Irrigation & Drainage education in India

• The objective of Education is to provide competent & motivated young professionals to meet the current challenges.
• Irrigation & Drainage forms a major component of Water Resources Sector.
• Efficient performance of the entire water sector is the key for successful outcome.
Brief overview of challenges in Water Resources Sector

Water need out pacing population growth

The use of water grew 6x.
Use pattern is changing

INDIA IS THE MOST WATER STRESSED
India has.....

- As much as 16% of world’s population
- Only 4% of global fresh Water Resources
- Only 2.45% of world’s land area
- 80-90% of water occurs in only 4 months
- Hardly 15-20 Rainy days
- Regions of abundance & acute shortage
- 24 major river basins, but with limitations to harness waters
Some key concerns.....

- Per capita availability of water
- Below par performance of projects
- Time and cost over runs of projects
- 40 M ha are flood prone
- Delayed Water sharing disputes
- Increased D/W & Industrial Needs
- Alarming Water quality issues
- Declining ground water table
- Climate Change....etc

We are only keeping pace with Population

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</thead>
<tbody>
<tr>
<td>Food grain production (mt)</td>
<td>50.8</td>
<td>82.0</td>
<td>108.4</td>
<td>129.6</td>
<td>176.4</td>
<td>201.6</td>
<td>234.5</td>
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<tr>
<td>Food grain import (mt)</td>
<td>4.8</td>
<td>10.4</td>
<td>7.5</td>
<td>0.8</td>
<td>0.3</td>
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<td>0</td>
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<tr>
<td>Buffer stock (mt)</td>
<td>---</td>
<td>2.0</td>
<td>---</td>
<td>15.5</td>
<td>20.8</td>
<td>40.0</td>
<td>44.2</td>
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<tr>
<td>Population (million)</td>
<td>361</td>
<td>439</td>
<td>548</td>
<td>683</td>
<td>846</td>
<td>1000</td>
<td>1210</td>
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Daunting task to feed it’s Millions

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>IRRIGATION MAJ.+MED.,MINOR in L. Ha</th>
<th>FOOD PRODUCTION</th>
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<tbody>
<tr>
<td>PRIOR TO PLAN</td>
<td>22.6</td>
<td>51 Mt (1950)</td>
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<tr>
<td>ULTIMATE</td>
<td>139.91</td>
<td>?</td>
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INDIA NEEDS 500 Mt BY 2050
We are walking on razor’s edge.....

Decline of interest in Water resources subjects in UG

- Lack of employment opportunities due to lack of/or haphazard recruitment.
- Lack of fixation of cadre strength in the departments.
- More emphasis on other streams like Structural Engineering etc.
- Private sector has not developed in WR sector.
- Gradual decline of allocation of funds compared to other sectors, in budgets.
- IT sector is recruiting even Civil Engineers on the campus itself IT jobs. Students are preferring office jobs than outdoor work.
- Lack of appropriate faculty to teach WR.
A model Curriculum should have

<table>
<thead>
<tr>
<th>Item</th>
<th>Range in %</th>
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<tbody>
<tr>
<td>Core subjects</td>
<td>22.5-27.5</td>
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<tr>
<td>Elective</td>
<td>12.5-15</td>
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<tr>
<td>Free Elective</td>
<td>7.5-10</td>
</tr>
<tr>
<td>Seminar &amp; trg</td>
<td>2.5-5</td>
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</tbody>
</table>

Outcome based experiential education is the key
Suggested changes-1

• Water Resources Engineering is taught in two semesters in most of the Universities. Ground water is an elective.
• Stronger skillsets are possible if the subject has an appurtenant lab practice also.
• There is urgent need to develop computer simulation lab exercises for irrigation and drainage. (ex: WUE, CWR etc)

Suggested changes

• Earlier practice of providing lien for field engineers to teach in colleges may be restored. This would benefit both departments and colleges
• Irrigation Design and drawing is a core subject in many Universities still
• Since degree is the qualification at entry level for all Govt. jobs, all the needed skills shall be in core subjects
• Outcome based lab work
Suggested changes

Additions/modifications to the syllabus

1. Role of water in life/quality of life (UG/PG/)
2. Global water foot print, virtual water. (UG/PG)
3. Water food nexus(U/G/PG)
4. Role of Irrigation in food security (UG/PG)
5. Impact of El Nino, La Nina, climate change on Irrigation, drainage and WRM (UG/PG)
6. IWRM case studies(U/G/PG)
7. Use of RS&GIS in water resources management (UG/PG)

Suggested changes-3

Additions/modifications

1. Hydrological Information System, SCADA
2. Inter linking of rivers
3. Water law and Principles of water sharing with case studies
4. EPC contracting system/contract management
5. New methods of yield computation for un-gauged catchments
6. Irrigation Drainage
Suggested New Electives

1. Irrigation and Drainage
2. Design of Lift Irrigation schemes
3. RS-GIS in Water Resources Management
4. Diagnostic Analysis

Induction/Refresher courses

• Induction course shall be compulsory
• Should be need/Outcome based
• Should Bridge the skill gap between UG and of the essential profession requirement
• A Good mix of field work, lab work and knowledge
• Multi disciplinary field work
  • Work with revenue, agriculture, WUA’s, other service providers/recipients
Thank you