



SARAO
South African Radio
Astronomy Observatory

Economic and socio-economic Impact of the Hydrogen Epoch of Reionization Array (HERA) in the Northern Cape province





Astronomy in the Northern Cape province

The Southern African region, that includes the Northern Cape province of South Africa, provides a pristine environment for astronomical observations. The region has unobstructed views of the southern sky due to the low population density in geographical areas, and a stable economic and geopolitical environment that has led to substantial international investment into astronomy infrastructure in this region.

The Northern Cape hosts world-class astronomy research infrastructure such as the Southern African Large Telescope (SALT), as well as the MeerKAT radio telescope which is a precursor to the Square Kilometre Array (SKA). Apart from these large-scale telescopes the region has seen growing international investment into co-hosted astronomy instruments and smaller telescopes on existing infrastructure sites.

Co-hosting astronomy instruments and telescopes can be seen as an innovative mechanism to stimulate economic and socio-economic development providing direct impact, through job creation, skills and imparting scientific knowledge on communities closest to the infrastructure site.



Hydrogen Epoch of Reionization Array (HERA)

The Hydrogen Epoch of Reionization Array (HERA) is a radio astronomy experiment located on the MeerKAT / SKA telescope site in the Northern Cape province of South Africa. The HERA instrument is an array consisting of 350 antennas, with the goal of observing how the first structures formed in the very early stages of the Universe, as the first stars and galaxies lit up space.

HERA is a US-led project that forms part of a large international collaboration representative of institutions from Europe, South Africa, the UK and the US. Construction of HERA began in 2015, with the full array reaching completion in 2021. SARAO managed the construction of the instrument in close collaboration with US institutions. Technical support for the maintenance and operations of the instrument on-site is provided by SARAO.

Direct benefits to the Northern Cape



Investment into the construction of HERA has benefitted the Northern Cape the most out of all provinces in South Africa.



Over R15 million in expenditure was made to suppliers in the Northern Cape for goods and services for construction of HERA from 2016 to 2021.



Local suppliers based in the town closest to the instrument, Carnarvon, benefitted the most from the direct investment (95% of total direct investment into the Northern Cape province) when compared to other towns in the Northern Cape.



Local businesses close to and in Carnarvon were able to directly benefit from the construction of HERA due to construction materials being sourced and manufactured locally.



Construction of HERA has had a positive impact on the construction sector in the region as a whole, through the use of local contractors in supplying materials and services.



UK investment through the Newton Fund was used to purchase equipment for the training of local artisans and technicians.

Training of local artisans & technicians



SARAO established a training centre in Klerefontein in 2017 to develop local artisans and technicians. The UK Newton fund contributed R911,749 towards equipment for the training of electricians, fitters, welders and boilermakers.



Between 2017 and 2021, 10 individuals were trained as qualified electricians by the training centre, of which two were employed by SARAO.



Local Employment created through hosting of HERA



The construction of HERA has created employment for 24 individuals on the infrastructure site over the period 2016 to 2021.



3 females and 21 males were recruited into on-site jobs for the building of the instrument, with most of individuals from Carnarvon.



Local employment mostly benefitted individuals residing in Carnarvon.



Over R10 million was invested in employing local staff for the construction, operations and maintenance of HERA over the period 2016 to 2021. This corresponds to 15% of the total direct investment into HERA for this period.



A survey found that locally based employees are now better informed and aware of career opportunities in technology / engineering related to radio astronomy instrumentation.

