



GREEN JOBS FOR THE POOR: A PUBLIC EMPLOYMENT APPROACH

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National Tapajos Forest Resident Collects Foliage, Brazil

This paper is part of a series commissioned by the Inclusive Development Cluster of UNDP's Poverty Group in the Bureau for Development Policy at UNDP with a view to identifying how to address various development challenges in the context of the current economic and financial crisis. To the extent employment has been shown to be central to recovery, the papers seek to explore how an employment focus can be addressed in synergy with the challenge in question.

Abstract¹

Over the past few years the employment creation potential of activities beneficial to the environment has been receiving increasing attention through the term of 'green jobs'. These jobs are often understood to be those involving the implementation of measures that reduce carbon emissions or help realise alternative sources of energy use in developed economies. This paper explores the potential for governments to create "green jobs" and align poverty reduction and employment creation in developing countries with a broader set of investments in environmental conservation and rehabilitation to also preserve bio diversity, restore degraded land, combat erosion, and remove invasive aliens etc. In many cases, environmental degradation has a devastating direct effect on the poor, whether they themselves are the main cause of this degradation or not, and indications are that well designed interventions can contribute directly to the poverty-environment nexus by allowing income generated from environmental activities to ease the pressure on generating income through exploiting the environment. Environmental sector targeted public employment programmes can also be deployed to specifically address environmental concerns and create employment for the poor at the same time. The paper draws heavily on the experiences on the Working for Water programme in South Africa because of the size and longevity of the programme and the extensive research and it has been subjected to. It continues by presenting an overview of the types of environmental activities that could be included in such programmes, and explores issues relating to how the programmes are prioritised, limitations with regards to estimating the costs and benefits, and in light of this, the paper considers how different types of funding and implementation strategies and mechanisms might be deployed and/or combined to enable these investments to take place and maximise employment and environmental benefits.

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I. Introduction

"It is my belief that what is being accomplished will conserve our natural resources, create future national wealth and prove of moral and spiritual value, not only for those taking part, but to the rest of the country as well";

Franklin D. Roosevelt, 1933 addressing the Civilian Conservation Corps

The Civilian Conservation Corps, established in 1933 as one of the New Deal programmes and which continued until 1942, provided employment to 2 million people. It planted an estimated 2-3 billion trees, controlled erosion on 40 million acres of farmland, facilitated mosquito control over 240,000 acres of land, established 711 State Parks and developed 3 million acres of land for park use (Jones 2008, Paige 1985).

The creation of Green Jobs through public employment programmes thus clearly has its precedents, especially in times of crisis. Given the severity of both the economic and environmental crises the world is facing today, the need for such public employment programmes is arguably larger than ever. Calls for a Global Green New Deal strongly emphasise the need for green investments and highlight their employment creation benefits of these investments. This paper attempts to contribute to this debate by arguing for the inclusion of environmental public employment programmes targeting the poor and unemployed which just like in the Great Depression can make huge contributions to environmental sustainability, reduction of poverty and unemployment, and mitigating the impacts of the crisis.

II. Environment, employment and government

A. Green Jobs

Much of the damage and destruction done to the environment that was done by humans can also be reversed by humans. And just as the activities that damage the environment have generated vast amounts of employment, the activities required to rehabilitate and conserve it will as well. Over the past few years, the employment creation potential of activities that are beneficial to the environment has been receiving increased attention. They are increasingly referred to as "Green Jobs"³ and with the increased awareness about the massive risks of

³According to (ILO 2008) Green jobs reduce the environmental impact of enterprises and economic sectors ultimately to levels that are sustainable or involve jobs that conserve or rehabilitate the environment. Specifically, but not exclusively, this includes jobs that protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency strategies; de-carbonise the economy; and minimise or altogether avoid generation of all forms of waste and pollution.

global warming green jobs are quickly rising up the ranks of global political priorities⁴. The focus of these jobs is increasingly related to jobs that either conserve energy or help realise alternative sources of energy (UNEP 2007), with the aim of accelerating the shift to low carbon economies. However, there is a wider interpretation of the concept of green jobs that looks beyond energy issues to a broader set of environmental activities that include conservation and rehabilitation to preserve bio diversity, restore degraded land, combat erosion, remove invasive aliens etc. It is important that the potential of these investments in restoring the environment, creating employment and contributing to reducing poverty is not lost in the current focus on energy related green jobs, important though that is.

This paper will focus on environmental investments and in particular on those activities that can create employment for the poor. These initiatives will be referred to *environmental public employment*⁵ programmes, which are programmes that provide income and employment to poor unemployed people by engaging them in activities that result in environmental rehabilitation and conservation. One reason for this focus is that with the increasing momentum that the concept of green jobs is gaining, those green jobs that will be able to offer better income and entrepreneurship opportunities will receive the most attention. But investments in the environment will also provide an opportunity to create meaningful and productive employment for the poor on a large scale, and it is important that this does not get lost in the current debates. While the focus of this paper is on these types of public employment programmes, it is recognised that these do not and cannot exist in isolation of other environmental management and conservation activities. Given the somewhat temporary nature of the employment created through public employment programmes, transition to and/or complementarity with other attempts to create sustainable livelihoods, farming and entrepreneurship opportunities are important. The manner in which they support broader environmental policies and initiatives is also critical.

B. The Role of Government in Creating Employment and as Custodian of the Environment

One underlying argument of this paper is that governments have a important role to play in direct employment creation for the poor, as most evidence to date suggests that the market will only create a limited amount of employment for this group and that those who do not manage to engage in employment are likely to remain poor and marginalised until they do

⁴Recently, Barack Obama, Gordon Brown and Nicolas Sarkozy promised to increase investments in the creation of "Green Jobs". (Newsweek 3 November 2008, New York Times 23 Nov 2008). According to UNEP (2009 press release), the US stimulus package directs approximately \$100 billion or over 0.7 per cent of GDP towards greening the US economy: \$18 billion for clean water, flood control and environmental restoration and \$8.4 billion for transit, and \$8 billion for high-speed rail; \$4.5 billion to make federal office buildings more energy-efficient, \$30 billion for a smart power grid, advanced battery technology and other energy efficiency measures, \$20 billion in tax incentives for renewable energy and energy efficiency over the next 10 years;

\$6.3 billion for energy efficiency in multifamily housing that gets federal assistance, such as HUD-sponsored low-income housing and \$5 billion to weatherize more than 1 million homes owned by "modest-income" families.

⁵This paper will use both public works programmes and public employment programmes. While the use of the term public works programmes is more common, public employment programmes is preferred as it avoids the focus on infrastructure associated with the terms public works.

so (Wray 2007, Osmani 2005). The current global financial and economic crisis has initiated a re-examination of the role of the state in the economy. While this debate continues there appears to be developing a consensus for the state to play a more active role in the economy, rather than seeing its role mainly as a regulator. Specifically with regard to employment creation, the role of the State is expected to grow as the private sector is rapidly reducing their numbers of employees. Most of the government responses have centred on boosting demand through stimulus packages and thus indirectly boosting employment. Increasingly integrating environmental components into the crisis-related stimulus packages is becoming more common in recognition of the fact that apart from the global economic and financial crisis, there is also an environmental crisis that needs to be addressed and that measures to address them cannot be put off for much longer. It would appear that public employment programmes like the ones advocated in this paper could play an increasingly important role in the ways governments respond to the current crises.

Policy proposals being formulated in this regard speak of a *Global Green New Deal* (GGND) which would be a large scale, globally coordinated approach to the multiple crises that the world is facing now.⁶ Many of the components identified as a part of such a GGND, such as waste management and recycling and “ecological infrastructure”, could be implemented through public employment programmes as advocated in this paper. Furthermore, those activities that have an infrastructure component to it, such as the ‘weatherisation’ of buildings and the installation of solar water heaters on homes could also be structured along the lines of the programmes being advocated, whereby governments may be able to subsidise part of the labour and material costs of these activities.

In respect of accelerating the achievement of the Millennium Development Goals (MDGs), arguments for a greater role for government are particularly relevant for those MDGs with significant positive externalities such as gender equality and environmental sustainability. Khan (2007) argues that these MDGs would require a greater proportion of public investments as individuals are unlikely to invest in the achievement of these MDGs. These public investments can be structured to maximize the employment created in the process. Investments in these MDGs can thus also contribute directly to MDG 1b which focuses on creating full employment.

In addition to the responsibility of governments to implement programmes that reduce poverty and unemployment, there is also a strong rationale for governments to ensure environmental sustainability as articulated in MDG 7. Governments are either the main custodians of the environment, responsible for policing environmental regulations and protected areas or implementing specific environmental mandates, all of which require an active role of government. And in the context of Governments as market regulators, especially for those markets that are failing, there is a need to intervene in the market for environmental and ecosystem services as these markets are still largely dysfunctional, with neither externalities nor benefits provided by the environment being properly reflected in pricing.

⁶The Global Green New Deal also covers public employment programmes such as Working on Water, see UNEP (2009), page 20 (e-publication page 42, 298)

The final argument for a larger role for governments to make these proposed investments is the direct link between the environment and poverty, to so-called environment-poverty nexus and the need to mitigate/address these issues. There are also instances where these issues are the basis for conflict or where addressing them can help to facilitate peace building /recovery. In many cases, environmental degradation has had a devastating direct effect on the poor, whether they themselves are the main cause of this or not. And indications are that well designed interventions can contribute directly to addressing this by allowing income generated from environmental activities to ease the pressure on generating income through exploiting the environment (Vitae Civilis 2002⁷).

C. Alternative Job Creation and Livelihood Approaches: Potential Linkages

While this paper advocates a leadership role for governments in these public employment programmes, there may be various reasons why governments are not able to play a leadership role and undertake public employment programmes at least in the short term. In such circumstances, government may be in a better position to play a supporting role, through assisting other organisations and civil society who are in essence creating employment through rehabilitation and conservation of the environment.

Often the opposition to public employment programmes is rooted in a strong belief of focusing on market based interventions as these are seen as more sustainable in the long run. As will be pointed out later, where such markets exist and are accessible to the poor, such approaches should be considered and the role of government should focus on developing the market and enabling the poor to access and participate in these markets in a fair manner. On the one hand this would typically require investments in small business development, as well as specific technical training on the environmental area concerned, be it recycling, sustainable harvesting of forest products etc. But it may also require governments to step in to regulate or play a more active role in these markets to make them work better for the poor. Such active roles could include, using government purchasing power to stabilise demand as well as subsidies, pricing strategies and other interventions.

The tree planting activities of the Green Belt Movement in Kenya is a good example of what could arguably be a large public employment programme implemented by civil society. As it stands, it is done mostly without the government, and is based on volunteering rather than the provision of income. In such circumstances there would still be the possibilities for governments to support these programmes, even if there is no clear policy intent for using public employment programmes to create employment, as its activities generate a range of other benefits. Government support could be channelled to such programmes by identifying areas where there is policy alignment. Such opportunities often exist around environmental conservation policy objectives, supporting sustainable livelihood strategies, small and micro enterprise development and youth development, which are all components of the Green Belt Movement as well.

A specific and fairly common opportunity would be to integrate the proposed interventions with youth development and employment programmes. Youth are generally worst affected by unemployment and in many developing countries, youth unemployment

⁷Projects that have sought to stabilise the price at which rubber tappers can sell their products have led to associations of rubber tappers taking a more active role in protecting, and thus ensuring the productivity of these rubber producing areas.

has reached crisis proportions with unemployment rates above 25% being common. In such areas, policy options might focus on employment and training programmes for youth, not only to provide them with skills, but also to create a greater understanding of key environmental concerns so that they are also able to themselves identify entrepreneurship opportunities in the fields of environmental conservation and rehabilitation.

A final opportunity lies in areas where investments in the environment can form the basis for income generation and small business development. In the State of Maharashtra in India, where an employment guarantee programme has been running since the 1970's, opportunities for the public employment programmes to invest in increasing the productivity of the privately held land of small farmers through the construction of irrigation infrastructure have been identified. These investments intend to increase the productivity and income of these small farmers and to enable them to grow additional crops and reduce their need to work on the actual employment programmes. Care needs to be taken to develop clear policies on which types of private enterprise could benefit from such approaches but in general if a clear focus on the poor is maintained such interventions should not be controversial or open to extensive abuse (Government of Maharashtra 2006).

This paper will continue by introducing the Environmental Sector of the Expanded Public Works Programme (EPWP) in South Africa and some of its key programmes. They will be discussed not so much as models, but more as examples of what is possible in terms of programmes that specifically address environmental concerns and create employment for the poor at the same time. The paper will draw heavily on the experience of South Africa's *Working for Water programme* for the following reasons:

- The size and longevity of the programme
- The extensive research and evaluations that have been done on the programme
- The particular emphasis of the programme: removal of alien invasive species, which is generally more difficult to motivate than other programmes, and so its success holds some valuable lessons for other programmes

It is recognised that there are many other programmes that also warrant attention, and efforts have been made to also refer to other relevant programmes such as the *National Rural Employment Guarantee Act* (NREGA) in India which has a strong natural resource management component. After discussing the South African examples, an overview of the types of environmental activities that could be included in such programmes will be presented. In section five the prioritisation of these programmes, including approaches and their limitations with regards to estimating the costs and benefits will be discussed. Section six will discuss possible funding mechanisms for these programmes.

III. Case Study: The Environmental Sector of the EPWP (South Africa)

A. *The Working for Water Programme*

The first public works programme in South Africa with a specific focus on environmental rehabilitation and conservation was the *Working for Water*⁸ programme which commenced in 1995 as part of the Reconstruction and Development Programme (RDP) initiated by the new democratic government. The name of the programme is somewhat deceptive, and it surprises many to find that the main activity of the programme is the removal of alien invasive vegetation. However, this vegetation consumes considerably more water than native vegetation and as a result their sometime rapid spread significantly reduces stream flow in a country that already has real water scarcity. As such the programme is really an investment in the limiting factor - available fresh water - in this case. Furthermore as the removal of these plants is a very labour-intensive activity, the naming of the programme is not only technically correct, but also manages convey how a programme that addresses a relatively obscure and poorly understood environmental problem, also addresses two key existing political priorities: employment creation and water scarcity. The ability of the programme to communicate and demonstrate the synergy between environmental rehabilitation, employment creation for the poor and increased availability of water remains one of the keys to its successes to date.

By March 2009 the programme had cleared 856 000 hectares of invasive alien vegetation and this has resulted in increased stream-flows and availability of water in these areas (DWAF 2008). The benefits have extended well beyond increased water availability however and include increased productivity of land, in particular in areas where livestock is kept, maintenance of bio-diversity in particular in ecologically sensitive areas where invasive plants can overtake native species, increased land values, improved resilience to fires and has assistance in the conservation of many protected areas and reserves, critical to the growing tourism industry in South Africa. (Common Ground 2003)

Over the years, the *Working for Water programme* has spawned a range of other environmental public employment programmes sometimes referred to as the “Working for” programmes: *Working for Wetlands*, *Working on Fire*, *Working for the Coast*, *Working for Tourism and Working on Waste*. Proposals have been prepared to establish three additional programmes in the short term: *Working for Woodlands*, *Working for Forests* and *Working for Energy*, which contains many activities focused on reducing greenhouse gas emissions such as installing solar water heaters, improving energy efficiency of government buildings and generating energy from biomass waste. In addition similar programmes that have not adopted the Working for name include People and Parks and Land Care.

B. *The Environmental Sector of the EPWP*

In 2004, when the South African Government commenced the EPWP, the then existing

⁸See Working for Water webpage.

environmental public works programmes were grouped together as the Environmental Sector. It was anticipated that this would allow for better reporting, overall management and mobilisation of resources. Furthermore, given the cross-cutting nature of many of the environmental sector interventions, it was anticipated that this grouping together would result in better coordination between the various line departments and their agencies. Currently the overall reporting on the programmes has improved, and better mobilisation of resources is also finally taking place. A process for having one consolidated bidding process for all the EPWP programmes for their share of the national budget is now underway and is looking promising. The intergovernmental fiscal incentive to be introduced in 2009 will also allow these programmes to grow more rapidly by funding their labour costs through this mechanism and using their existing budgets to fund non-wage costs.

The sector now consists of eleven different programmes and three new programmes have been proposed. In the 2007-08 financial year the combined government expenditure on these programmes was ZAR 1 300 million (USD 183.3 million) (DPW 2008). Employment for poor previously unemployed people created in the last financial year amounted to 23 075 person-years of work (full-time equivalents) and 119 000 people worked and received ZAR 251 million in income directly through the various programmes. Estimates are that the sector will double in terms of employment created over the next five years of the programme, although this will still not fully respond to need for the services that these programme provide.

It is not claimed that the Environmental Sector of the EPWP is an unqualified success. The programmes do have a number of challenges and do face criticism. With regards to its impact on reducing poverty, the main criticism of the programme is that the work opportunities it offers are of too short a duration and thus provide too little income.⁹ Furthermore some of the programmes offer wage rates that are too low¹⁰, in relation to what is required to move workers above the poverty line (Mitchell 2008). The problem of work opportunities that are of limited duration can partially be addressed by improved programme design. Planning and scheduling work to maximise the duration of employment is possible, although care should be taken not to get into situation where projects are never finished because work duration targets need to be met as has reportedly been the case in some NERGA programmes in India (CSE 2008). With regards to the low wage rates, a process is underway in South Africa to establish a national minimum wage rate for the EPWP.

In terms of establishing such programmes, the South African experience demonstrates that there are three plausible routes for doing so. The first option is that these programmes are initiated within their own right, possibly with a specific intention of integrating various policy objectives. The Working for Water programme was established in such a manner. The second option is for departments and agencies to initiate such programmes as an expansion of their activities to protect, conserve, and rehabilitate the environment. An example of this is the Working on Fire programme which complements the other fire fighting and prevention activities of government. The third is where public works programmes that aim

⁹See EPWP Mid Term Review (2007); Antonopoulos (2008)

¹⁰Legislation in South Africa allows the departments of sub-national governments that implement public works projects to set their own local wage rates based on prevailing wage rates in the area. As a result wage rates vary considerably across the country and current proposals are that a national minimum wage level is set.

to maximise employment creation are designed to include environmental activities as part of their mandate. The newer environmental programmes established as part of the EPWP such as working on waste are examples of these.

What the environmental sector of the EPWP does clearly demonstrate is that these programmes can get off the ground and become significant contributors to both environmental rehabilitation and employment creation for the poor, and that they can do this in a way that also provides real economic and public benefits. As the environmental challenges facing most countries will only become more severe going forward, it is worth analysing the South African and other similar programmes around the world in more detail to assess what role they can play in addressing environmental concerns and reducing poverty.

IV. Scope of Environmental Public Employment Programmes

The activities that could be included into these environmental public employment programmes are wide ranging, and the ones chosen will depend on local conditions and priorities. The examples and activities presented are illustrative of the range of possibilities, including highlighting those that are often not considered. All the proposed activities can be done in a labour-intensive manner and lend themselves to employing poor, unskilled and semiskilled workers who would generally be able to do this type of work with minimal or limited training interventions. This is not meant to imply however that these programmes do not require skilled staff and professionals to be engaged in their design and implementation. Examples of environmental activities which can be done labour-intensively and where poor unemployed and underemployed can be engaged is provided in Table 1, with those activities included in the Environment Sector Programmes of the EPWP or NREGA¹¹ in India indicated in ().

Table 1: Interventions, benefits and work activities of various environmental interventions

Intervention	Main benefit	Labour-intensive work activities
Combating soil erosion (EPWP Land Care, NREGA)	Maintained productivity of the land	Construction of earth structures, planting of (native) vegetation

¹¹See National Rural Employment Guarantee Act [NREGA] (2005)

¹²Capturing rain water and directing it to replenish the ground water in urban areas is important as ground water is often the main source of urban water supply and the impermeability of most urban environments, dominated by asphalt and concrete, results in most water running off.

Intervention	Main benefit	Labour-intensive work activities
Water harvesting (NREGA)	Increased availability of (ground) water	Construction of weirs and other structures such as underground tanks, ponds, and cisterns in urban areas ¹² , renovation of traditional water bodies, desilting of tanks
Removal of invasive alien species (Working for Water)	Increased availability of water, increased productivity of land	Physical removal of aliens, applications of chemicals were appropriate
Removal of waste and litter (Working for the Coast)	Reduced pressure on storm and waste water infrastructure, aesthetics, public health	Collection and transport of waste and litter
Guarding of reserves and protected areas (People & Parks?)	Conservation of biodiversity, in particular endangered species, tourism	Patrolling of parks and park perimeters
Sustainable harvesting of forest products	Income through sale of products/ benefits from use	Collection and harvesting of products such as rubber, honey, firewood etc
Rehabilitation of degraded land (Working for Wetlands, Working for Woodlands, NREGA)	Restores ability of the land to provide ecosystem services such as water harvesting, purification, carbon sequestration and providing habitat to endangered species	Planting native vegetation, removal of alien vegetation and other man introduced structures, restoring streams and wetlands
Recycling	Income through the sale of recycled products, reduced landfill requirements	Collection, separation and transport of recyclable material
Composting	Income through sale of compost, inputs for agricultural and horticultural activities, reduced landfill requirements	Collection and separation of organic materials, construction and maintenance of composting facilities, packaging and sale of composted material
Installation of solar water heaters for poor households and government buildings	Reduced CO2 emissions, reduced energy costs for the poor and for government	Production and installation of solar water heaters

Intervention	Main benefit	Labour-intensive work activities
Weatherising homes and government buildings	Reduced CO2 emissions, reduced energy costs for the poor and for government	Insulating of ceilings, doors and windows
Fire prevention and fire fighting (Working on Fire)	Reduce the impact of and frequency of fires, in particular forest fires	Cutting and maintenance of firebreaks, removal of flammable material
Drought Proofing, Greening/ tree planting (Greening the Nation, watershed development NREGA)	Drought Proofing Production of fruits/ shade, carbon sequestration, reduced soil erosion, increased value of land	Planting of trees and other vegetation, watering and maintenance of saplings; micro watershed development

The benefits listed above, are the most direct and visible benefits of these activities. There is a range of other benefits that accrue which are not mentioned explicitly. The reason for this is that the quantification of these benefits, as discussed later, is difficult. Further, in most cases, stressing the clear and more direct benefits may be a more useful strategy for finding support for such programmes.

The degree to which it is desirable to establish a programme around each of these activities would need to be assessed on a case-by-case basis. What all of them have in common however is that beyond the benefits listed for each of them, they all have significant potential socio-economic benefits in being able to provide productive employment to poor and marginalised unemployed and underemployed people. It is this aspect that in most instances will need to be emphasised in order to make these programme politically attractive. There are few activities where government can create work for the poor even though this is often politically desirable, and it is this which gives these programmes potential political leverage. Furthermore these “Green Jobs for the poor” are all productive activities, and in many cases are desperately needed to reverse decades if not centuries of environmental decline.

V. Issues of Prioritisation, Costs & Benefits for Environmental Public Employment Programmes

It is still difficult for most governments to make decisions regarding investment in the environment. The main reason for this is that there is often no widely accepted approach for analysing the economic costs and benefits of these investments while these programmes compete with other investment options, whose benefit-cost ratios can be demonstrated

with more certainty. While the use of public employment programmes as a policy tool to reduce poverty and unemployment is less contested, there are some common criticisms that need to be addressed as well. Two approaches will be discussed below, the first will look at these environmental public employment programmes primarily as an investment in natural resources and the second will look at them as investment in reducing poverty. Integration of these two approaches will then be considered. This section will conclude with specific circumstances where it is believed that these programmes can be particularly beneficial and should be considered as possible investment options.

A. *Investments in the Environment*

Building the economic case for investments in natural capital, as the environment is increasingly referred to, continues to be difficult. The fundamental underlying difficulty remains the absence of a functional market for many of the benefits the environment and its ecosystems create. As a result there are very few pricing signals, or even related prices from which value could be inferred. While this paper is not the place to get into the merits or demerits of using market mechanisms to manage the environment, the point about the difficulty of doing cost-benefit analyses without markets and pricing information remains. As a result, doing these analyses is often extremely costly because of the amount of data that needs to be collected and the models that need to be created to essentially simulate a market situation. Environmental public works programmes run into the same difficulties when their economic viability needs to be assessed.

Turpie (2004) provides an excellent overview of the challenges within the field of resource economics itself that make these types of analyses so difficult. And while she focuses on the Working for Water programme, many of the issues she identifies apply to the quantification of benefits of a wider range of environmental programmes. The key issues she identifies that are relevant in the context of this discussion are briefly discussed below.

- *Identification of beneficiaries:* Whom the assumed beneficiary of an intervention is impacts both on the methods for determining the values and as a result also the actual value. For instance, when nature is the main beneficiary of increased water availability, this is generally valued/estimated as being of zero value.
- *Valuation of non -consumptive benefits:* Non consumptive benefits including services like soil formation and bio diversity remains difficult and costly to quantify. Some approaches such as the contingency valuation methods are costly to conduct and as a result these benefits are not quantified and are ignored.
- *Discount rates applied to benefits:* At higher discount rates, long term benefits are undervalued and so at an 8% discount rate (typically used in SA), the value accruing within a 25-30 year range is valued at nearly zero. Given the long term, even as regards intergenerational benefits that result from investments in the environment, a consensus needs to be developed on the appropriate discount rate for these benefits.

Recent developments in the field of Compensation and Rewards for Environmental Services (CRES) hold significant promise for resolving some of these issues as they provide specific methodologies for quantifying specific environmental benefits and also attempt to

create markets for these products and services which will allow for more effective pricing mechanisms.

Despite the difficulties outlined above, some activities have specific benefits which can be quantified accurately enough to make a solid economic case. The increased availability of water as a result of the Working for Water programme in South Africa has been quantified using various methods. And while the different methods yield different results, the fact that the benefit can be quantified is no longer disputed. In some circumstances, these benefits alone are sufficient to economically justify the programme and the difficulties in quantifying the range of other benefits the programme provides is not as problematic. In many cases however the programme can only be economically justified if some of the other benefits are also quantified. Until more cost-effective and more widely accepted methodologies are developed to quantify these other benefits: bio-diversity, aesthetics, soil formation, water purification etc. the difficulty with justifying these programmes solely on their currently quantifiable benefits will remain.

B. Investments in Poverty Reduction

The other approach to justifying these types of programmes is to treat them like investments in poverty reduction, because of the income they transfer to the poor employed on such programmes. Viewed in this manner, the main alternative policy option for governments would be direct cash transfers to the poor and a comparison with such a policy would be justifiable. From this perspective, cash transfers programmes are able to transfer income to the poor much more efficiently than public employment programmes and would seem preferable. But this would ignore the environmental and employment benefits the programmes provide as discussed in the section above.

One approach to deal with this is to separate the wage costs and non-wage costs of such programmes, treating the wage costs as a cash transfer to the poor and discounting it in terms of the programme cost-benefit analyses. Based on this approach, the environmental benefits would need to exceed the non-wage costs for the programme to be economically justifiable. This approach is favoured by Turpie (2004) among others and underlies the introduction of an intergovernmental wage incentive by the South African government to fund the wage component of the expansion of the EPWP in its second phase (Lieuw-Kie-Song and Miller [2009]).

There are also more specific issues that arise when cash transfer programmes are compared to public employment programmes. The first is that fully discounting the wage costs of these programmes ignores the opportunity costs for poor people working on the programme however low that may be. In comparison in the case of a cash transfer the opportunity cost is close to zero. Another point is that generally the non-income benefits of work as articulated by Wray (2007) and others are important but generally ignored because of the difficulties in quantifying benefits like increased self esteem and dignity and in proving the causal relationship between high unemployment and social problems like crime, alcoholism etc. The final point is that the overhead costs of cash transfer programmes should also be taken into account if such comparisons are made. Particularly in the case of means tested conditional cash transfers these cost can be substantial.

There is a broader point to be made however on the question as to whether cash

transfers or employment programmes are the preferable policy option for poverty reduction. This debate in many cases represents these two approaches as exclusive alternatives but in essence this represents a false choice, as they are not inherently mutually exclusive, and can actually be designed to be complementary. Mitchell (2008) for instance found increased rates of poverty reduction for households that had both access to income from cash transfers and the EPWP in South Africa.

C. Investments in the Environment and Poverty Reduction

An approach that takes into account the poverty reduction and environmental benefits of the proposed programmes would thus clearly be preferable. And, as was already discussed in the previous section, one approach is to discount the wage costs paid to the poor in the programmes and treat it as a poverty reduction cost. Then the non-wage costs are evaluated against the environmental benefits that these programmes provide. While this does not address the difficulty of quantifying certain environmental benefits, with this framework investments in these programme becomes more attractive.

One key concern that needs to be addressed, however, when treating these programmes as an investment in both environment and poverty reduction, is whether one of them is a primary objective. It is best that both arguments are articulated explicitly in making the case for these programmes. Experience has shown that many public works programmes find it difficult to find a balance between maximising employment creation on the one hand and the provision of assets or services on the other hand, and if the motivation is focused on only one of them, typically the balance tends to swing in the direction this particular focus area. Lieuw-Kie-Song and Miller (2009) argue that this balance is often tipped one way or the other depending on the context in which the programme was designed and established. As a result when there is a change in context these programmes can lose political and popular support, even though their continuation may be justifiable. In summary, there are risks of too much focus on employment creation objectives, resulting in poor assets and services (make-work programmes) or too much focus on assets and services resulting in limited employment creation and impact on poverty.

Deliberate efforts need to be made in the design and implementation of these programmes to try and maximise both these developmental impacts. This requires emphasis on accepted technical norms and standards for the asset or service, as well as a strong focus on the use of labour intensive methods in programme activities. In addition, there are also specific contexts when these approaches can be combined effectively and there are actually possible virtuous circles of having this dual focus. These will be discussed next.

D. High Impact Opportunities

There are six sets of circumstances identified where environmental public works programme could be particularly effective policy options on their own or for integration into other activities.

1. Circumstances of Acute Environmental Distress

In many parts of the world, the natural capital has already been so severely depleted that without significant investments to reverse the degradation its productivity will continue to be extremely low. Where poor people in these areas are dependent on the productivity of

the environment they are essentially trapped in a situation where their own productivity also remains extremely low. Typically these people would be too poor to be able to make the required investments in natural capital themselves. Probably the clearest example of such conditions is Haiti, where in many areas due to severe deforestation, soil erosion and flash floods, the productivity of the land is already so low that it is not able to sustain the people living in these areas. Long-term investments in restoring natural capital would be required in these areas, creating the opportunities for long term employment for the poor living in those areas. While Haiti may be one of the most extreme examples of such circumstances, they already exist in areas in many other countries, although they may not be as clearly identifiable.

While the example of Haiti shows a case where the poor are directly impacted by acute environmental distress, there may be cases of acute environmental distress that do not impact as directly on the poor, but where public employment programmes may still be an effective policy option, given the labour-intensive nature of activities required for addressing this environmental distress. Examples of such environmental distress are the serious threats that some invasive plants present to some protected parts of the unique Fynbos Biome in South Africa and the disappearance of 93% of the Atlantic rainforest in south eastern Brazil. In South Africa this threat is partially being addressed by the Working for Water programme. In Brazil, some of the activities required to conserve and rehabilitate the remaining parts of the Atlantic rainforest could be also be implemented through environmental public employment programmes¹³.

2. Complementing other Rural Development Strategies and Schemes

The proposed programmes also offer good potential for complementing other rural development strategies. The reasons for this is that a critical element missing in many rural development programmes is a set of activities where the poor can sell their surplus labour and receive cash income to complement other livelihoods. Public employment programmes that provide such income but are designed to limit the opportunity cost of participation by not competing with other livelihoods can be particularly effective in reducing poverty¹⁴. At the same time many rural areas offer substantial opportunities for investments in natural capital. These investment opportunities may be as diverse as water harvesting for increasing local agricultural activities, increasing the area's attractiveness as a tourist destination, or maintaining catchment areas to improve water supply for local communities as well as downstream communities or cities. The environmental focus areas of NREGA in India are an example of this strategy where public employment programmes are being viewed as a way to complement rural development strategies particularly those focusing on increasing

¹³Environmental public employment programmes are rarely considered as an option in Brazil and the focus is mostly on creating opportunities for self employment and increased income for those poor dependent on or living close to protected areas. While these approaches have their merits, they also have their limitations and allow for a limited arms-length involvement of the State (Vitae Civilis 2002, Protecting Social and Ecological Capital, Sao Paolo, Brazil)

¹⁴Examples of such designs are the Zibambele road maintenance programme in South Africa that provides regular and predictable part-time employment to poor women. Women are employed for 60 hours a month, but have considerable flexibility in scheduling their work programmes to fit around their other livelihood activities and domestic responsibilities. NREGA in India also allows the poor to decide when they want to work for the programme, allowing them to take up paid agricultural employment in peak seasons, or to continue agriculture on their own land.

agricultural productivity and livelihood creation (see Government of India, Ministry of Rural Development (2008).

3. Poor are actively engaged in Destruction/ Over Harvesting

There are many areas where poor people are involved, or actually employed by third parties to destroy natural capital. An example of this is the deforestation in the Amazon region in Brazil. While reliable figures are hard to obtain because of the illegal nature of these activities, it is well known that many poor are employed under very poor conditions to (illegally) clear the forest. In many cases, they do this for a lack of better options available to them. Environmental public works programme could offer employment with better working conditions to these people and at the same time employ them to rather do environmentally sound activities like reforestation or other agro-forestry activities.

These programmes would not be effective on their own in combating deforestation or over harvesting in the circumstances described above as the factors driving this type or environmental destruction are typically many and complex. However what these programmes would provide is alternative employment and income to the poor engaged in these activities and at the same time direct their labour towards rehabilitation and conservation rather than destruction.

4. Urban Areas with High Concentrations of Poverty and Unemployment

Urban areas with high concentrations of poor people are the fourth opportunity for such programmes. Such areas are generally also characterised by deteriorating environmental conditions and high availability of surplus labour, because of un- or underemployment. In such circumstances, infrastructure focused public works programmes may already be in place, but the inclusion of environmental activities (as well as others) creates an opportunity to increase the impact significantly. Furthermore, investments in infrastructure that have specific environmental benefits such as improved sanitation, capturing of rainwater, insulation of homes and provision of solar water heaters are all attractive from various perspectives. Other opportunities could be around greening and tree planting, waste management and recycling, but depending on the area other activities may also be desirable.

5. Responses to Natural Disasters

Another high impact opportunity for these programmes lies in structuring the responses to natural disasters as public employment programmes. In this context, both short and long term opportunities exist. The short-term responses to natural disasters would focus on reversing the damage of these disasters, in particular in areas where the environment was already fragile because of over utilisation and over-harvesting. But beyond that, long term opportunities also exist in restoration of the environment which could help limit the impact of similar disasters in the future. One example of this is coastal mangrove forests which are recognised as helping to reduce the impacts of floods and tsunamis as well as playing a critical role as breeding grounds for many species of fish.¹⁵

¹⁵The Green Coast Project was initiated in Indonesia after the 2004 Tsunami to rehabilitate coastal mangrove forests. Local fishermen were engaged in the rehabilitation of the forests, but rather than being paid wages, they were provided with grants to re-purchase lost fishing gear. See also www.globalnature.org/bausteine.net/file/showfile.aspx?downloadid=6426&sp=D&domid=1011&fd=2

6. Climate Change Adaptation

Adaptation to climate change has been identified as another potential opportunity for such programmes. As global temperatures rise, many areas will need to proactively plan measures to minimise the impact of this. Although effective measures to adapt to climate change are still being identified, this field is developing rapidly and some opportunities can already be outlined. The measures as diverse as the construction of dykes against rising sea water levels and water harvesting structures in areas that are projected to become drier would all lend themselves to implementation using public employment programmes. Especially where those that would be directly affected are poor and would benefit from additional income through the employment, such programmes should be considered.

VI. Funding Options

The proposed programmes could theoretically be funded by a combination of public and private sectors as the benefits of the investments would accrue to both. However the lack of functional markets for the services that the environment provides, described earlier in this paper, also affect the potential for environmental programmes to attract private investment. Without a market the private sector is not able to capture the returns on its investment and would thus not be interested. Until such markets become functional, it is unlikely that there will be significant private sector funding of these types of programmes and the focus is therefore on how to mobilise public sector funding. It is recognised however that there are cases where there are functional or partially functional markets and these cases will be discussed separately below.

Table 2 attempts to provide an overview of the various funding options for these programmes. It points to different funding options based on whom these programmes accrue to. In cases where there are multiple benefits that accrue to different parties, a combination of funding mechanisms may be possible, although this may only be practically warranted in programmes that are big enough to justify the overhead costs of accessing these different funding streams.

A. Publicly Funded Programmes

The most obvious funding sources for these programmes would be the budgets of government departments responsible for the environment, departments implementing public works programmes or donor funds. In such cases these programmes would have to be motivated based on their ratio of costs and benefits and would typically compete with other government or departmental priorities. The potential problems of this approach, is that given the difficulties of quantifying the environmental benefits, these programmes would often have a lower ratio or rate of return when compared with other government investment options. In cases where the benefits can be quantified and are substantial however this approach may be effective.

These programmes can be also financed through other mechanisms. One option is to access funds intended for poverty relief and reduction programmes. The Working for Water in Programme in South Africa was funded through such mechanisms from 1995 until 2003.

Such programmes can generally make a strong case to access these types of funds given their ability to create employment and transfer income to the poor.

There may also exist funding mechanisms used for other environmental activities and a case could be made for some of these funds to be made available for environmental public works programmes. If these mechanisms are linked to specific taxes, rates or levies, an argument could also be made to increase these in order to cover these costs of these new programmes. Examples of such mechanisms include:

- Charges/ levies for ground and surface water to farmers, industry and reservoirs
- Tourism/user fees in parks and nature reserves
- Taxes earmarked to maintain protected areas/ nature reserves
- Pollution taxes
- Leverage carbon credits

In cases where the cause and effect relationship between the programme activities and accrued benefits are not disputed, and no specific funding mechanisms exist yet, the funding of such a programme may be linked to the introduction of a new tax or levy related specifically to the programme. For example a levy on groundwater extracted could be introduced, if the programme increases the quantity of available water.

B. Activities that Operate within Existing Markets

Some of the activities outlined in table 2, particularly those in the second column operate within existing markets and warrant some more discussion in particular with regards to the role of government. One could distinguish here between the existing markets for specific products which are already being accessed by the poor and the markets for services which are generally poorly developed and are inaccessible to the poor. Examples of the first are forest products such as sustainably harvested wood, various fruits and nuts, honey and medicinal plants or recycled materials like steel and aluminium. Examples of the second are services like climate regulation through carbon sequestration, water supply through rivers and aquifers etc.

Recycling and harvesting of ecosystem products already have a high degree of participation by the poor in developing countries. Interventions by government in these areas need to be sensitive to these existing conditions and must make sure that the poor do not end up carrying the largest cost of any intervention or regulation, even if this was not the intention. In particular regulatory interventions may inadvertently impact the poor by distorting existing market mechanisms. On the other hand it should also be recognised that in many countries these markets are dominated by illegal and unscrupulous middlemen, often to the disadvantage of the poor (UNEP 2007) and that regulation may be required.

Interventions in these areas would preferably focus on improving the income streams for the poor involved in these activities so that these activities become more attractive and grow through an effective stimulus. Examples of such mechanisms would be the deposit on soda cans operative in many states of the USA which in effect guarantee a minimum price at which these cans be sold back making it more attractive to collect these cans in

order to recycle. Similar schemes could be implemented much more widely and are being tested in Brazil with natural rubber harvested from protected areas (Vitae Civilis 2002). Such interventions would make sense when the (buy-back price) of materials is very low or volatile. In the case of the soda cans, the consumer effectively subsidises the buy-back price by paying for the deposit upon purchase of the soda. In cases where this may not be viable, governments could play such a role by instituting mechanisms to ensure a minimum price level for the specific products.

In the circumstances above, the degree of government involvement would vary and in many cases it may not be clear that these are environmental public works programmes, given government's minimal role. There are many programmes however where such products are only a part of the benefits produced. Programmes that clean rivers and streams for instance may generate considerable amounts of recyclable material, but generally the value of these materials when sold would not be sufficient to cover the programme costs. Strategies would be required to maximise such income using some of the mechanisms described above while at the same time ensuring continued public funding.

Some programmes may even decide to go into downstream value add activities so as to expand the income generating activities available to the poor in the relevant areas. Examples of such activities are programmes that use collected waste for art or raw material for other products, or the biomass from removed alien vegetation for the production of charcoal to be sold.

The potential of these activities is significant in increasing the poverty reduction impact by measures to increase income and working conditions in these areas, but also in generating funds to support the implementation of the proposed programmes. They also have the advantage that there are existing mechanisms for the poor to access these markets and efforts can focus on improving this market access rather than having to create markets where none yet exist, as is the case with the next set of activities.

C. Raising Funds through Payments for Environmental and Ecosystem Services

The markets for environmental and ecosystem services are generally much more complex, dysfunctional and difficult for the poor to access. The best example of this is the market for carbon credits. Although it is developing rapidly, it is still largely dysfunctional and impossible for the poor to access. For this reason, the role of government will remain critical for public employment programmes that produce carbon sequestration as a benefit. But even simpler markets like water supply for instance remain difficult for the poor to participate in effectively. Programmes whose activities result in increased water in streams or in groundwater that benefits farmers and water companies would typically require governments to play an intermediary role, by collecting revenue from those who benefit and channelling this back to the programmes that generate these benefits in the first place.

Considerable efforts are being put into developing the markets for environmental services, in particular to enable Compensation and Rewards for the Ecosystem Services (CRES) that ecosystems provide. The intention of these efforts is to have these services recognised and have the beneficiaries of the services pay for them. This income can then be used to maintain or expand the ecosystems that provide the services. Many of the proposed programmes and activities could potentially contribute to and benefit from this

new approach

The Working for Water programme has been able to claim limited payments for the environmental service of additional water provided since 1996 through payments by water users directly to the Department of Water Affairs and Forestry that implements the Working for Water programme¹⁶. Furthermore a legislative framework has been put in place to enable programmes to charge beneficiaries for the increased water availability and an improved method for estimating the tariffs at a national level for this service has also been developed (Blignaut et. al. [2006]). The proposed approach is that in areas where the tariff would be excessive in relation to the benefits derived from the additional water or in terms of ability of beneficiaries to pay, the costs be subsidised through direct funding from government as part of the EPWP, and that this is seen as a subsidy, but that it is paid for in the overall context of the poverty reduction objectives of the EPWP. Based on an analysis of all the main water management areas in South Africa it was estimated that user charges could contribute to covering approximately 30% of the cost of managing invasive alien plants, as opposed to the current 10%, while the government would continue to pay for the remaining 70%. This demonstrates both the potential, but also the limitations of CRES for funding of these programmes. It should be noted however, that in the CRES model, the only benefit taken into account is water availability, and the other benefits of the Working for Water programme as mentioned earlier are ignored.

Given current developments, specifically regarding CO2 markets, it is likely that markets for environmental services will grow both in scope and sophistication. This could potentially provide a huge boost for arguments in favour of investments in the environment, as it will allow for better quantification of the benefits the environment provides and so could lead to increased income and funding opportunities. The role of governments in shaping these markets will remain critical however. Regulation will be needed to ensure that the ultimate positive impacts on the environment are realised, that the markets are fair and that they are accessible.

¹⁶The funds received by the Department can only be used to clear areas within the catchment from which payment is derived. Payments received amount to approximately R30 million per year (US\$ 3 million) currently

Table 2: Funding Options for Environmental Programmes

Main Beneficiary:	Direct income generated by work activities through existing markets	No direct income but benefits that accrue to the poor	Benefits that accrue to third parties	Benefits that accrue to government	Benefits that accrue to society as a whole
Funding mechanism	Income is directed to those working as wages or profits	Government funding from poverty relief funding	Government funding but raised through special levies or taxes	Government funding but paid for from general taxes or cost savings	Government funding and paid for from general taxes or sale of services on (international) markets
Role and activities of Government (van Noordwijk et.al. 2007¹⁶)	Government as market regulator: Provides regulations, subsidies, promote price stability, foster formalisation through SMME's & Cooperatives	Government acts as buyer (on behalf of poor beneficiaries) Buys services through the funding of public employment programmes	Government acts as intermediary: Buys services through funding of develop methods for quantification of benefits to establish a fair price, sells services through taxes, levies, or user charges	Government acts as buyer Buys services through the funding of public employment programmes, offsets programme costs against other cost savings if applicable	Government acts as buyer for downstream beneficiaries ¹⁷ : Buys services through the funding of public employment programmes Sells them on international markets if applicable
Rationale for proposed role of government	Markets are not yet functioning fully and the poor and the environment carry the burden of continued market failure	Poor are not able to afford to pay for these benefits	No existing market mechanisms exist for beneficiaries of the services to compensate those working directly	Government is the main beneficiary of the service	Benefits are general, long term and generally not priced and government acts in its role of investing in the long term public interest
Example	Income from sale of recycled materials, income from sale of products harvested from ecosystems	Rehabilitated grasslands providing more food for livestock, reduced soil erosion increases local agricultural activities	Increased availability of water to farmers through water harvesting and catchments maintenance,	Guarding and custodianship of government owned protected areas, reduced space requirements for landfills, increased availability of water to utilities	Preserved bio-diversity, cleaner surface water, more robust natural habitats, carbon sequestration

VII. Conclusions and Recommendations

This paper essentially argues for increased investments in natural capital through the employment of surplus labour. The proposed method of integration of these two activities is the establishment of environmental public employment programmes that employ poor unemployed and underemployed people to conduct activities which have recognised environmental benefits. The Environmental Sector programmes of the EPWP in South Africa are used as examples to demonstrate the potential and scope of these programmes and some of the key lessons were presented.

The paper recommends that governments play a strong leadership role in these programmes, although their specific role would vary depending on the context, nature of programme and whom the benefits of the programme accrue to. It does so based on the recognised mandate government has in poverty reduction and environmental management. It is also argued that these programmes provide a good opportunity for governments to align poverty reduction and investments in environmental conservation and rehabilitation.

Environmental activities typically suffer from a lack of investment caused to a large degree by the difficulties in quantifying environmental benefits and the absence of functional markets. Given a wide range of possible programmes and benefits, it suggests an approach for mobilising funding based on whom the benefits of a programme accrue to. This approach is in principal based on a “beneficiary/ user pays” model but recognises the current market limitations of such approaches. It therefore recommends that in most cases government plays a leadership role in implementing these programmes, but changes its funding role and mechanisms depending on who the beneficiary of the services is.

¹⁷Van Noordwijk et al. use this categorisation in terms of government role in establishing Compensation for Environmental Services Schemes, not for public employment programmes. It was found that this categorisation was also useful in the proposed mechanisms for assessment of these programmes.

¹⁸These downstream beneficiaries can be geographic in the more literal sense, but also economic in that there is a long process before benefits ultimately accrue to a third party, making the causal relationship less clear. There can also be a time element in terms of investments whose benefits will only accrue to future generations

References

- Antonopoulos, Rania (2008) "Macro-micro Impacts of Employment Guarantee Programmes" Policy Brief, Research Project #34 http://www.undp-povertycentre.org/paper-seminar/IPCSeminar_Rania_Antonopoulos.pdf
- Aronson J, Blignaut J, Milton SJ and Clewell A (2006) "Natural capital: The limiting factor". *Ecol. Eng.* 28:1-5. http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VFB-4KPN9VD-1&_user=5653944&_coverDate=11%2F01%2F2006&_rdoc=1&_fmt=high&_orig=browse&_cdi=6006&_sort=d&_docanchor=&view=c&_ct=1&_refLink=Y&_acct=C000068011&_version=1&_urlVersion=0&_userid=5653944&md5=8dd3f47f6c1f050f916b235927628df
- Blignaut JN, C Marais C and Turpie JK (2007), "Determining a charge for the clearing of invasive alien plant species (IAPs) to augment water supply in South Africa", *Water SA* Vol. 33 No. 1 January 2007, available on www.wrc.org.za
- Bracer C, Scherr S, Molnar A, Sekher M, Ochieng BO and Sriskanthan G. (2007) "Organization and Governance for Fostering Pro-Poor Compensation for Environmental Services: CES Scoping, Study Issue Paper no. 4." ICRAF Working Paper #39. Nairobi, Kenya: World Agroforestry Centre. <http://www.worldagroforestry.org/downloads/publications/PDFS/WP14961.PDF>
- Center for Science and Environment (CSE) (2008) "NREGA Opportunities and Challenges, Natural Resource Management and Livelihood Unit", CSE, New Delhi, India http://www.cseindia.org/programme/nrml/pdf/NREGA_Policy_Paper_2008.pdf
- DPW (2008), "Expanded Public Works Programme 4th Quarter Report for 2007-08 Financial Year", Department of Public Works, Government of South Africa, available on www.epwp.gov.za
- Du Plessis L L (2003), "An assessment of selected non-water benefits of the Working for Water Programme in the Eastern and Southern Cape", Masters Thesis, Faculty of Arts, University of Port Elizabeth, Port Elizabeth, South Africa, available on www.dwaf.gov.za/wfw
- Government of India, Ministry of Rural Development (2008) "Report of the Task Force on Convergence" http://www.indiaenvironmentportal.org.in/files/Report_TF_Convergence.pdf
- Government of Maharashtra (2006), The Maharashtra State Employment Guarantee Scheme 2006, http://nagarzpv.in/html_docs/MREGS.htm
- ILO (2008) Green Jobs: Facts and Figures http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_098484.pdf
- Jones (V 2008) *The Green Collar Economy*, Harper Collins Publishers, New York, NY, USA <http://www.greenforall.org/resources/the-green-collar-economy>
- Khan A R (2007), "Employment and Millennium Development Goals: Analytics of the Linkage in the Context of an Accelerated Effort to Achieve the MDGs", *Bangladesh Development Studies*, Vol. XXXI, Nos. 1 & 2, available on www.azizkhan.net/EmploymentMDG.pdf
- Lieuw-Kie-Song M R and Miller S (2009) "Moving towards the MDGs: an employment centered focus" UNDP Poverty Group, New York NY, USA [forthcoming]
- Mitchell W (2008) "Assessing the wage transfer function and developing a minimum wage framework for the Expanded Public Works Programme in South Africa", Centre for Full Employment and Equity, University of Newcastle, Newcastle Australia http://e1.newcastle.edu.au/coffee/pubs/reports/2008/ILO_South_Africa/EPWP_Assessment_Bill_Mitchell_June_2008_complete.pdf

- National Rural Employment Guarantee Act (2005) India <http://nrega.nic.in/>
- Paige J C (1985) The Civilian Conservation Corps and the National Park Service, 1933-42, An Administrative History, National Park Service 1985, http://www.nps.gov/history/history/online_books/ccc/index.htm
- Southern Africa Labour and Development Research Institute (SALDRU), University of Cape Town, Rutgers School of Law (State University of New Jersey, USA) and ITT (UK) (2007) commissioned report "EPWP Mid Term Review: Component 1 International PWP Comparative Study" http://www.hsrb.ac.za/research/output/outputDocuments/5468_McCord_MidtermreviewofEPWPcomparativestudy.pdf
- Turpie J (2004) "The role of resource economics in the control of invasive alien plants in South Africa", South African Journal of Science 100, January/February 2004 pp 87-93 <http://www.dwaf.gov.za/wfw/Docs/Papers/SAJSFeb2004turpie.pdf>
- UNEP (2009) Press Release: Realizing a "Green New Deal" UNEP-Commissioned Report Underlines How Environmental Investments can get the Global and National Economies Back to Sustainable Work 25th Governing Council/Global Ministerial Environment Forum 16-20 Feb <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6079&l=en&t=long>
- UNEP (2008) Green Jobs: Towards decent work in a sustainable, low-carbon world Green Jobs Policy messages and main findings for decision makers¹⁹ http://www.unep.org/labour_environment/PDFs/Greenjobs/UNEP-Green-Jobs-Report.pdf
- UNEP (2007) Green Jobs: Towards decent work in a sustainable low-carbon world, www.unep.org/labour_environment/features/greenjobs.asp
- Van Noordwijk M, Leimona B, Emerton L, Tomich TP, Velarde SJ, Kallesoe M, Sekher M and Swallow B. (2007) "Criteria and indicators for environmental service compensation and reward mechanisms: realistic, voluntary, conditional and pro-poor: CES Scoping Study" Issue Paper no. 2. ICRAF Working Paper no. 37. Nairobi, Kenya: World Agroforestry Centre. p.22 <http://www.worldagroforestry.org/downloads/publications/PDFs/WP14964.PDF>
- Vitae Civilis (2002), Protecting Social and Ecological Capital, Vitae Civilis, Instituto para o Desenvolvimento, Meio Ambiente e Paz, , São Lourenço da Serra, São Paulo, Brazil http://www.vitaecivilis.org.br/default.asp?site_Acao=mostraPagina&paginaId=1814
- Working for Water webpage, Department of Water Affairs and Forestry, Republic of South Africa <http://www.dwaf.gov.za/wfw/>
- Wray R (2007), "The Employer of Last Resort Program: Could it Work for Developing Countries", International Labour Office, Economic and Labour Market Paper no. 2007 / 5, Geneva, August 2007 <http://www.cfeps.org/elm07-5.pdf>

¹⁹The overview draws on evidence and findings presented in the report "Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World". While the overview is consistent with the report, it also includes reflections emerging from the exchanges among the partners of the Green Jobs Initiative not contained in the original report.

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