Status of Government's Poverty Reduction Programmes - Focus on DST's Social Impact Programme

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EXECUTIVE SUMMARY

Poverty and unemployment remain South Africa's main challenges, even with the vigorous deployment of many government poverty alleviation policies and programmes (see Section 2). Continued existence of these challenges will make the South African government fall short of its Millenium Development goal to reduce poverty and unemployment by half by 2014. The challenges prompted the National Advisory Council on Innovation (NACI), through its Innovation for Development (INNO4DEV) subcommittee, to commission this study.

The study was initially planned as a survey of all existing government poverty alleviation programmes. It was soon realized that this was a huge and complex task, and accordingly the scope of work was narrowed down to the effectiveness of the Department of Science and Technology's (DST) *Science and Technology for Social Impact (STSI)* programme, which comprises the Sustainable Livelihoods and Sustainable Human Settlements sub-programmes. The core mandate of these sub-programmes is to promote the development and use of science, engineering and technology (SET) in introducing and demonstrating innovative social solutions that have potential to contribute to poverty reduction.

The objectives of the study were to:

- Identify existing government poverty alleviation programmes and policies with a special focus on the DST's STSI programme and then evaluate the effectiveness of the programme in terms of successes and challenges, as well as reasons thereof.
- Identify linkages and institutional arrangements between DST and other government departments.
- Formulate high level recommendations aimed at coordinating poverty alleviation programmes and enhancing their social impact..

Factors taken into account in analyzing the impact of the DST's STSI programme were enterprise and employment creation, human capital development, sustainability and up-scaling of projects, as well as partnerships and linkages. The findings revealed that the programme made some positive impact in terms of skills transfer, creation of a number of jobs and small enterprises particularly within the Essential Oil and Aquaculture Clusters, as well as transfer of computer literacy in terms of the Digital Doorway technology. However, the social impact in general was too small and limited to a few beneficiaries directly involved in projects, and was also unsustainable. The challenges that lead to the poor impact included the following:

- Poor diffusion and up-scaling of technologies due to:
    - Lack of partnerships and linkages between government departments and other stakeholders to coordinate efforts was a major challenge even though some government departments, including DST, had signed Memoranda of Understanding on cooperation.
    - High capital costs and complex technical requirements
    - Costs of some proposed technologies (e.g. solar panels) were deemed too high by local municipalities and developers and left out of housing projects.
- Enterprises created were too small to be viable businesses and could not break even or make profit. As a result, loans could not be repaid, local demand could not be met (contracts were lost) and potential investors remained uninterested in such enterprises.
- Training in terms of capacity and skills did not seem to guarantee employment elsewhere or enable one to establish one's own business, mainly because the majority of beneficiaries were involved in small, low level activities such as weeding and general farming tasks.
- Jobs created continued to depend on the DST for funding of salaries even after the project's lifespan had passed.

- Lack of clearly defined performance deliverables made it difficult for the DST to track progress in terms of successes and failures. (The Auditor-General also mentioned this challenge in the DST's Annual Report of 2008/9).

In order for the DST's programme to make practical and meaningful social impact, the following recommendations are made.

Specific recommendations:

- That the DST form a partnership with the DTI and integrate the essential oils cluster into the latter's essential oils incubator programme. The common goals of both departments and the fact that the DTI also houses SEDA, the agency whose core mandate is enterprise development, make the rationale for a partnership compelling. The benefits are the combining of expertise and resources and the avoiding of duplication.
- That the DST align its STSI projects with all relevant departments including the integrated development plans (IDPs) of municipalities in order to fast-track implementation processes and enhance integration and coordination.
- That with regard to the ICT Digital Doorway project, the DST take the lead in identifying other departments and stakeholders who can support further diffusion of the project, as well as explore the possibility of engaging the private sector from a Corporate Social Responsibility perspective.
- That the DST engage with the Department of Rural Development and Land Reform (DRDLR) as a matter of urgency as the DRDLR's planned activities overlap with some of the current projects within the DST's STSI programme. There is a real opportunity here for cooperation as well as the advantage for the DST of being able to use the DRDLR offices throughout the country as points of entry to communities.

General recommendations:

In order to improve the effectiveness and efficiency of the DST's (and of other government departments') programmes on poverty alleviation and social development, the following general recommendations are made.

- The DST must meet with other relevant government departments to review their Memoranda of Understanding (MoU) on cooperation on social benefits programmes and commit themselves to giving effect to the MoU.
- DST should focus its role in Social Impact programmes to the following:
  i) conducting stakeholder mapping and appropriate technology needs assessments, understanding stakeholder expectations and roles and forming coordination structures (e.g. technology cooperation teams),
  ii) facilitating the development, demonstration and promotion of appropriate innovation packages; replication and roll out must be taken up by other line departments, municipalities and social entrepreneurship organizations,
  iii) compiling and disseminating portfolios of replicable social innovations that have potential to be taken up by private investor and line departments,
  iv) acting as a technology gate keeper by conducting technology scans and technology analyses, and providing strategic advice to other departments and municipalities on appropriate technology.
- DST must establish a robust marketing strategy to communicate appropriate implementable technology (innovation) and business models to facilitate development of small enterprises that will create employment opportunities and generate wealth for the poor communities.
- DST should develop results (outcomes) based Monitoring and Evaluation system in which goals, objectives and performance indicators to measure impact of projects should be clearly defined and agreed to by all stakeholders. The system should not only measure project performance, but also determine whether projects are contributing in a strategic way to the DST's goals, e.g. determining if the right partnerships have been formed and also if there are practical plans in place for massification (diffusion) of pilot projects.

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- Mr Mfanakuthi Gama (Department of Rural Development and Land Reform)
- Prof Dan Archer (Meeting of Minds - Housing)
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SECTION 1. INTRODUCTION

The South African government recognizes that Science and Technology (S&T) are central to wealth creation and improving the quality of life of all South Africans. The White Paper on S&T advocates that government's research portfolio gives attention to those areas of research and development (R&D) with the capacity to affect quality of life (DACST, 1996). Specific emphasis must be placed where market failure is high, particularly in areas such as the following:

- environmental sustainability
- health care provision
- meeting basic needs at the community level
- reducing the total cost of infrastructure provision
- provision of safety and security to all South Africans

The White Paper also states that government has a duty to ensure that an appropriate portion of the budget allocated for S&T is utilized in these areas. Urban and rural communities need to be supported and encouraged to adopt social and technological innovations. As a result of this policy directive, an important mission of the National R&D Strategy is to use S&T in the fight against poverty (DST, 2002) and unemployment.

The previous Councils of National Advisory Council on Innovation (NACI) were aware of the importance of utilizing Science, Technology and Innovation (STI) for improving the quality of life of all South Africans, particularly the neglected grassroots communities that were not (fully) enjoying the fruits of economic growth and democracy. This culminated in the current NACI Council commissioning the present study.

The primary aim of the study was to contribute towards a better understanding of the status of government driven poverty alleviation programmes in South Africa in order to identify successes to build on as well as challenges that still warranted attention. The project objectives (see Appendix A) were to:

- Identify existing government poverty alleviation programmes and policies with a special focus on the Department of Science and Technology's (DST) Science and Technology for Social Impact (STSI) programme.
- Identify linkages and institutional arrangements between DST and other government departments that included Trade and Industry and the reconfigured Departments of Rural Development and Land Affairs and Human Settlement.
- Analyze the impact of the programme(s).

- Examine if the impact made was as a result of technological innovations or not
- Formulate recommendations that are aimed at enhancing the social impact of the poverty alleviation programmes.

The report is structured as follows:
Section 1 gives some background and context of the study and its aims and objectives.

Section 2 presents an overview of the extent of poverty and unemployment in South Africa. It also presents key government policies and programmes geared to address poverty and unemployment such as the Reconstruction and Development Programme (RDP), Growth, Employment and Redistribution (GEAR) and Accelerated Shared Growth Initiatives-South Africa (ASGISA). This is followed by a brief description of several other government antipoverty initiatives.

Section 3 describes the research design and methodology of the study. It also highlights some limitations to obtaining adequate data.

Section 4 broadly covers the DST's Science and Technology for Social Impact Programme. It examines the impact of this programme in terms of enterprise and job creation, human capital, sustainability and upscaling as well as partnerships and linkages between stakeholders. It also presents specific challenges that hampered the implementation of the programme.

Section 5 summarises findings and finally makes recommendations aimed at responding to identified challenges.

SECTION 2. POVERTY AND UNEMPLOYMENT IN SOUTH AFRICA: A BRIEF REVIEW

2.1. CONTEXT

When the new democratic government came to power it stressed the importance of redressing poverty, unemployment and inequality amongst the people of South Africa. Despite its general status of a middle income country, very high unemployment and poverty levels continue to be among the key problems facing macro-economic policy in South Africa.

Poverty is multi-faceted and in essence describes a state of deprivation that prevents an individual from attaining minimum "socially acceptable" standard of living (Khumalo, 2003; Bhorat et al., 2004). Figure 2.1 below depicts the multi-faceted nature of household poverty.

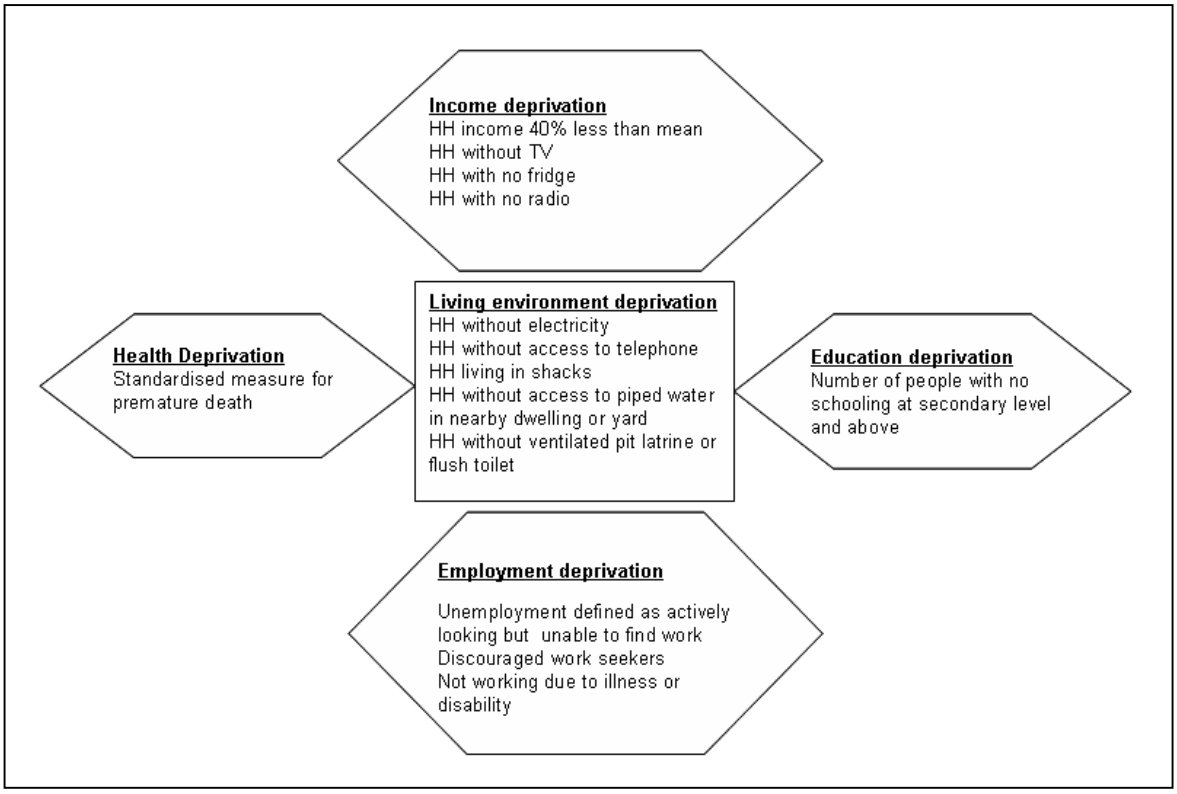

Figure 2.1: Schematic representation of deprivation domains **(HH=Household)**.

As illustrated in Figure 2.1 above, poverty has many dimensions and causes, and therefore it requires different kinds of interventions at different levels (national, provincial and local) in order to be reduced significantly. Poverty is not confined to any one racial group in South Africa, but it is

concentrated amongst Blacks, particularly Africans (Mbuli, 2008). The challenges that poor communities face include limited access to basic services, infrastructure, education and training as well as settlement patterns that place poor people far from economic opportunities.

2.1.1. Extent of unemployment

South Africa has one of the highest rates of unemployment compared to other stable global economies, with the official measure of unemployment rate of about 25%. This can be attributed to a range of causes, such as globalization, industrial restructuring, rapidly expanding labor force, large job losses in mining and agriculture and slow job creation in other sectors such as manufacturing (Altman, 2007). The high unemployment is one of the main causes of poverty in South Africa. Despite government's efforts to combat this challenge, success remains elusive. As shown in Table 2.1 below, average unemployment between September 2001 and June 2009 was approximately 26% of the entire population using the narrow definition of unemployment (Presidency, 2009). The narrow definition refers to those people seeking employment but who could not find any in the last two weeks; the broad definition includes people who have been discouraged from seeking employment.

Table 2.1: Unemployment as percentage (Broad and Narrow)

	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	Sep	**Sep**	**Sep**	**Sep**	**Sep**	**Sep**	**Sep**	**Sep**	**June**
Narrow (official)	29.4	30.4	28.0	26.2	26.7	25.5	23.0	23.2	23.6
Broad (unofficial)	40.0	41.6	41.0	39.7	39.7	36.2	34.3	30.2	32.5

Source: Presidency, 2009.

The official unemployment rate declined from 26% in September 2004 to about 24% in September 2009 (Presidency, 2009). The data above does not reflect the massive job losses that South Africa has just witnessed due largely to the recent global economic crisis which resulted in a decline in economic growth and a rise in unemployment to approximately 25% in the third quarter of 2009 (Statistics South Africa, 2009).

The South African government has set a Millenium Development Goal (MDG) of reducing unemployment by half by 2014. The global economic crisis together with other factors poses a challenge to achieving this target. The creation of jobs will rely on the public sector-led construction package and expansion of the extended public works programme.

2.1.2. Extent of poverty

The extent of poverty in South Africa continues to be an area of intense research. However, a detailed discussion on poverty in South Africa is beyond the scope of this report. Poverty is measured in various ways, two measures that are widely used are the Annual Media Products Surveys (AMPS) and the Income and Expenditure Surveys (IES). The real annual mean per capita analysis, based on both the AMPS and IES datasets, shows an improvement in the incomes of the poorest rising from R847 in 2000 to R1041 in 2008 as shown in Table 2.2. In contrast, the income of the richest 10 % of the population increased at a faster rate, from R74 401 in 2000 to R97 899 in 2008. When the percentage incomes of the richest and poorest quintiles are compared, the deep structural nature of poverty in South Africa is clear. It seems also that that the lowest rate of improvement is in the middle income ranges.

Table 2.2: Per capita income (2008 Constant Rand Prices, AMPS DATA)

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Poorest 10%	847	761	830	921	1004	977	1037	1092	1041
Poorest 20%	1185	1088	1183	1305	1379	1401	1486	1564	1486
Richest 10%	74401	74479	71811	83197	81153	92952	99177	104385	97899
Richest 20%	49466	49574	48030	54080	53205	60581	64388	67770	645655

Source: Presidency, 2009.

These data highlight that South Africa still remains with unacceptable high levels of poverty and unemployment despite government's efforts towards poverty reduction and economic growth.

The following section describes some of government interventions to combat these social challenges.

2.1.3. Impact of anti-poverty policies and programmes

Since the end of apartheid, South Africa has put in place numerous policies, programmes and measures for reducing poverty and promoting sustainable social and economic development. The key anti-poverty policies in South Africa find their expression in the Reconstruction and Development Programme (RDP), the Growth, Employment and Redistribution (GEAR) macroeconomic strategy, the Accelerated and Shared Growth Initiative South Africa (ASGISA) which includes the Joint Initiative on Priority Skills Acquisition (JIPSA).

In 1994 the new government adopted the RDP as its basic policy framework (ANC, 1994). The programme was aimed at addressing South Africa's social and economic challenges through reconstruction and development. The success of the RDP was dependent on economic growth,

and government came to the view that a macroeconomic stimulus was necessary. The new macroeconomic policy, announced in June 1996 as GEAR strategy, was aimed at generating economic growth, creating sufficient employment opportunities, delivering social services, redistributing income and protecting the citizens of the country. GEAR was successful in achieving many of its macroeconomic targets (such as containing the fiscal deficit). However, it did not succeed in achieving the targeted 6% annual growth rate and creation of 500 000 new jobs by 2001. Since 2001/2002 there has been a transition from fiscal austerity to more growth-oriented policies.

ASGISA has emerged as the most prominent socio-economic policy that was put forward in late 2005. Its primary motivation was to meet government's target to reduce poverty and unemployment by half by 2014. Its main tenet is that the required economic growth rate could not be achieved without effective economic leadership from government and effective partnerships between government and other key stakeholders such as organized labour and the private sector (Presidency, 2006)

Soon after ASGISA was launched, JIPSA was established. The motivation behind JIPSA was the view that the single greatest impediment for economic development in South Africa is shortage of skills such as engineers and scientists, managers (financial, personnel and project management), and skilled technical employees such as artisans and Information and Communication Technology technicians. JIPSA was set up as a new structure to address scarce and critical skills needed to meet ASGISA's objectives. Measures were also put in place to support ASGISA's objectives and government goals towards 2014 and beyond. These include National Industrial Policy Framework (NIPF), Industrial Policy Action Plan (IPAP) and IPAP2 (Davies, 2010).

In 2008, government published a draft poverty reduction strategy which has not yet been adopted (The Presidency, 2008). The document states that at the centre of the fight against poverty is the creation of economic opportunities and enabling or empowering communities and individuals to access these opportunities, as well as providing a safety net in the form of social assistance.
The government interventions geared to address high levels of poverty and unemployment have led to endorsement of the newly proposed Economic Growth Plan (EGP). The EGP is aimed at addressing the unemployment challenge as central to South African economic development. The EGP framework is to identify key areas and sectors for job creation, and is projected to reduce unemployment rate by 10 %. The creation of at least 5 million jobs is targeted for the next 10 years, mainly from the private sector. The EGP will have to take a holistic approach that does not only focus on the private sector which is mainly driven by profit and global economic patterns, but should also cater for skills development and support of social entrepreneurship, key tools that will enable

sustainable poverty reduction and enhance employability. The above mentioned target of 5 million jobs is the same as that of the newly launched economy growth path which is to be achieved by 2020. This will probably complement efforts of GEAR and ASGISA.

All spheres of South African government have also been directing much of their efforts towards strengthening income and employment generation as well as reducing poverty (PSB, 2003, 2007; SEDA, 2008; DWAF, 2003; Hall, 2004; DPW, 2009; HSRC, 2006; Sibanda, 2001, Mbuli, 2008; Presidency, 2008; DCD, 1998; Triegaardt, 2006). Their efforts include programmes such as the following:

- Income generation and enterprise development programmes
- Small, medium and micro enterprise (SMME) sector supported by the Small Enterprise Development Agency (SEDA) of the DTI
- Local Economic Development (LED)
- DST's technology station programmes to strengthen and accelerate interaction between Universities of Technology (UoTs) and SMMEs, e.g. Tshumisano Trust.
- Technology Support programmes under SEDA of DTI to provide technical and financial support to technology stations
- Land Reform Programme to bring a fair and equitable land re-distribution
- Several programmes on basic services
- Extended Public Works Programme (EPWP)

A comprehensive analysis of all government poverty reduction programmes is a huge and complex undertaking. Hence the present study was confined to the DST's Science and Technology for Social Impact programme.

SECTION 3. RESEARCH METHODOLOGY

The methodology used to extract the required data (information) was based on a review of available literature, which comprised a collection of public policy documents and a series of progress reports and research studies. Government policies and programmes for poverty alleviation and unemployment were also identified online.

Limited face-to-face and telephonic interviews were also conducted with some stakeholders to solicit their views and insights. Stakeholders interviewed included the Department of Science and Technology (DST), Department of Rural Development and Land Reform (DRDLR), Buffalo City Municipality, Pikitup, and implementing agencies such as Council for Scientific and Industrial Research (CSIR) and Human Sciences Research Council (HSRC). The information extracted from the poverty reduction programmes was expected to determine successes, failures and the reasons thereof. The analysis was based on the sets of questions listed below:

Enterprise and job creation

- How many viable/successful enterprises have been created?
- How many jobs have been created and are they sustainable?
- Has the programme reduced unemployment in rural communities?
- What impact has the programme had on poverty?

Human Capital Development

- What are the benefits of the new skills to beneficiaries?
- Can they enable people to start their own business?
- Have the skills improved their chances of getting other employment?

Sustainability of Project

- Are the business models sound?
- Are income generating enterprises breaking even or profitable and financially independent from DST?
- What are the growth prospects of the generated enterprise?

Replication and diffusion technology

- Have the technologies been adopted widely in poor communities?
- If they have been adopted, what are the results?
- What are possible reasons for diffusion or lack of?

Partnerships and linkages with other government departments

- Which key departments are involved in DST projects (local, provincial and national)?
- What contribution have they made in terms of adoption and rolling out projects?
- What are the partnership benefits?

A critical limitation to the study was the reliance on literature review as the main source of information while excluding views of beneficiaries. It was assumed that relevant reports would be available but that was not the case. A number of reports obtained were not so useful because they provided information that largely covered project activities and outputs (e.g. infrastructure, human capital development and investment costs). Given the limitation, some of the objectives were not addressed adequately. This was probably due to a lack of defined performance indicators and targets for monitoring progress and impact of programmes. This was also noted by the Auditor General in the DST's Annual Report as an area of concern.

SECTION 4. ANALYSIS OF DST'S SCIENCE AND TECHNOLOGY FOR SOCIAL IMPACT PROGRAMME

4.1. BACKGROUND

As stated in Section 1, the South African government recognizes the important role that science and technology can play in reducing poverty. The White Paper (DACST, 1996) and the National R&D Strategy (DST, 2002) also spelt out the role of science and technology in poverty reduction. The National R&D strategy identified the need for a poverty reduction mission, which focuses on demonstration and diffusion of technologies to improve the quality of life and improve service delivery. In response to the national priorities as set out in the White Paper and the National R&D Strategy, Department of Science and Technology (DST) established the Science and Technology for Social Impact (STSI) programme. It started during the financial year of 2000/01 as part of the National Treasury's "Special Poverty Relief" programme that was intended to directly and indirectly create jobs and improve the quality of life for the poor. The programme falls under the ambit of the programme for Socio-Economic Partnerships (Figure 4.1). The programme has two flagship sub-programmes namely the Sustainable Livelihoods and Sustainable Human Settlements.

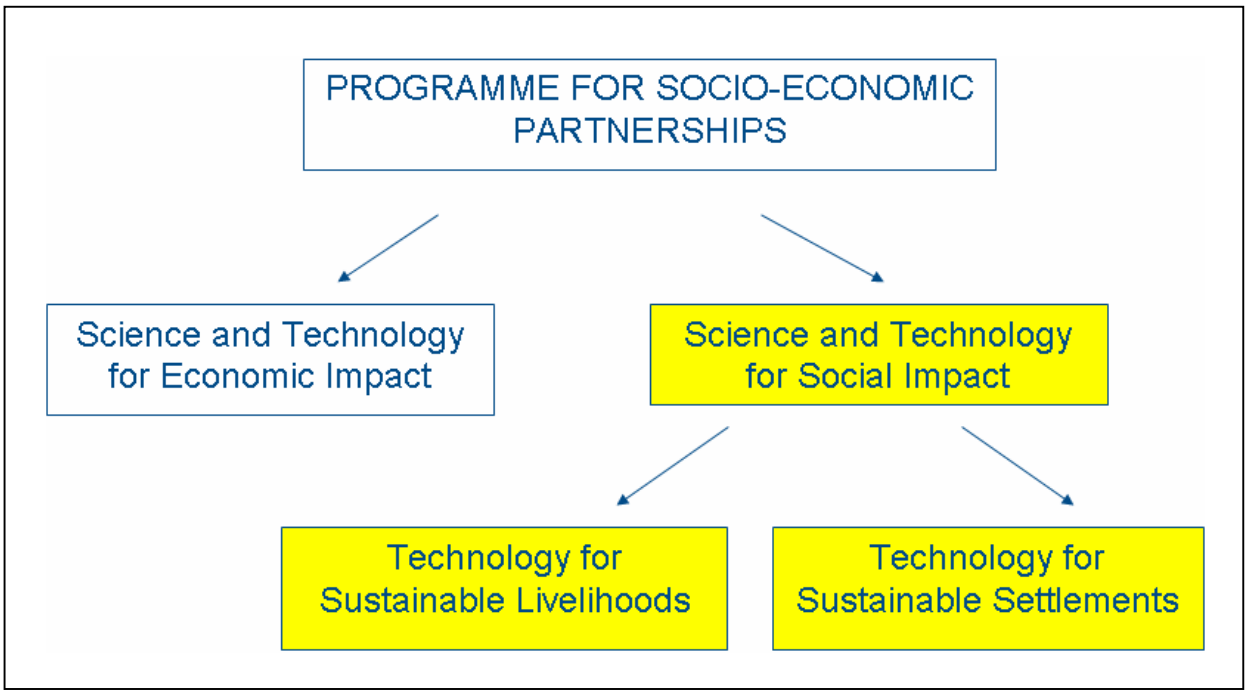

Figure 4.1: Arrangement of Socio-Economic Partnerships Programme **(highlighted in yellow).**

The core mandate of the sub-programmes is to promote the development and use of technologies that have potential to contribute to poverty reduction. They focus on introducing and demonstrating innovative social solutions that are mature and have the potential to achieve government's broad objectives. In 2001, DST supported several community based projects with the aim of contributing towards poverty reduction and creating jobs (DST, 2006). Those projects were in priority areas such as beneficiation of agricultural products, aquaculture, small scale agriculture and health care.

One of the key roles of the DST programme is to facilitate and promote interest of the scientific community in poverty reduction as a key area of activity. The second role is to coordinate the activities of the different stakeholders who play a role in promoting the application of science and technology in poverty reduction. The DST planned to partner with various stakeholders such as national, provincial and local government departments, science councils, academic institutions and the private sector in delivering its social impact programme to change lives of the communities.

It must be noted, however, that the role of the DST's Social Impact programme in poverty reduction is indirect. Its core mandate is to promote the development and or use of poverty reducing technologies, but the large-scale dissemination of these technologies is not primarily DST's responsibility (DST, 2006).

4.1.1. Investment approach

Briefly, DST invests in selected economic sectors in conjunction with implementing agencies which supply the technology and provide training (DST, 2006). In general, DST requests applications or business plans from interested parties who have to indicate the expected timeframe for the project to become independent or sustainable. Upon approval, the funds for supporting the projects are transferred to the implementing agency. A legal entity is then created (such as a section 21 company or cooperative) in which the key stakeholders are represented. On site management of the project is established for infrastructure development, capacity development, production and marketing of products.

The beneficiaries of the programme are mainly poor communities from the rural and or peri-urban nodal areas. Target beneficiaries receive a minimum wage as workers during the implementation of the projects either on a permanent or part time basis. DST monitors the project implementation process and approves funding for subsequent years on a case by case basis.

4.1.2. Indicators

According to STSI programme guidelines, outcomes and indicators are set out for each investment. For outputs, these indicators could include pilot evaluation reports produced, number of pilots that meet their objectives, etc. Outcome indicators relate principally to the (estimated) number of people, households and or communities who have benefited from the programmes (i.e. as a measure of 'diffusion') and the impact of those benefits.

4.1.3. Funding

Table 4.1 below compares the funding of the economic and social impacts programmes. According to this table, funding for science and technology for economic impact has increased from R244 million in 2005/6 to R865 million in 2008/9. During the same period, funds that were allocated to the Social Impact programme have increased from R184 million to R271 million. Moreover, in 2008/9, this constituted only 23% of the total funds allocated to the Socio-economic Partnerships programme.

Table 4.1: Comparison of funding of the Economic and Social Impact programmes (figures are in million rands)[1]

Programmes	**2005/6**	**2006/7**	**2007/8**	**2008/9**
Economic Impact	244	297	851	865
Social Impact	184	248	254	271

Source: DST Annual Reports

It is noted that the funding for social impact has been increasing over the years, and is highly motivated by robust and urgent need for social intervention to improve the quality of life.

[1] These figures were not verified with DST.

4.2. SUSTAINABLE LIVELIHOODS

The primary aim of the Sustainable Livelihoods sub-programme is to empower deprived or marginalized communities to generate income through transfer and adoption of technologies. The programme began operating in 2000/01 as part of the "Special Poverty Relief" programme funded by National Treasury to directly and indirectly create jobs and improve the quality of life for the poor. In broad terms, the sub-programme provides technical know-how and financial support to initiate and develop the projects. Beneficiaries are identified and are provided with training; start up infrastructure and other required support. Implementing agencies are responsible for technology transfer and training of the beneficiaries.

As shown in Table 4.2 below, DST has selected essential oils, aquaculture and indigenous medicinal plants as priority sectors in terms of government's policies for job creation and poverty reduction. For example the essential oils cluster, is based on a study by the National Economic Development and Labour Advisory Council (Nedlac) which identified essential oils as having business potential especially for rural communities (Fridge, 2004).

Table 4.2: Focus areas of the Sustainable Livelihoods sub-programme

Cluster	**Key technology transferred**	**Implementing agency**
Essential Oils	Drip irrigation, distillation technology Propagation of plants	CSIR
Aquaculture	Cage-net fresh water fish farming technology	University of Stellenbosch
Indigenous Medicinal Plants	Propagation of medicinal plants, conservation	CSIR, MRC, Institute for Natural Resources

Source: DST, Technology for Sustainable Livelihoods.

Similarly, the aquaculture cluster is in line with ASGISA's focus on agro-processing, agriculture and labour intensive industries that can absorb unskilled and semiskilled people. The medicinal plants cluster is also well aligned with DST's Farmer to Pharma (now Bio-economy) Grand Challenge (DST, 2008) and the National Strategy for indigenous knowledge systems (IKS).

4.2.1. Essential Oils Cluster

The essential oils cluster is aimed at transferring technologies to propagate and extract high-value, low-volume volatile aromatic constituents from plants. Essential oils cluster and plant extracts are required for a range of products including food flavors, pharmaceutical goods and industrial solvents. South Africa's diverse climate, abundant and unique flora provides opportunities for identification of novel crops and agricultural diversification. Increasing consumer interest and a wide and growing range of applications in commercial industries has led to a strong growth in world demand for these commodities.

The CSIR's chemical processing technology allows the production of essential oils by community based farmers in many of the diverse climatic zones of South Africa. The technology transfer involves the provision of appropriate agro-processing technology such as steam distillation facility and the development of infrastructure at the site, irrigation system; office and ablutions facilities. This approach ensures that agricultural, technical and business skills and facilities remain in the community even beyond the funding period.

The overall plan of DST is to help communities establish a minimum of 30 ha site, equipped with an industry-sized distillation factory to extract the oils, and a drip irrigation system. DST's model is to support the project until it reaches profitability (3 years for a 30 ha site) before exiting the businesses. Sometimes the project could be supported for a period of over three years to allow for demonstration of business potential. Plants that are supported include *Rose geranium*, Buchu, *Lippia javanica*, and lemon grass (Table 4.3).

Table 4.3: List of essential oil projects

Name of Product	Location	Year
Buchu	Genadeberg,Western Cape	2006
Rose geranium	Onseepkans and Pella, Northern Cape KwaNobuhle, Eastern Cape Elandskraal, Limpopo Mbazwana-Kwanganase, KwaZulu-Natal	2004/5 2004 2005 2006
Lippia javanica	Hi-Hanyile, Giyani, Limpopo	2002
African Ginger	Sibonelo, KwaZulu-Natal	2005
Perlagonium sidoisas	Senqu, Eastern Cape	2006

Source: DST, Sustainable Livelihoods Programme

To date, nine essential oils enterprises have been created and are being incubated. The goal of DST is to form partnerships with other departments such as Agriculture and Trade and Industry to play a leading role in the roll-out. Essential oil projects were initially implemented in 17 communities but currently the number has dropped to 7. This was largely attributed to social and political conflicts, project failures and high level of illiteracy. Instead of addressing the challenges at hand,

the DST decided to use state, ARC and historically black university owned land for technology and business demonstrations. All this probably led to poor uptake of technologies by beneficiaries.

4.2.2. Indigenous Medicinal Plants Cluster

The indigenous medicinal plants initiative seeks to promote trade and investment in biological resources in support of sustainable livelihoods. It intends to strengthen the capacity of communities to enhance the production of value-added products and services derived from biodiversity for both domestic and international markets. DST also seeks to integrate biotechnology with South Africa's indigenous knowledge systems (IKS), in order to strengthen the emerging bio-economy in the country. As shown in Table 4.4 below, a number of projects have been initiated in several provinces but most are still at pilot stage.

Table 4.4: Indigenous medicinal plant projects

Name of Products	Location	Year
African ginger	Sibonelelo, KwaZulu-Natal	2005
Hoodia gordonii	Onseepkans and Pella, Northern Cape	2003
Pellagornium sidoides	Senqu, Eastern Cape	2005
Devil's claw and *Sutherlandia* species	Witdraai Medicinal Plants, Northern Cape; Tsolwana, Eastern Cape	Not available

Source: DST Sustainable Livelihoods brochure

One of the key challenges that face this sector is the absence of commercial nurseries to supply seed stock (seedlings). As a result, very little has be done in the medicinal plant cluster as much effort is now on developing seed stock to ensure supply of planting material. Before any significant progress can be made, upstream seedling supply industries have to be developed. The absence of nurseries together with other challenges such as intellectual property rights will have a negative impact on progress in this sector. To date, Mpumalanga, Northern Cape and Free State provinces have already started producing seedlings of African ginger, Devils claw and Sunderlandia, respectively.

Impact of essential oils and herbal medicines

In practice, successful technology transfer should result in increased income of beneficiaries, human capital development, livelihood diversification, asset accumulation in a sustainable manner. In this section, the impact in job creation, human capital development, sustainability and diffusion is examined.

Job creation and poverty

In 2008, 290 jobs created in essential oils and medicinal plants clusters. Those jobs were created during the implementation of the projects and employees were paid from project funds. The wages ranged from R1 100 for semi-skilled staff to about R5 200 for managers.

An evaluation of the essential oils programme which was conducted by the HSRC showed that the essential oils projects have a positive impact on poverty for participating households (DST, 2007). A minimum wage earned made a big difference in their lives since many were previously unemployed. The impact on poverty appeared to be limited only to those household who were directly involved in the projects. Beyond the project funding period, there was no evidence of job creation through spin offs such as job creation in related industries.

A key question that has to be addressed is the potential contribution of the essential oils sector in job creation. A study by the Fund for Research in Industry Growth and Equity (FRIDGE) estimated that this sector has the potential to create approximately 3000 jobs (Fridge, 2004). Assuming that this estimate is realistic, and the technology can be transferred and replicated successfully, the contribution of this sector to reducing employment will still be very modest.

Human capital development

The development of human capital should empower beneficiaries with new skills, knowledge, high self-esteem, a sense of independence and personal competency. The HSRC evaluation report showed that the skills that are acquired by the participants could not be easily leveraged in the labor market (DST, 2007). Most of the workers are involved in weeding and general farming activities where there is an abundance of such skills. Moreover, there are very few essential oils enterprises in South Africa which can benefit from their know-how. Therefore, the skills that have been acquired have limited demand in the market place. The only beneficiaries who are empowered are in supervisory positions, through exposure to management practices such as production planning, infrastructure maintenance, financial recording and employee management.

Sustainability and up-scaling

To ensure that the livelihoods of target communities improve, DST's projects must strive towards sustainability. Assessing the sustainability of the projects is very difficult and is not easy to provide an unambiguous answer. Sustainability was assessed in terms of financial viability, business model and growth prospects (market).

Although the DST's social impact programme was designed to provide sustainable innovative solutions, but its projects could not achieve that as they failed to break-even. As a result, the DST continued to fund those projects. Unless DST reviews its social impact programme and transforms

it to a sustainable model that will generate long lasting enterprises with sound economic benefits, its efforts will continue to make very little impact.

The South African market for essential oils is very small but relatively secure. The United Nations International Trade Yearbook estimated that world production of essential oils in 2003 was 130 000 tons valued at about US$1 billion with an annual growth rate of 10% (DST, 2006). Therefore, the case for developing a viable essential oils industry is strong. However, the projects have to prove that they are attractive investment opportunities before massive adoption can take place. In the absence of a successful business model, the potential for diffusion of the essential oils business is uncertain. Moreover, the high capital costs, complex technical requirements of essential oils are way beyond the means of most of the workers. This makes it difficult for poor communities to start their own essential oils enterprises. The projects have to prove that they are attractive investment opportunities before massive adoption can take place.

Partnerships and linkages

By far the most prominent partnership that DST has formed is with the implementing agencies. In some cases national and provincial departments together with local municipalities and provincial departments of Agriculture in the Western Cape, Limpopo and Northern Cape have been involved but the nature of involvement is unclear. There is no linkage with the Department of Rural Development and Land Affairs.

The most glaring gap in terms of partnership is the lack of cooperation with DTI and Department of Rural Development and Land Reform (DRDLR). The DTI has an essential oils incubator programme which could aid in further development of DST's generated enterprises, whereas DRDLR should be the leader in the development of rural areas. Moreover, DTI is a strategic and ideal partner because it houses Small, Enterprise and Development Agency (SEDA), the agency whose core mandate is enterprise development and promotion. The reason why such vital linkages have not been formed was attributed to alleged delays and reluctance from other line departments to form partnerships.

4.2.3 Aquaculture Cluster

The Aquaculture cluster is implemented in partnership with the University of Stellenbosch as the technology supplier. Its aim is to establish and develop emerging fish farmers in South Africa. . The High Density Polyethylene (HDPE) cage culture system, which was developed by Stellenbosch University, offers the opportunity to utilize open water systems such as large dams, lakes and the ocean for controlled production of aquaculture species. This culture system offers benefits such as

ease of production, lower operational costs and flexibility. It is regarded as the most competitive and lowest risk of production method for the recommended candidate species. It also lowers entry barriers significantly.

DST's activities in this cluster involve pilot demonstrations of grow-out technologies (Table 45). These are carried out in collaboration with other government departments who are responsible for the uptake, support and roll-out. The two initiatives that are supported by DST are the fresh and marine water aquaculture programmes. The first is the small scale fish farming project in the Western Cape and the grow-out pilots conducted in partnership with the Departments of Water Affairs and Agriculture for support, uptake and roll-out.

Table 4.5: List of aquaculture projects

Name of Products	**Location**	**Year**
Rainbow trout	Small Scale Fish Farm Project, Western Cape	2002
Tilapia, catfish	Provincial Grow-out pilots, KwaZulu-Natal, Free State, Eastern Cape, Mpumalanga, Limpopo, North West	2006
Abalone	Mariculture Honderklip Bay, Northern Cape and Eastern Cape	2006
Yellowtail, silver and dusky kob	Mariculture at Nelson Mandela bay, Eastern Cape	2007
Yellowtail ranching	Marine Water,Western Cape	2008

Source: DST, 2006, DST Progress Reports

In the Western Cape, the small scale fish farming project has established 35 small scale trout producers in the Southern Cape regions (Stellenbosch, Worcester, Ceres and Tulbagh). To represent the farmers, a cooperative, Hand-on Small scale Fish Farmers cooperative has been formed. The cooperative has an agreement of 250 tons per annum to supply a local company named Three Streams Smokehouse in Franschoek. It is also producing trout fish for Woolworths

The provincial grow-out pilots are meant to establish commercial factors of indigenous fish (tilapia, catfish [trout and carp]) using HDPE cages in state-owned irrigation waterworks. This is to ascertain the technical, economic, and environmental viability for commercial grow-out of the species. The pilots are to be set up in seven provinces (excluding Gauteng and Western Cape). The Departments of Agriculture and Water Affairs are also involved in the pilots.

Under the marine water culture projects, an abalone grow-out pilot was conducted in Honderklip Bay in the Northern Cape in partnership with HIK-Abalone an industrial partner and Stellenbosch University. The outcomes of the project can be summarized in terms of the following:

- The development of two land based farming systems by private sector partners (Ponahalo

Aquaculture, AquaHarvest) at Kleinzee and Mitchells Bay (near Hondeklip Bay), with a required capital investment of R60 million, and the creation of 120 permanent and 60 temporary jobs, excluding downstream activities.

- The development of up to four abalone ranching concessions along the Namaqualand coastal region, by private sector partners (Ponahalo Aquaculture, AquaHarvest, AquaFarm, Diamond Coast Abalone, Benguela Aquaculture, others), with a required capital investment of R200 million, and the creation of 200 permanent and 80 temporary jobs, excluding downstream activities.

- The establishment of Diamond Coast Abalone Pty Ltd, that incorporate the Hondeklip Bay Workers Trust as an equal shareholder, into the development of abalone, farming, ranching and processing operations in Hondeklip Bay. The company is currently employing 13 permanent workers from the Hondeklip Bay community.

- The development of a Regional Abalone Hatchery, as a Public-Private venture, with a supply capacity of 6 million spat per annum, providing seed stock to regional producers in the Northern Cape Region.

From the above it is clear that the DST Hondeklip Bay Abalone Pilot Project have made a significant contribution to the establishment of a regional development initiative in the Northern Cape, driven by the private sector, in collaboration with government departments (provincial and national).

In the Eastern Cape, DST in partnership with Irvin & Johnson (I&J) Ltd is conducting a marine Finfish grow-out pilot in ocean-based HDPE cages to ascertain the feasibility of commercial grow-out of Yellowtail, Silver and Dusky Kob.

Impact of aquaculture

In this section, the impact in job creation, human capital development, sustainability and massification (diffusion) is examined.

Job creation and SMMEs development

In 2009, the number of jobs that were created by the cooperative was 221. The majority of the workers (156) were however part-time employees, with only 22 full time fish farmers. The rest were involved in indirect jobs that have been created in fish processing, such as subcontractors, support staff and consultants. At this stage, the impact of this project on the income and poverty of participants is very small because the enterprise(s) failed to break-even in terms of profit resulting in some employees leaving due to lack of guaranteed income.

Within two years, the project established 15 small, micro and medium enterprises (SMMEs) but the number was over 50% less than the recommended minimum number of 35 required to make enterprise viable. It benefited very few beneficiaries and the most advanced project under the aquaculture cluster is the small scale fish farming named the Hands-On Cooperative in the Western Cape. Also observed was that the business had potential to be commercially sound only in the

marine environment suggesting that inland communities surrounded by freshwater bodies cannot benefit. Large scale farming with marine fish was deemed easier than with freshwater fish that require extreme temperature requirements that are difficult to maintain.

Human capital development

The project offers on-site training to the small scale farmers on aquaculture systems, recirculation systems, fish health management and diagnostics courses. Business training and administration is also provided to members. The impact of human capital development on the beneficiaries was not evident.

Sustainability and upscaling

The cooperative has secured long term contracts to supply 200 tons of fish per annum to the private sector. In 2009 it produced about 118 tons which is almost 50% below demand. This is probably due to the fact that only 22 of the 35 farms were in operation. This implies that the inability to meet local demand threatens the sustainability of this venture because it could lose contracts.

Table 4.6 shows the financial performance of the cooperative from 2007-2009. Despite the yearly grant from DST and other support from donors the cooperative posted a profit only in 2008. It is not easy to determine the future financial viability of an enterprise based on only three years, but the financial performance up to now is reasonable for a relatively new venture.

Table 4.6: Income statement of the Hands-on Cooperative (figures are in million rands)

Aspects of income statement	**2007**	**2008**	**2009**
Revenue	4.2	1.6	6.5
Expenditure	4.8	1.3	6.4
Net profit/loss	-0.193	0.39	-0.024

Source: DST Reports, Financial Statements of Cooperative

The business model of the cooperative is sound, unlike the essential oils projects; it is already operating independently without relying entirely on DST for financial support. It has raised loans from ABSA to cover infrastructure and from other donors. The cooperative has a good structure for saving on costs such as overheads and marketing , it also enhances the bargaining power of its members.

Of concern though is that a number of fish farmers, unfortunately, under performed during the 2009 season; they could not reach production targets and subsequently failed to repay the production loan accounts of the Co-operative. This situation has caused serious cash flow implications for the Co-operative. The Board has subsequently decided to consolidate operations and to limit the

financial risks to the Co-operative by only allowing the 10 best projects to continue farming in 2010. The projects that have been excluded will be re-evaluated and re-introduced, if merited, as from 2011.

Of particular interest is the development of operational, administrative and managerial structures and procedures that ensure efficient and transparent financial and managerial practices. This venture shows that it has developed management practices that are crucial for its sustainability.

The potential for developing a sustainable business in this province is very encouraging for the following reasons. Aquaculture does provide an opportunity to communities to participate in the local and regional economies, without the ownership of "land" being a primary prerequisite. This refers to the establishment of small-scale fish farming units on existing irrigation dams, without land transfer and pre-ownership being required. In this event though, farming rights are to be secured by legal agreement. Unlike the essential oils business, the initial start-up costs for this venture is very modest. The cage technology also can be shared as a common facility by many fishermen. The fish product is not only a source of income but also a food source for the community.

Partnership and linkages

The Cape Winelands Municipality is involved in the project and provides political support. It has also made an amount of R120 000 available for purchasing of farm equipment. Other local councils such as Worcester and Witzenberg are also involved but the exact nature of their involvement is unclear. The project has also developed partnerships with several organizations in the private sector and development agencies. There was no indication, however, if the Departments of Water Affairs and Environment as well as Trade and Industry played any lead role in the projects.

An important aspect though is the close proximity of the University of Stellenbosch to the local fish farmers which should facilitate technology and knowledge transfer. In essence a local system of innovation which consists of knowledge organizations, suppliers, clients and government has developed. This model is worth investigating further to determine best practices that can be used in other provinces.

Specific challenges

- No coordination of efforts of DST and other government departments.
- Projects are not driven by needs of poor communities but by proposals handed in by academic institutions and science councils.
- Inability of enterprises to meet local demand.
- Cash flow problems resulted in cooperatives failing to service loans.

- Poor production performance by some farming units.
- Securing markets for products remains a problem.
- Fluctuation of product prices because of over supply.
- Loss of plants due to insect infestation e.g. termites.
- Agronomic problems such as poor weed control, poor irrigation and insufficient fertilisation.
- Under utilisation of process or distillation capacity because plantations were not fully developed.
- Suppliers of inputs and services are far from plantation and distillation sites.

4.3. SUSTAINABLE HUMAN SETTLEMENTS

The Technology for Sustainable Human Settlements sub-programme focuses on the physical living environment, namely housing, basic services (water, sanitation, refuse disposal and energy) and transport. The objective is to develop innovative solutions that improve the quality of life whilst reducing the total cost of living.

Table 4.7 displays the portfolio of projects that have been piloted and demonstrated. The information contains a brief description of each project, its location, the implementing agency and partners. The sectors covered include water and sanitation, housing, waste, energy and information and communication technology (ICT). The follow-up interviews with DST officials revealed that a large number of projects made very little or no impact on the lives of the poor communities. Some projects failed while others were terminated with no record kept of lessons learnt, and, surprisingly, several new projects have been introduced. Indications are that the new projects are also likely to end-up being terminated.

4.3.1. Impact of projects

The impact of projects was assessed in terms of human capital development, sustainability, up-scaling, and partnerships and linkages. However, the impact of almost all listed projects in Table 4.7 could not be evaluated as there was no adequate information. The Digital Doorway (DD) made noteworthy progress and therefore became the only project that was evaluated in this section. The objective of the DD project is to improve computer literacy of rural communities. It is therefore regarded as a service delivery project.

Table 4.7: List of projects under the Sustainable Human Settlements sub-rogramme

Sector	Project name and title	Location	Implementing agency (IA)and partners (P)	Status
Housing/settlement	To develop construction technologies for affordable, sustainable, high-quality housing for middle to low-income groups	Overstrand municipalities, Western Cape	CSIR (IA) provincial Department of Human Settlement	Project delayed because of EIA processes
Housing Material	Insulated Concrete Forms and Wood Cement Composite Panels for housing	KwaZulu-Natal	Meeting of Minds	Project terminated in KwaZulu-Natal because of lack of raw materials (wood waste).
Water	To accelerate the delivery of water services to communities	OR Tambo and Amathole district municipalities, Eastern Cape	CSIR (IA) and HSRC (IA) DPLG (P), OR Tambo& Amathole Municipalities (P) DWAF (P) IDT (P), DBSA (P)	Project delayed – target date for completion Sept 2010. Project is still at planning stage, CSIR developing outputs and outcomes
Energy	Solar distillers and geysers; to develop a cost effective solar geyser Imbaula Gel Stoves	Northern Cape Gauteng	NAWASAN(IA) No other partners Francois Oliver	Project was terminated because of non-compliance by implementing agency Project terminated-no explanation provided
Waste Management	Underground bin system for waste storage	Johannesburg, Gauteng	Pikitup (IA) (P)	Project not sustainable
ICT (Digital Doorway)	To improve computer literacy of rural communities	Project replicated in all provinces - 2006 units installed	CSIR (Meraka Institute) Department of Education, Eastern Cape	DST has exited the project and Digital Doorway installed nationally

Sources: DST Annual Reports, project reports and interviews

Human capital development

In total 206 DD terminals have been installed successfully in schools and villages in all provinces. Three groups of people benefited from this project,

i) community champions who received training in the use and first line support of DD terminals,

ii) community members themselves who through the use of DD terminals could improve their levels of computer literacy.

iii) employees of the black owned companies who were contracted to do assembly, installation, support and maintenance of DD terminals.

Since the start of their involvement with the project, one of the companies appointed eight previously unemployed young people to work on the project. The DD team provides training and mentoring.

Whilst the deployment of the DD has been successful, there is no evidence to show its impact on the livelihoods of the beneficiaries. For example, although the expected outcome is improved computer literacy, no studies have been done to show if this objective has been achieved or not. Moreover, how this project will contribute to poverty reduction is unclear.

Sustainability of the project

Sustainability is indeed an issue with this project, because typically such projects have little prospect for direct cost recovery. Its ability to sustain itself financially is therefore a function of its perceived efficacy by other government departments. With the large number of DD in the field, it is becoming more urgent to address issues such as support and maintenance, fault reporting and updating of content.

Both the DST and the Meraka Institute are desirous that the Digital Doorway project grows exponentially and that its impact and reach be increased beyond the original aim of promoting computer literacy. There is an opportunity to utilize the infrastructure to increase the impact of the DD by supporting entrepreneurs and SMMEs in the communities where they have been deployed.

Upscaling of the project

The massification of the DD has largely been driven by DST which has made funds available for the deployment of the terminals in all provinces. Future diffusions will face challenges such as cost of supporting large, country-wide installed base, high cost of travel to do repairs, lack of reliable

human resources to report in cases of failure. ICT is rapidly changing and continuous product and content development, database update connectivity challenges will have to be managed. The issue of vandalism and electricity supply will also have to be taken into consideration.

The diffusion of the project has also received a major boost due to the interest that has been shown by the United Nations Children's Fund (UNICEF) to deploy the units in other countries (e.g. Lesotho and private company Syngenta purchased five units). To roll-out the projects, it is crucial that DST is proactive in approaching and bringing other government departments and the private sector on board. One model that has been proposed by the CSIR is the establishment of a company that will manage the maintenance of the existing infrastructure and future expansion into other services. The idea of manufacturing and distributing the units has also been explored.

Partnership and linkages with government departments

Getting other government departments on board has proved to be a challenge. The Northern Cape Department of Education is the only stakeholder that has assumed responsibility for logistical arrangements surrounding the installation (e.g. site identification, negotiations with community leaders, identification of community representatives as well as transporting and storing the DD to relevant sites).

General challenges

The following challenges attributed to poor diffusion of many projects:

- Poor support by relevant government departments and private organizations hamper diffusion and uptake of technologies.
- Lack of partnership between government departments.
- No adequate record of completed projects.
- Failure by DST to conduct needs analysis.
- DST staff was not fully involved in the projects probably due to lack of capacity and relevant skills to deal with many projects of this nature.
- DST is not well informed and has a narrow view of the extent of logistics involved in the area of human settlement, for example geographical locations of demonstration sites, municipality processes, and so forth.
- DST had no clear plan for roll-out of technologies or innovations.
- Municipalities and developers neglect some technologies on account of affordability, e.g. Solar panels were deemed expensive.
- Change management such as succession of ministerial and management officials
- Delayed land claims and Environmental Impact Assessment approvals

- Lack of zoning by Department of Water and Environment was a barrier to the introduction of technologies such as solar geysers and water infrastructure.
- Changing project's goals e.g. one project's objective to curb the outbreak of cholera changed to accessing of clean drinking water and a target of 2800 people in the social mobilization project was changed to 1700.

SECTION 5. SUMMARY

5.1. CONCLUSIONS

There is no doubt that the DST's intention and effort to investment on Science and Technology for Social Impact (STSI) programme dedicated to fighting poverty and unemployment was a good intervention. However, the resultant impact was evidently too little to improve the quality of life and the livelihoods of the poor communities as attested by many challenges highlighted in the previous sections and under the following areas.

Enterprise and employment creation

It was only the DST's Sustainable Livelihoods sub-programme that made some impact in terms of job and enterprise creation but it was very small. The number and size of enterprises created from essential oil, medicinal plants and aquaculture projects clusters were too small for viable businesses to be established. Jobs created were few relative to the total number of the unemployed people in the area. "Salaries" were paid out of project funds as a result of enterprises that could not break-even or make profit. Only participating households benefited from those projects. However, indications were that the essential oil enterprise had potential to create up to 3000 jobs.

Human capital development

Regarding the Sustainable Human Settlements sub-programme, only the Digital-Doorway project benefited a few pupils and community members by improving their computer literacy through training and mentoring, but the impact was small. The Sustainable Livelihoods sub-programme also failed dismally to offer any noteworthy training that could guarantee jobs or enable someone to start their own business. The following were some reasons mentions:

- Beneficiaries were largely assigned to weeding and general farming.
- There were few essential oil enterprises to learn from.
- Very few supervisors were trained in planning, maintenance of facility, finances and employee management.
- Aquaculture offered on-site training to small scale farmers on recirculation systems, fish health management and diagnostic courses but there was no evidence of impact on beneficiaries.

Sustainability and up-scaling

The majority of the projects was not sustainable and could not be scaled up, for the following reasons:

- DST lacked clear plans on how to exit its investments.
- Enterprises (aquaculture) were too small for a viable business and therefore could not neither meet the local demand nor attract potential investors.
- Enterprises failed to break-even leading to failure to repay loans.
- High capital costs and complex technical requirements resulted in municipalities and developers failing to implement some proposed technologies.

The sustainability, especially of the income generating projects, is very uncertain based on their financial performance. Almost all of them still require continued financial support from the DST. It is difficult to estimate when enterprises will breakeven without detailed feasibility studies or business plans. Expecting projects to make social impact only after a minimum lifespan of three years is probably ambitious.

Partnerships and linkages with other government departments

Although some departments and organizations were involved in rolling out the Digital-Doorway and some aquaculture business models, partnership to roll-out innovations in general has been a big challenge in both sub-programmes. It is alleged that government departments delays to commit to partnership or they are just not interested. The only visible partnership created by DST was with implementing agencies such as MRC, HSRC and CSIR. Where some government departments and local municipalities were involved, the nature of their role was unclear. The only exception was the Cape Winelands Municipality that gave political support and some funds for purchasing aquaculture equipment. What is glaring though is the lack of partnership with the DTI that has an essential oil incubator programme.

Surprisingly, all this is happening despite the signed memoranda of understanding (MoU) of the DST with several other departments as well as the existence in government of a Ministerial Cluster and the Forum for South African Directors-General (FOSAD) which are geared to forge integration and coordination. The relevance, appropriateness and functioning of inter-governmental cooperation requires further investigation. It is an issue that cannot be easily understood via a desktop survey.

Performance targets and indicators

Another key finding is the lack of well defined performance indicators and targets for measuring outcomes and impact. In the absence of these it becomes very difficult to measure project success or failure. The Auditor General comment on the DST's STSI project in its Annual Report of 2008/9 is worth mentioning here. It states that targets with regard to the Science and Technology for Social Impact Programme were not:

- Specific in clearly identifying the nature and the required level of performance
- Measurable in identifying the required performance
- Time bound in specifying the time period

5.2. RECOMMENDATIONS

In order for the DST's programme to make practical and meaningful social impact, the following recommendations are made:

Specific recommendations:

- That the DST form a partnership with the DTI and integrate the essential oils cluster into the latter's essential oils incubator programme. The common goals of both departments and the fact that the DTI also houses SEDA, the agency whose core mandate is enterprise development, make the rationale for a partnership compelling. The benefits are the combining of expertise and resources and avoiding duplication.
- That the DST align its STSI projects with all relevant departments including the integrated development plans (IDPs) of municipalities in order to fast-track implementation processes and enhance integration and coordination.
- That with regard to the ICT Digital Doorway project, the DST take the lead in identifying other departments and stakeholders who can support further diffusion of the project, as well as explore the possibility of engaging the private sector from a Corporate Social Responsibility perspective.
- That the DST engage with the Department of Rural Development and Land Reform (DRDLR) as a matter of urgency as the DRDLR's planned activities overlap with some of the current projects within the DST's STSI programme. There is a real opportunity here for cooperation as well as the advantage for the DST of being able to use the DRDLR offices throughout the country as points of entry to communities.

General recommendations:

In order to improve the effectiveness and efficiency of the DST's (and of other government departments') programmes on poverty alleviation and social development, the following general recommendations are made.

- The DST must meet with other relevant government departments to review their Memoranda of Understanding (MoUs) regarding cooperation on social benefit programmes and commit themselves to giving effect to the MoUs.
- DST should focus its role in Social Impact programmes to the following:

  i) conducting stakeholder mapping and appropriate technology needs assessments, understanding stakeholder expectations and roles and forming coordination structures e.g. technology cooperation teams,

  ii) facilitating the development, demonstration and promotion of appropriate innovation packages; replication and roll out must be taken up by other line departments, municipalities and social entrepreneurship organizations,

  iii) compiling and disseminating portfolios of replicable social innovations that have potential to be taken up by private investor and line departments,

  iv) acting as a technology gate keeper by conducting technology scans and technology analyses, and providing strategic advice to other departments and municipalities on appropriate technology.
- DST must establish a robust marketing strategy to communicate appropriate implementable technology (innovation) and business models to facilitate development of small enterprises that will create employment opportunities and generate wealth for the poor communities.
- DST should develop results (outcomes) based Monitoring and Evaluation system in which goals, objectives and performance indicators to measure impact of projects should be clearly defined and agreed to by all stakeholders. The system should not only measure project performance, but also determine whether projects are contributing in a strategic way to the DST's goals, e.g. determining if the right partnerships have been formed and also if there are practical plans in place for massification (diffusion) of pilot projects.

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LIST OF APPENDICES

Appendix A. Impact of South Africa's poverty programmes and policles: Terms of Reference

INTRODUCTION

The primary mandate of the Innovation for Development (INNO4DEV) sub-committee of the National Advisory Council on Innovation (NACI) is to provide advice, through NACI, to the Minister of Science and Technology and Cabinet on how to bridge the gap between formal and informal sectors through technological innovation in order to improve the quality of life of all South Africans, and in particular the grassroots communities by integrating the two sectors into policy making and implementation within the national system of innovation (NSI).

REQUEST FOR PROPOSALS

In order to effectively respond to social challenges that confront, to a large extent, poor South Africans, INNO4DEV sub-committee is inviting potential service providers to respond to the Request for Proposal (RFP) for a desktop study, Status of South African Poverty Alleviation Programmes, to be commissioned during the financial year 2009/2010. The study is an input to the situational analysis that is being undertaken to assess how South Africa has been responding to social challenges over the past.

PURPOSE

The purpose of the study is to scan the existing government policies and (or) programmes that were intended to address social challenges such as poverty and unemployment in South Africa and assess impact thereof.

COVERAGE

This is a high level study that is expected to cover a wide range of government poverty alleviation programmes, but NACI decided that the scope be narrowed down to the DST's Science and Technology for Social Impact programme.

SCOPE OF THE WORK

The scope of the work comprises the following:

- Identify existing government poverty alleviation programmes and policies with a special focus on the Department of Science and Technology's (DST) Science and Technology for Social Impact (STSI) programme.
- Identify linkages and institutional arrangements between DST and other government departments that included Trade and Industry and the reconfigured Departments of Rural Development and Land Affairs and Human Settlement.
- Analyze the impact of the programme(s).
- Examine if the impact made was as a result of technological innovations or not

- Formulate recommendations that are aimed at enhancing the social impact of the poverty alleviation programmes.

OUTPUT SCHEDULE

Below are key outputs to be delivered within specified timeframes.

- First draft report: mid of November 2009
- Final draft report: End of November 2009.