

Socio-economic impact of astronomy in South Africa

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Abstract

In South Africa, a country where almost half the population lives in poverty, we have built the multi-million dollar Southern African Large Telescope, we have begun on the even more expensive Karoo Array Telescope, and we are one of the two finalists bidding to host the multi-billion dollar Square Kilometre Array! In trying to communicate astronomy to the public, how do we justify such spending to a family in a rural area living in poverty? This presentation will expand on efforts in South Africa, specifically the SALT Collateral Benefits Programme, which are trying to answer these seemingly difficult questions. The socio-economic impact of astronomy on societies, especially those in the vicinity of these large telescope projects, will be investigated, with examples and experiences being shared, especially from the sparsely populated Northern Cape Province of South Africa.

Introduction

In 1998, the South African government approved the construction of the Southern African Large Telescope (SALT) in Sutherland, Northern Cape Province. The South African government agreed to contribute 50% of the capital construction costs with the remaining 50% sourced from international partners. The idea behind SALT was to enable South Africa to remain internationally competitive in astronomy well into the 21st century. Furthermore, such a facility was intended to provide both South African and international scientists with a capability that can explore the depths of the Universe and expand the frontiers of knowledge.

The SALT Collateral Benefits Programme (SCBP) was designed to maximise benefits from the investment of public funds in the construction and operation of SALT. During the construction period the focus was on job creation in the local area (building of infrastructure such as roads and buildings). Since the inauguration of SALT in November 2005, we have moved from the construction to the operational era, and the SCBP has evolved towards the current state.

There are now three main focus areas to this programme:

1. Education in Mathematics, Science, Engineering and Technology: to supply the country and the continent with well-trained and motivated professionals in substantially increased numbers.
2. Science Communication and Awareness: to effectively engage with the public in order to disseminate relevant information in the fields of astronomy and space science.

3. **Socio-Economic Development:** in order to contribute to a better quality of life for all people, especially the disadvantaged.

Each of these areas will be briefly discussed, followed by a listing and short description of activities carried out in 2007.

1. Education in mathematics, science, engineering and technology:

Fundamental to the socio-economic development of any region is education. The biggest impact that SALT and astronomy has had on the people in South Africa has probably been in education. SALT is an icon that is known by virtually every learner in the country – it is even a part of the school curriculum at various levels. What it means to a young South African is that there are great opportunities in this country in the fields of science and technology. The SCBP uses this icon to inspire learners towards careers in this field. We also use astronomy and SALT as a tool for teaching concepts in mathematics and science at school level. Some of the educational activities in 2007 include:

- **Scifest 2007:** Annual National Science Festival attended by tens of thousands of learners – SCBP runs learner and educator workshops as well as stargazing for the public.
- **National Science Week 2007:** Annual event on the science outreach calendar – activities carried out in Cape Town and Sutherland, promoting science awareness with a focus on astronomy.
- **Astronomy Month 2007:** Another annual event celebrated nationally.
- **Space Week 2007:** Linked to the international “World Space Week”, we teamed up with the space science community for a space camp for learners from across the country.
- **Astronomy Quiz 2007:** Second annual event involving four rounds of quizzes for Grade 6 learners from across the country. SCBP co-ordinated both the Western Cape and Northern Cape quizzes.
- **Women’s Day 2007:** Government sponsored activities targeted at role modelling for female learners.
- **UCT, PSP, SUN Educator Workshops:** Educator development workshops, in partnership with educator-training institutions, aimed at equipping them with the skills to take astronomy to the classroom.
- **SABC Careers Fair:** SCBP participated in the Cape Town leg of this exhibition (targeted at learners) on behalf of the astronomy community in SA – materials were sent to us from other astronomy facilities for exhibition.
- **Astronomy Art Competition 2007:** Targeted at very young learners and reaching out mainly to schools in the Northern Cape.
- **Workshadow:** Learners are given the opportunity to “shadow” SAAO staff from a variety of career fields.
- **Science Clubs:** National effort to establish and network science and astronomy clubs from schools across the country.
- **Resource Development:** Constant improvement and development of astronomy resources for use by educators and in schools in general.

- **Outreach:** Schools and community visits to demonstrate the use of telescopes and the basics of astronomy and SALT (either ad hoc or by request).
- **Universe Awareness Programme (UNAWA):** Astronomy outreach targeted at very young children especially in rural areas. This has been focused so far on the children aged 3 and older in the Northern Cape (involves games, demonstrations, videos, etc.).
- **Scholarships:** School level and university level scholarships awarded to deserving students in the field of astronomy.

2. Science communication and awareness

Public understanding of science and technology, especially in the rural Northern Cape area where SALT is located, is generally very low. In terms of the social aspects, there has always been a feeling amongst the Northern Cape communities that the people working at SALT were in a very different class from them — that the people of the local towns were only good enough to do the “unskilled” or “low-skilled” work while the “outsiders” did all the important science. This has always been a challenge in developing the relationship between the observatory and the poorer communities. The SCBP organises events and activities to try to address this problem and to enable a greater interaction with the community. Stargazing events are accompanied by talks by astronomers/engineers as well as open discussions about the community’s belief systems as well as the science being done at the observatory. Free observatory/SALT tours are also offered (transport provided at no cost) for people in Sutherland. All this has greatly improved public opinion about science and astronomy and helps to address one of the major problems in rural South Africa – a lack of self-confidence amongst the poor. Examples of some activities in Sutherland and across South Africa:

- **Astronomical Events (Eclipse, comet):** Lunar eclipse and comets (McNaught, Holmes) were used to bring astronomy to people’s attention.
- **Stargazing:** Specific events, held especially in the Northern Cape, where the community is invited to look through telescopes.
- **Sasol TechnoX:** Annual science outreach festival that sees tens of thousands of learners pass through.
- **Science Unlimited:** Another annual science outreach festival in a different part of the country.
- **Hobby X:** Partnership with the Cape Centre of the Astronomical Society of Southern Africa to exhibit SAAO/SALT/astronomy information at this annual exhibition.
- **Namakwa Festival:** Annual festival held in Springbok (Northern Cape) — attended by large number of public – SCBP provides an exhibition and telescopes for night sky viewing.
- **Free community tours:** The people of the town of Sutherland are offered free tours to the SAAO facility on a regular basis.
- **Open Nights:** Second Saturday of every month is “open night” for the public — astronomers from SAAO are assigned for open night duty.
- **What’s up:** Monthly description of the night skies produced by astronomer Dave Laney. Accompanied by star charts from the Iziko Planetarium.
- **Tour programme:** Extensive day and night tour programme in Sutherland and an ad hoc tour programme (by appointment) in Cape Town.

- **Indigenous Astronomy:** Activity to collect and document indigenous stories and myths about the African skies. Partnership with the Iziko Planetarium and the Unizul Science Centre.
- **Resource Development:** Public resources such as posters, information sheets and souvenirs are constantly being developed.
- **Visitor Centre Developments:** Constant improvement to exhibits and displays on a minimal budget.

3. Socio-economic development

This focus area, although probably the most important to people on the ground in poorer communities, is also the most difficult to address directly. The SCBP is constantly involved in discussions with the communities on activities and programmes that will help to uplift the socio-economic status of the area. The difficulty comes in drawing the line between what we can do from the observatory side and what the local municipality is mandated to do from the national government. It is important to work closely with other government structures and so the SCBP must stay informed about the politics and developments in the local municipality (which can sometimes become very complicated). Having said that, the biggest impact on the community since the inauguration of SALT has certainly been in the field of tourism. In the first year after inauguration the number of visitors to the small town of Sutherland shot up to 13,000 visitors per annum. This has resulted in a rapid increase in the number of guest-houses, coffee shops and tourism related businesses such as the Arts and Crafts project for the unemployed. SALT has been involved in a number of socio-economic development projects on various levels, from being a partner in funding proposals to actual implementation. These projects include:

- **Community Meetings:** In partnership with the municipality, regular meetings were held during 2007 to keep the community constantly informed about SALT developments and to explore ways of SALT to play a role in the socio-economic development of the community.
- **DVD Evenings:** Targeted mainly at the youth, a “homemade bioscope” aimed at keeping young people away from the taverns. Usually preceded by a talk on astronomy or social issues such as AIDS.
- **Heritage Weekend Festival:** Planned during the community meetings, this festival was aimed at celebrating the Karoo heritage during the Heritage Weekend in September. SCBP provided the telescopes and activities for celebrating the astronomical heritage and clear skies.
- **Indaba expo:** In partnership with the Karoo-Hoogland Municipality, this was an exhibition to attract more tourists to the Northern Cape.
- **Christmas, New Year events:** Separate events for very young children and teenagers respectively during Christmas and New Year (since 2006). All events have strong astronomy themes and include stargazing, talks on astronomy and videos. Also music and dancing when the attention to astronomy wanes.
- **Youth Day events:** Held in the towns of Fraserburg and Sutherland and included the screening of the popular South African youth day movie “Sarafina” as well as stargazing and astronomy Q&A sessions.
- **Wall Painting:** Only implemented in the town of Williston so far, this project entailed young

and old being provided with paint to express themselves on a long empty wall. SCBP involvement was registered in the form of drawings of SALT and starlore images.

- **Community Tour guides:** Young unemployed people from Sutherland have been trained to escort visitors up to the telescopes and around the town.
- **Tarring of roads:** Various proposals, motivations and recommendations made (in partnership with the municipality) to the provincial government for the tarring of the roads between Sutherland, Fraserburg and Williston.
- **Protection of Paleo Surface:** Proposals have been drawn up in conjunction with the municipality over the protection of a rock surface in Fraserburg that is of paleontological interest.
- **Arts and Crafts programme:** Joint proposals with the municipality to the Department of Arts and Crafts for funding of an Arts and Crafts Programme. Goods are marketed at the SAAO in Sutherland.

Conclusion

It is clear from the broad range of activities given in the examples above that a lot of people are being reached with activities that contribute to the socio-economic development of communities in South Africa. The model used by the SCBP can readily be adapted and applied to any other observatory or research facility across the world. The challenge to implementing such a programme, with the target audience being spread across schools, general public and poorer communities, will probably lie primarily in finding the staff and the funding.

The focus of the SCBP in terms of socio-economic development has generally been on the area surrounding the observatory in the Northern Cape province of South Africa. However, being a major player in astronomy both nationally and across Africa, the SAAO and SALT have a responsibility to spread the impact of astronomy much further. This has already begun to happen in many ways in anticipation of the International Year of Astronomy 2009.