope than the LFSs. They measure aspects of the living circumstances of South Africans to measure the level of development and assess performance of government programmes and projects and report on five broad areas (education, health, work related activities, unemployment and access to services and facilities). The survey also includes information on the main sources of income of households and household expenditure. Data are collected from a sample of about 30,000 households across the nine provinces. The last two surveys from which data are available (2004 and 2005) include questions on participation in EPWP and other job creation projects<sup>16</sup>. The GHSs offer scope for analysis based on matching low wage employment and incidence of unemployment with data on household expenditure. The potential for relating employment and unemployment with other household socio-economic characteristics also exists. GHSs were preceded by October Household Surveys<sup>17</sup> (OHSs) which had a similar purpose and scope.

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<sup>15</sup> We are very grateful to Stats SA and the South Africa Data Archive (SADA) at the National Research Foundation for making the databases available.

<sup>16</sup> The data collected do not separate employment on EPWP and other job creation programmes and when the respondent participated.

<sup>17</sup> The first OHS was undertaken in 1994 followed by annual OHSs until 1999. OHSs were replaced by GSHs in 2000.

### 3.1.4 Other sources

Other sources considered were one-off dedicated surveys. One source of direct relevance is surveys of PWP workers reported in McCord (2004) and elsewhere. Data from surveys of participants on two PWPs were used to assess the effectiveness of such programmes as social safety nets and / or as supply side stimulus in the labour market. The inquiry was designed to be compatible with the 2003 LFS for ease of comparative analysis. The two projects on which the surveys were undertaken were the Gundo Lashu programme in Limpopo and Zibambele programme in Kwazulu Natal. The former is a road construction programme on which recruitment at the given wage rate was based on random selection from seeking work on the project. On the latter, women from poorer households were given priority. Therefore, the profile of workers on the Gundo Lashu programme is more representative of those who would seek work on an extended EPWP. Further analysis of the Gundo Lashu data within the framework of this study would have provided useful evidence for this study. This analysis was not possible within the time frame. Nevertheless, the McCord study provided some invaluable insights on labour supply responses to rural PWPs and was very helpful in developing the model for this study.

Two other studies considered as possible sources of data, especially with reference to evidence on the reservation wage rate, were the more recent Khayelitsha/Mitchell's Plain (KMP) study (see Walker, 2003, and Nattrass, 2002) and the earlier SALDRU93 and OHS94 surveys. The KMP study probed the reservation wage issue through two questions and also asked a more concrete hypothetical question, i.e. whether the respondent would accept a local PWP job at a given wage rate. About two-thirds of the unemployed said that they would work on a local PWP for a wage rate of R33 per day. The stated reservation wage of about 40 per cent of these was less than the PWP wage rate. For the remainder, there could be some inconsistency between the responses or that the availability of local employment indicated by the question on a local PWP revealed the willingness to take a local job at a low wage rate. Since the KMP study was undertaken in an urban area, its detailed findings may not be directly applicable for rural areas. Nevertheless, evidence on the distribution of stated reservation wages and willingness to take a low paid PWP job and their relationship with the mean prevailing wage rate provided some insights.

Another source of data considered was the South African Integrated Household Survey conducted by the Southern Africa Labour and Development Research Unit in 1993 (henceforth SALDRU93). It was a multi-purpose household survey containing information on a range of aspects including household composition, education, health, expenditure, employment and other income generation activities. The data have generated much valuable research on the labour market and unemployment which has provided valuable context for this study. SALDRU93 included a question on the reservation wage rate though a number of authors have noted deficiencies which seriously reduced the value of responses to this question for analysis<sup>18</sup>.

Kingdon and Knight (2001) examined evidence on the stated reservation wage rates in SALDRU93 and OHS94. Their aim was to determine whether the levels of reservation wage rates stated by the unemployed implied the existence of voluntary unemployment. The authors compared the stated reservation wages for the unemployed with predicted wages for

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<sup>18</sup> The question on the reservation wage rate did not ask about the expected hours of work or the location of work and information was not sought on past wages or wage offers rejected.



them. The predicted wages were estimated from wage functions fitted to evidence on the employed. The comparison showed a reasonable correspondence between the reservation wages and the predicted wages though for some 40 per cent of respondents, the reservation wage was substantially higher than the predicted wage, probably because of unrealistic expectations of the inexperienced unemployed and an element of bargaining. The SALDRU93 and OHS94 data are now more than a decade old and there are known deficiencies in them. Nevertheless, examination of a number of studies based on these sources provided some useful insights and identified the problems and pitfalls associated with estimating reservation wage rates and labour supply response.

### 3.1.5 Choice of data sources

The database we have chosen for the analysis is GHS 2004 because it provides data on all the variables we need<sup>19</sup> and it identifies urban and non-urban respondents. GHS 2005 provides the same data but does not distinguish between urban and non-urban cases. Use of LFSs would have required us to modify the approach since they do not include data on household expenditure and recent LFSs do not distinguish between urban and non-urban cases. GHS data are provided in four databases, House, Person, Worker and Tourism with identifiers for each case which enable linking of the databases and adding variables from one database to another. We have made use of the House, Person and Worker databases. In addition, demographic data were needed on the number of non-urban households at the province and national level. The most recent population projections, a Census 2001 publication and GSH 2004 were used to make these estimates.

## 3.2 Labour supply modelling options

### 3.2.1 Introduction

In this section, we briefly review the types of empirical labour market related studies that have been conducted and assess their lessons in developing the approach adopted in this study. In doing this, we readily acknowledge that there are a number of research institutes and scholars who have studied and continue to study the South African labour market, the unemployment situation and policy options in come depth and the review of studies in Section 2 and in this section is very brief and selective.

Section 2 shows that a number of researchers have studied the labour market and the unemployment situation in South Africa and have looked at why unemployment is so high, the nature of unemployment, differences between urban and rural unemployment, the large differential in wage rates and earnings between the formal and informal sectors and the small size of the informal sector. However, we have not been able to identify any studies which attempt to estimate the elasticity of labour supply, though the work on the reservation wage rate has some relevance.

### 3.2.2 Regression models and market level data

Statistical studies on the labour market in South Africa using aggregated employment and wage data have focused on the demand for labour and have largely ignored labour supply, especially of unskilled labour, apart from acknowledging that such labour supply is large and growing and its price elasticity is probably very high. This omission is understandable partly because increasing demand and improving the quality of labour are seen to be the main

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<sup>19</sup> The data requirements have been outlined in the next section along with the methodology.

solutions for reducing unemployment and partly because of the technical difficulties of estimating the supply function (discussed below).

Fallon and Lucas (1998) used time series data to show that the long run weighted mean demand elasticity for black workers in the formal sector is -0.71. This implies a fall in employment of about 7 per cent after a period of adjustment if wages go up by 10 per cent as employers adjust their demand for labour in response to the change in its price. Kingdon and Knight (1999) use cross-section data to investigate a different aspect, the relationship between the unemployment rate and the wage rate, the so-called 'wage curve'. They find that the wage curve elasticity is -0.1 implying that a 10 per cent increase in the unemployment rate is associated with a 1 per cent reduction in the hourly wage rate. This result is comparable with western economies. The 'wage curve' shows that the higher the unemployment the lower the wage rate because the bargaining power of employees is weaker and the employers do not have to pay higher wage rates to retain employees and keep them working efficiently, i.e. the relationship reflects the wage setting behaviour of employers. However, there is some evidence that the unionised labour force is insulated from the 'wage curve' effect.

Estimating supply functions from aggregated market level data is technically difficult because of the identification problem since levels of employment and unemployment at a given wage rate are outcomes of matching supply and demand (assuming there are no distortions<sup>20</sup>). As a result, most researchers have found it convenient to assume close to perfect elasticity of unskilled labour supply. It may be possible to deal with the identification problem by specifying a system of simultaneous equations and choosing suitable variables to jointly estimate supply and demand functions and elasticities for unskilled labour if such data were available. However, for this study, this approach has been ruled out for technical, data, time constraint and resource availability reasons. The technical problems are those of identifying suitable variables and specifying the model to adequately reflect the factors other than the wage rate affecting labour supply and demand. The choice of variable would have to deal with the identification problem and specify relationships for employment in the formal and informal sectors and possibly further market segmentation and relationships between the market segments. Such an undertaking would be a major research project requiring at least an year and much larger resources than available. It is questionable whether the time series and cross-section data required for such an undertaking are available.

### 3.2.3 Micro level approach: Assessing an individual's supply response

Many of the problems associated with analysis of aggregated data at the market level are overcome by examining the labour supply response at the micro level, more precisely at the individual level, and relating this response to socio-economic indicators such as the household income per head, the age, sex, education level, work experience and skills of the individual.

There are a number of approaches to assessing the response at the micro level. If data on unskilled jobs undertaken at different wage rates and socio-economic characteristics of the subjects are available, it would be possible to estimate a statistical relationship between the probability of undertaking employment at a given wage rate to socio-economic characteristics. The conventional approach is to estimate a probit relationship in which the ratio of probabilities is estimated as a function of household level probit function to identify

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<sup>20</sup> With negotiated wage rates which are widely thought to be above the market clearing rate, this assumption is questionable.

the factors affecting the probability of a member of a household taking up unskilled employment at a given wage rate. An alternative is the logit approach in which the discrete alternatives of choice between seeking employment or not are related to the wage rate and selected socio-economic variables.

Discrete choice approaches such as probit and logit are useful for identifying the significant explanations of variations in probability ratios and the choices made. A number of studies on the South African labour market have applied this approach. However, it is difficult to estimate labour supply elasticities from the estimated functions and given this limitation, the approach is not suitable for our purpose.

#### 3.2.4 More direct micro level approaches

Two alternative direct micro level approaches have been identified. The first involves primary data collection using stated preference methods to identify the reservation wage rate of respondents with different socio-economic characteristics and building up an aggregated labour supply response based on the evidence. This approach was not considered because of resource and time constraints. A simpler direct approach is to infer reservation wage rates, more precisely upper limits of reservation wage rates and labour supply response from available data on the distribution of participation in low wage employment and low earning informal sector activities and the most important personal and household features contributing to such participation. This is the approach we have adopted and explained in more detail in the next section.

## 4.0 METHODOLOGY AND DATA ANALYSIS

### 4.1 Introduction

As noted earlier, the design and planning of the proposed “demand driven” approach to rural employment creation and poverty alleviation requires an understanding and quantification of the supply response (or the elasticity of labour supply) of rural people to low wage manual work. Previous sections have reviewed the labour market and unemployment situation and examined data availability and modelling options. It was noted in the previous section that rigorous econometric approaches to modelling available data and collection of primary data were beyond the scope of this study because of resource, time and technical complexity problems. However, existence of available data, notably from LFS and GHS surveys, indicated that there would be some scope for making a rough assessment of the likely labour supply response within a margin of error. As stated in Section 3.1.5, the study investigations have been based almost entirely on GHS 2004.

Of necessity, the methodology had to be developed and adapted to make use of the data. Therefore these two elements are outlined together with reference to the theoretical underpinnings in the rest of this section.

### 4.2 Overview of the conceptual approach

The most appropriate conceptual approach for a study of supply response is the distribution of reservation wages. However, suitable data on reservation wages is not available and could not be collected. Therefore the approach taken is to infer the distribution of reservation wages from GHS 2004 data. The high unemployment represents an excess of supply over demand in the labour market. It is assumed that the unemployed, including discouraged workers, seek employment more or less actively and that each person available for employment, whether looking for a job actively or otherwise, has a reservation wage rate. It is further assumed that inferences can be made about the distribution of the reservation wage rates of the unemployed from evidence on the pay and earnings of those who are employed.

GHS 2004 Worker database includes data on pay or earnings for those who were employed or engaged in income generation in the seven days prior to the survey for all members of sample households aged 15 years and above. Information on the type of employment undertaken and reasons for not being in work is also collected. It has been assumed here that for those who were in employment, the reservation wage rate is equal to or lower than the wage rate at which the person was working. We therefore have revealed evidence on the upper limits of the reservation wage rates of those in employment.

However, with high unemployment rates, those engaged in income generating activities are a small proportion of the labour force age group<sup>21</sup>. Some of these persons are not seeking employment (e.g. because they are either fully engaged in household activities, in education or are infirm)<sup>22</sup>. The remainder are (a) either unemployed actively seeking work, or (b) discouraged members of the labour force, categories broadly corresponding to the official and

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<sup>21</sup> In the GHS 2004 sample, about 65 per cent of all those 15 years and older were not in any form of paid employment.

<sup>22</sup> The reasons for not being in employment are considered further when assessing the proportion of adults not working who are unemployed and available for work.

broad definitions of unemployment. As noted above, their reservation wage rates are not revealed because they are not in employment<sup>23</sup>. Here, we assume that as far as reservation wage rates are concerned, those in employment are a random selection of those in the labour force. Therefore the distribution of the reservation wage rates of those in employment is representative of the distribution of the reservation wage rates of those available for employment but not employed at the time of the survey. This is an important assumption underpinning this study.

An objection to the assumption could be that those in employment are not randomly selected since employers' selections may have been based on the suitability of candidates for the work or their willingness to work for a lower wage rate. The self employed may also have been more active in pursuing opportunities than unemployed persons. Further, some persons may remain unemployed because they set unrealistically high reservation wage rates for themselves. Though, others from poorer households may have lowered their reservation wage rates out of desperation. Ideally, empirical work would be required to test the validity of the assumption. Since this is not possible, considering the balance of arguments, the assumption that the distribution of the reservation wage rates of those in employment is representative of the distribution of the reservation wage rates of those available for employment but not employed is reasonable. Sensitivity analysis of the result assuming higher participation by the unemployed than in the central assumption (i.e. implying lower reservation wage rates for the unemployed) has been carried out in Section 5.

The reservation wage rate of a person, or the willingness to undertake employment at or above a given pay rate, is a function of the living standard of the person's household<sup>24</sup> and other household and person characteristics. The household characteristics include the size and age composition of the household, whether it receives remittances from outside, any welfare payments it receives, the number of persons who are in the working age group, employed and not employed. Relevant characteristics of an individual include the age, health, education and qualifications. There are also intra-household dynamics which affect employment seeking by an individual. For example, young persons from large households may have pressure on them to seek employment to supplement the household income but members of households with higher living standards may have higher reservation wage rates.

Assessing the effects of the range of household and person characteristics on the reservation wage rate requires complex modelling which is beyond the scope of the study. It is also possible to arrive at broad estimates of labour supply for unskilled work at low wage rates without such modelling. The approach adopted here uses the household living standard, more precisely the household expenditure per head<sup>25</sup>, as a proxy for household socio-economic characteristics. There is likely to be an association between the levels of wage rates of members of a household and household expenditure per head. Arguably, this is a two way relationship. Higher wage levels imply higher household income and expenditure. However,

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<sup>23</sup> In principle, those in the unavailable for work categories may have high reservation wage rates at which they may be willing to give up their alternative activities but we assume that these rates are too high to concern us. This point is elaborated later with evidence.

<sup>24</sup> We focus here on the influence of the household living standard on the reservation wage rate. There clearly also a relationship between the actual wage rate earned and the household living standard. This has been discussed below.

<sup>25</sup> There are a number of reasons, specific to the situation and data availability in South Africa and more general, for preferring expenditure to income as an indicator of living standard. These are discussed below.

existing lower household income and expenditure may also lower the reservation wage rates of unemployed members of households.

While wage levels and earnings of employed persons contribute to household income, many households also receive welfare payments and remittances from migrant workers which supplement their incomes and expenditures. Our focus is not on this direction of the relationship but on relating the willingness of at least one member of a household to undertake employment at a given wage rate to the expenditure per head of the household. To examine this relationship further, data from GHS 2004 have been used to compare the expenditure per head distribution of households with a member in employment below a range of low wage rates with the expenditure per head distribution of all households in the sample.

Expenditure per head is preferred over income per head for a number of reasons. International evidence (Anand and Harris, 1994; World Bank, 2002) indicates that expenditure is easier to measure and conceptualise by respondents. It is also more stable than income since households smooth their consumption and living standard in the face of income variability. Specifically in the context of this study, income per household is difficult to estimate and there is greater potential for errors and under-reporting since there are a number of sources of income (e.g. for lower income households, wages, earnings from self-employment, welfare payments and remittances from migrant workers). GHS 2004 asks for expenditure information in two forms, total expenditure in bands and estimates of actual expenditure by categories. For this study data from the second source have been chosen to construct the expenditure per head variable. The two sources were compared and were found to be reasonably consistent. Estimating expenditure is also not without problems and there is evidence of under-reporting (Meth, 2006a). The option of making the types of adjustments made by Meth to correct for the under-reporting was considered but it was thought that given the broad level at which this assessment was being carried out, the effects of the adjustments in the results were thought not to be substantial.

### **4.3 Using GHS data and operationalising the model**

Table 3 shows the distribution by expenditure per head bands of non-urban households of persons whose pay levels were below the equivalent of ZAR 30 per day equivalent<sup>26</sup>. The choice of expenditure per head is justified because of the strong relationship between wage employment and household income and especially between wage employment, lack thereof and poverty incidence (see Section 2.2). Each household is represented only once in the distribution since only the lowest paid employed person is included. The table also includes the distribution by expenditure bands of all non-urban households in the GHS 2004 sample (columns 4 and 5) and, in column 6, the number of households with a member earning below ZAR 30 per day in each expenditure band as a proportion of all households in that expenditure band (i.e. for the <1000 band, the number is 676 as a per cent of 2271). As would be expected, at such a low daily wage rate equivalent, there is a higher representation of households in the lower expenditure per head bands. The table also shows (last number in column 6) that households with at least one person employed at a wage rate below ZAR 30 make up just above 23 per cent of the total number of sample households.

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<sup>26</sup> The choice of ZAR 30 is for illustration. Similar tables have been produced for a range of wage rates.

**Table 3: Distribution of non-urban households with at least one person employed at pay below ZAR 30 per day and all non-urban households**

(1) Household expenditure per head (ZAR)	Non-urban households with at least one member employed at wage rate below ZAR 30 per day.		All non-urban households in GHS 2004 sample		(6) Below ZAR 30 per day households as per cent of all households
	(2) Number	(3) Per cent	(4) Number	(5) Per cent	
<1000	676	26.6	2271	20.9	29.8
1000 - 1999	799	31.4	2937	27.0	27.2
2000 - 2999	364	14.3	1630	15.0	22.3
3000 - 3999	286	11.2	1049	9.6	27.3
4000 - 4999	163	6.4	664	6.1	24.5
5000 - 5999	76	3.0	385	3.5	19.7
6000 - 6999	66	2.6	354	3.3	18.6
7000 - 7999	47	1.8	246	2.3	19.1
8000 - 8999	18	0.7	171	1.6	10.5
9000 - 9999	6	0.2	130	1.2	4.6
10000 +	42	1.7	1037	9.5	4.1
	<b>2543</b>	<b>100.0</b>	<b>10874</b>	<b>100.0</b>	<b>23.4</b>

Source: Derived from GHS (2004)

Nevertheless, at the ZAR 30 per day wage rate, the distribution of households is not as heavily weighted towards the lower expenditure per head bands as would be expected. This may be because a daily wage rate of ZAR 30 per day is fairly high in the rural context. It is equivalent to about ZAR 660 per month and ZAR 7920 per year<sup>27</sup>. A person who is in regular employment at this wage rate (as opposed to someone with intermittent casual employment) generates an income per head which would support expenditure per head in the 85.4 to 87.7 percentiles range for all households. Given that the median non-urban household size is 4.0, for a household at the median being supported by a regular earner of ZAR 30 per day could enable expenditure per year of ZAR 1980 putting the household near the top of the ZAR 1000 to 1999 expenditure per head range or at about the 47<sup>th</sup> percentile. The fact that a wage rate of ZAR 30 per day puts a wage earner fairly high up the scale in the non-urban economy does not mean that this is a high wage rate. It is more an indication of the high poverty incidence. As noted earlier, GHS expenditure data underestimate household expenditure (Meth, 2006a). Given that the nominal under-reporting in most cases is likely to be below 10 per cent, the broad observations made above are not seriously undermined.

If it can be assumed that all persons seeking employment at wage rates below ZAR 30 are able to gain such employment, the proportions in column 6 in Table 3 could be said to be representative of the labour supply for the GHS sample of households. Based on the assumption that the GHS sample is representative of the total population of households, the information can be used to scale up to the labour supply at province and national levels subject to sampling errors. However, column 6 in Table 3 cannot be assumed to represent the labour supply for the sample because of the excess supply in the South African labour market. In other words, there are likely to be many people with reservation wage rates below ZAR 30 per day who are not able to get a job. Therefore, an estimate is needed of the ratio between the

<sup>27</sup> Calculations based on the assumption of an average working month of 22 days.

number of households of those who are employed and those who may wish to be employed at or below a given wage rate. Since the distribution of households by expenditure bands is known, evidence on this ratio for one expenditure band only or for all households is needed. The ratio is estimated here for the lowest expenditure per head band (<ZAR1000). A low expenditure band is preferred because of the larger number of cases providing a sounder basis for analysis and estimation.

The proposed procedure requires an estimate of the total number of households with at least one person available for employment at a given wage rate in the expenditure per head band <ZAR1000. To derive this, we start with the GHS 2004 Worker database with the variables household size<sup>28</sup> and computed household expenditure per head imported from the House database. Our initial assumption is that for a given wage rate<sup>29</sup> all those who are employed at a wage rate below the given wage rate would be available for EPWP work. In addition, a proportion of those who are unemployed and available for work<sup>30</sup> will have a reservation wage rate below the given wage rate and will therefore wish to participate in EPWP at the given wage rate.

It is necessary to qualify the assumption that all those who are employed at a wage rate below the threshold wage rate would wish to join the EPWP. This assumption does not take account of the features of employment other than pay. Some people currently working at a wage below the threshold wage rate may prefer to remain in this employment rather than take EPWP employment. Possible reasons for such a choice are: (a) many of those in regular employment throughout the year at a lower wage rate would prefer this to EPWP employment at higher daily pay for a limited number of days<sup>31</sup>, or (b) some in low pay employment would consider EPWP employment too physically arduous.

On the other hand, some persons may prefer locally available, regular, predictable, and sustained EPWP employment over less certain casual employment even if the latter pays more, as McCord (2004) found in her study of workers on the Gundo Lashu and Zibambebe programmes. If the extended EPWP offers 80 or 100 days of credibly guaranteed employment over a number of years, even larger number of persons may prefer EPWP employment to alternatives. Other features of EPWP employment such as flexibility of working hours, physical demands of the work, physical security while carrying out work and costs of entry to employment (e.g. the severity of administrative barriers and irregularities) will also affect the labour supply response.

The effects on labour supply response of employment features discussed above cannot be quantified without detailed empirical work. On balance, our central assumption that all those who are employed at a wage rate below the threshold wage rate would wish to join the EPWP is reasonable. Arguably, those who prefer to stay in lower paid employment in preference to EPWP employment would be roughly balanced by those with higher pay who prefer to take EPWP employment.

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<sup>28</sup> Household size is not available in the House database. It has been computed by aggregating in the Person database and imported to the House database.

<sup>29</sup> The procedure is repeated for a range of wage rates between ZAR 15 to ZAR 70 per day to assess the labour supply response and effectively estimate the labour supply curve.

<sup>30</sup> The unemployed and available for work or the “unemployed available” category is defined and discussed below.

<sup>31</sup> Options being considered are offer of employment at 80 or 100 days.



Some sensitivity testing has been done to assess the effect of only a proportion of those in lower wage employment switching to EPWP employment (see Section 5). The issue of choice between EPWP and alternative employment raises another important issue. Given the self-selection nature of the proposed extended EPWP, those who are in employment cannot be prevented from leaving their employment to join the EPWP. Therefore, when setting the EPWP wage rate it will be necessary to ensure that it is not set too high in the context of the labour market, leading to “job diversion” and distortion of other economic activities<sup>32</sup>.

In order to estimate the number of unemployed persons who are available for employment at the given wage rate, we invoke again the assumption that the distribution of reservation wages of those who are employed at a given wage rate broadly represents the distribution of the reservation wages of the unemployed. Columns 2 and 3 in Table 4 show the pay per month<sup>33</sup> equivalent frequency distribution of workers in non-urban households with expenditure per head below ZAR 1000. Column 4 shows the upper limit of each wage rate range and column 5 shows the cumulative frequency distribution of workers up to but not including the wage rate in column 4.

On the assumption that a worker in employment would not have taken up the employment at a given wage rate unless his/her reservation wage rate is at or below this wage rate, the numbers in column 5 can be interpreted as indicating that the percentage of workers whose reservation wage is below the level in column 4 (i.e. 44.9 per cent in column 5 for the wage level ZAR 440 indicates that for 44.9 per cent of the workers, the reservation wage rate is ZAR 440 or lower). The bold italicised numbers in columns 4 and 5 indicate the alternative wage rates for which labour supply responses have been estimated in this exercise.

**Table 4: Pay frequency distribution and implied upper reservation wage limit for all workers in non-urban households in GHS 2004 sample with annual expenditure per head below ZAR1000**

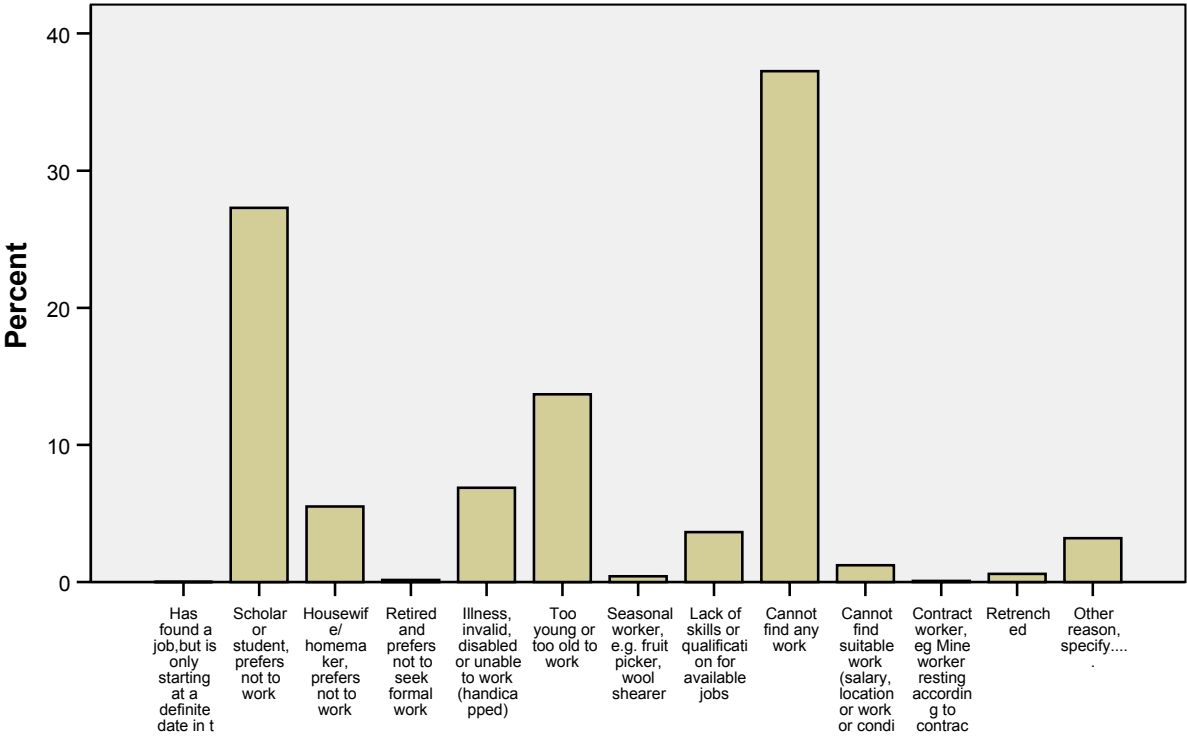
(1) Pay per month equivalent bands (ZAR)	Frequency distribution		(4) Reservation wage levels (ZAR)	(5) % of workers with lower reservation wage
	(2) Number	(3) Per cent		
0 – 219	159	17.2	220	17.2
220 – 329	114	12.3	<b>330</b>	<b>29.5</b>
330 – 439	143	15.4	<b>440</b>	<b>44.9</b>
440 – 549	85	9.2	550	54.1
550 – 659	126	13.6	<b>660</b>	<b>67.7</b>
660 – 769	71	7.7	770	75.4
770 – 879	78	8.4	<b>880</b>	<b>83.8</b>
880 – 989	22	2.4	990	86.2
990 – 1099	37	4.0	<b>1100</b>	<b>90.2</b>
1100 – 1319	29	3.1	<b>1320</b>	<b>93.3</b>
1320 – 1539	15	1.6	<b>1540</b>	<b>94.9</b>
1540+	47	5.1		
Total	926	100.0		

<sup>32</sup> This raises the need to make special arrangements for exemption for the extended EPWP from existing minimum wage regulations. The issue is raised in Section 5.

<sup>33</sup> Respondents were asked to provide information on pay per week, per month or per year. The data was converted to per month equivalent.

The reservation wage rate distribution of those who are unemployed and available for work is assumed to be broadly the same as that for the employed (i.e. as in column 5 in Table 4)<sup>34</sup>. The next stage is to define and identify the unemployed and available for work from the Worker database. For those who were not in employment in the previous seven days, GHS 2004 includes a question on the reason for not being employed with a number of alternatives in Question 2.11 (see Figure 1 and Table 5 for the alternatives).

Figure 1 and Table 5 show the breakdown of reasons given by non-urban respondents who were not engaged in any income earning activity from households with expenditure per head less than ZAR 1000. In all, there were 6894 such persons in households with expenditure per head below ZAR 1000 and as the evidence shows, the largest single category was “Code 09 Cannot find any work” (just over 37 per cent) though arguably Codes 07, 08, 10 and 12 probably also imply lack of work opportunities. Codes 01 to 06 can be interpreted as persons not available for work and Code 11, a very small proportion, are strictly speaking not unemployed. Based on this evidence, we have defined our “unemployed available” category as including all those with Codes 07 to 10, 12 and 13. We have assumed that those in the category “Other reason” are also “unemployed available”.



**Figure 1: Reasons for not working: Rural workers from households with expenditure per head below ZAR 1000**

<sup>34</sup> See Section 4.1 for discussion of this assumption.

**Table 5: Reasons for not working: Rural workers from households with expenditure per head below ZAR 1000**

	Frequency	Per cent
01 - Has found a job, but is only starting at a definite date	1	0.0
02 - Scholar or student, prefers not to work	1881	27.3
03 - Housewife/ homemaker, prefers not to work	380	5.5
04 - Retired and prefers not to seek formal work	11	0.2
05 - Illness, invalid, disabled or unable to work (handicapped)	474	6.9
06 - Too young or too old to work	944	13.7
07 - Seasonal worker, e.g. fruit picker, wool shearer	29	0.4
08 - Lack of skills or qualification for available jobs	252	3.7
09 - Cannot find any work	2568	37.2
10 - Cannot find suitable work (salary, location or work or condition	85	1.2
11 - Contract worker, e.g. Mine worker resting according to contract	6	0.1
12 - Retrenched	42	0.6
13 - Other reason	221	3.2
<b>Total</b>	<b>6894</b>	<b>100.0</b>

To test the validity of the above assumptions, the reasons for not working were cross-tabulated with the response to whether the person would accept a job if it was offered (Q2.12). Table 6 shows the result which generally supports the definition of the unemployed available though with some qualifications. Over 98 per cent of those in the category “Cannot find work” would accept a suitable job. The proportions for the other Codes assumed to be “unemployed available” are lower (except for 07). Conversely, there are small proportions of those in the Codes indicating unavailability for work who would accept a job if offered. It is likely that some homemakers and retired may be induced to participate in EPWP because of its nature and location<sup>35</sup>. Nevertheless, on the whole, the choice of Codes for identifying the “unemployed available” appears to be sound<sup>36</sup>.

For a given wage rate, we interrogate the Worker database to select all the persons over the age of 15 who are either employed at below the threshold wage rate or are “unemployed available”. At this stage, the number of cases in the database can also be reduced to focus on the relevant categories, e.g. non-urban and belonging to households with expenditure per head less than ZAR 1000. The selected cases may include more than one members of a household. Since the initial assumption is that the extended EPWP will limit participation to only one person per household, the Worker database is aggregated by household to leave only one member of each household in the reduced (aggregated) database.

<sup>35</sup> McCord (2004) found that on the Zimbabwe programme women with household duties could combine EPWP employment close to their homes with these.

<sup>36</sup> GHS also asks questions to identify the unemployed according to the official and the broader definitions. However, our preferred approach described here initially identifies all those above the age of 15 who are not employed and then determines whether they are part of the labour force based on their reasons for not working.

**Table 6: Willingness to accept a job by those not working in past 7 days for different reasons**

Code (Q2.11)	Reason for not working in past 7 days	Q2.12 If suitable job is offered, will you accept						Total	
		Yes		No		Don't know			
		Number	%	Number	%	Number	%	Number	%
02	Housewife/homemaker, prefers not to work	21	5.5	355	93.4	4	1.1	380	100.0
03	Scholar or student, prefers not to work	10	0.5	1,856	98.7	15	0.8	1,881	100.0
04	Retired and prefers not to seek formal work	1	9.1	10	90.9	0	0.0	11	100.0
05	Illness, invalid, disabled or unable to work (handicapped)	20	4.2	447	94.3	7	1.5	474	100.0
06	Too young or too old to work	13	1.4	919	97.6	10	1.1	942	100.0
07	Seasonal worker, e.g. fruit picker, wool shearer	29	100.0	0	0.0	0	0.0	29	100.0
08	Lack of skills or qualification for available jobs	232	92.1	18	7.1	2	0.8	252	100.0
09	Cannot find any work	2,519	98.1	44	1.7	5	0.2	2,568	100.0
10	Cannot find suitable work (salary, location or work or condition)	80	94.1	5	5.9	0	0.0	85	100.0
11	Contract worker, e.g. Mine worker resting according to contract	5	83.3	1	16.7	0	0.0	6	100.0
12	Retrenched	31	73.8	10	23.8	1	2.4	42	100.0
13	Other reason	123	55.7	95	43.0	3	1.4	221	100.0
	Total	3,084		3,760		47		6,891	

The next stage is to calculate the labour supply response rate, i.e. the proportion of households in a given expenditure per head band from which a person is likely to participate in the extended EPWP. To obtain this rate, we need a count of all the households from which there might be an EPWP participant, either someone who is employed at a wage rate below the threshold rate or an unemployed available person whose reservation wage rate is below the threshold wage rate. The aggregated Worker database provides a count of those employed at a

wage rate below the threshold level and a count of the unemployed available. Whether the latter are likely to be EPWP participants depends on their reservation wage rate.

We do not have information on the reservation wage rates of the unemployment available. However, from Table 4 (or its equivalent for other threshold wage rates) we have estimates of the percentages of employees who have reservation wage rates below the threshold. The overall response rate for a given threshold wage rate therefore is the count of all persons in employment below the given wage rate and per cent of households with at least one available unemployed, the latter obtained by multiplying the number of unemployed available by the relevant reservation wage rate adjustment factor from Table 4 divided by the total number of households in the expenditure per head band.

The same procedure has been repeated for a range of alternative threshold wage rates. However, the interrogation, manipulation and reduction of the database have to be done with care and in the correct sequence to avoid simple mistakes. For example, a household with an employee earning ZAR 580 per month may be included at the threshold wage rate of ZAR 660 per month. At the threshold wage rate of ZAR 550, it would not be included on the wage rate criterion but it is possible that the household has a member who falls in the available unemployed category and therefore should be included. Any sensitivity analysis to assess the effects of lower number of below wage rate employed persons participating would also need to be adjusted for “available unemployed” persons in the households excluded on the wage rate criterion. Table 7 sets out the results.

**Table 7: Calculation of percentages of non-urban households (expenditure per head <ZAR1000) responding to EPWP at a given wage rate**

	<b>Households with at least person available</b>	<b>All households</b>	<b>Response rate (%)</b>
Pay <330 and available unemployed	699	2,244	31.1
Pay <440 and available unemployed	1,025	2,244	45.7
Pay <660 and available unemployed	1,441	2,244	64.2
Pay <880 and available unemployed	1,691	2,244	75.4
Pay <1100 and available unemployed	1,785	2,244	79.5
Pay <1320 and available unemployed	1,821	2,244	81.1
Pay <1540 and available unemployed	1,851	2,244	82.5

Multiplying the participation rate by the number of households in the relevant expenditure per head category in the GHS 2004 sample produces the labour supply response for the sample. In order to obtain the estimate at the national and provincial levels, data on the number of households at these levels are needed. The latest population projections (Stats SA, 2006) provide population estimates for South Africa and the provinces but no information is provided on the average size of households or the number of households. The population is not separated into urban and non-urban categories either. Therefore, Stats SA (2006) has been

used as the source of total population data but it has been necessary to rely on other earlier sources for data on the number of households and the urban, non-urban split.

Census 2001 (Stats SA, 2003a, and related online resources) provide data on the number of households and the size of households for South Africa and by province. However, this information is now dated. Therefore, household sizes estimated from the GHS samples have been used in the study. Stats SA (2003a) does not provide data for urban and non-urban populations and households separately though Stats SA (2003b) discusses the problem of distinguishing between urban and non-urban populations and provides their estimates at the province and national levels. The estimates of the urban and non-urban split from Stats SA have been used to estimate the number of non-urban households. The result is presented in Table 8.

**Table 8: Population and household size: South Africa and by province**

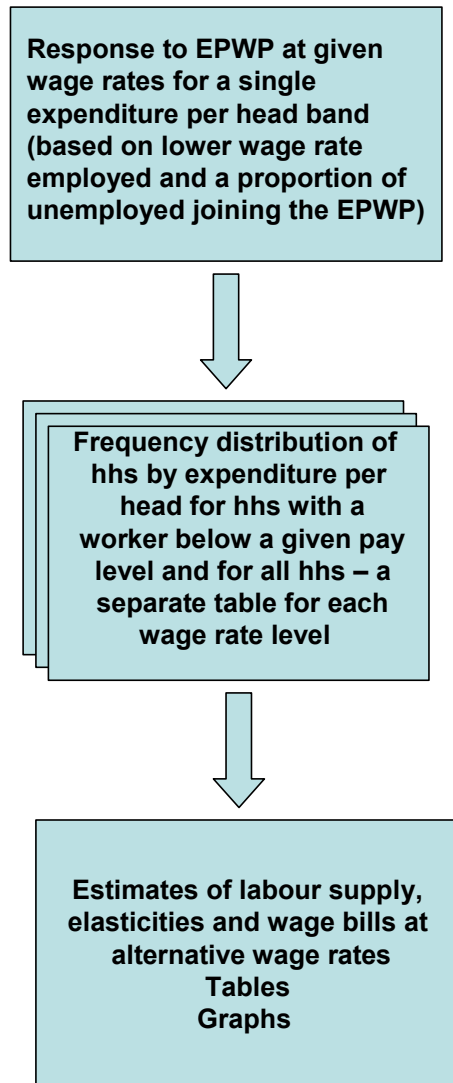
Province	Total population (a)	Urban population (%) (b)	Non-urban population (%) (b)	Non-urban population	Non-urban HH size (c)	Non-urban households
Western Cape	4,745,500	90.4	9.6	456,921	3.1	147,394
Eastern Cape	7,051,500	38.8	61.2	4,312,484	4.6	928,467
Northern Cape	910,500	82.7	17.3	157,445	4.0	39,835
Free State	2,958,800	75.8	24.2	715,615	4.1	173,987
KwaZulu-Natal	9,731,800	46.0	54.0	5,256,541	4.6	1,142,726
North West	3,858,200	41.8	58.2	2,245,493	4.2	538,668
Gauteng	9,211,200	97.2	2.8	256,808	3.1	82,178
Mpumalanga	3,252,500	41.3	58.7	1,910,635	4.2	454,167
Limpopo	5,670,800	13.3	86.7	4,917,589	4.1	1,202,864
South Africa	47,390,800	57.5	42.5	20,229,530	4.3	4,710,286

(a) Source: Statistics SA (2006) Mid-year population estimates, South Africa 2006. Not adjusted for provincial boundary changes in 2006.

(b) Source: Stats SA (2003)

(c) GHS 2004

We now have all the information organised in the appropriate form to generate the results. Figure 2 helps to explain the model structure. The top box in the figure represents the table in which we calculate the response to EPWP at each selected threshold wage rate from households in a single expenditure per head band (see Table 7). The potential participants are persons employed at a lower wage rate than the EPWP wage rate and a proportion of the unemployed as noted in the previous section. The second box represents tables showing the distribution by expenditure bands of households from which a person has been employed at a wage rate below the threshold wage rate (see Table 9 and related discussion in the next section). For comparison and calculation of labour supply, each table also includes the expenditure per head distribution of all non-urban households. Province level estimates can also be made by working with province level data. The third box in the figure represents the tables and graphs of the results of the labour supply calculations at stage two. Labour supply elasticities and the wage bill are also calculated at this stage (see Table 10 and Figures 3 and 4 in the next section).



**Figure 2 Overview of the labour supply study methodology**

## 5.0 RESULTS, CONCLUSIONS AND QUALIFICATIONS

The final results have been presented in a set of tables and graphs prepared as interlinked spreadsheets which can also be used to carry out further sensitivity analyses. Table 9 shows the labour supply calculation for a single wage rate. Tables for the remaining wage rates are included in the Appendix. The first number in column 3 in Table 9 is the per cent of households in the <ZAR1000 expenditure per head band from which at least one person is likely to participate in the EPWP. This factor has been imported from Table 7 and along with the frequency distributions in the table, it enables the calculation of the number of likely EPWP participants from each expenditure per head band and in total.

**Table 9: Estimate of the EPWP participation rate for non-urban households at a given wage rate (ZAR 660 per month equivalent, 2004 prices)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head [a]	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample [a]	Proportion of total rural households with a potential EPWP worker ((6) as % of (5)) [b]	Proportion of all rural hhs in each exp/head band in GHS 2004 sample [a]	Total no of rural households [c]	Potentail EPWP workers [d]
<1000	26.6	<b>64.2</b>	20.9	984,450	632,171
1000 – 1999	31.5	58.8	27.0	1,271,777	747,367
2000 - 2999	14.4	48.2	15.0	706,543	340,904
3000 - 3999	11.2	58.6	9.6	452,187	265,044
4000 - 4999	6.3	52.2	6.1	287,327	149,848
5000 - 5999	3.0	43.2	3.5	164,860	71,178
6000 - 6999	2.6	39.8	3.3	155,439	61,812
7000 - 7999	1.9	40.6	2.3	108,337	44,018
8000 - 8999	0.7	22.4	1.6	75,365	16,858
9000- 9999	0.2	9.9	1.2	56,523	5,619
10000+	1.7	8.8	9.5	447,477	39,335
	100.00	50.4	100.0	4,710,286	<b>2,374,154</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>50</b>

Notes: [a] Source: GHS 2004; [b] Estimated from GHS 2004 database; [c] Source: Demographic data and GHS 2004; [d] Calculated from previous columns

In Table 9, the number 2,374,154 highlighted in yellow is the estimated non-urban extended EPWP labour supply response at the ZAR 660 per month wage rate. We refer to this as the “EPWP labour supply response” because the estimate is based on the assumption that extended EPWP employment would be rationed to one person per household<sup>37</sup>. The EPWP labour supply estimate for ZAR 660 per month is imported into the summary spreadsheet along with the EPWP labour supply estimates at the other wage rates to enable calculation of labour supply elasticities and wage bills at alternative wage rates (Table 10). Figures 3 and 4

<sup>37</sup> The actual labour supply without the rationing to one per household is likely to be much larger.



show respectively the EPWP labour supply curve (i.e. the relationship between the wage rate and labour supply) and the relationship between the wage rate and the wage bill.

Since the database is of 2004 vintage, the wage levels used in the analysis have been assumed to be at 2004 prices and rural consumer price indices have been applied to calculate equivalent wage rates at 2006 prices to calculate the wage bill. Evidently, given the high unemployment and poverty and a substantial number of persons engaged in activities yielding low earnings, even at a wage rate as low as ZAR 16 per day (equivalent to a little over US\$2.00 per day), EPWP participation is likely to be over 1 million. At ZAR 32, at 2.37 million, the EPWP labour supply response is more than double that at the ZAR 16 per day wage rate and it is substantially higher at higher wage rates as would be expected. Nevertheless, the supply elasticities implied by our estimates are lower at higher wage rates. This is explained by the limit imposed by the population and the restriction that a household's employment entitlement is limited to one person in an year. For example, when the wage rate is ZAR 64, according to our calculations, the EPWP is expected to attract participants from 83 per cent of non-urban households.

Table 10 and Figure 4 show the wage bill implied by the estimated EPWP supply responses under the two options of offering employment to a participant for 80 days and 100 days in an year. As would be expected, the wage bill would be much higher at higher wage rates because of the higher cost per participant and the larger supply response. Table 10 shows the supply response at the national level. Province level estimates have also been made by applying the response rates to province level data on the number of non-urban households (see Table 11).

**Table 10: Estimated EPWP labour supply, elasticities and wage bill summary table: South Africa non-urban**

Wage rate (2004 prices)	Wage rate (2004 prices)	Labour Supply (Millions) [a]	Equivalent wage rate (2006 prices)	Elasticity	Wage bill (Million ZAR)	Wage bill (Million ZAR)
Monthly	Daily		Daily		Ass 1 [a]	Ass 2 [b]
330	15	1.15	16.1		1,483	1,853
440	20	1.69	21.5	1.32	2,899	3,624
660	30	2.37	32.2	0.84	6,113	7,642
880	40	3.27	42.9	1.11	11,219	14,023
1100	50	3.70	53.6	0.55	15,863	19,829
1320	60	3.89	64.4	0.29	20,052	25,065
1540	70	4.05	75.1	0.26	24,331	30,414

[a] Estimated number of persons willing to work at the given wage rate based on a limit of one person per household.

[b] Ass 1 (Assumption 1) - 80 days of work offered by EPWP.

[c] Ass 2 (Assumption 2) - 100 days of work offered by EPWP.

Figure 3 EPWP labour supply - estimated response to range of wage rates

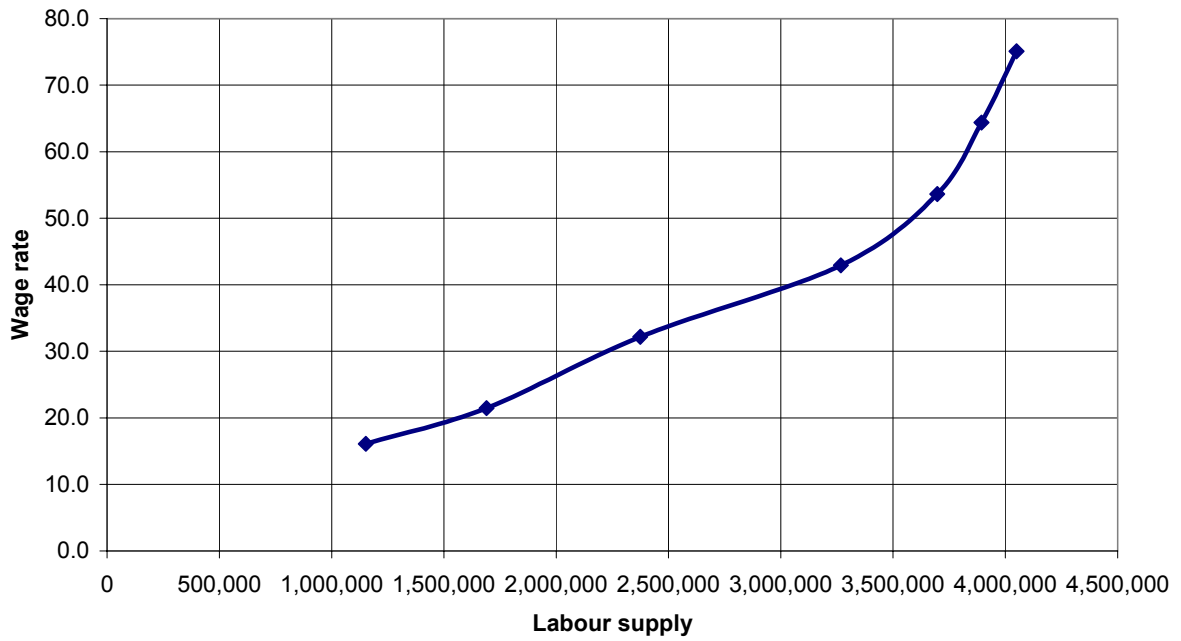
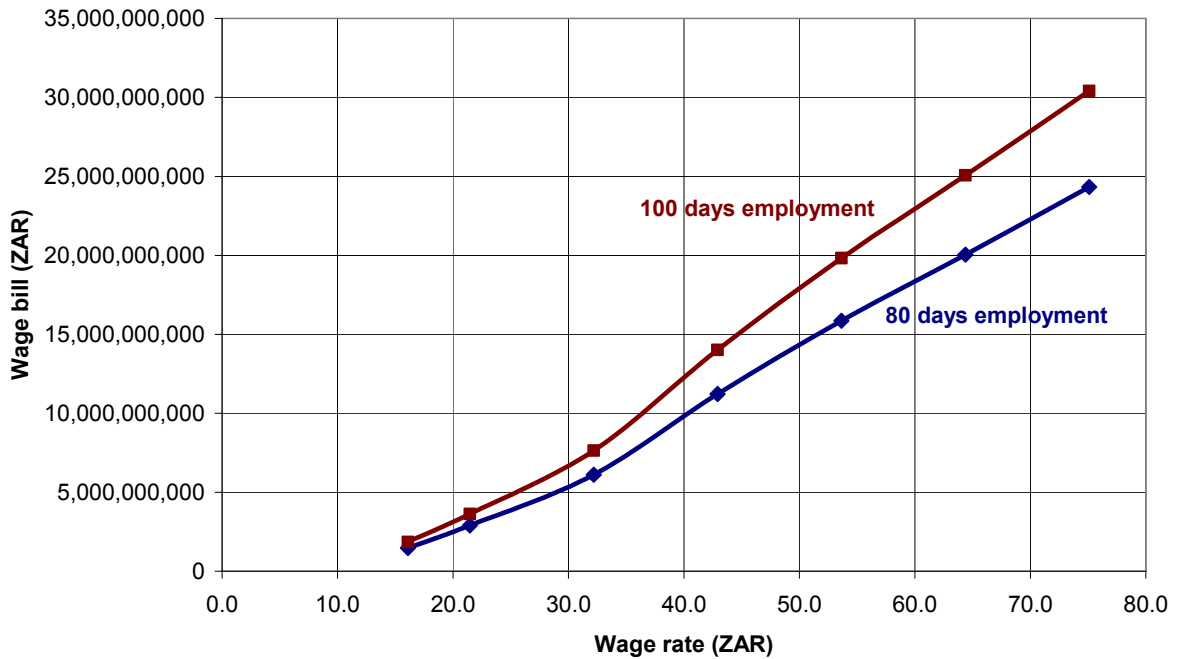


Figure 4 Wage bill at alternative wage rates (2006 prices)



**Table 11: Province level EPWP labour supply and wage bill at alternative wage rates**

Wage rate (2004)	330 per month		660 per month		1320 per month	
	Labour Supply [a]	Wage bill (ZAR)	Labour Supply [a]	Wage bill (ZAR)	Labour Supply [a]	Wage bill (ZAR)
Western Cape	36,037	46,396,812	74,292	191,295,583	121,842	627,468,254
Eastern Cape	227,008	292,263,885	467,981	1,205,013,616	767,511	3,952,562,719
Northern Cape	9,740	12,539,447	20,078	51,700,554	32,930	169,582,882
Free State	42,539	54,767,735	87,696	225,809,173	143,825	740,676,210
KwaZulu-Natal	279,394	359,708,773	575,975	1,483,091,108	944,628	4,864,684,138
North West	131,703	169,562,525	271,508	699,111,871	445,286	2,293,155,431
Gauteng	20,092	25,868,239	41,421	106,655,599	67,932	349,840,814
Mpumalanga	111,043	142,963,335	228,917	589,442,536	375,435	1,933,429,268
Limpopo	294,097	378,638,877	606,287	1,561,140,548	994,340	5,120,693,948
South Africa	1,151,654	1,482,709,629	2,374,154	6,113,260,588	3,893,729	20,052,093,664

[a] Estimated number of persons willing to work at the given wage rate.

As would be expected, the size of the programme at the province level depends on the size of the population and accordingly, Limpopo, KwaZulu-Natal and Eastern Cape would have by far the largest programmes. However, the provincial estimates made in Table 11 are based on the assumption that standards of living and distribution of expenditure per head are broadly uniform across provinces. If this is not the case, Table 11 would underestimate EPWP labour supply and the wage bill in the poorer provinces and overestimate them in the better off provinces. The full procedure for estimating the EPWP labour supply (i.e. using the expenditure per head and reservation wage distributions for the province) was applied to Limpopo which has a large non-urban population and high incidences of unemployment and poverty. It was found that at the ZAR 660 per month wage rate, labour supply in Limpopo was about 20 per cent higher than in Table 11. Clearly, it would be important to examine the differences between the provinces in more detail.

Within the data limitations, the study has produced some plausible results, though it would have benefited from further corroboration from other sources and evidence to test the assumptions on which it was based. One assumption which warrants testing is that all those employed at a wage rate below the threshold wage rate would join the EPWP (see Section 4.3 for more detailed discussion). In the absence of other evidence, the effect on labour supply of a proportion (20 per cent) of with pay below a given EPWP wage rate not joining the EPWP has been assessed. On the other side, it is possible that we have been too conservative on the participation of the unemployed available by assuming that the distribution of their reservation wage rates is identical to that of those employed. It is also possible that some of those in the categories not considered to be potential participants (e.g. in the “Housewife/homemaker, prefers not to work” category in Figure 2 and Table 5) may be available for EPWP employment if it is close to home and flexible enough to combine with other essential activities. Therefore, we have also tested the effect of the unemployed available participation being 20 per cent higher than under the central assumption. Table 12 summarises the effects of the sensitivity tests.

Evidently, 20 per cent lower switching to EPWP by the employed reduces the labour supply by between 11 per cent and just over 7.5 per cent depending on the wage rate. The increases in the labour supply are of a similar order of magnitude if we assume that participation by the unemployed available is 20 per cent higher. Difference in the wage bill would be proportional

to the differences in supply. Since our estimates are based on a number of assumptions which need testing, it will be necessary to make allowance for a margin of error. Studies either before the start of the extended EPWP or during the early stages will be essential to test the validity of the assumptions made and to make adjustments in the planning and budgeting as necessary. Ideally, there should be a pilot stage when the proposed programme is tested, information on supply response is collected systematically and careful studies are carried out.

**Table 12: Sensitivity test result: Lower switching by the employed and higher participation of the unemployed available**

Daily wage rate (2004 prices)	Equivalent daily wage rate (2006 prices)	Labour Supply		
		% difference for employed switching to EPWP 20% lower	Central assumptions (millions)	% difference for unemployed participation 20% higher
Daily	Daily			
15	16.1	-10.8	1.15	9.2
20	21.5	-9.8	1.69	10.2
30	32.2	-9.4	2.37	10.6
40	42.9	-8.9	3.27	11.1
50	53.6	-9.2	3.70	9.4
60	64.4	-8.5	3.89	8.1
70	75.1	-7.7	4.05	6.9

Another important question that the sensitivity tests raises is the extent to which EPWP would provide employment to those who are unemployed and the extent to which those in low paid earning activities switch to EPWP employment. On our central assumptions, at the wage rate of ZAR 30 per day, about 53 per cent of the EPWP jobs created would be taken by the unemployed available with the rest being taken by those in other employment. The proportions are of similar order of magnitude for the other wage rates, ranging between 46 per cent and 55 per cent. At low wage rates, i.e. up to about ZAR 40 per day, this should not raise serious concerns since higher earnings for those in very low pay jobs is a desirable outcome. However at higher wage rates, there is serious risk of damaging effects on other economic activities.

The problem of too high wage rates distorting the labour market and its implications for the EPWP wage bill raises the need to make special arrangements for exemption for the extended EPWP from existing minimum wage regulations. As noted in Section 2.4, EPWP has been permitted to pay wage rates below the relevant sectoral minimum rates in return for provision of training for workers. Clearly a similar exemption from minimum wage regulations will be required for the extended EPWP. This could be on a similar basis to the existing agreement for the EPWP. However, given the universal access (albeit limited to one person per household) that the proposed extended EPWP would offer, the expected larger scale as a consequence and the greater emphasis on welfare objectives, it may not be feasible to provide training for all workers and a different basis may be required for exemption from minimum wage regulations. A strong case could be made out for such exemption based on: (a) the extended EPWP's objective of providing welfare support to the poorest households through employment, and (b) extended EPWP employment not displacing existing formal sector jobs.

Two other important challenges for a large scale programme are creation of sufficient worthwhile EPWP employment to absorb the expected large labour supply response and efficient and effective management of the programme to ensure that those who are in need of access to the programme do get access and that there are no serious abuses. In spite of the various limitations that have been pointed out, the labour supply response and wage bill estimates have been based on plausible assumptions and appear to be reasonable, especially within the middle range of wage rates between ZAR 20 and ZAR 40. The model can also be further developed and tested with empirical evidence to improve its soundness and applicability.

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## **APPENDIX**



**Tables for calculating EPWP labour supply by household expenditure bands: South Africa non-urban**

**Table A.1 Estimate of the EPWP participation rate for non-urban households at a given wage rate (ZAR 330 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
<b>Household expenditure per head</b>	<b>Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample</b>	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	<b>Total no of rural households</b>	<b>Potential EPWP workers</b>
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	26.6	<b>31.1</b>	20.9	984,450	306,653
1000 – 1999	31.5	28.5	27.0	1,271,777	362,533
2000 - 2999	14.4	23.4	15.0	706,543	165,366
3000 - 3999	11.2	28.4	9.6	452,187	128,567
4000 - 4999	6.3	25.3	6.1	287,327	72,688
5000 - 5999	3.0	20.9	3.5	164,860	34,527
6000 - 6999	2.6	19.3	3.3	155,439	29,984
7000 - 7999	1.9	19.7	2.3	108,337	21,352
8000 - 8999	0.7	10.9	1.6	75,365	8,177
9000- 9999	0.2	4.8	1.2	56,523	2,726
10000+	1.7	4.3	9.5	447,477	19,081
	100.00	24.4	100.0	4,710,286	<b>1,151,654</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>24</b>

**Table A.2 Estimate of the EPWP participation rate for non-urban households at a given wage rate: ( ZAR 440 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	Total no of rural households	Potential EPWP workers
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	26.6	<b>45.7</b>	20.9	984,450	449,671
1000 – 1999	31.5	41.8	27.0	1,271,777	531,611
2000 - 2999	14.4	34.3	15.0	706,543	242,489
3000 - 3999	11.2	41.7	9.6	452,187	188,529
4000 - 4999	6.3	37.1	6.1	287,327	106,589
5000 - 5999	3.0	30.7	3.5	164,860	50,630
6000 - 6999	2.6	28.3	3.3	155,439	43,968
7000 - 7999	1.9	28.9	2.3	108,337	31,310
8000 - 8999	0.7	15.9	1.6	75,365	11,991
9000- 9999	0.2	7.1	1.2	56,523	3,997
10000+	1.7	6.3	9.5	447,477	27,980
	100.00	35.9	100.0	4,710,286	<b>1,688,763</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>36</b>

**Table A.3 Estimate of the EPWP participation rate for non-urban households at a given wage rate: (ZAR 660 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	Total no of rural households	Potential EPWP workers
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	26.6	<b>64.2</b>	20.9	984,450	632,171
1000 – 1999	31.5	58.8	27.0	1,271,777	747,367
2000 - 2999	14.4	48.2	15.0	706,543	340,904
3000 - 3999	11.2	58.6	9.6	452,187	265,044
4000 - 4999	6.3	52.2	6.1	287,327	149,848
5000 - 5999	3.0	43.2	3.5	164,860	71,178
6000 - 6999	2.6	39.8	3.3	155,439	61,812
7000 - 7999	1.9	40.6	2.3	108,337	44,018
8000 - 8999	0.7	22.4	1.6	75,365	16,858
9000- 9999	0.2	9.9	1.2	56,523	5,619
10000+	1.7	8.8	9.5	447,477	39,335
	100.00	50.4	100.0	4,710,286	<b>2,374,154</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>50</b>

**Table A.4 Estimate of the EPWP participation rate for non-urban households at a given wage rate: (ZAR 880 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	Total no of rural households	Potential EPWP workers
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	22.7	<b>75.4</b>	20.9	984,450	741,847
1000 – 1999	29.6	76.0	27.0	1,271,777	966,560
2000 - 2999	15.3	70.7	15.0	706,543	499,471
3000 - 3999	12.2	88.3	9.6	452,187	399,381
4000 - 4999	6.9	78.5	6.1	287,327	225,694
5000 - 5999	3.5	70.2	3.5	164,860	115,791
6000 - 6999	3.5	72.6	3.3	155,439	112,847
7000 - 7999	2.3	70.6	2.3	108,337	76,540
8000 - 8999	1.3	56.0	1.6	75,365	42,195
9000- 9999	0.8	48.6	1.2	56,523	27,476
10000+	1.8	13.4	9.5	447,477	59,858
	100.00	69.4	100	4,710,286	<b>3,267,659</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>69</b>

**Table A.5 Estimate of the EPWP participation rate for non-urban households at a given wage rate (ZAR 1100 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	Total no of rural households	Potential EPWP workers
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	21.2	<b>79.5</b>	20.9	984,450	783,085
1000 – 1999	28.6	83.1	27.0	1,271,777	1,057,451
2000 - 2999	15.9	83.1	15.0	706,543	586,837
3000 - 3999	12.2	99.7	9.6	452,187	450,607
4000 - 4999	7.1	91.5	6.1	287,327	262,934
5000 - 5999	3.8	84.4	3.5	164,860	139,088
6000 - 6999	3.6	84.6	3.3	155,439	131,467
7000 - 7999	2.4	82.7	2.3	108,337	89,550
8000 - 8999	1.4	70.8	1.6	75,365	53,349
9000- 9999	1.0	67.4	1.2	56,523	38,106
10000+	2.8	23.2	9.5	447,477	103,840
	100.00	78.5	100	4,710,286	<b>3,696,314</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>78</b>

**Table A.6 Estimate of the EPWP participation rate for non-urban households at a given wage rate (ZAR 1320 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	Total no of rural households	Potential EPWP workers
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	20.3	<b>81.1</b>	20.9	984,450	798,878
1000 – 1999	27.8	86.0	27.0	1,271,777	1,093,352
2000 - 2999	15.9	88.6	15.0	706,543	625,994
3000 - 3999	12.3	100.0	9.6	452,187	452,187
4000 - 4999	7.3	99.8	6.1	287,327	286,874
5000 - 5999	3.9	93.9	3.5	164,860	154,836
6000 - 6999	3.8	96.6	3.3	155,439	150,087
7000 - 7999	2.6	95.6	2.3	108,337	103,541
8000 - 8999	1.5	75.6	1.6	75,365	56,995
9000- 9999	1.2	82.3	1.2	56,523	46,546
10000+	3.2	27.8	9.5	447,477	124,439
	100.00	82.7	100	4,710,286	<b>3,893,729</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>83</b>

**Table A.7 Estimate of the EPWP participation rate for non-urban households at a given wage rate (ZAR 1540 per month equivalent)**

(1)	(2)	(3)	(4)	(5)	(6)
Household expenditure per head	Per cent of rural households with a worker in the specified wage rate range in GHS 2004 sample	<i>Proportion of total rural households with a potential EPWP worker ((6) as % of (5))</i>	<i>Proportion of all rural hhs in each exp/head band in GHS 2004 sample</i>	Total no of rural households	Potentail EPWP workers
Source: GHS 2004	Source: GHS 2004	<i>Source: Estimated from GHS 2004 database</i>	Source: GHS 2004	Source: Demographic data and GHS 2004	Source: Calculated from previous columns
<1000	19.7	<b>82.5</b>	20.9	984,450	812,039
1000 – 1999	27.3	88.7	27.0	1,271,777	1,128,041
2000 - 2999	16.1	94.1	15.0	706,543	664,822
3000 - 3999	12.1	100.0	9.6	452,187	452,187
4000 - 4999	7.4	100.0	6.1	287,327	287,327
5000 - 5999	4.0	100.0	3.5	164,860	164,860
6000 - 6999	4.0	100.0	3.3	155,439	155,439
7000 - 7999	2.7	100.0	2.3	108,337	108,337
8000 - 8999	1.6	87.1	1.6	75,365	65,638
9000- 9999	1.2	87.9	1.2	56,523	49,698
10000+	3.9	36.0	9.5	447,477	161,283
	100.00	86.0	100	4,710,286	<b>4,049,672</b>
<b>Participation rate (% of households from which at least one person is a potential EPWP worker)</b>					<b>86</b>