INNOVATION FOR POVERTY ALLEVIATION PROGRAMME GETS UNDERWAY

The Department of Science Technology (DST) is supporting a number of exciting projects that intend to use science and technology to reduce poverty through job creation, the development of small and medium enterprises, economic growth and improved quality of life.

Projects
For this reason, the Department’s Innovation for Poverty Alleviation Programme, which the Department launched on 17 September 2010, is supporting the following projects with nearly €30 million in untargeted budget support from the European Union over four years:

- Aquaculture – establishment of abalone hatcheries
- Beneficiation of waste streams from primary processing operations: development of BIOMIN as a soil ameliorant; and Chemcity.
- Beneficiation of farmed produce into finished products – development of herbal products
- Community Wireless Mesh Network
- Demonstration agronomy – establishment of an African ginger nursery
- Demonstration agronomy – indigenous leafy vegetables
- Demonstration agronomy – new essential oil species
- Demonstration agronomy – Damask rose (Rosa damascene)
- Expansion of demonstration grow-outs to commercial scale in Pella, Onseepkans and KwaNobuhle.

(There is a link from the second paragraph to this section of text, which is why DST has been written out again) Innovation for Poverty Alleviation Programme
The Innovation for Poverty Alleviation Programme is a partnership between the Department of Science and Technology (DST) and the European Union’s (EU) Sector Budget Support Programme (SBS). (http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=13271&tid=20046).
The SBS supports the use of science and technology (S&T) and innovation to develop small and medium enterprises in rural areas to contribute to improved quality of life.

The focus of the Innovation for Poverty Alleviation Programme is on:
- the creation of jobs through science, technology and innovation interventions
• the establishment of **sustainable livelihoods** through small-scale science and technology-based **agro-processing and aquaculture industries** in line with that sector’s bioeconomy objectives

• enhancing **human settlements** through appropriate technologies for such things as access to clean **water**, **information** and **communication** technologies and renewable **energy**

• supporting small and medium **enterprises** with demonstration technology

• improved **access** to online government services and science and technology knowledge through the application of **information communication technologies**

• developing and improving global **environmental science** and responses

• **Strengthening the science sector** in South Africa.

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**The European Commission**


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**Sector Budget Support**

The European Commission defines budget support as the transfer of financial resources of an external financing agency to the national treasury of a partner country. These financial resources form part of the partner country’s global resources, and are consequently used in accordance with its public financial management system.

Sector budget support takes the form of a transfer to the national treasury in support of a sector programme. This kind of support seeks to accelerate progress towards the partner country’s sectoral goals. [http://ec.europa.eu/europeaid/how/delivering-aid/budget-support/index_en.htm](http://ec.europa.eu/europeaid/how/delivering-aid/budget-support/index_en.htm)

The sector approach assists collaboration between government, development partners and essential stakeholders mainly with the aim of improving both government and national ownership of public sector policy and decisions about the allocation of resources. This means coherence between policy, spending and results. It also reduces transaction costs.

The first project to benefit from the SBS-funded Innovation for Poverty Alleviation Programme is the **Community Wireless Mesh Network** (WMN) project. This large-scale
technology demonstrator project has progressed significantly since its inception. By the start of 2011, R40 million had been allocated to the WMN project.

Other SBS beneficiaries include agro-processing projects to the value of R38 million.
Aquaculture – establishment of abalone hatcheries

To increase community benefit from, and involvement in the abalone industry - following employment losses in coastal areas, a ban on wild harvesting, increased poaching and a decline in wild populations of abalone - and to support the growth of employment in an abalone ranching industry the Department of Science and Technology's Innovation for Poverty Alleviation Programme is supporting a project that intends to expand abalone aquaculture in the Northern and in the Western Cape. R10 million in support has been set aside for the first year of the project.

Several coastal communities in the Northern Cape have been hit by a combination of job losses in both mining and fishing.

The establishment of abalone hatcheries at selected sites in Hondeklip Bay in the Northern Cape and possibly Hawston in the Western Cape aims to stimulate the development of aquaculture industry.

Aquaculture, which entails cultivating fish, shellfish and aquatic plants, has great potential to contribute to establishing vibrant provincial economies.

In the short-term this project will establish a leading abalone hatchery in each of these regions as a first step towards stimulating the development of aquaculture. In the long-term the project wants to stimulate aquaculture’s development in a way that reflects inclusive growth in areas where communities have been affected by job losses in the fishing industry. For example, an established abalone hatchery provides a reasonable case for rearing worms for the bait industry and mussels for human consumption.

The Northern Cape offers good conditions for shore-based aquaculture in the form of favourable biological conditions, nutrient-rich unpolluted seawater, the downscaling of diamond-mining and access to mine-related infrastructure.

In an area where unemployment is extreme – between 75 and 80% – it is estimated that the Hondeklip Bay abalone project will create at least 120 permanent and 50 temporary jobs. The project also promises to create downstream small businesses and Black Economic Empowerment (BEE) opportunities. Employment starts with substantial managerial, clerical and supervisory staff and increases to skilled, semi-skilled and unskilled staff employed during the establishment and construction of a site.
About abalone (Haliotis midae)
Abalone is a herbivorous species that grazes at night and remains inactive by day both in the wild and in tanks.

Young, newly metamorphosed, abalone are reared on diatoms cultured on plates or in bags and weaned to seaweed or formulated feeds when their shells are between 4 and 6 mm long and the creatures are between five and six months old.

South African abalone farms’ greatest production cost is feed, which is a compound formulated diet, harvested kelp (Ecklonia maxima), cultured seaweed (Gracillaria and Ulva spp.), or a combination of these.

The development of abalone farming has stimulated research into abalone’s digestive physiology, its feeding behaviour and optimisation of the use of natural and formulated diets in conditions of intensive culture.

The hatcheries will have the capacity to produce about 6 million abalone spat (10 mm) and juveniles (25 mm) a year. To support abalone ranching initiatives both hatcheries will include the development of nurseries.

The development of the hatcheries is based on the transfer of existing hatchery technologies, although the project aims to produce improved broodstock developed by the Innovation Fund Genetic Improvement of Abalone Programme (http://www.dst.gov.za/other/gpc/Aquaculture%20Activities.pdf).

The hatcheries at Hondeklip Bay and Hawston will be guided through a three to five-year set up period to facilitate commercialisation, BEE and community participation. Because of the project abalone hatchery technologies will be transferred to previously marginalised and disadvantaged communities.

Beneficiation of waste streams
The Department of Science and Technology’s Innovation for Poverty Alleviation Programme is supporting two projects targeting the beneficiation of waste streams from primary processing operations to produce a soil ameliorant. The University of Pretoria (www.up.ac.za), Agricultural Research Council (ARC) (www.arc.agric.za), Mintek (www.mintek.co.za) and Eskom are co-developers in these projects.
ARC is the principal agricultural research institution in South Africa and Mintek is South Africa's national mineral research organisation.

BIOMIN's aim is to meet the need of a niche market for carefully balanced micro-nutrient and NPK formulations that are safe, registered, affordable and available to plant roots at the right time and with minimal leaching.

This would be of value to communities, as well as emerging and small-scale farmers whose land-use is depleting soils of nutrients and therefore reducing productivity. Over-cropping, net harvest of nutrients through crop harvest and poor replenishment of lost nutrients are to blame for this.

Almost R3 million has been set aside for the first year of the BIOMIN project. It aims to establish a demonstration processing facility at Roodeplaat. During the first year of the project a demonstration facility will be established in Marble Hall.

Both projects will use technology developed by Mintek to convert waste into a high-value soil ameliorant for better fertility and crop production at more affordable prices than those of conventional fertilizers.

The projects will source Class-F fly ash from coal-fired power stations and household sewage sludge from municipal sewage plants. This will be processed with the addition of lime and nitrogen from commercial sources to produce soil ameliorant.

The projects will create 12 jobs each in the form of community-based enterprises, in addition to contributing to waste management and greater food security.
The Chemcity project has almost R6 million in support from the Department of Science and Technology for its first year. This project, being undertaken with the Council for Scientific and Industrial Research (www.csir.co.za) as a partner, aims to establish a fruit and plant oil extraction beneficiation business in Tzaneen as well as a laboratory. The intention is to supply the cosmetic and health industries.

The Chemcity project will use waste streams from the production and processing of the following species in Limpopo:

- Baobab seeds (Adansonia digitata)
- Marula nut (Sclerocarya birrea)
- Mobolo plum stone (Parinari curatellifolia)
- Wild plum fruit (Ximenia)
- Macadamia nut
- Mango stone
- Avocado
- Papaya seed (Carica papaya)
- Pumpkin seed
- Kalahari melon seed
- Num-num (Carissa bispinosa)
- Natal plum (Carissa macrocarpa)
- Kei apple (Dovyalis caffra)
- Sausage tree (Kigelia Africana).

The demonstration centre to be established by this project aims to improve the standards of finished products in a new value chain centred on extracts from fruit and nut-bearing indigenous trees. When standard oil specifications can be maintained finished products will be marketed via a website.

With wealth creation, employment and economic beneficiation in mind, the demonstration centre will foster entrepreneurship and job creation. The centre will target rural communities to create employment opportunities and promote economic benefits. Seventeen people, five of them graduates, will be employed. Outsourcing will generate other job opportunities.
Beneficiation of farmed produce – development of herbal products

With R5.4 million in support from the Innovation for Poverty Alleviation Programme there is a project underway that aims to improve South African researchers’ capability to develop effective medicines and related substances.

This is a step in the right direction if South Africa is to start successfully patenting many medicinal substances. The country has the potential to launch various products derived from its unique indigenous plants. In reality most research into and development of the few products traded internationally and based on South African plants has been done by international companies.

Early research done at universities for academic purposes, the absence of product development in line with market needs, a lack of a reliable supply of plant material through cultivation, poor quality procedures and a lack of funding and infrastructure for product development are among the main reasons for this.

To build on research done in this area by the Council for Scientific and Industrial Research (CSIR) (www.csir.co.za) this project will see existing facilities at the CSIR being upgraded to serve as a training demonstration processing and formulation facility.

The upgrade will entail investment in:

- a pre-processing area for the receipt of plant material, inspection areas for the plants, their washing and/or cleaning, slicing, herb drying and grinding.
- additional water extraction vessels in an aqueous extraction area.
- the write-up room being extended.
- a new facility in the form of an organic extraction area for specialised organic extraction of plants being established.
- a formulation facility with capsuling and tableting equipment, equipment for preparing syrups and liquid formulations, granulators, creams and labelling equipment.

The project will also invest in establishing a demonstration facility at the University of Fort Hare. It will comprise buildings to house the equipment, a receiving area for plant inspection,
a plant cleaning area with facilities for plant material to be washed, slicing and chopping equipment, drying equipment such as a herb drier, grinding equipment for dust collection, such as a hammer mill with appropriate dust collectors, selected extraction – if feasible – as well as a packaging and dispatch area and equipment such as packing equipment and labelling.

Eleven jobs will be created and skills will be transferred to young graduate scientists from historically disadvantaged higher education institutions and labourers near the cultivation sites. Because of this project, postgraduate University of South Africa (www.unisa.ac.za) students from various regions in South Africa will be trained at CSIR facilities.

The plants to be used by this project include devil’s claw, mesembryanthemum, African ginger, milk thistle, and aloe ferox.

**Wireless Mesh Network**

Rural communities stand to benefit significantly from the R60 million community wireless mesh network project which is a response to one of government’s strategic priorities – rural

In the context of government’s Integrated Sustainable Rural Development Programme, and existing research and development initiatives by the Council for Scientific and Industrial Research’s Meraka Institute (www.csir.co.za), the project is being rolled out at municipal ward level in the Sekhukhune District of Limpopo Province, JT Gaetsewe District in the Northern Cape and Nkangala District in Mpumalanga.

The project aims to take broadband infrastructure to rural communities and equip individuals there with the necessary entrepreneurial and technical skills to build and operate large area wireless networks. Such networks are also known as community wireless networks.

This is a grassroots-up approach to rolling out infrastructure in areas where unemployment is high, a large portion of the adult population has had no formal education and the weak skills base constrains economic growth.

By September 2010, 180 schools in the Nkangala District Municipality had been connected to the wireless mesh network and, and of these, 114 had been connected to the Internet. Nineteen village operators had been trained and set up, and technical training in wireless mesh network technology had been given to a further 50 young people.

By the end of the project hopefully 45 small enterprises run by village operators will have been established and given Internet-access, and 450 government sites, most of them schools, will have the use of voice-over-Internet protocol. This technology allows telephone calls to be made using computer networks.

The community wireless mesh network project recognises that rural and marginalised communities have limited opportunities for sustainable business, a lack of access to information communication technologies (which can spur economic development), sub-optimal government services where government offices are isolated from telecommunications infrastructure, a lack of support of maintenance of information communication technology infrastructure, and human capacity development.

Shortcomings in the provision of services to certain rural communities are attributed to settlements being remote, and widely dispersed for historical reasons.
Giving communities access to community wireless networks should help change this.

Demonstration agronomy - African ginger nursery

It is thought that essential oil made from ginger is popular because of its decongestant and antimicrobial qualities. This explains its use as a decongestant and antibiotic.

African ginger’s natural growing range is in Mpumalanga and Limpopo Province.
The Department of Science and Technology’s Innovation for Poverty Alleviation Programme has allocated almost R5 million for the first year of a project launched in response to a possible decline in the wild population of African ginger (*Siphonochilus aethiopicus*), which is being sold via formal and informal channels.

Although this rare plant is easily cultivated through micro-propagation and there are a few small-scale cultivation efforts, there are no commercial nurseries for the plant.

The project will establish a commercial-scale nursery for ‘hardened’ material using propagation material from the Agricultural Research Council (ARC) (www.arc.agric.za) facility at Roodeplaat, and micro-propagation material from a commercial nursery until a successful micro-propagation protocol is developed by the ARC.

The rate of growth of plants from these sources will be compared, and planting of propagated and micro-propagated plants will be increased yearly to establish a 20 ha plantation, with 5 000 plants per hectare.

This project will create over 80 jobs.

**Demonstration agronomy - indigenous leafy vegetables**

R2.8 million has been allocated to a project that aims to provide a source of commercial-quality indigenous and indigenised food seed. It will achieve this by establishing a seed-supply facility at the Agricultural Research Council Roodeplaat Vegetable and Ornamental Plant Institute (ARC) (www.arc.agric.za) facility.

The ARC maintains 402 indigenous and indigenised vegetables as seed or in glass houses.
The following indigenous food crops can be cultivated and propagated for seed in isolated cages by maintaining pollination distances:
Chinese cabbage, nightshade, amaranthus, jute mallow, cowpeas, pumpkin, spiderplant, Cleome gynandra, Chorchorus, amadumbe, Chenopodium, kale and rape, and wild melon.

The success of indigenous food seed market expansion will depend on the production of indigenous vegetables at grow-outs at rural based universities. The Universities of Zululand, Limpopo, Fort Hare and North West will be sites for satellite seed production.

A beekeeper will supply hives and transfer knowledge as part of the project which, it is also hoped, will attract the interest of commercial seed companies.

**Demonstration agronomy - new essential oil species**
The Council for Scientific and Industrial Research (CSIR) (www.csir.co.za) has selected cold-climate plant species for essential-oil trials for use in the flavour, fragrance, herbal medicine and cosmetics industries.

Agronomy trials at experimental farms of the Agricultural Research Council (ARC) (www.arc.agric.za), South African National Biodiversity Institute (SANBI), agricultural colleges and universities based in rural areas will involve Helichrysum odoratissimum, basil, lemon balm, Palmarosa and yarrow.

In the past no essential oil projects funded by the Department of Science and Technology and implemented by the CSIR were based on organic farming principles or organic oil premiums. The purpose of this aspect of the project is to cultivate clusters of highly marketable essential oil species under organic conditions on a single site.

This three-year project has been allocated R5.1 million for its first year; it will create over 50 jobs.
**Demonstration agronomy – Damask rose**

Essential oil obtained from the Damask rose (Rosa damascene [Rosa gallica x Rosa moschata]) and produced under conventional agricultural conditions sells for R30 000 per kilogram, however when oil is organically certified its price soars to as much as R65 000 a kilogram. This oil is in demand on the local and international markets.

Rose oil has a deep, rosy, fresh aroma, and its colour ranges from clear to pale yellow. The major chemical constituents of rose oil are citronellol, geranoil, nerol, linaloo and phenyl ethyl alcohol.

The Damask rose demonstration agronomy project will establish a 20 ha demonstration site in the eastern Free State. That area is thought to be ideal because of its climate which is
characterised by very cold winters followed by an extended cool spring - and agro-ecological potential.

Flowers are hand-harvested before sunrise and the petals distilled the same day to extract the essential oil. Four job opportunities per hectare will be created during this five-year project.

Expansion of demonstration grow-outs to commercial scale at Pella, Onseepkans and KwaNobuhle


Pella and Onseepkans in the Northern Cape represent the start of an essential oils production cluster based on the leaves and new shoots of a cross-bred rose-scented geranium cultivar, Pelargonium cv. Rose. KwaNobuhle near Uitenhage in the Eastern Cape is a southern site for growing the same plant.
The targeted essential oil is for a 1:1 ratio of citronellol and geraniol, which is the so-called ‘Bourbon’ grade that fetches a premium. The January 2010 price for 1 kg of oil produced at Onseeplankans and Pella was US$130.

The Council for Scientific and Industrial Research (CSIR) (www.csir.co.za) regards Egypt, India and China as competitors in this market.

This project will expand the 30 ha cultivation at each Northern site to approximately 50 ha. The land areas leased from the Khai Ma municipality at Pella and Onseeplanks extend to 80 ha and 85 ha respectively. The steam distillation facility can process 9.6 tons of plant material in a 12-hour cycle. The CSIR ratio of 32.5 ha: 100 kg of oil a month translates into 1 200 kg of oil a year.

The KwaNobuhle site is being expanded from 12 to 30 ha so that it can produce 900 kg of oil a year at a ratio of 20 ha:50 kg of oil. Chemical analysis of the oil produced at KwaNobuhle shows that it is almost of Bourbon grade.

These projects will employ 240 workers and three site supervisors and develop human capital in various ways. For example, the site supervisor and distillation facility operators will gain valuable managerial, administration, horticultural and processing experience in carrying out the project.

The installation of weather stations at the sites will also result in the transfer of skills: on-site leaders have to be taught how to apply information accumulated by their weather stations when they make day-to-day decisions about such things as optimum planting time and irrigation protocols.

R8.3 million has been allocated for the first year of this project.

CONTACT DETAILS

1. Mr Victor Senna (Acting Chief Director)
   Tel: 012 843 6845, Cell: 073 044 2542
2. Mr Daniel Mokhohlane (Deputy Director)
   Tel: 012 843 6349, Cell: 076 518 8565