

A Country Report on Engineering Education in Papua New Guinea

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Presentation Outline

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- Universities in Papua New Guinea
- Papua New Guinea University of Technology (Unitech)
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PAPUA NEW GUINEA



Papua New Guinea

- ❑ Government: Commonwealth:
 - Sovereign: Queen Elizabeth II
 - Governor General: Queen's Representative - Prime Minister
- ❑ Area: 462,840-km² (≈ 179,000-sq miles)
- ❑ Population: About 8.0-Million People live mostly in rural communities:
 - ✧ With significant challenges in health, education and economic opportunity.
- ❑ Over 1,000 Distinct Ethnic Groups
- ❑ Languages: 867 Distinct Native Official Languages for Communication with the following official languages:
 - English
 - Tok Pisin
 - Motu

Papua New Guinea

- ❑ Literacy Rate: 70%
- ❑ Religion: More than 70% are Christians and other 30% are indigenous.
- ❑ Literacy Rate: 70%
- ❑ Economically, Papua New Guinea's overall economic growth performance has been consistent with real GDP per capita averaging 3 percent since the mid-2,000s.
- ❑ While revenues continue to face challenges arising from subdued global commodity prices, good macroeconomic management and well calibrated service delivery is necessary to ensure development benefits are accessed by a greater number of citizens into the future.

Papua New Guinea

- ❑ Papua New Guinea's growth trajectory and abundant resource potential provides a strong platform for economic engagement with Asia and further abroad.
- ❑ The country's economy remains dominated by two sectors: the agricultural, forestry, and fishing sector, which engages most of the labor force (the majority informally); and the minerals and energy extraction sector which accounts for the majority of export earnings and Gross Domestic Product.

Papua New Guinea

- ❑ To diversify Papua New Guinea's asset base and increase employment, investment is needed to strengthen capacity in institutions, human capital, and physical infrastructure.
- ❑ Electricity, telecommunications, road and other transport infrastructure remain critical to enabling private sector-led growth.
- ❑ Obtaining more revenue from the mineral and petroleum sector by discontinuing the practice of providing significant tax concessions to companies operating in this sector will improve both the fiscal balance and the foreign exchange position in Papua New Guinea.

Papua New Guinea

- ❑ Further, translating revenues into strong, tangible improvements in living standards for all Papua New Guineans remains the key challenge for the Government of Papua New Guinea, yet other challenges are also immense.
- ❑ It is important to improve public financial management and efficiency of public spending to convert resource revenues into inclusive growth and, consequently, a genuine improvement in the livelihoods.

Papua New Guinea

- ❑ With all these abundance of natural resources such as minerals, oil & gas, raw agricultural products, engineering is required to adequately convert these raw products into final useable products with improved value.
- ❑ It is high time for Papua New Guinea to start add value to our raw products that can be sold at a high value that will improve our financial situation of the nation.

Definition of Engineering

- ❑ ABET has defined engineering as “*The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation or safety to life and property*”

Definition of Engineering

- ❑ The definition of engineering in Wikipedia as *“Engineering is the application of scientific, economic, social, and practical knowledge in order to design, build, and maintain structures, machines, devices, systems, materials and processes. It may encompass using insights to conceive, model and scale an appropriate solution to a problem or objective”*.
- ❑ From the two formal definitions above, it is clear that the field of engineering is extremely broad.

Importance of Engineering

- ❑ The history of our current civilization is but an account of engineering and technological development. Engineering finds its application in all branches of human endeavor, especially in *'transportation, communications, manufacturing, construction, and resource exploitation'*
- ❑ Contributions made by engineering have transformed our social, cultural, political and economic situation.
- ❑ A number of nations have transformed their economy from the status of *'developing'* to the status of *'first- world'* economy within a span of five decades using engineering.

Importance of Engineering

- ❑ Engineers are required to create solutions to problems encountered by our human society.
- ❑ An engineer needs to be creative to find solution to a new problem because a solution may not be readily available.
- ❑ An engineer needs to identify a problem, conceive a solution and proceed to design a device, system, or process.
- ❑ In today's technological society, an engineer may be required to work on highly complex projects, which demand such attributes as teamwork, effective communication, ethical responsibility, environmental conservation and sustainability.

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Importance of Engineering

- ❑ Without engineering it would be beyond imagination how these societies would have developed.
- ❑ Engineers are required to create solutions to problems encountered by our human society.
- ❑ An engineer needs to be creative to find solution to a new problem because a solution may not be readily available.
- ❑ An engineer needs to identify a problem, conceive a solution and proceed to design a device, system, or process.
- ❑ Engineering education programs need to ensure the importance of engineering are met.

Engineering Education

- ❑ Engineering education is an engine for national development and innovation.
- ❑ It develops graduates for the needs of business and industry for any nation.
- ❑ Engineering education is the activity in teaching and learning of the principles related to engineering profession.
- ❑ Engineering students must attain certain general and technical attributes at the end of their undergraduate studies such as the ability to design a system, component or a process within realistic constraints etc.

Engineering Education

- ❑ There is growing popularity for engineering education in such fields as mechanical, civil, computer, electrical, mining, petroleum, and other forms of related engineering.
- ❑ It can be seen that a significant level of engineering activities are going on in the country.
- ❑ Due to inadequate supply of Papua New Guinea national workforce, expatriate or foreign work force performs many of the engineering and management activities in the country.
- ❑ Efforts must be made to train national workforce to replace these foreign workfoce.

Universities in Papua New Guinea

No New Universities Established so Far:

1. State Universities:

i. University of Papua New Guinea (UPNG)

ii. Papua New Guinea University of Technology (Unitech)

iii. University of Goroka (UOG)

iv. University of Natural Resources (UNR)

v. Private Universities:

a) Divine Word University (DWU)

b) Pacific Adventist University

The Papua New Guinea University of Technology (Unitech)

- ❑ The only Technical University in the Country.
- ❑ Thirteen (13) Teaching Departments.
- ❑ Total Student Population of about 3,200.
- ❑ Four Engineering Departments:
 1. Mechanical Engineering:
 - 150 undergraduates
 2. Electrical and Communication Engineering:
 - 220 undergraduates (both diploma & degree)
 3. Civil Engineering:
 - 165 undergraduates
 4. Mining and Mineral Processing Engineering:
 - 210 undergraduates (both Mining and Mineral processing)

The Papua New Guinea University of Technology (Unitech)

- Structure of the Engineering Programs:
 - **Mechanical Engineering**
 - Two Streams:
 - Regular four year degree program.
 - Five year sandwich degree program
 - Electrical and Communication Engineering:
 - Two Programs:
 - Two year diploma program
 - Four year degree program
 - **Civil Engineering:**
 - Four year degree program
 - Mining and Mineral Processing:
 - Two programs:
 - Four year degree program in mining
 - Four year degree program in mineral processing

New Developments

- ❑ Program Accreditation – Institution of Engineers, Australia (IEAust.):
 - Institution of Engineers, Australia (IEAust) has been engaged to assist in the Accreditation of our programs.
- ❑ Establishment of the Office of a Dean to Oversee the all Engineering Departments.
- ❑ Development of Graduate School:
 - Creation of a graduate Office to coordinate all graduate activities and encourage students to take up graduate training.
 - Dean of Graduate School – Oversee the Graduate Activities of the University.
- ❑ Revise all Engineering Curriculums to meet Accreditation requirement.

Problems in the Promotion of Engineering Education

- ❑ Adequately qualified human resource:
 - Faculty, Support Staff, Lecture Halls
 - Administrative Staff
- ❑ Inadequate Scientific Infrastructure:
 - Libraries
 - Lecture or Classrooms
 - Laboratories and Workshops
 - Office Facilities
- ❑ Shortcomings in the **Funding** and Supporting Science infrastructure
- ❑ ***Lack of appreciation of the importance of science, engineering and technology as an essential ingredient of economical and social development!***

Summary

- ❑ Institution of Engineers Australia (IEAust.) have been engaged to assist in the accreditation of our programs.
- ❑ Engineering education has become very important due to:
 - the increase of mining, petroleum and gas exploration.
 - the increase of downstream processing of various raw products or resources.
 - the expansion of government departments
- ❑ There must be an appreciation of the importance of science, engineering and technology as an essential ingredient for economic and social development in the nation.

Seeking Assistance

- Seeking Assistance from experienced AEESEAP members on the following:
 - ◆ Opportunities for collaboration:
 - For Research
 - For Faculty exchange (both short term and long term)
 - For Student Exchange
 - ◆ For the Accreditation of our engineering programs for international recognition.

Thank you!