

Skills in Geo-sciences – Exploring New Frontiers

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Abstract

Education is vital role to human resource development. Harnessing education in the correct way will result in tremendous upliftment of the society.

By 2016, approximately 50 per cent of the total population will be in the age group of 15–25 years. India will be one of the youngest nations by 2020 and this changing demographic condition would may be of immense advantage to India.

“Make in India” project, was launched with an aim to make skill developed nation which is a key engine for India’s economic growth. We have to skill the Indian man power in different sectors. And education is one the sector where there is a pressing need of skill development. To generate jobs in unconventional areas we have to explore new areas like Earth Sciences or geosciences for development of new types of skills.

Presently, only few universities and colleges are imparting education in geosciences. We should popularise this subject and open the departments in different universities and above all take this subject to school level. Future of Geo-sciences and skills therein is not restricted - to skill development and job creation only. It has immense potential of developing entrepreneurship also.

Keywords

Geoscience, Skill development, Natural hazards, Exploration, Biome

I. Introduction

If nation is a system, education is the heart of it. Harnessing education in the correct way will result in tremendous upliftment of the society. Be it primary, secondary or higher education, in every sphere, education is playing the pivotal role by bringing in the change and letting the individual understand which path to choose. Education empowers the nation. So, every government, is now committed to provide the facilities that are required for educating a child right from the beginning.

We have to skill the Indian man power in different sectors. And education is one the sector where there is a pressing need of skill development. Up to now major conventional subjects like physics chemistry mathematics biology computers, commerce and law were being given much emphasis and were considered as job generating areas. As population increased large number of youths have been inclined towards these areas. However, these areas have already shown a signs of saturation. To generate jobs in unconventional areas we have to explore new areas like Geosciences or Earth science for development of new types of skills.

Geoscience is the study of Earth’s physical composition, structure, history, and the natural processes. They provide information to society for use in solving problems and establishing policies for resource management, environmental protection, public health, safety, and welfare.

Geoscience is concerned about various Earth issues like, supplies of fossil fuels, mineral ores, groundwater, global warming trend, how and where should we dispose of industrial wastes, how can we satisfy society’s growing demands for energy, yet conserve natural resources for future generations. They study and mitigate geo hazards such as volcanic eruptions, earthquakes, floods, tsunami’s

and landslides. They explore and discover new ideas about the natural world from the depths of the oceans and the core of the Earth to the outer reaches of space.

II. Indian Scenario with Respect to Skills

By 2016, approximately 50 per cent of the total population will be in the age group of 15–25 years, a vast population would enter the working age group in the next 15 years.

India will be one of the youngest nations by 2020 and this changing demographic condition would may be of immense advantage to India. Because, while there will be shortage of productive workforce globally but India will experience a surplus. However we need to understand that this demographic advantage for us will not be automatically transformed into higher economic growth.

Strategic interventions and foresight in terms of encouraging investments in education and skills development by policy makers are needed to reap maximum benefits of demographic dividend. “Make in India” project, was launched with an aim to make skill developed nation which is a key engine for India’s economic growth. For the success of this project, it is important to focus on the development of the skills of Indian youth to enable them in getting and doing the right job. To take advantage of this demographic dividend we have to explore jobs in unconventional areas like Geosciences and try to develop various kinds of skill in these areas for better future.

III. Skills in Geosciences

Geoscience or geology is the study of Earth and its system, it deals with the science of exploration, discovery, and Earth stewardship. The geosciences address all issues relating to Earth Systems, including the solid Earth, oceans, and atmosphere. The major applications of the geosciences are exploration and responsible development of natural resources for eg. oil, gas, coal, minerals, construction aggregate, water, soil etc, preservation of the natural environment, restoration from environmental damage, mitigation of geo hazards such as earthquakes and landslides, and exploratory research like the Mars space mission and understanding El Niño.

Geoscientists use physics, chemistry, biology, mathematics and computing to understand the planet as a natural system—its origins, how it’s changing, and how it might change in future.

Geoscience is helping us to tackle some of the biggest challenges facing the world today. We try to find answer while studying this subject

- How might climate change affect our planet.
- How can we supply clean water to the developing world.
- How can we better predict natural disasters or geo hazards such as earthquakes, volcanic eruptions, tsunamis and drought.
- How can we exploit efficiently the planet’s mineral and energy resources while mitigating the negative environmental impacts.

Earth science is about how we can get the resources we need without damaging the environment.

IV. Various Skills in Geosciences

To become a good and sound geoscientist number of skill should be required. In depth knowledge of earth, field work is an essential

and mandatory part of geosciences.

There are additional technical and non-technical skills outside the strict geo science education requirements that will enhance your development. The most important skills are to learn how to experiment, to gain diverse early experiences, and discover how to think analytically and solve problems. Because of the nature of geo science and technology today, a strong basis in mathematics, statistics, and computers helps develop your analytic skills.

In science, as in most disciplines, effective communication, especially the ability to sell your ideas, is required to successfully complete your work. The ability to express yourself orally and in writing is an essential skill.

It is increasingly important that all geoscientists understand the business that employs their services. A course in business, finance or economics will be an asset.

V. Job opportunities in Geosciences

Geoscience addresses critical issues such as energy, meteorology, water and mineral resources, stewardship of the environment, oceanography, reducing natural hazards for society, planetary science and more. These are the challenges face by society but also unlocks lucrative and personally rewarding careers in industry, academia, research and government. Geo science jobs are plentiful, salaries are good, and the demand for young and enthusiastic geoscientists is expected to continue growing. Geoscience education is crucial for workforce development in key fields that face a significant shortage of highly qualified geologists ready for employment:

Geologists play a vital role in the petroleum industry including identifying and assessing potential hydrocarbon reservoirs and overseeing the drilling and production of oil and gas wells. As oil and gas become scarcer, identification of exploration opportunities is becoming increasingly challenging and resources are becoming more difficult to recover.

Geologists are essential to the mining industry, providing the underlying geologic mapping, geophysics, and geochemistry to identify and understand critical mineral deposits. As the development of green technology and clean energy advances, the need for specialty minerals such as radio nuclides, rare earths, and precious metals will increase.

Hydrogeologists are critical in indentifying and preserving clean drinking water. Aquifers are coming under increasing pressure as population grows and climate change leads to slow replenishment in arid parts of the country. Environmental geologists play a vital role in clean-up efforts for contaminated aquifers.

Geological engineers perform many vital tasks, including locating facilities such as dams, toxic waste repository sites, and nuclear power plants. An area of great future potential for geological engineers will be locating sites for carbon capture and sequestration, as well as upgrading aging infrastructure such as highways, bridges, and water systems.

Geologists play a lead role in understanding how to best mitigate natural hazards such as earthquakes, floods, volcanic eruptions, tsunami, landslides, and avalanches. Natural hazards pose an especially large threat for vulnerable urban areas where the economic and human risk is potentially catastrophic. Preparedness and vulnerability assessment with disaster mitigation group.

Geoscience education is very important for college students . People educated in Earth sciences can promote appreciation and respect for our natural resources, leading to more students deciding to pursue geoscience careers and to an increase in overall public awareness of the key issues involving Earth science.

Geoscientists and geoscience education have a role in informing students and citizens about the geoscience implications of Earth hazards and resource supplies.

VI. Entrepreneurial opportunities in the Geosciences

The geosciences have a long tradition of entrepreneurship, especially in the exploration and discovery of natural resources. Independent petroleum geologists have been a creative driving force in the progress of the petroleum industry since its inception. The environmental industry is dominated by relatively small consulting firms led by geoscientists and engineers.

In the wake of recent corporate and governmental downsizing a large number of out placed geoscientists entered the consulting fields in their specialty area. Success in this area requires particular dedication. If you are motivated to do this you need to seek out successful people and discover what experiences you need in order to pursue this pathway.

VII. Conclusion

The HRD ministry and UGC affirms the need for strong support to geoscience departments and programmes at all institutions of higher learning. This commitment will help ensure that future generations of students receive the Earth-science education they will need to address crucial societal issues that have the potential to impact global economic security and the well-being of human populations over the next century or more. Some suggestions are mentioned for development of geosciences in coming future –

1. Geoscience education is essential to prepare the next generation of skilled geoscience workers to address important societal needs for natural resource development and management, natural hazards mitigation, environmental protection, and ecosystem restoration.
2. Introduce Geoscience courses at Senior secondary level. Excursion field trips from Junior level in schools expressing a knowledge building for driving forces affecting the earth biome.
3. Field and laboratory activities that are essential to geoscience education provide spatial and observational skills not only to geoscientists but also to professionals in a range of related careers. Specific field like climatology, oceanography, palaeontology, mineralogy to be taught in sectorized in graduation level.
4. Undergraduate research experience as part of a geoscience education provides a strong foundation in the scientific method and enhances the student's ability and desire to continue in a geoscience career.
5. Practical Geology to be made a part of diploma and polytechnic in mechanical structural and civil affairs, field trips for varied ecosystems mountain desert, marine upland lowland. Interactive studies, coastal zone management, nuclear flux transfer into water bodies.
6. Micro level graduation and master in problem solving mode eg water crises, droughts, floods and earthquakes.
7. Government and UGC increased the investment in geoscience education by government. Current investment in geoscience education is insufficient to meet future demands for skilled geoscientists.
8. College and university administrators must sustain geoscience programs so that they can educate non-majors and the general public, train future Earth-science educators at all levels. Administrators should view geoscience education and literacy as an essential component of higher education given its clear

relevance in many aspects of society.

9. Policy makers must make available new sources of funding for programs to educate the next generation of Earth scientists that will be vital to public health, strong economies, and global security.
10. Industries in the private sector, such as oil and natural gas companies, minerals extraction and environmental and engineering companies rely heavily on the expertise developed by geoscience programs in institutions of higher education. These industries must advocate for increased funds which are critical for the continuation and enhancement of geoscience education, and, whenever possible, directly support the geoscience departments and initiatives that are responsible for training their future workforce.

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