

# India – Brazil – South Africa

## Commonalities in Challenges, Resources, Trends & Vision

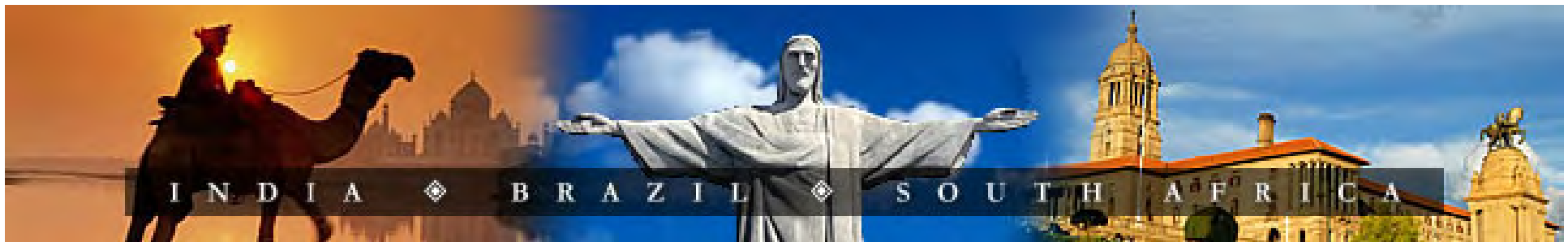
- Three large democracies with rich culture and history
- Rich in human and natural resources
- Fast growing economies
- Common concerns in health and resource management
- Issues in catering to huge population with large scatter in economic and intellectual potentials
- Strong base in Science and Technology ; Poised for rapid industrial growth

# IBSA TRILATERAL CO-OPERATION

- IBSA is a trilateral developmental initiative between India, Brazil and South Africa to promote South-South Cooperation.
- After the G-8 meeting that took place at Evian in 2003, and the subsequent meeting of the Foreign Ministers of the respective countries in Brasilia on June 6, 2003 the IBSA Dialogue Forum was formalized through the adoption of the "Brasilia Declaration".

***([www.ibsa.nic.in](http://www.ibsa.nic.in))***

***([www.ibsatrilateral.org](http://www.ibsatrilateral.org))***

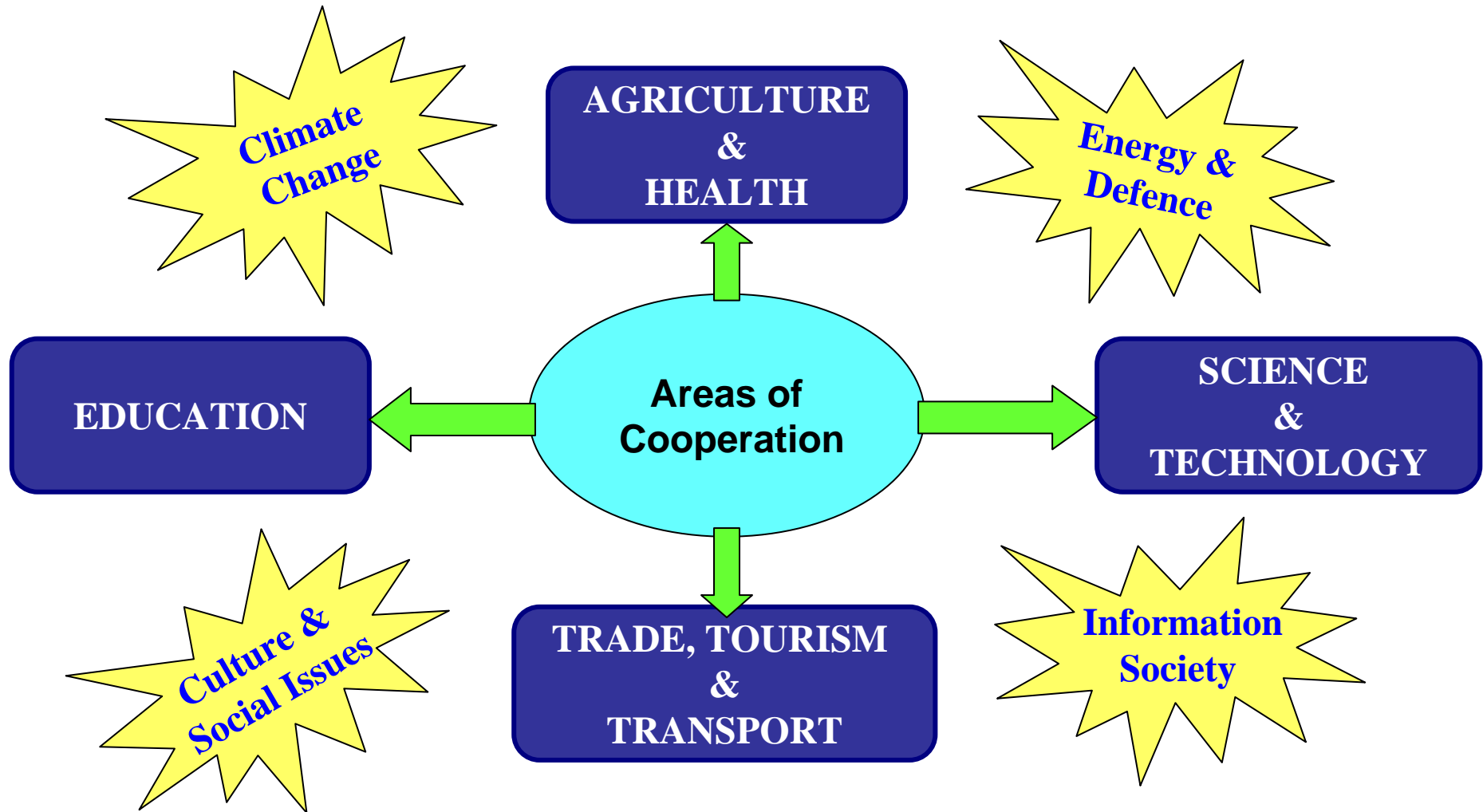


# Objectives of IBSA Co-operation

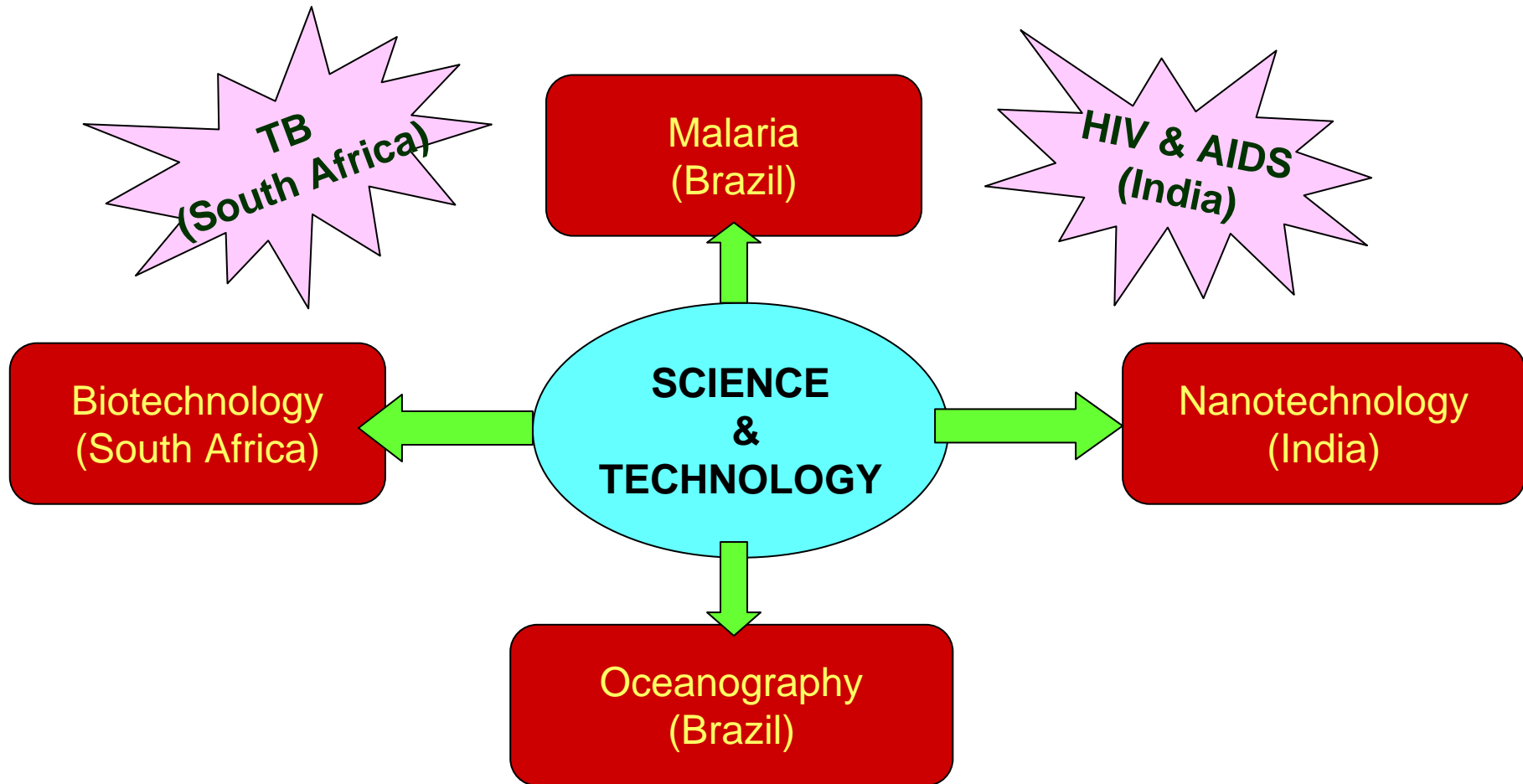
- ❑ To promote South-South dialogue, cooperation and common positions on issues of international importance
- ❑ To promote trade and investment opportunities between the three regions of which they are part
- ❑ To promote international poverty alleviation and social development
- ❑ To promote the trilateral exchange of information, international best practices, technologies and skills, as well as to compliment each others competitive strengths into collective synergies
- ❑ To promote cooperation in a broad range of areas, namely agriculture, climate change, culture, defense, education, energy, health, information society, science and technology, social development, trade and investment, tourism and transport.

The IBSA Dialogue Forum has regular consultations at Senior Official (Focal Point), Ministerial (Trilateral Joint Commission) and Heads of State and/or Government (Summit) levels, and also facilitates interaction amongst academics, business and other members of civil society.

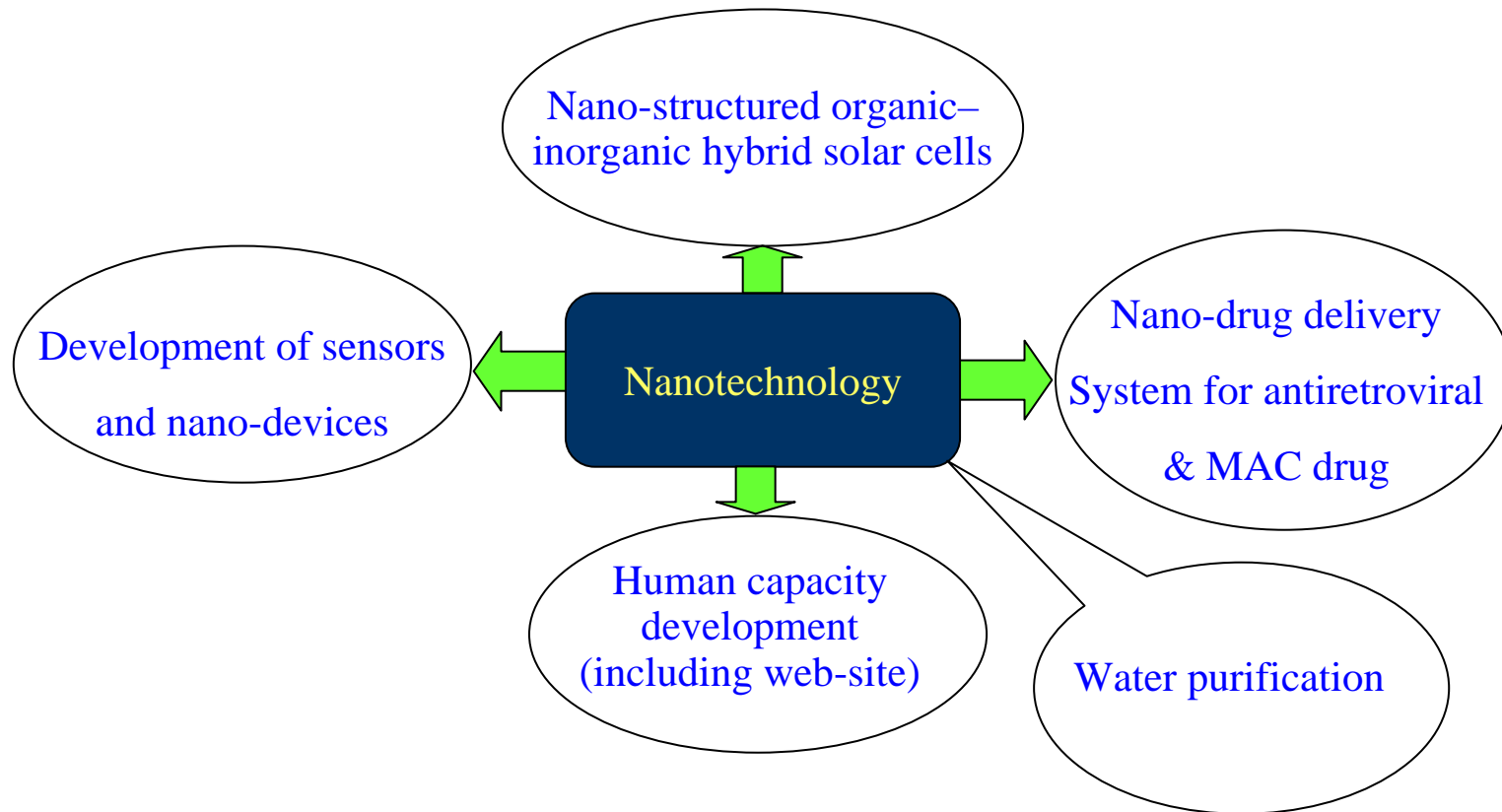
# IBSA – Areas of Cooperation



# IBSA – Science & Technology



# IBSA – Science & Technology



# Action Plan

- **It was decided to have three exchange visits, one in each country of one week duration**
  - Awareness generation
  - Familiarization with facilities
  - Identify collaborating partners
- **The following areas were identified for collaboration:**
  - Advanced Materials
  - Energy Systems
  - Health and Water
- **Subject Area coordinators were also identified**

Brazil– 2006, India– 2007, South Africa – 2008

# Action Plan

- It was decided to start with only one flagship project in each identified area.
- Development of Sensors and nano-devices, Photovoltaics, Nano-drug delivery and water treatment were identified as the flagship project
- Education and Human resource development were also identified as key areas for this collaboration
- It was also decided that IBSA nanotechnology initiative website be hosted from India, with support from Brazil and South Africa

# Technical Coordination

<b>SUBJECT</b>	<b>INDIA</b>	<b>BRAZIL</b>	<b>SOUTH AFRICA</b>
<b>National Coordinator</b>	<b>Dr. Baldev Raj dir@igcar.gov.in</b>	<b>Prof. J.A. Brum brum@Inls.br</b>	<b>Dr. T. Hillie thillie@csir.co.za</b>
<b>Health and water</b>	<b>Dr. P.K.Gupta pkgupta@rrcat.gov.in</b>	<b>Prof. Silvia Guterres nanoc@farmacia.ufrgs.br</b>	<b>Dr. Ndumiso Cingo cingon@unisa.ac.za</b>
<b>Energy</b>	<b>Prof. B.R.Mehta brmehta@iitd.ac.in</b>	<b>Prof. Ivo A. Hummelgen iah@fisica.ufpr.br</b>	<b>Dr. Kenny Mathe KMathe@csir.co.za</b>
<b>Advanced materials</b>	<b>Dr.A.K. Tyagi akt@igcar.gov.in</b>	<b>Prof. Elson Longo liec@power.ufscar.br</b>	<b>Dr. Molefi Motuku molefim@mintek.co.za</b>
<b>Human Resource</b>	<b>Prof S.Ranganathan rangu2001@yahoo.com</b>	<b>Prof J.A. Brum brum@Inls.br</b>	<b>Prof Neil John Coville neil.coville@wits.ac.za</b>
<b>Web Site</b>	<b>Dr R.Ramaseshan seshan@igcar.gov.in</b>	<b>Dr Ana Flávia Nogueira anaflavia@iqm.unicamp.br</b>	<b>Dr. T. Hillie thillie@csir.co.za</b>

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# IBSA - Proposal

- Development of sensors and nano-devices
- Nanostructured organic– inorganic hybrid solar cells
- Nano-drug delivery system for antiretroviral and mycobacterium avium complex ( MAC) drugs
- Water purification
- Human capacity development (including web-site)

## Subject Area 1.0 Advanced Materials: Lead Country – India

**Co-Ordinators**

**Dr. A. K. Tyagi**  
akt@igcar.gov.in

**Dr. Monica Cotta**  
monica@ifi.unican.br

**Dr. Molefi Motuku**  
molefim@mintex.co.za

### Flagship Project 1.1: Development of Sensors and Nanodevices

**PI**

**Dr. A. K. Tyagi**  
akt@igcar.gov.in

**Dr. P. S. P. Herrmann**  
herrmann@cnpdia.  
enbrapa.br

**Dr. Lucky M. Sikhwivhil**  
lsikhwivhilu@csir.co.za

#### Sensors based on Thin Films and Oxide Nanostructures

**Co-PI**

**Prof. I. Manna**

**Prof. J. A. Brum**

**Dr. Sreejarani Pillai**

#### Sensors based on Microcantilevers and Semiconductor Nanostructures

**Co-PI**

**Prof. V. Ramgopal Rao**

**Prof. Monica Cotta**

**Dr. Rudzani Nemetudi**

## Subject Area 2.0 Energy : Lead Country – Brazil

<b>Co-Ordinators</b>	<b>Prof. B.R.Mehta</b> brmehta@physics.iitd.ernet.in	<b>Prof.Ivo A.Hummelgen</b> iah@fisica.ufpr.br	<b>Dr. Mukulu Mathe</b> kmathe@csir.co.za
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### Flagship Project 2.1: Nanostructured Organic– Inorganic Hybrid Solar Cells

<b>PI</b>	<b>Prof. B.R.Mehta</b> brmehta@physics.iitd.ernet.in	<b>Prof.Ivo A.Hummelgen</b> iah@fisica.ufpr.br	<b>Prof.Neil J. Coville</b> neil.coville@wits.ac.za
<b>Co-PI</b>	<b>Dr. P. Ayyub/ Prof.Amaln J.Pal</b>	<b>Prof.Ana F. Nogueira</b>	<b>Dr. Willem Van Otterlo</b>

## Subject Area 3.0: Health and Water: Lead Country – South Africa

<b>Co-Ordinators</b>	Dr. P. K. Gupta pkgupta@cat.ernet.in	Prof. S.S.Guterres nanoc@farmacia.ufrgs.br	Dr. N.Cingon cingon@tut.ac.za
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### Flagship Project 3.1: Nanotechnology based drug delivery system (s) for antiretroviral and Mycobacterium avium complex ( MAC) drugs : Lead Country – South Africa

<b>PI</b>	Dr.Sadhna Sharma Prof. G. K. Khuller gkkhuller@yahoo.co.in	Prof. S.S.Guterres nanoc@farmacia.ufrgs.br	Dr H. Swai hswai@csir.co.za

### Flagship Project 3.2: Water Purification : Lead Country – India

<b>PI</b>	Dr. P.K. Tewari pktewari@barc.gov.i	Prof. Paulo Herrmann herrmann@cnpdia. cnbrs.br	Dr B. Mamba bmamba@uj.ac.za
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## Subject Area 4.0 Human Capacity Development: Lead Country – India

<b>Co-Ordinators</b>	Prof. S.Ranganathan rangu2001@yahoo.com	Prof. J.A.Brum brum@Inls.br	Prof.Neil J. Coville neil.coville@wits.ac.za
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# Expected outcome

- The scientific knowledge will be shared among the three countries using several mechanisms such as joint-workshops, technical training, web-based tools
- The collaboration is expected to result in joint publications.
- The results may also have commercial values. The patents and any commercialisation of product will be discussed under IBSA framework.
- Novel sensors for environment monitoring and agri instrumentation, solar cell devices with improved efficiency, nanodrug delivery system and water purification/treatment technologies are the expected deliverables of this project.
- Another important contribution of collaboration will be Human Capacity development in the area of Nanotechnology.
- The cooperation would be of immense societal value dealing with core issues of health and safe drinking water.

## **IBSA –Nanotechnology Initiative : Other events**

- ◆ **International Conference on Nanoscience and Nanotechnology (ICONSAT – 2008), Feb 27 – 29, 2008, Chennai, India.**

**Participation of Scientists from**

**Brazil : Prof.Monica A Cotta,**

**South Africa: Prof.Neil J Coville and Dr. Suprakas Sinha Ray**

- ◆ **International Conference on Nanostructured Materials (Nano – 2008), 4 - 6 June, Rio de Janeiro, Brazil**

- ◆ **Participation of scientists from India:**

**Prof. S. Ranganathan, Prof.Pushan Ayyub**

- ◆ **International Conference on Nanoscience and Nanotechnology (NanoAfrica – 2009), Feb 1 – 4, 2009, Pretoria, South Africa.**

- ◆ **Participation of scientists from**

**India: Dr.A.K.Tyagi, Prof.B.S.Murty, Prof. Ramgopal Rao and Dr.Vikram Kumar**

**Brazil: Prof.Monica A Cotta**

- ◆ **IBSA nanotechnology initiative meeting Feb 5<sup>th</sup> 2009, Pretoria, DST, South Africa**

# IBSA- Nanotechnology Initiative

## Calendar for the year 2009-10

Organization of 3 Nano Schools, of 1 week duration each

- ◆ 13-19 Sept.2009 – Brazil – Energy systems: Photovoltaics
- ◆ *23-27 Nov.2009 – South Africa–Health & Water: Nano drug delivery & Water Purification*
- ◆ 22-26 Feb. 2010 – India – Advanced Materials: Sensors and Nano Devices