PARTICIPATION AND IMPACT OF POVERTY-ORIENTED PUBLIC WORKS PROJECTS IN RURAL MALAWI

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PARTICIPATION AND IMPACT OF POVERTY-ORIENTED PUBLIC WORKS PROJECTS IN RURAL MALAWI

Abstract: This paper reports the results on the factors that influence participation in the poverty-oriented public works programme in rural Malawi and analyses the determinants of the revealed positive socio-economic impact among the participants. The public works programme in Malawi targets poor households through self-selection by offering a wage rate below the government minimum wage for rural areas. The empirical results in this study show that most participants in the programme are poor characterised by low education, belonging to female-headed households and households with higher periods of food insecurity, with excess supply of labour, with low levels of assets and whose reservation wages are below the wage offered in the programme, although men are more likely to participate than women. If we account for selectivity bias, the impact of the public works programme increases with the gender (female) of participants, the number of members participating per household, in the short-term and with the earnings from the public works employment. The analysis suggests that concentrating public policy on deepening coverage, rather than widening coverage, may be a superior strategy for attack poverty in the long-term.

Key words: Public works programmes, Poverty, Malawi

1. Introduction

Public works programmes (PWPs) have been important interventions in rural development in both developed and developing countries, in light of the failure of top-down development strategies and market reforms in redistributing growth and development. The motivation for such interventions centres on the provision of a safety net to vulnerable groups or the poor while at the same time embarking on rural development based on labour resources in the rural areas. Subbarao (1997) argues that PWPs as safety nets, confer transfer and/or stabilisation of benefits to the poor, and using the poors' labour to build infrastructure for development. The use of PWPs to foster rural development and as a poverty-alleviation strategy is evident in most developing countries in Asia, Africa and Latin America, and this dates back as far as the eighteenth century (Ravallion, 1991b; World Bank, 1990). Some of the poverty-oriented programmes that have attracted the attention of researchers include those being implemented in India (Datt and Ravallion, 1994; Ravallion, 1991b; Gaiha, 1996a, 1996b, 1997 and 2000), Bangladesh (Hossain and Asaduzzaman, 1983), Argentina (Ravallion, 1999; Jalan and Ravallion, 1999), Botswana and Kenya (Teklu and Asefa, 1997 and 1999).

In Southern Africa public works initiatives have been implemented in Zimbabwe since the late 1980s, South Africa since early 1990s mainly on water projects, in Botswana since 1992 and in

Malawi since 1995. Botswana has one of the most extensive public works programme operated at all times of the year, in response to protracted rural unemployment and structural poverty (Teklu and Asefa, 1997). The scale of the programme is drought-responsive - expanded when drought strikes and relaxed during years of moderate harvest by the rural poor. The public works programme in Botswana is presently used as a principal instrument to addressing the country's structural poverty in the rural areas.

In Malawi, the government attempts at a national scale public works programme first came into reality in 1995 on a pilot basis, and later in July 1996 as a national intervention programme under the name Malawi Social Action Fund (MASAF).[1] MASAF was established as one of the poverty alleviation instruments designed to address community social needs within the context of a wider safety net programme including the agricultural 'starter pack' and food for work programmes. The public works programme is just one of the many efforts by government, non-governmental organizations and international organizations to reduce the level of poverty in Malawi estimated at 54 percent of the population in 1995. Most of the social and living conditions indicators in Malawi in the early 1990s, were not encouraging. In 1995, the infant mortality rate was estimated at 133 per 1000 live births, only 48.4 percent of the population had access to safe sources of drinking water, 48 percent of infants were stunted and 30 percent were underweight (Malawi Government/University of Malawi, 1995).

This study evaluates the efficacy of self-targeting in public works projects through setting the wage below the minimum wage and identifies factors that influence the revealed positive impact of the programme on the livelihoods of participants. The next section reviews the role of public works programmes as a poverty alleviation strategy. Section 3 provides a description of the MASAF public works programme in Malawi focusing on its design features and implementation strategies. Section 4 describes the methodology and data used in the analysis. In section 5, we report the empirical results on the factors that determine participation, the extent of public works employment and impact of the public works programme on the socio-economic status of participants. The results of our study suggest that the programme largely targets the poor through

[1] However, the public works concept was used in the District Road Improvement and Maintenance Programme (DRIMP) prior to the programme implemented under the Malawi Social Action Fund.

its use of a wage rate below the official minimum wage, with the probability of participation increasing with characteristics associated with poverty in rural Malawi. Section 5 provides concluding remarks.

2. Public Works Programmes as Poverty Alleviation Projects

The theoretical and empirical literature on public works programmes as rural development and poverty alleviation programmes is vast and raises issues that relate to targeting, remuneration, institutional and administrative frameworks, appropriate technology, determinants of participation, and their impact on employment and poverty.[2] Public works programmes can be classified into four main categories according to the way they address the objectives of employment and income generation to the participating individuals or communities and the creation of economic and social capital (Clay, 1986). The first group relates to relief works, which are primarily rapid responses to food insecurity under extraordinary food and income distress circumstances (Tschirley et al., 1996; Holt, 1983). Temporary employment is offered on local infrastructure creation or rehabilitation, in return the means of survival are provided to the participating vulnerable households temporarily. Second, there are income augmenting programmes, often implemented in response to seasonal fluctuations in incomes which primarily serve as safety nets for those whose income fall below subsistence levels. The incomes earned from the projects are intended to stabilise the welfare of the poor. Third, there are long-term employment generation programmes, designed to cater for employment needs among the unemployed and underemployed, particularly those caught up in structural unemployment where alternative livelihoods are problematic. The final group comprise low-cost infrastructure programmes, which emphasise the creation of infrastructure rather than income augmentation.

The targeting of participants in public works programmes varies and depends on the type of intervention and the relative emphasis on the objectives of the programme. Apart from the need to develop infrastructures in disadvantaged areas, the public works programmes tend to focus on income generation through employment as a poverty reduction strategy and programmes that are

[2] See Subbarao (1997), Teklu and Asefa (1999), Datt and Ravallion (1994), Gaude and Watzlawick (1992), Guha (1981), Mellor (1982), Holt (1983), Hossain and Asaduzzaman (1983), Imschoot (1992), Edmonds and Veen (1992), Clay (1986), Ravallion (1991a, 1991b) and Gaiha (1996a, 1996b, 1997, 2000).

designed around poverty alleviation tend to target the poor in disadvantaged communities. Ravallion (1999) asserts that public works programmes can reduce poverty by providing paid work for the unemployed from poor households and by producing goods and services that poor families value. In countries where poverty is wide spread, it becomes difficult to adopt a specific targeting criterion for public works employment due to imperfect information about the poor available to implementers of the programmes. Many, however, argue that the use of the wage rate for public works projects that is not greater than the minimum wage acts as a self-targeting device that eliminates those that are not poor in the community by targeting those with low reservation wage rates (Ravallion, 1991a). However, Subbarao (1997) notes that while a low wage rate is likely to keep those that are not poor out of the programme, it may result in lower transfer earnings per (poor) participant, and hence the resulting reduction in poverty may not be significant.

The extent of coverage of poverty-oriented public works programmes depends on the wage rate set for the programme. The principal benefit received by a worker from the public works is income earned from the labour services rendered and this is critical in the supply of labour services. The determination of the wage rate in public works programmes is critical both for targeting and the benefits that the poor generate from their participation, but may also have wider implications for the local economy (Subbarao, 1997; Ravallion, 1991a; Gaiha, 1996b, 1997). Generally, there are several alternative ways for the determination of wage rates in public works programmes. First, the minimum wage for unskilled labour is mostly used as a maximum wage that can be paid to those who choose to participate in public works employment. Second, others such as Subbarao (1997), advocate a wage rate that is no more than the prevailing market wage rate for unskilled labour. Third, Basu (1987) advocates a wage rate that is consistent with the available budget, such that all those who are willing to work can be employed at that 'budget' wage rate. Fourth, the wage rate can be set at a higher level, which is considered socially acceptable, although this requires a very generous budget and generates less employment (Ravallion, 1991a).

In any case, it is important to strike a balance between the objectives of self-targeting and ensuring that workers receive a meaningful transfer. Too low a wage keeps the overall participation rate low while at the same time ensuring a disproportionate number of poor workers

than would be observed if the wage rate were higher. The foregoing naturally also begs the question of the level of the public works employment wage that confers economic empowerment to the poor and also minimises or avoids disrupting the local labour markets. The empirical evidence on the levels of wages in public works programmes varies across countries. Subbarao (1997) cites ten public works programmes in which four paid the minimum wage, two having the minimum wage higher than the market wage, two paid less than the minimum wage (one with minimum wage greater than market wage), two paid less than the ruling market wage and one paid more than the ruling market wage.[3]

The other design feature of public works employment programmes relates to the form and method of wage payment. Three main forms of payment are commonly used in public works: payment in cash wages, payment in-kind wage and a combination of cash and in-kind wages. Miller (1992) notes that cash payments allow for greater multiplier effects on local employment, particularly in agriculture. Moreover, cash payment gives exclusive freedom to the wage earner on the use of the income. Payments in kind are usually in the form of food for work. Arguments in favour of payment in-kind revolve around their convenience of affording beneficiaries (most of whom are chronic food deficit producers) rapid access to food and nutrition in times of dire food needs (Clay, 1986). An empirical case in point is the experience in Ethiopia where food rations proved an efficient intervention instrument during the famine (Holt, 1983). Dandekar and Sathe (1980) find that the food element of the Maharashtra Employment Guarantee Scheme (MEGS) was the most significant attraction. In terms of gender, Subbarao (1997) notes that wages in-kind or piece-wage payments may attract more women than men. Even critical in the preference of food payments to cash payments is the imminent access to nutritional gains among low income beneficiary groups (Mellor, 1980; Clay, 1986).

The disadvantages of payment in-kind relate to the operational and transactional constraints from the point of view of logistical demands, and its direct and indirect effects on the local economy

[3] Miller (1992) reports similar variations in eleven countries. For example, in Uganda the public works wage rate was higher than the minimum wage which in turn was higher than the ruling wage rate while in Burkina Faso the public works wage rate was 29 percent of the minimum wage but 86 percent of the ruling market wage.

via the product and factor markets.[4] Sometimes, workers do not accept the type of food commodities being paid if the food does not conform to the ideal dietary patterns and standards. Zgovu and Tsoka (1996) find discontent with the food commodities (weeviled and tasteless yellow-turned-brown maize rations) among beneficiary communities on the Chapananga Food for Work programme operated by the World Vision International/Malawi. With respect to the effect on the local economy, Jackson (1982) demonstrates that when payments in-kind leak into the local produce market they pose disincentive effects to local agriculture to the extent that they tend to lower demand and therefore lower prices of locally grown (close) substitute crops. Such effects, however, are largely short term and localised unless the programme is operated as a long-term intervention and/or the programme's size can readily have national impact (Clay, 1997). Gaiha (2000) argues in favour of lowering the wage rate relative to the agricultural wage rate and payment in-kind to be discontinued to improve the targeting of the poor in the rural public works in India.

The methods of remuneration also vary, but the literature suggests three main bases for determining remuneration. First, remuneration is mainly based working hours per day - six or eight hours. Second, remuneration can be based on daily tasks, in which the workers who complete a predetermined task early can leave but receive a daily wage. Third, workers can be paid according to piecework in which remuneration is based on output produced. However, whatever method of remuneration used what becomes critical in increasing participation and productivity is the promptness of payment (Miller, 1992). Untimely income disbursements and levels of wage rates potentially undermine the stabilisation property of the programme. Zgovu et al. (1998) note cases of delayed income disbursements to workers at some public works projects in Malawi.

The administrative structure and the number of institutions involved in the implementation of the public works programmes vary from country to country. Gaude and Watzlawick (1992) argue that proper decentralisation of the design and management of local infrastructure works has

[4] For instance, in-kind wages require extensive outlays to defray costs of organisation for logistics, acquisition of foods (in most cases the foods are imported), transportation of bulky foods from the exporting or donor source into the recipient country and to the project site (mostly remotely located with limited accessibility during the rainy season), storage, fumigation and security considerations in-transit and at the project site.

far-reaching implications for the effectiveness of public works programmes. Imschoot (1992) observes that public works projects implemented in India, Madagascar and the Sudan are highly decentralised and encourage the active participation of the local authorities, technical departments and target groups, with the responsibility of the ministry (central government) being that of co-ordinating the activities of other technical services at decentralised levels. In Bangladesh, the management of the public works programme was mostly devolved around local government structures, responsible for the identification of projects, preparation of proposals and project plans, and project approval and prioritisation, with projects mainly initiated at local village meetings (Hossain and Asaduzzaman, 1983). The role of collaborating institutions too is critical for the realisation of the intended safety net effect. Implementation of the public works programmes brings together a number of government (and sometimes non-government) agencies for their expertise in various aspects of the project activities. Inefficient and costly linkages adversely affect the share of programme resources that eventually filters down to workers (Zgovu et al., 1998).

Public works programmes have two direct effects on the participating households and communities. First, is the impact on incomes through the provision of employment to the poor households and individuals participating in the public works projects. It is for this reason that many countries have integrated public works programmes in their poverty alleviation strategies. The extent of the impact on poverty depends, however, on the wage rate, the timing of the programme (execution and disbursement of funds), the social benefit of the project and the costs associated with the forgone opportunities (Subbarao, 1997; Ravallion, 1991b; Datt and Ravallion, 1994). Ravallion (1998) acknowledges the difficulties in estimating the cost and benefits of public works programmes.

The empirical evidence on the positive employment and net income effects on participants in public works programmes in developing countries is overwhelming. Datt and Ravallion (1994) find that the severity of poverty in the Employment Guarantee Scheme in India had fallen from 5 percent to 3.2 percent and that the foregone incomes resulting from workers participation in the programme were not substantial to outweigh the earnings from the public works programme. Teklu and Asefa (1999), with respect to public works in Botswana and Kenya, also conclude that the access of the poor to public works employment appears to improve net income and decrease

poverty among the rural poor.[5] Gaiha (1996a) notes that although there was marked deterioration in targeting in the Maharashtra Employment Guarantee Scheme, a large subset of the chronically poor depended heavily on public works as an additional source of income with significant welfare gains. More recently, Gaiha (2000) reports that net earnings from rural public works in India did achieve a significant reduction in the poverty gap and the squared poverty gap indices, but not in the head-count index. Jalan and Ravallion (1999) find that ignoring forgone incomes greatly overstates the average gains from the Trabajar program, although sizable gains are about half the gross wage.

The second direct effect of public works programmes is the development of the physical infrastructure in rural areas by communities. These physical infrastructures include roads and transport networks, bridges, dams and irrigation facilities, soil conservation, water facilities and markets. The availability of these facilities improves economic productivity and uplifts the social status of the communities and promotes rural development that is necessary for long-term and sustainable livelihoods.

Nonetheless, the two direct impacts of the public works programmes generate indirect benefits and costs that have to be captured in the socio-economic impact assessment of the projects. Public works programmes can have multiplier employment effects in the local economy in the long run particularly where the incomes saved are invested in further productive activities whether in farm or off farm activities (Gaiha, 1996a, 1996b). Other benefits include the effect of public works wages on agricultural wages. Gaiha (1997) notes that a one percent increase in public works wages raises agricultural wages by 10 percent in the short-term and by 18 percent in the long term. Some of the public works programmes may impart skills in the form of management and organisation of work and skills in construction activities. The incomes derived from public works employment can also be used to meet food requirements thereby improving the nutritional status of children and adults in the participating households. Mvula et al. (2000) provide some evidence of improvements in the nutritional status of children belonging to households that participated in the public works projects, using a matched panel sample of

[5] Guha (1981) cites several examples of the positive impact of public works programmes on employment and incomes in South Asia.

participants.[6] Socially, the reduction in poverty improves social well being by limiting situations of helplessness and by stabilising the incomes of the poor. The development of infrastructure in rural areas may create conducive conditions for productive and economic activities. For example, the construction of a road that links the rural area to markets may encourage on farm production and agricultural-based public works projects such as irrigation and soil conservation are likely to have a positive impact on agricultural productivity and the environment.

The use of public works programmes in addressing poverty has been criticised for putting emphasis on the short-term benefits. Bryceson and Howe (1997) observe that labour-intensive public works have been over-identified with hastily executed relief works, with the objective of addressing the immediate survival of distressed people in emergency situations. As the World Bank (2001) notes, a well-designed and well-funded public works programme should serve as an instrument for risk mitigation and as a coping strategy. Mitigation of risk requires that the safety net should be available after a crisis. The other problem with public works programmes is that the quality of infrastructures is generally poor and the long-term maintenance of the assets is not guaranteed. Gaiha (1996a) notes that the quality of the assets is generally poor and the benefits from the assets created accrue more to the non-poor. Another problem with public works programmes in developing countries, particularly when implemented by a government institution is that the available resources tend to be spread thinly and for political and social reasons the programmes tend to aim at reaching as many people as possible without necessary addressing the long-term nature of poverty evident in developing countries.

3. The Public Works Programme in Malawi

The public works projects are mainly implemented by the Malawi Social Action Fund (MASAF) with funding from the Malawi Government through credit from the World Bank. The first phase of MASAF (MASAF I) that commenced in 1995 was financed through a government credit of US$ 56 million from the World Bank and a further credit of US$ 66 million in 1996 was

[6] Data for participants in public works collected in 1998 was compared to the data collected in 2000 on the same respondents. In the 2000 study 81 percent of those who participated in the projects covered in the study used the earnings to purchase food items. Nonetheless, the analysis does not control for other intervening factors that might have contributed to improvements in the nutritional status of children.

obtained for the implementation of the second phase of MASAF (MASAF II). MASAF activities are today central to the government's approaches to directly addressing three problems, namely, growing unemployment, declining income per capita, and under-investment in basic economic infrastructure (MASAF, 1999, 2000). MASAF has three main operational sub-components. The first component is the community sub-project whose focus is direct financing of basic social infrastructure through participatory community development approaches. The activities under community sub-projects include rehabilitation, extension and construction of social and economic infrastructures such as schools, health centres, markets, and bridges. The second component is the public works programme, which is entirely a safety net or stabilisation scheme through which income are transferred to vulnerable households and individuals on the condition that they provide labour on economic and environmental infrastructures. The third is the sponsored sub-project that targets disadvantaged and vulnerable groups through the sponsoring agencies already working with these groups.

The MASAF public works programme is a safety net in which MASAF funds labour-intensive public works to create employment as a cash transfer strategy. The activities under the public works programme component include rehabilitation and construction of economic infrastructure such as access roads, rainwater harvesting structures, afforestation and environmental assets. The public works programme not only provides a direct safety net in form of employment and cash income, it also enables communities to invest in the creation and strengthening of basic economic infrastructure (Mvula et al., 2000). The public works programme in Malawi was implemented against the background of pervasive poverty in the rural and urban areas, with about 54 percent of the population living below the poverty line in 1995 (World Bank, 1995). According to the World Bank (2001) in 1999 gross national product per capita in Malawi was estimated at US$190 while National Statistical Office (2000) reports that recent estimates of poverty in Malawi indicate that 65.3 percent of Malawians are poor, with 29 percent barely surviving. In the design of social safety nets in Malawi, four main socio-economic groups are identified as the most vulnerable: rural households with small land holdings, female-headed households, AIDS orphans and their relatives, and those who can not care for themselves (World Bank, 2001).

Projects for public works are selected based on their labour use intensity using the guideline that at least 35 percent of the project costs ought to be wages. Thus, similar to other poverty-oriented

public works programmes in developing countries, the MASAF public works programme is designed around the poverty alleviation objective and targets the areas that are poor and food insecure. The target areas for public works are selected by the MASAF management unit on the basis of the vulnerability of the agricultural extension planning area (EPA) in terms of food insecurity and other poverty indicators.[7] Once extension planning areas have been selected, MASAF requests the relevant District Assemblies (local government) to submit project proposals for public works employment in the selected extension planning areas in consultation with the communities.[8]

The MASAF public works programme is implemented through the existing government administrative, technical and financial management structures at district level. These collaborating government institutions include District Assembly (as overseer of the programme and financial manager at district level) and line ministries including Ministry of Works and Roads, Ministry Water and Irrigation Development (for technical expertise) at both policy and implementation levels. The financial budget for the projects is provided by MASAF, with the District Assemblies contribution being in terms of technical expertise and provision of transport facilities for implementation and supervision of projects. Nonetheless, most district government departments in Malawi face tight budgets and this in some cases affects the efficiency in wage payments and in supervisory activities.

Once the projects are approved, the implementation of the projects rests with the District Assembly and the local committees. The District Assemblies are responsible for financial management and technical supervision of the projects through a subcommittee that constitutes technical departments of various government ministries. The selection of households and individuals to participate in the public works projects entirely rests in the hands of the community through their project committee. In principle, at the individual level, the MASAF public works programme is self-targeting through setting the wage for public works below the minimum wage

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[7] An extension planning area (EPA) is an administrative subdivision for agricultural development with a typical population of 50,000 - 100,000.

[8] Except in cases where the projects are already on the 'approved shelf' of community requested projects of the District Development Committee, consultations with the communities if projects are solicited is minimal.

for rural areas. In practice, the project committee at the community level identifies the vulnerable households and assists in the recruitment and management of workers and this raises the possibility of mistargeting due to asymmetric information available to the committee. In the projects in this study, there is evidence of rationing due to the fact that a specific number of participants were required and some project committees recruited workers on 'first come first served basis' although more people were willing to participate at the offered wage.[9] Mvula et al. (2000) find that about 28 percent of the nonparticipants in the sample expressed their interest but were not employed in public works.

The guidelines for targeting also single out female-headed households as one of the groups in which the incidence of poverty is high and are expected to be given preference in targeting. The programme also set a target of reaching female participants of at least 30 percent of participants, which has more than been achieved at 34 percent by the first quarter of 2000 (MASAF, 2000). Nonetheless, despite the likely leakages, the targeting of the poor is quite high, with 79 percent of the participants from the survey attributing poverty as the main reason for their participation.

The wage rate is paid on the basis of standard tasks completed by the participants, and wages are paid in cash.[10] The wage rate for each task has been MK15.80 since 1998, which was MK0.10 lower than the daily minimum wage for rural areas. Mvula et al. (2000) find that the participants tend to complete the standard tasks in 3.51 hours, which gives the participants extra time for the day to use their labour in other productive and social activities. If the task rate is converted to time rates, it implies that the programme pays more than twice the minimum wage for most of the participants, given that the minimum wage is earned over the eight-hour period.[11]

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[9] Arguably, the very poor mostly lack information about the availability of these programmes and are likely to be excluded from the scheme. Nonetheless, MASAF has recently introduced double shifts to accommodate the increased demand for public works employment.

[10] The two recent evaluations of the public works programme in rural Malawi reveal that there is some preference for in-kind wages particularly among women during the food deficit months (December - March) (Zgovu and Mvula, 1998; Mvula et al., 2000).

[11] However, in time rates, productivity may be much lower due to slack and inefficient monitoring and supervision and is possible that the task rate output may be higher than the time rate output obtained at a minimum wage outside the public works programme.

The direct and indirect benefits of the public works programme in rural Malawi are substantial. Most participants and nonparticipants appreciate the importance of public works employment income in the short-term in smoothing their consumption patterns. The assets created such as roads have linked some of the rural areas to the main roads and main markets and this benefits both the participants and nonparticipants. Some assets have environmental benefits, particularly those whose benefits are localized such as reafforestation projects, river bank rehabilitation and dam rehabilitation. However, the long-term nature of benefits from these projects may be limited, particularly roads whose benefits accrue more to nonparticipants, due to failure for the District Assemblies and communities to maintain the assets once MASAF funding phases out. Of all the road projects in this study, not a single one has been maintained since the projects were completed. Road rehabilitation and construction under Phase I of the MASAF public works programme constitutes 86.2 percent of the 392 public works projects, while 9.7 percent of the projects are afforestation projects, 2.8 percent are dams or water tanks and 1.3 percent are river bank rehabilitation projects. The lack of commitment by the District Assemblies in maintaining the completed projects casts doubt on the sustainability of the assets and their contribution to sustainable rural development.[12]

4. Methodology and Data

4.1 Analytical Framework

The decision whether to participate or not to participate in public works programmes is modelled within the household or individual time allocation model based on the relative income that could be earned in a particular activity. The time allocation model postulates that an individual will allocate available time across several activities (wage labour, own farm work, other self-employed work, leisure, domestic work, public works and unemployment) to maximise utility which is a function of income and individual or household characteristics (Datt and

[12] MASAF enters into agreement with the District Assemblies and relevant technical government departments on maintenance of assets and projects that are for public use are handed over to the District Assemblies and communities. However, due to free-rider problems particularly in road projects, the communities are reluctant to maintain the roads and the District Assemblies lack funding to maintain these assets. However, for localized projects such as dams and afforestation projects, the communities are willing and do maintain the assets created from public works employment.

Ravallion, 1994). Teklu and Asefa (1997) model the household or individual decision to work in the public works programme as a choice process that involves comparing income with the public works employment and without the public works employment. The individual decides to work on a public works project as long as the expected net income from the public works exceeds alternative income from other activities. However, this approach assumes, as we assume in the rest of the analysis, that the decision to work is made by the individual in the household and ignores intra-household decision making that may be typical in developing countries.

Denoting participation in the public works programme by PPWP = 1 and non-participation by PPWP = 0, the probability of participation in the public works programme can be modelled by the standard probit model as:

$$Prob(PPWP = 1) = \Phi(x'\beta)$$

$$Prob(PPWP = 0) = 1 - \Phi(x'\beta) \quad (1)$$

where PPWP is the dummy for participation in the public works programme, Φ is the normal distribution function, **x** is the vector of individual participants' and household characteristics that determine the individual choice to participate in the public works programme and **ß** is the vector of parameters or coefficients. The probability of participation can therefore be obtained by evaluating Φ given **x'ß**. We hypothesize that participation in public works projects is influenced by socio-economic characteristics and household characteristics such as sex of respondent, the number of economically active members of the household, the age of the participant, the education levels of participants, land holdings, household wealth, the respondents' reservation wage for similar employment (Teklu and Asefa, 1997; Datt and Ravallion, 1994; Gaiha, 1996a).

The ultimate objective of the public works programme in Malawi is to alleviate the state of poverty among participants. Mvula et al. (2000) document the positive impact of public works projects to participants in terms of revealed improvements in the socio-economic status within the communities, the amount of transfer benefits per participants, creation of new paid employment, changes in nutritional status of children and changes in survival strategies. We investigate two other relationships with implications for targeting of participants. First, the

extent of employment in public works projects varies although the wage rate per task is the same. We explore the factors that determine the extent of employment estimated by the number of tasks completed by the individual in the public works projects. With a fixed wage rate, the higher the number of tasks completed the higher the income earned from public works, although this also depends on the completion period for the projects. Second, 58.2 percent of participants described the change in socio-economic status as being better off and that their households can afford basic facilities. We explain variations in the perceived impact of participation in public works by the gender, education, the sex of the household head, the size of the household, the number of members participating in the public works programme, the reservation wage and the total earnings from public works employment.

Since the targeting of employment in public works involves self-selection, estimation of employment and socio-economic impact equations may suffer from selectivity bias. Following Heckman (1979) two-stage procedure, a probit model of participation is first estimated, from which we obtain the inverse Mills ratio which is used as one of the explanatory variables in the employment and impact equations in the second stage correcting for selectivity bias.[13] The estimations were carried out using the TSP 4.4 computer software package (Hall et al., 1995).

4.2 Data and Sample

The data used in this study was collected during the third beneficiary assessment of the public works programme in rural Malawi in 2000 (Mvula et al., 2000). Sixteen project sites were chosen out of 392 projects that were implemented during Phase I of the MASAF public works programme. The sixteen projects were drawn from 14 districts and eight of them were also covered in the baseline study in 1998 (Zgovu and Mvula, 1998).[14] In this study, we use 1,836 observations of which 72 percent are from participants and 28 percent are from non-participants. Obviously, this sample is not representative and the data was biased towards participants and it

[13] See Teklu and Asefa (1997) and Vodopivec (1999) for application of the Heckman two-stage procedure in public works employment.

[14] For each project site a random sample of 90 participants and 30 non-participants, hence 1,820 respondents was the target. The actual sample covered in the study was 1,991 respondents of which 69.9 percent were participants and 30.1 percent were non-participants, to which a semi-structured questionnaire was administered in addition to selected focus group discussions. See Mvula et al. (2000) for details.

is risky to make generalisations from the analysis. Nonetheless, with these limitations, the study provides pointers on the factors that determine participation that may be relevant in the targeting of the poor.

Table 1 presents the descriptive statistics of the variables that we use in the analysis of factors that influence participation in public works, extent of employment and the socio-economic impact of public works projects. The gender distribution of our sample is almost equal with males being 50.44 percent and females 49.56 percent of the sample. Also 82.4 percent of the respondents belong to male-headed households compared to 17.6 percent that belong to female-headed households. The average household size is 5 members with 3 members being economically active members of the household. In terms of participation in the wage labour market, 58.9 percent of those who participated in public works had worked in alternative employment 12 months before the public works project. The average size of land holdings is 1.21 hectares and the average number of food deficit months in a year is 2.

[Table 1 about here]

In terms of asset possession, only 65.3 percent possess at least one asset and the average number of livestock (proxied by number of chicken) is 6. Nearly half of the sample respondents had their reservation wages (the wage rate below which they would not accept similar employment under normal circumstances) below the wage offered in the public works programme. Among the participants in the public works programme 68 percent revealed that their participation in public works projects improved their socio-economic status in the community. The average earnings from public works employment are MK1,803.69 for the period of engagement in the public works programme, but the standard deviation is above the mean earnings.

5. Empirical Results

5.1 Participation in the Public Works Programme

Table 2 present the maximum likelihood estimates of factors that influence participation in public works employment. We estimate the probability of participation on the pooled sample, and on

the decomposed sample for male and female respondents and we include dummies for sites to account for variations across project areas. The results show that participation is significantly influenced by gender, education, household composition, assets and reservation wages. Gender in terms of sex of participants plays an important role in the participation, with the probability of males participating being 13.3 percent higher than the probability of females participating in the public works programme. The age of the respondent (AGE) is positively associated with participation, but the coefficient is only statistically significant at the 5 percent level in the pooled sample model. Most of the poor in Malawi are least educated, and the significant negative relationship between number of years of school (EDUC) and probability of participating in all the three models suggests that the programme has high likelihood of targeting the poor. The unit increase in the years of schooling decreases the probability of participation by 0.97 percent among male respondents and 1.21 percent among female respondents.

[Table 2 about here]

Recent estimates of poverty in Malawi suggest that 65 percent of female-headed households in Malawi are poor, compared to 56 percent for male-headed households (National Statistical Office, 2000). Female-headed households in the public works programme in Malawi are a specific target group in the design of the programme, and the negative relationship between male-headed households (SEXHH) and probability of participation further confirms high targeting of the vulnerable groups.[15] Belonging to a female-headed household increases the probability of participation by 6.41 percent in the pooled sample and by 7.58 percent among females. The probability of participation significantly increases with the number of economically active persons in the household (HSEC) in the pooled sample and in the sample of females. This relationship suggests that members from households with higher labour force are more likely to participate, and this has implications for the participation of the vulnerable groups when projects are initiated during the farming period. Mvula et al. (2000) find that 42.9 percent of participants preferred working on public works projects in the post-harvest season, during which many households have less work to do than during the cropping season.

[15] The variable representing sex of household head was not included in the male sample because the proportion of male respondents belonging to female-headed households is less than 2 percent and its inclusion does not alter the reported results significantly.

Land size (LANDS) reduces the probability of participation in the pooled sample and the male sample models, but increases the probability of participation among females. However, the coefficient is statistically significant only in the male sample model, and the results show that a unit increase in the size of agricultural land decreases the probability of participation by 1.79 percent among males. Food insecurity represented by the number of months the household is in food-deficit in a year, FDEFM, is positively related to participation and the coefficient is statistically significant at the 5 percent level except in the male sample. Generally, areas that are targeted for public works projects are selected on the basis of food insecurity and in rural Malawi it is more widely accepted that lack of adequate food is one of the principal indicators of poverty (Machinjili et al., 1999). Possession of at least one household asset (ASSETS) as one of the measures of wealth decreases the probability of participation in all the three models. The impact of asset possession on participation is stronger among females compared to male respondents, with acquisition of a second asset reducing the probability of participation by 8.24 percent in the former and 5.53 percent in the latter. Respondents whose reservation wages are above the wage offered for the public works employment are more unlikely to participate as indicated by the negative coefficient of the dummy variable, RWAGE. However, the coefficient of RWAGE is only statistically significant at the 1 percent level in the pooled and male samples. If the reservation wage is a proxy of poverty, then the public works programme using the minimum wage as a self-selecting instrument has higher probability of targeting the poor.

These results have implications for targeting the vulnerable groups. While some individuals with similar characteristics of the poor were eliminated from participation due to rationing, the multivariate regression analysis in this study shows that the level of targeting the poor in the Malawian public works programme is high and confirms earlier results in Mvula et al. (2000). If we describe the poor as those with low education, those belonging to female-headed households, those with excess labour, the landless, the food insecure, those lacking assets and those with lower reservation wages, then individuals with these characteristics are more likely to be targeted in public works projects in rural Malawi through the use of wage rates below the minimum wage. Most of these characteristics are associated with poverty in Malawi. Machinjili et al. (1999) in a survey on the perception of poverty note that poverty in Malawi is associated with households that lack adequate incomes, employment opportunities, sufficient food, adequate shelter, adequate clothing, security, credit opportunities, adequate infrastructures,

entrepreneurship spirit, inputs and transport facilities. We also find gender differences in participation with respect to labour force, land size, food security and reservation wages.

5.2 Extent of Employment

The level of cumulative earnings from public works employment, in a programme that offers uniform wages per task and across gender, partly depends on the total number of tasks completed in public works projects. Table 3 presents ordinary least square estimates of the total number of tasks completed in the public works programme from the pooled, male and female samples. Since the period of employment varies across projects, we include site dummies to control for variations in the duration of the programme in the area. The results for the female sample are weak, apart from the site dummies only the dummy for the number of household members participating is statistically significant at the 10 percent level.

[Table 3 about here]

The results from the pooled sample show that the total number of tasks, hence total earnings, increase with age up to 54 years, thereafter there is a negative relationship between employment and age. The critical age at which the extent of employment begins to decrease with age in the male sample is 44 years. In a programme that pays a uniform wage, this implies that young people tend to earn more by devoting more days to the public works projects. The physical requirement of most activities particularly in road construction, imply that the aged are likely to work less than the more productive age group.[16] The level of education is positively related to the extent of employment in public works projects, but the coefficient is statistically significant at the 5 percent level only in the pooled sample. The results show that those with higher education, once targeted, tend to maximize their participation in the public works employment in order to earn more income.

[16] Nonetheless, in the MASAF public works programme the elderly are offered lighter tasks such as baby-sitting.

Participants that belong to male-headed households also tend to commit more days to public works projects compared to those that belong to female-headed households. Previous employment prior to public works employment is negatively associated with extent of public works employment, but the coefficient of the dummy EXPERI is only statistically significant at the 5 percent level in the pooled sample and at the 1 percent level in the male sample. The impact of experience in wage employment is stronger among males than among females. Thus, those participants that had employment 12 months prior to working in the public works programme tend to complete fewer tasks in public works projects. The explanation for this may lie in the fact that the likelihood of exit may be higher, such that once they find alternative employment they easily drop out of the public works programme. The extent of employment also tends to be higher among participants that have more than one member of the household participating, and this applies across males and females although the effect in the former is higher than in the latter. Total tasks completed were also significantly higher among participants in sites 3, 5 and 13 but were significantly lower in sites 6, 9 and 10.

5.3 Socio-economic Impact of Participation

The success of a poverty-oriented public works programme can be partly judged by its ability to improve the socio-economic status of vulnerable groups either directly through income transfers or indirectly through the economic prosperity that the assets created bring to the community. Nonetheless, the full benefits of the programme need to take into account the social cost of implementing the programme, the opportunity cost of participation and the efficiency of the institutions involved in the implementation process. Here, we only consider the revealed socio-economic benefit of the programme from the perspective of those who participated in public works employment.[17] Participants in the public works programme were directly asked whether their participation in the MASAF sponsored public works employment had improved their socio-economic status or livelihoods. The 'yes' responses to this question were recorded from 70.9 percent of the participants covered in the study and most described the change as being better off now and being able to afford basic necessities. Other participants indicated that they own small

[17] See Mvula et al. (2000) for further details on the impact of the MASAF public works programme including sentiments recorded during focus group discussions.

businesses and acquired more assets using the income earned from the public works employment. Nonetheless, 81.2 percent of participants reported that wages from public works employment were mostly used to purchase food items. A comparison of children covered in the 1998 baseline survey and the 2000 beneficiary assessment using anthropometric scores reveals improvements in the nutritional status of children (Mvula et al., 2000).

Table 4 presents maximum likelihood estimates of the probability of revealing the positive impact of participation in the public works programme. The probit models are adjusted for selectivity bias by the inclusion of the inverse Mills ratio as an explanatory variable. The general model (Model 1) shows negative relationships between changes in socio-economic status and being male, belonging to male-headed households, household size, food insecurity but positive relationship with the reservation wage, number of household members participating, the time trend and the total earnings.

[Table 4 about here]

However, only four factors are statistically significant even in the parsimonious model (Model 2) but the generalized likelihood ratio test generates a test statistic with a chi-squared distribution of 56.58 with 7 degrees of freedom, which rejects the parsimonious model in favour of the general model at the 1 percent level. The results show the coefficient of SEX being statistically significant at the 1 percent level and shows that the probability of the programme having positive impact is 13.1 percent higher among female participants compared to male participants. This may be due to higher valuation of marginal increases in income particularly where such income is allocated to purchase of food products. Focus group discussions also revealed that females were more in favour of in-kind payments in form of food payments than males, implying that females' valuation of food items is higher than that of males.

Respondents that had more than one member of the household participating in the programme have higher probability of revealing improvements in the socio-economic impact. The probability of revealing positive impact increases by 18.2 percent if more than one person in the household were to participate. This result also relates to the issue of targeting. For example, if rationing were to be on the basis of one participant per household in favour of widening

coverage, then such rationing may undermine the positive impact of the programme on the socio-economic status of vulnerable groups. In the study areas, about 25 percent of participants reported that recruitment of workers was restricted to one member per household. This is expected because in each of the projects there were limited employment opportunities and the communities responsible for recruitment used some sort of rationing (Mvula et al., 2000). However, in new projects under MASAF II, double shifts have been introduced to provide employment opportunities to all the poor irrespective of the number participating per household. Nonetheless, whether one or more people in the household participate depends on the labour force in the household. Teklu and Asefa (1997) find that at least 20 percent of the poor in Botswana could not participate because of the absence of supporting working adults.

The inclusion of the time trend captures the effect of the most recent participation in public works projects.[18] The coefficient of the time trend, TIME, is statistically significant at the 5 percent level and the positive relationship implies that the most recent participation has greater impact. Although the marginal effect of time is small, 0.24 percent, the results suggest that the long-term impact of the public works programme is marginal. This raises questions on the extent to which public works employment may contribute positively to alleviating poverty in the long-run. Finally, those who earn more, hence who devote more days or who participated in projects with longer duration, have higher probability of revealing the positive impact of the programme. The coefficient of EARNINGS is positive and statistically significant at the 5 percent level, and a unit increase in the earnings raises the probability of revealed impact by 4.91 percent. The result therefore shows that the longer the duration of employment the more likely the project is to make significant differences in the livelihoods of the participants.

6. Concluding Remarks

This study set out to investigate the factors influencing participation and extent of employment, and the characteristics of those who revealed the positive impact of participation in public works projects in rural Malawi. The public works programme in rural Malawi, implemented by

[18] It must also be acknowledged that the wage rate in the earlier periods was lower and the effect of inflation might have worsen the standard of living with implications on the valuation of the impact of the programme.

MASAF, aims at targeting the poor and vulnerable groups using the minimum wage as a self-selecting instrument for participation. The analysis in this study shows that although there is leakage, in the sense that some of the very poor are left out due to rationing, the use of a wage rate below the minimum wage encourages participation from the very poor - particularly the less educated, those from female-headed households, the food insecure, those lacking assets and those whose reservation wages are below the statutory minimum wages for rural areas. However, we find evidence of gender imbalance in participation, with the probability of participation for males being higher than that for female respondents. In most project sites, focused group discussions revealed that the information content at community level had a lot of gender stereotyping, particularly with respect to the nature of work, that discouraged women from registering their interest in public works employment (Mvula et al., 2000).

Although public works employment is short-term, 68 percent of participants revealed that their participation in the programme significantly improved their socio-economic status within the community. The econometric analysis shows that female participants, those that worked for longer period (earned more), those from households in which more than one member participated and those who participated in the most recent projects tend to reveal the positive impact of the programme. The fact that those who participated in the most recent projects felt that the programme improved their socio-economic status, implies that the long-term effects of the public works programme are negligible, and the fight against poverty needs long-term solutions. Indeed, in most project sites communities are demanding the provision of public works employment on a more continuous basis for them to move out of the poverty trap. However, the policy dilemma facing the government is whether to widen or deepen coverage given the limited resources. The current thinking is for the programme to reach as many poor as possible, a strategy that is deficient in addressing the long-term nature of poverty. Our analysis shows that deepening coverage, either through provision of employment over a longer period or increasing the wages, may be the best strategy for attacking poverty in the long-term compared with the present political correctness of widening coverage.

References

Basu, K. (1987) The Elimination of Persistent Hunger in South Asia: Policy Options, in J. P. Dreze and A. K. Sen (eds.) **The Political Economy of Hunger**, Oxford: Oxford University Press

Bryceson, D. F. and Howe, J. (1997) African Rural Labour and the World Bank: An Alternative Perspective, **Development in Practice, 7 (1)**, 26-38

Clay, E. J. (1986) Rural Public Works and Food-for-Work: A Survey, **World Development, 14 (10 / 11)**, 1237-1252

Dandekar, K. and Sathe, M. (1980) Employment Guarantee Scheme and Food for Work Programmes, **Economic and Political Weekly, 15**, 707-713

Datt, G. and Ravallion, M. (1994) Transfer Benefits from Public Works Employment: Evidence for Rural India, **Economic Journal, 104 (November)**, 1346-1369

Edmonds, G. A. and de Veen, J. J. (1992) A Labour-based Approach to Roads and Rural Transport in Developing Countries, **International Labour Review, 131 (1)**, 95-110

Gaiha, R. (1996a) How Dependent are the Rural Poor on employment Guarantee Scheme in India, **Journal of Development Studies, 32 (5)**, 669-694

Gaiha, R. (1996b) Wages, Participation and Targeting - The Case of the Employment Guarantee Scheme in India, **Journal of International Development, 8 (6)**, 785-803

Gaiha, R. (1997) Do Rural Public Works Influence Agricultural Wages? The Case of the Employment Guarantee Scheme in India, **Oxford Development Studies, 25 (3)**, 301-314

Gaiha, R. (2000) Do Anti-poverty Programmes Reach the Rural Poor in India, **Oxford Development Studies, 28 (1)**, 71-95

Gaude, J. and Watzlawick, H. (1992) Employment Creation and Poverty Alleviation through Labour-Intensive Public Works in Least Developed Countries, **International Labour Review, 131 (1)**, 3-18

Guha, S. (1981) Income Redistribution through Labour-Intensive Rural Public Works: Some Policy Issues, **International Labour Review, 120 (1)**, 67-82

Hall, B. H., Cummins, C. and Schnake, R. (1995) **Time Series Processor Version 4.3 - User Manual and Reference Manual**, California: TSP International

Heckman, J. (1979) Sample Selection as a Specification Error, **Econometrica, 47 (1)**, 153-161

Hossain, M. and Asaduzzaman, M. (1983) An Evaluation of the Special Public Works Programme in Bangladesh, **Bangladesh Development Studies, 11 (1 / 2)**, 191-226

Holt, J. F. J. (1983) Ethiopia: Food for Work or Food for Relief, **Food Policy, 8 (3)**, 187-201

Imschoot, M. van (1992) Water as a Source of Employment, **International Labour Review, 131 (1)**, 125-137

Jackson, T. (1982) **Against the Grain**, Oxford: Oxfam

Jalan, J. and Ravallion, M. (1999) Income Gains to the Poor from Workfare: Estimates for Argentina's Trabajar Program, World Bank Working Paper No. 2149, Washington

Machinjili, C., Mataya, C. and Tsoka, M. G. (1999) A Study to Develop Research Policy for and Operational Definition of Poverty in Malawi, Report prepared for the Poverty and Social policy Division of the National Economic Council

Malawi Government, (1994), **Malawi: Demographic and Health Survey 1992**, (National Statistical Office, Zomba, Malawi) and Demographic and Health Surveys Macro International Inc. (Maryland USA).

Malawi Government and University of Malawi (1995) Malawi Social Indicators Study, Ministry of Economic Planning and Development, National Statistical Office and Centre for Social Research, Lilongwe, Malawi.

MASAF (1999) Project Implementation Manual, Lilongwe: MASAF Management Unit

MASAF (2000) Public Works Programme: Quarterly Report for the period January to March 2000, Lilongwe: MASAF Management Unit (PWP Division)

Mellor, J. W. (1980) Food Aid and Nutrition, **American Journal of Agricultural Economics, 62 (5)**, 979-983.

Mellor, J. W. (1982) Food Employment and Growth Interactions, **American Journal of Agricultural Economics, 64 (2)**, 304-311.

Miller, S. K. (1992) Remuneration Systems for Labour-Intensive Investments: Lessons for Equity and Growth, **International Labour Review, 131 (1)**, 77-93

Mvula, P. M., Zgovu, E. K., Chirwa, E. W and Kadzamira, E. (2000) Malawi Social Action Fund: Third Beneficiary Assessment of the Public Works Programme, Report by Wadonda Consult prepared for the Malawi Social Action Fund, Lilongwe: MASAF

National Statistical Office (2000) The Poverty Analysis of the Integrated Household Survey 1997-98 - The State of Malawi's Poor: The Incidence, Depth, and Severity of Poverty, Available at *http://www.nso.malawi.net*

Ravallion, M. (1991a) On the Coverage of Public Employment Schemes for Poverty Alleviation, **Journal of Development Economics, 34**, 57-79

Ravallion, M. (1991b) Reaching the Rural Poor through Public Employment: Arguments, Evidence, and Lessons from South Asia, **World Bank Research Observer, 6 (2)**, 153-175

Ravallion, M. (1998) Appraising Workfare Programs, World Bank Working Paper No. 1955, World Bank, Washington, D.C

Ravallion, M. (1999) Appraising Workfare, **World Bank Research Observer, 14 (1)**, 31-48

Subbarao, K. (1997) Public Works as an Anti-Poverty Programme: An Overview of Cross-Country Experience, **American Journal of Agricultural Economics, 79 (2)**, 678-683

Teklu, T. and Asefa, S. (1997) Factors Affecting Employment in a Labour-Intensive Public Works Scheme in Rural Botswana, **Economic Development and Cultural Change, 46 (1)**, 175-186

Teklu, T. and Asefa, S. (1999) Who Participates in Labour-Intensive Public Works in Sub-Saharan Africa? Evidence from Rural Botswana and Kenya, **World Development, 27 (2)**, 431-438.

Tschirley, D., Donovan, C. and Weber M. (1996) Food Aid and Food Markets: Lessons from Mozambique, **Food Policy, 21**, 189-209.

Vodopivec, M. (1999) Does the Slovenian Public Work Program Increase Participants Chances to Find a Job? **Journal of Comparative Economics, 27**, 113-130

World Bank (1990) **World Development Report**, Washington D.C.: World Bank

World Bank (1995) **Malawi: Human Resources and Poverty, Profile and Priorities for Action**, Washington D.C.: World Bank

World Bank (1999) **African Development Indicators 2000**, Washington D.C.: World Bank

World Bank (2001) **World Development Report 2000/2001: Attacking Poverty**, Washington D.C.: World Bank

Zgovu, E and M. Tsoka (1996) Chapananga Food For Work Programme Evaluation Report, World Vision International/Malawi, Blantyre, Malawi.

Zgovu, E. K. (2000) The Dynamics of Rural Labour Market in Malawi, (Final Report), National Economic Council and Rural Economic Policy Centre, Lilongwe

Zgovu, E. K., Mvula, P.M., Kunkwenzu, E., and Potani, M. (1998), A Review and Evaluation of the MASAF Safety Net Programme, (Final Report) Malawi Social Action Fund, Lilongwe, Malawi.

Zgovu, E. and P. Mvula (1998) MASAF Safety Net Baseline Study, Malawi Social Action Fund, Lilongwe, Malawi.

Table 1 Descriptive Statistics from Sample Respondents

Variable	Description	Mean	SD
	Dependent Variables		
PPWP	Dummy variable equal to 1 if respondent participated in public works, otherwise equal to zero.	0.7157	0.4512
LOGTASKS	Natural logarithm of total number of tasks in public works projects.	-0.2053	0.9517
IMPACT	Dummy variable equal to 1 if the respondent who participated revealed that their participation resulted in significant changes in the household socio-economic status.	0.6838	0.4652
	Household Characteristics		
SEX	Sex of respondent (Male = 1, Female = 0).	0.5044	0.5000
AGE	Age of respondent in years.	37.8328	14.012
AGESQ	Age of respondent in years squared.	1627.54	1195.99
EDUC	Education of respondent in number of years of schooling.	3.9237	3.428
SEXHH	Sex of Household Head (Male = 1, Female =0).	0.8241	0.381
HHSIZE	Number persons in the household	4.9666	2.3275
HSEC	Number of economically active household members.	2.6563	1.449
EXPERI	Dummy variable if the participant had participated in the wage labour market 12 months before the public works programme.	0.5887	0.4923
	Households Assets and Wealth Indicators		
LANDS	Land size in hectares.	1.2098	1.323
FDEFM	Number of food deficit months in the previous season.	1.9853	3.369
ASSETS	Possession of at least one asset (bicycle, plough, ridger, sewing machine, ox-cart, fishing boat/canoe, radio, etc).	0.6525	0.476
LIVEST	Number of chickens.	6.1138	9.382
HHMPD	Dummy if the number of household members participating in the public works project is more than 1.	0.3897	0.4880
	Wages and Earnings from Public Works		
RWAGE	Dummy equal to 1 if reservation wage is revealed greater than MASAF wage.	0.4706	0.499
EARNINGS	Total earnings from the public works programme (Hundreds of Malawi Kwacha).	18.0360	18.4706
	Project Status and Sites		
TIME	Trend representing the last time the respondent participated in the programme (TIME = 1, ..., 5).	3.7491	0.6904
SITE1 - SITE16	Dummy variables for 16 project sites covered in the study.	-	-
Proportion of participants in public works		0.72	
Proportion of non-participants		0.28	
Number of respondents		1836	

Table 2 Maximum Likelihood Estimates for Determinants of Participation in Public Works Projects in Malawi *(Probit Models: Dependent Variable is PPWP)*

Variables	Pooled Sample			Male Sample			Female Sample		
	coeff.	*t-ratio*	*slope*	*coeff.*	*t-ratio*	*slope*	*coeff.*	*t-ratio*	*slope*
Intercept	**0.5256** [b]	*2.520*	0.1646	**0.9887** [a]	*3.439*	0.2918	0.3664	*1.216*	0.1125
SEX	**0.4232** [a]	*5.541*	0.1325	-	-	-	-	-	-
AGE	**0.0064** [b]	*2.455*	0.0020	0.0042	*1.171*	0.0012	0.0054	*1.342*	0.0017
EDUC	**-0.0390** [a]	*-3.508*	-0.0122	**-0.0328** [b]	*-2.193*	-0.0097	**-0.0394** [b]	*-2.276*	-0.0121
SEXHH	**-0.2049** [b]	*-2.099*	-0.0641	-	-	-	**-0.2470** [b]	*-2.273*	-0.0758
HSEC	**0.0437** [c]	*1.833*	0.0137	0.0328	*0.931*	0.0097	**0.0561** [c]	*1.655*	0.0172
LANDS	-0.0377	*-1.552*	-0.0118	**-0.0607** [b]	*-2.127*	-0.0179	0.0470	*0.740*	0.0144
FDEFM	**0.0288** [b]	*2.352*	0.0090	0.0138	*0.794*	0.0041	**0.0361** [b]	*2.134*	0.0111
ASSETS	**-0.2025** [a]	*-2.696*	-0.0634	**-0.1875** [c]	*-1.648*	-0.0553	**-0.2683** [b]	*-2.531*	-0.0824
LIVEST	-0.0027	*-0.778*	-0.0009	-0.0052	*-1.041*	-0.0015	0.0018	*0.350*	0.0006
RWAGE	**-0.2053** [a]	*-3.083*	-0.0643	**-0.2620** [a]	*-2.697*	-0.0773	-0.1315	*-1.374*	-0.0404
SITE2	**0.3256** [c]	*1.749*	0.1019	0.2110	*0.718*	0.0623	**0.4117** [c]	*1.653*	0.1264
SITE3	0.2835	*1.540*	0.0888	0.0172	*0.064*	0.0051	**0.4919** [b]	*1.926*	0.1511
SITE4	0.2583	*1.414*	0.0809	0.2736	*1.022*	0.0807	0.2561	*1.005*	0.0786
SITE5	0.2169	*1.160*	0.0679	0.2903	*1.195*	0.0857	-0.2899	*-0.843*	-0.0890
SITE6	**-0.8855** [a]	*-4.712*	-0.2772	**-0.5314** [b]	*-2.076*	-0.1568	**-1.6140** [a]	*-4.945*	-0.4956
SITE7	0.1091	*0.587*	0.0341	-0.2739	*-0.993*	-0.0808	0.3868	*1.497*	0.1188
SITE8	0.1665	*0.866*	0.0521	0.2451	*0.982*	0.0723	-0.3105	*-0.897*	-0.0953
SITE9	0.1858	*0.957*	0.0582	0.0932	*0.346*	0.0275	0.3267	*1.149*	0.1003
SITE10	0.1749	*0.928*	0.0547	**-0.5319** [c]	*-1.880*	-0.1570	**0.5983** [b]	*2.241*	0.1837
SITE11	0.0995	*0.498*	0.0312	-0.1333	*-0.475*	-0.0393	0.3562	*1.220*	0.1094
SITE12	**-0.4715** [b]	*-2.479*	-0.1476	-0.3383	*-1.122*	-0.0998	**-0.4919** [c]	*-1.923*	-0.1511
SITE13	0.1720	*0.914*	0.0538	0.2181	*0.716*	0.0643	0.2248	*0.897*	0.0690
SITE14	0.0723	*0.370*	0.0226	-0.1006	*-0.380*	-0.0297	0.2876	*0.967*	0.0883
SITE15	0.1358	*0.689*	0.0425	0.5691	*1.550*	0.1679	0.0569	*0.221*	0.0175
SITE16	0.0578	*0.300*	0.0181	-0.2665	*-1.005*	-0.0786	**0.4802** [c]	*1.659*	0.1475
R^2	0.0708			0.0640			0.1351		
Log *L*	-1018.05			-486.11			-495.24		
Prediction	0.7314			0.7540			0.7412		
N	1839			927			912		

Notes: Superscripts *a*, *b* and *c* stand for estimates statistically significant at the 1 percent, 5 percent and 10 percent level, respectively. The slope is the change in the probability of participation as a result of the unit change in the explanatory variable. The R-squared is the Kullback-Leibler R^2.

Table 3 Ordinary Least Square Estimates for Total Employment from Public Works Projects in Malawi *(Models Adjusted for Selectivity Bias: Dependent Variable is LOGTASKS)*

Explanatory Variables	*Pooled Sample*		*Male Sample*		*Female Sample*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*	*coefficient*	*t-ratio*
Intercept	**-1.3558** [a]	*-3.812*	**-1.1838** [a]	*-3.100*	**-1.7990** [b]	*-2.377*
AGE	**0.0321** [b]	*2.368*	**0.0355** [a]	*3.012*	0.0428	*1.307*
AGESQ	**-0.0003** [b]	*-2.084*	**-0.0004** [a]	*-2.640*	-0.0004	*-1.122*
EDUC	**0.0214** [b]	*2.257*	0.0135	*1.066*	0.0012	*0.065*
SEXHH	**0.1924** [b]	*2.483*	-	-	-	-
EXPERI	**-0.1323** [b]	*-2.321*	**-0.2364** [a]	*-2.879*	-0.0943	*-1.198*
HHMPD	**0.1133** [c]	*1.957*	**0.1555** [c]	*1.812*	**0.1358** [c]	*1.727*
TIME	0.0816	*1.529*	0.0801	*1.155*	0.0419	*0.453*
SITE2	**0.2152** [c]	*1.857*	0.1757	*0.996*	**0.4690** [b]	*2.466*
SITE3	**0.4615** [a]	*4.607*	**0.3657** [b]	*2.315*	**0.8062** [a]	*4.630*
SITE4	0.1761	*1.384*	0.2550	*1.493*	0.2064	*0.910*
SITE5	**0.6805** [a]	*5.903*	**0.7785** [a]	*5.369*	-0.1064	*-0.312*
SITE6	**-1.3033** [a]	*-4.707*	**-1.4976** [a]	*-4.870*	-0.8676	*-1.502*
SITE7	0.0389	*0.362*	0.1033	*0.581*	0.2177	*1.302*
SITE8	0.1641	*1.315*	0.1695	*1.023*	0.1718	*0.723*
SITE9	**-0.3098** [b]	*-2.145*	-0.3301	*-1.669*	-0.0556	*-0.232*
SITE10	**-0.2916** [b]	*-2.194*	0.0591	*0.271*	-0.1858	*-0.989*
SITE11	0.0777	*0.465*	0.4166	*1.599*	-0.0352	*-0.124*
SITE12	-0.0539	*-0.392*	-0.2226	*-1.184*	-0.1544	*-0.615*
SITE13	**0.4080** [a]	*3.345*	**0.3838** [b]	*2.108*	**0.6619** [a]	*3.477*
SITE14	-0.0775	*-0.568*	0.0322	*0.189*	-0.1378	*-0.541*
SITE15	0.1786	*1.434*	0.1809	*1.027*	0.2040	*1.014*
SITE16	-0.1460	*-1.227*	-0.1236	*-0.697*	-0.0574	*-0.302*
λ	-0.2717	*-1.534*	-0.0567	*-0.275*	0.4144	*0.940*
Adjusted R^2	0.2616		0.3087		0.1902	
F-test *[p-value]*	15.69	*[0.000]*	11.75	*[0.000]*	5.06	*[0.000]*
N	955		528		381	

Notes: The t-statistics are based on heteroscedastic-consistent standard errors. Superscripts *a*, *b* and *c* stand for estimates statistically significant at the 1 percent, 5 percent and 10 percent level, respectively. λ is the inverse Mills ratio from the participation equations for the pooled, male and female samples.

Table 4 Maximum Likelihood Estimates of the Revealed Improvement in Socio-economic Impact of the Public Works Programme *(Probit Model Adjusted for Selectivity Bias: Dependent Variable is IMPACT)*

Explanatory Variables	*Model 1*			*Model 2*		
	Coefficient	*t-ratio*	*slope*	*Coefficient*	*t-ratio*	*slope*
Intercept	-0.0487	*-0.164*	-0.0166	-0.2357	*-0.899*	-0.0795
SEX	**-0.3832** [a]	*-3.593*	-0.1305	**-0.3897** [a]	*-4.439*	-0.1314
EDUC	0.0143	*0.992*	0.0049	-	-	-
SEXHH	-0.1697	*-1.214*	-0.0578	-	-	-
HHSIZE	-0.0184	*-0.977*	-0.0063	-	-	-
FDEFM	-0.0017	*-0.150*	-0.0006	-	-	-
RWAGE	0.0537	*0.567*	0.0183	-	-	-
HHMPD	**0.5366** [a]	*5.850*	0.1827	**0.5375** [a]	*6.127*	0.1813
TIME	**0.0071** [b]	*2.360*	0.0024	**0.0070** [b]	*2.411*	0.0023
EARNINGS	**0.1442** [b]	*2.259*	0.0491	**0.1444** [b]	*2.341*	0.0487
λ	-0.0705	*-0.248*	-0.0240	0.0758	*0.322*	0.0256
R^2	0.0659			0.0608		
Log Likelihood	-570.39			-598.68		
Prediction	0.6813			0.6911		
N	954			1010		

Notes: Superscripts *a*, and *b* stand for estimates statistically significant at the 1 percent and 5 percent, respectively. The slope is the change in the probability of revealing positive socio-economic impact of participation as a result of the unit change in the explanatory variable. λ is the inverse Mills ratio from the participation equation for the pooled sample. The R-squared is the Kullback-Leibler R^2.