Status of Science, Technology and Innovation (STI)- Bhutan

3rd February 2020
Outline of Presentation

1. Inspiration and Guiding Principles
2. STI Governance and Institutional Arrangement
3. Key achievements and on-going activities:
   a. Schools
   b. Tertiary Education Institutions
A. Royal Addresses by HM the King

His Majesty The King’s Address at the 14th RUB Convocation - 24 May 2019:

“In addition, there are emerging new developments such as Artificial Intelligence, Quantum Computing, Block chain, Machine Learning, Big Data, IOT (the Internet of Things), Virtual Reality and Augmented Reality, etc.”.
### Inspirations & Guiding Principles of STI in Bhutan

#### B. 12th Five Year Plan 2018-2023

<table>
<thead>
<tr>
<th>12th FYP-National Key Result Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Macroeconomic Stability Ensured</td>
</tr>
<tr>
<td>2. Economic Diversity and Productivity Enhanced</td>
</tr>
<tr>
<td>3. Poverty Eradicated and Inequality Reduced</td>
</tr>
<tr>
<td>4. Culture and Tradition Preserved and Promoted</td>
</tr>
<tr>
<td>5. Healthy Ecosystem Services Maintained</td>
</tr>
<tr>
<td>6. Carbon Neutral, Climate and Disaster Resilient Development Enhanced</td>
</tr>
<tr>
<td>7. Quality of Education and Skills Improved</td>
</tr>
<tr>
<td>8. Water, Food and Nutrition Security Ensured</td>
</tr>
<tr>
<td>9. Infrastructure, Communications and Public Service Delivery Improved</td>
</tr>
<tr>
<td>10. Gender Equality Promoted, Women and Girls Empowered</td>
</tr>
<tr>
<td>11. Productive and Gainful Employment Created</td>
</tr>
<tr>
<td>12. Corruption Reduced</td>
</tr>
<tr>
<td>13. Democracy and Decentralization Strengthened</td>
</tr>
<tr>
<td>14. Healthy and Caring Society Enhanced</td>
</tr>
<tr>
<td>15. Livability, Safety and Sustainability of Human Settlements</td>
</tr>
<tr>
<td>16. Justice Services and Institutions Strengthened</td>
</tr>
</tbody>
</table>

Ministry of Education, Royal Government of Bhutan
C. Education Blueprint 2014-2024:

“Students will acquire deep knowledge and understanding of Science, Technology (Including ICT), Engineering, and Mathematics (STEM), the vital tools they need to succeed in Higher Education or function effectively in a competitive economy”.

Student Attributes:

1. Knowledge and understanding
2. Intellectual competence
3. Communicative competence
4. Enduring habits of life-long learning
5. Family, community and national values
6. Spirituality and Character
7. Physical wellbeing
8. Leadership competence
9. World-readiness

Ministry of Education, Royal Government of Bhutan
D. Sustainable Development Goals 4: *Quality Education*
Inspirations & Guiding Principles of STI in Bhutan

F. Education ICT Master Plan (iSherig-2 2019-2023)

To harness the potential and benefit of Information and Communication Technology in teaching and learning process, the Education Ministry launched its second ICT Master Plan called iSherig-2 today.
STI Governance and Arrangement

- **Ministry of Education**
  - 529 schools

- **Royal Education Council**
  - School curriculum reforms and development

- **Bhutan Council for Examination and Assessment**
  - Centre of Excellency in Educational Assessment

- **Autonomous Institutes:**
  - Royal University of Bhutan
  - Khesar Gyalpo University of Medical Sciences of Bhutan
Key achievements and on-going activities …

A. Schools:

12 Five Year Plan

- Establishment of STEM Premier School
- Strengthen TVET education in Schools
- Implementation of UG ex-country Scholarship in the critical fields (STEM)
Key achievements and on-going activities …

Education Flagship (Digitization of Schools)

➢ Preparing children for 21\textsuperscript{st} Century tech-world
➢ Equipping schools with adequate facilities
➢ Introduce coding from PP-12 (\textit{Scratch and Python}) – \textit{Leap learner}
➢ Introducing Integration of ICT in Sciences & Mathematics

Budget- Nu 1 billion
Key achievements and on-going activities

Education ICT Master plan 2019 -2023 (iSherig-2)
Key achievements and on-going activities

School Curriculum Reforms:
- Rationalization of School Curriculum
- Differentiated curriculum in STEM and Social Sciences
- Introducing curriculum on digital literacy and technology
- Digitization of Curriculum Materials
  - prototype digital textbook for class V ICT curriculum
Key achievements and on-going activities……..

National STEM Olympiad

Theme of 2019: *Artificial Intelligence for Sustainable Farming*

- Provide opportunities to experience hands-on application through collaboration & discussion.
- Instill positive attitude and values for STEM.
- Platform for recognition of outstanding achievement in STEM.
- Improve the quality of STEM education.
Key achievements and on-going activities….

B. Status of STI in Tertiary Education

Tertiary Education Policy of the Kingdom of Bhutan 2010;

Tertiary Education Roadmap for Bhutan: 2017-2027.
Tertiary Education Institutions with STI related programmes

**Royal University of Bhutan**

**Constituent Colleges:**
1. Sherubtse College (*Science & Social Science*)
2. College of Science & Technology (*Engineering & IT*)
3. Jigme Namgyel Engineering College (*Engineering*)
4. College of Natural Resources (*Natural Sciences*)
5. Gyelpozhing College of Information Technology (*IT*)
6. Gaedu College of Business Studies (*Innovation*)
7. Samtse College of Education (*Science Educators*)

**Affiliated College (Private):**
1. Royal Thimphu College (*Innovation*)

**Khesar Gyalpo University of Medical Sciences of Bhutan**

**Constituent Faculties:**
1. Faculty of Post Graduate Medicine
2. Faculty of Nursing and Public Health
3. Faculty of Traditional Medicine

**Affiliated College (Private):**
1. Arura Academy of Health Sciences
## Tertiary Education Institutions with STI related programmes

### Table 5.6 – Students enrolled in STEM subjects within and outside Bhutan, 2018

<table>
<thead>
<tr>
<th>Field of study</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-country Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>1200</td>
<td>469</td>
<td>1669</td>
</tr>
<tr>
<td>Science and Allied Sciences</td>
<td>967</td>
<td>883</td>
<td>1850</td>
</tr>
<tr>
<td>Medicines</td>
<td>75</td>
<td>53</td>
<td>128</td>
</tr>
<tr>
<td>Nursing</td>
<td>79</td>
<td>162</td>
<td>241</td>
</tr>
<tr>
<td>Public Health</td>
<td>22</td>
<td>37</td>
<td>59</td>
</tr>
<tr>
<td>Allied Health Professional</td>
<td>173</td>
<td>62</td>
<td>235</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2516</td>
<td>1666</td>
<td>4182</td>
</tr>
<tr>
<td><strong>Ex-country Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>437</td>
<td>494</td>
<td>931</td>
</tr>
<tr>
<td>Sciences</td>
<td>345</td>
<td>229</td>
<td>574</td>
</tr>
<tr>
<td>Engineering</td>
<td>865</td>
<td>349</td>
<td>1214</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1647</td>
<td>1072</td>
<td>2719</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>4163</td>
<td>2738</td>
<td>6901</td>
</tr>
</tbody>
</table>
Some of STI initiatives as University level

A. College of Science & Technology:
   - Centre for Renewable and Sustainable Energy Development

B. Jigme Namgyel Engineering College:
   - Centre for Appropriate Technology

C. Gyalpozhing College of Information Technology:
   - Centre of Excellence in Information Technology steeped in GNH values
Globally competent Bhutanese citizens for 21st century and beyond
Thank You