Developing HPC in Resource Constrained Environments: From Challenges to Opportunities
Computational research is critical to the development of innovations that improve the overall quality of society.
It has made enormous contribution to America's Science, Industrial Competitiveness, Engineering, and Homeland security.
When properly applied in other regions of the world especially the underdeveloped regions where there is constraint in high performance computing resources.
Amidst other issues it will address problems particular to the region.

Agriculture

Environment

Transportation

Health Care
HPC in Agriculture

With computational support for high-quality research in areas of agriculture and biotechnology, research scientists will not have to wait for the natural production cycle to analyse various issues like quality of seed, produce, and weather pattern. But with HPC, the same can be done using simulation.

*Roots simulation*
Jonathan Lynch and his colleagues use computer modeling to simulate the roots of two of the world’s most important staple crops: beans and corn. Computer modeling helps to pinpoint critical factors that are difficult to measure on real roots as they are growing in soil.

IMAGE: PENN STATE
HPC in Agriculture

With high performance computing, researchers can conduct leading-edge research into plant genetics to create improved varieties of seeds. This will support, management and analysis of massive amounts of molecular, plant, environmental and farm management data. This will in no small way improve product development decisions faster than those made by using traditional experiments and testing.

From: genomics to crop breeding
Richard Flavell
Nature Biotechnology 28, 144–145 (2010) doi:10.1038/nbt0210-144
High performance computing in agriculture will lead to the management, analysis and extrapolation of massive amounts of genetic and environmental data for prediction of new hybrid seed development. Improved quality of current hybrid seeds under testing for possible commercialization. Quicker answers to research problems by an order of magnitude—from days and weeks to a matter of hours—*HCL research in Agriculture*
“This will lead to the development of superior varieties seeds, the right fertilisers, and will help various other processes to enhance agricultural productivity on sustainable basis. This will help the scientific community to meet food security challenges in the country,” - Anil Rai, principal scientist, Indian Agricultural Statistics Research Institute, New Delhi.
Significant barriers prevent the application of high performance computing due to resource-constraints
Effective computational research requires access to modern high performance computing resources.

Integrating enterprise resources in order to meet the high-performance requirements of applications.
Improved overall competency in Computational Research methodologies

Intellectual Resources

Infrastructural Resources

HiReConSIG
Developing HPC in Resource Constrained Environments: From Challenges to Opportunities
That we have challenges does not mean we have problems
Our challenges become problems, when we lack the capacity to solve them.
No matter how big a challenge is, there is always a corresponding solution to meet it.
Every Challenge becomes an opportunity for development, when capacity is built to solve it
“Challenges are gifts that allow us a chance to enhance our lives, not to worsen them” - huffpost
Positive deviance (PD) is an approach to behavioral and social change based on the observation that in any community, there are people whose uncommon but successful behaviors or strategies enable them to find better solutions to a problem than their peers, despite facing similar challenges and having no extra resources or knowledge than their peers. These individuals are referred to as positive deviants.

Source: From Wikipedia, the free encyclopedia
The Positive Deviance approach is an asset-based, problem-solving, and community-driven approach that enables the community to discover these successful behaviors and strategies and develop a plan of action to promote their adoption by all concerned.

Source: http://www.positivedeviance.org/
Global, grassroots, and going places!
Travel and professional development for science, technology, engineering, and mathematics scholars.

providing world-class HPC that enables cutting-edge research:
The Square Kilometre Array (SKA)

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High Performance Computing in Resource Constrained Environments
SPECIAL INTEREST GROUP
Positive deviance is a strength-based approach which is applied to problems requiring behavior and social change. It is based on the following principles:

Communities self-organize and have the human resources and social assets to solve an agreed-upon problem.

Collective intelligence. Intelligence and know-how is not concentrated in the leadership of a community alone or in external experts but is distributed throughout the community.

Sustainability as the cornerstone of the approach. The PD approach enables the community or organization to seek and discover sustainable solutions to a given problem.

It is easier to change behavior by practicing it rather than knowing about it. “It is easier to act your way into a new way of thinking than think your way into a new way of acting”.

PD PRINCIPLES
“Partnership is the operative word, between academic institutions both in Africa and abroad, between universities and the private sector, and with new investment partners in Asia and Latin America”

Makhtar Diop, the World Bank's Vice President for Africa
ROAD MAP FOR HiReConSIG

Discussion Driven

Collaborate:

SIG-Become mission targeted

Formal Recognition

----- Needs a face: website

----- Needs a Forum

----- Needs Evangelist

----- Institutional and Organizational Membership.
THANK YOU

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