

GREEN JOBS AND HUMAN RESOURCES: AN INDIAN PERSPECTIVE

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ABOUT THE GREEN JOBS

- Green jobs mainly refer to the employment opportunities in broad areas of Energy, Environment and Sustainable Development
- These jobs require skills on Social, Economic, Environmental, Management and Policy Aspects
- Given the inter-disciplinary nature of Environmental Knowledge and various areas and activities related to Sustainable Development, there is a huge potential for green jobs in India
- These jobs will absorb a large number of experts who can promote sustainable and innovative solutions to ensure energy security and address the ever increasing environmental problems in the country
- Energy is the most essential input for development activities and the depletion and degradation of natural resources are amongst their most undesirable outputs
- Energy and Environmental Professionals are and will remain in high demand in several Government, Public and Private Sector Organizations, NGOs and International Agencies

STATE OF ENVIRONMENT (What? Why? Where? How? Who?)

- **Chakachak Mumbai!! Kahan aur Kab? (Spic and Span Mumbai!!Where and When?)**
- A campaign initiated by the MCGM is still a far cry from reality as the situation of MSWM is abysmal
- This is despite a substantial budget that MCGM spends MSWM (5-25% of total)
- Main reasons for mismanagement of MSW- attributed to the under-performance of ULBs, public apathy and lack of environmental awareness



A Comparison of MSW Storage and Collection in Mumbai (2014) and Frankfurt (1994)

EDUCATION AND EMPLOYMENT LINKS

- The role of environmental education, particularly at the higher level, is very important to create employment and address the ever increasing environmental problems and for achieving sustainable development
- The emergence of environment education in India can be traced back to 1970s, when, it was a part of civil engineering- courses taught were “water supply/ sanitary/ waste water engineering
- Re-christened as “public health engineering” and later as “environmental engineering”
- Environmental Engineering is a subject offered at UG level and also as a major specialization at PG level in Civil and Chemical Engineering
- From 1980 onwards, many science and humanities disciplines included environment as part of their curriculum and several inter-disciplinary areas such as Environmental Physics, Environmental Chemistry, Environmental Sociology, Environmental Psychology, etc. emerged
- Thus, the scope of environmental education is widening and, presently, almost all disciplines in India have included environmental courses in their curriculum in some form or the other

POTENTIAL AND PROSPECTS

- **Energy and Environmental Professionals are required at all levels, from all disciplines and in almost all organizations**
- Since energy is the most essential input and pollution is an undesirable by-product of any development activity, India needs experts who not only understand the linkages among energy, environment and development but also offer solutions for minimizing negative effects during the life cycle of production and consumption activities
- With increasing demand for sustainable products, processes and services, India needs to focus on a synchronized development strategy that ensures economic progress, provides energy security and maintains the ecological balance

Level of Jobs- unskilled, semi-skilled and skilled

Potential Organizations-Local, State, National and International Orgs.- such as ULBs, Central and State Ministries, PCBs, International Organizations, NGOs and Corporate Sector

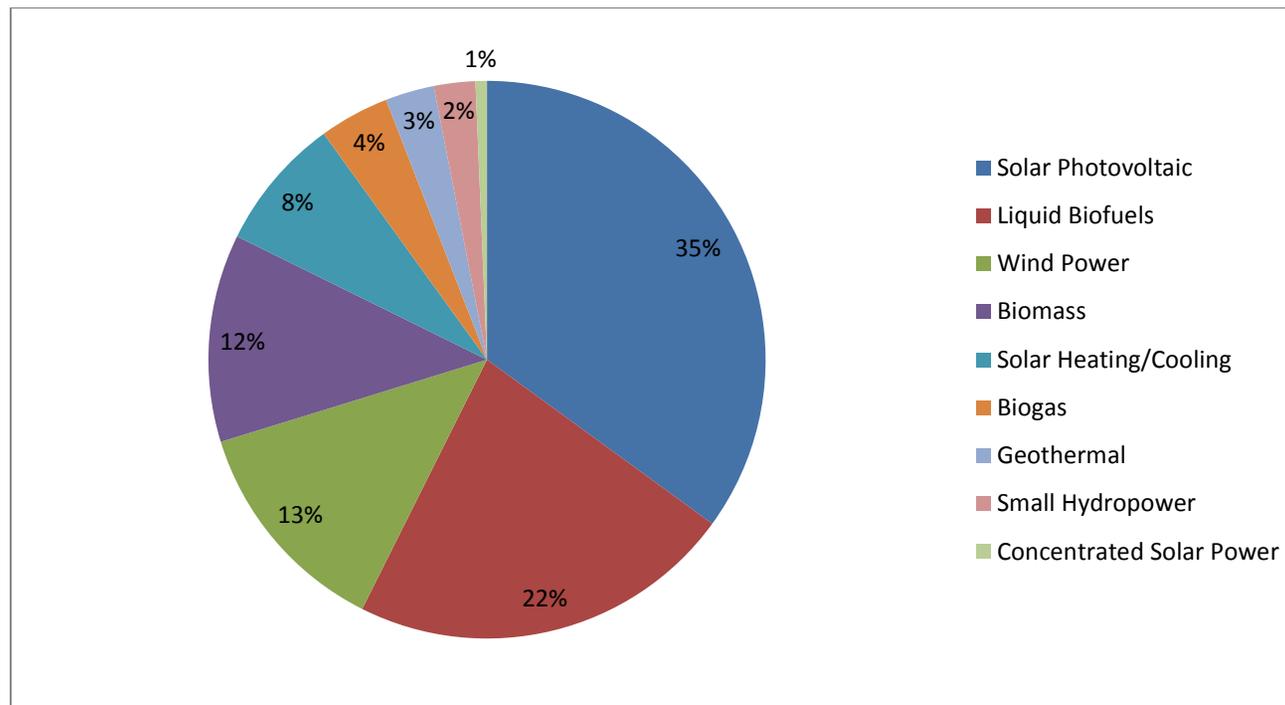
Some Projections-

- IRENA estimated about 6.5 Million jobs in RE Sector for 2013.
- Planning Commission projected over 5.0 lakh technical manpower and 1.5 lakh non-technical manpower need to be inducted into the RE sector in the 11th and 12th plan periods.
- Results from a Micro-scale Study in India

SOME FACTS AND FIGURES

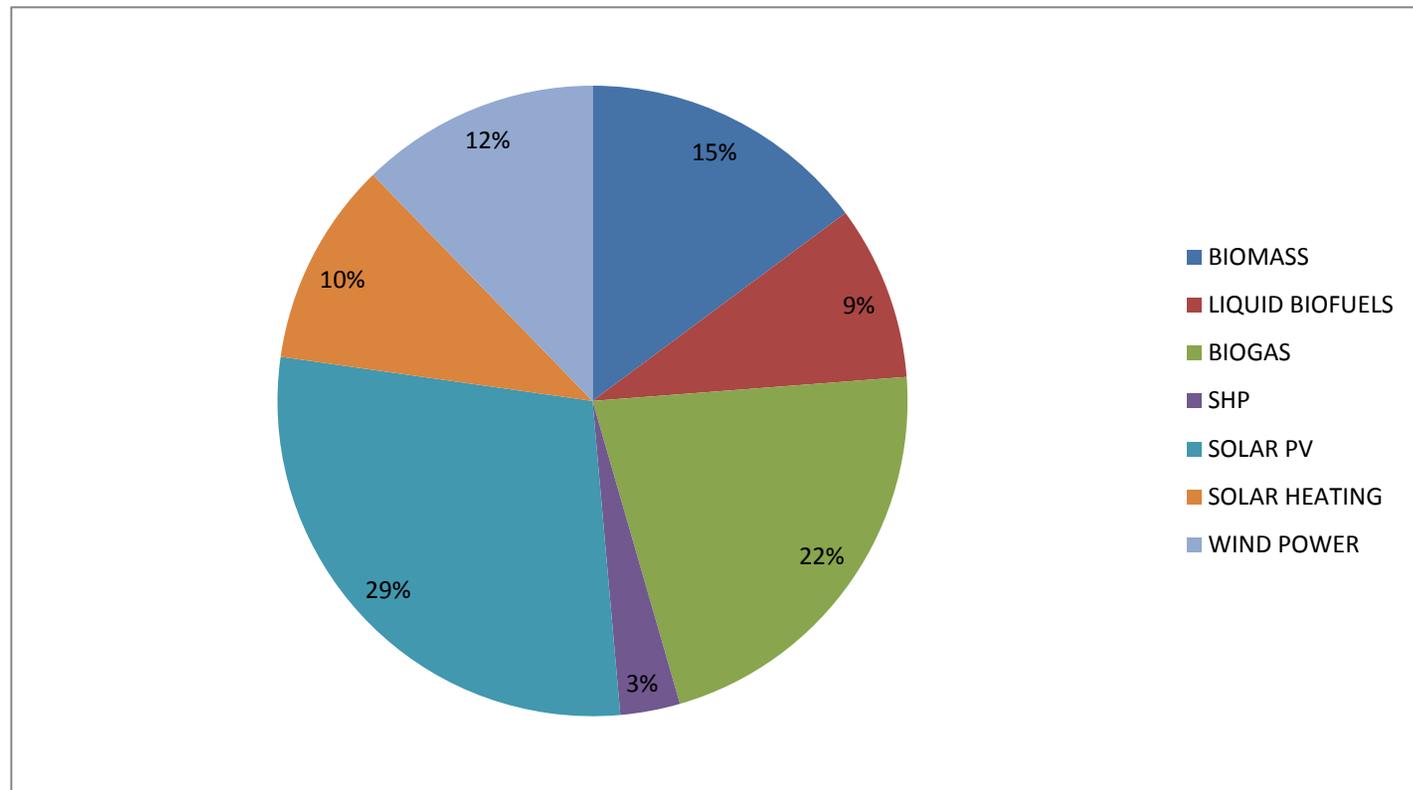
- A Report of IRENA indicates that, **in 2013, the renewable energy jobs reached 6.5 million** and in decreasing order, the largest employers were, China, Brazil, The United States, **India**, Germany, Spain and Bangladesh -SPV sector accounted for 2.3 million jobs, Solar heating for 0.5 million jobs; Bioenergy for 2.5 million jobs and Wind energy for 0.8 million jobs

Share of World Jobs in RE Sector (Total Jobs 6492K)



Source: IRENA, 2014

Share of RE Jobs in India



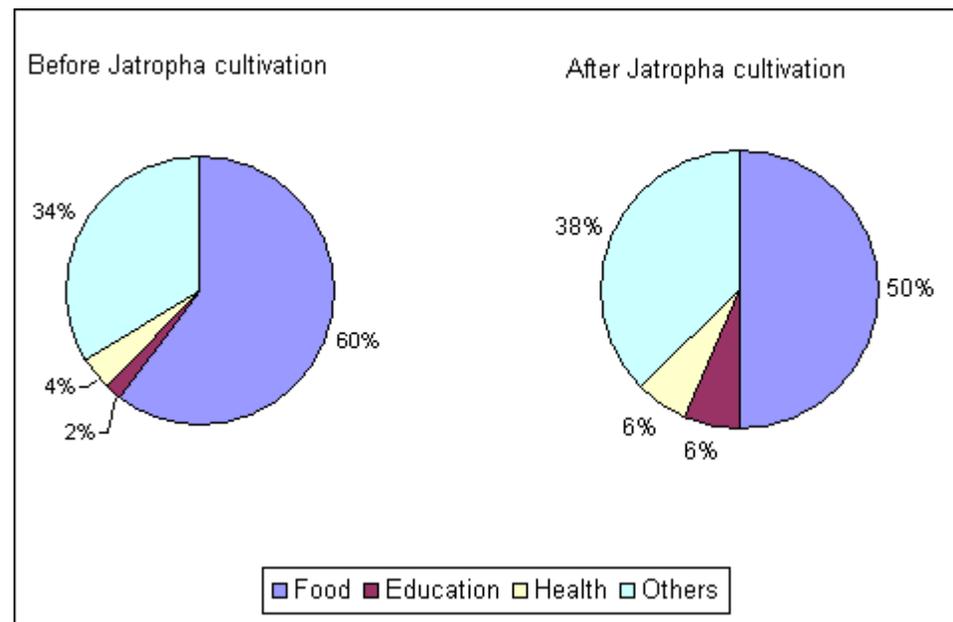
Source: IRENA, 2014

EMPLOYMENT AT LOCAL LEVEL: A Case Study on LCA of Biofuel Production

- **Employment in Jatropha Cultivation Stage**

SN	Item	Values
1	Area of Jatropha Cultivation (acres/ ha)	120 / 48.56
2	Employment (person days per year)	12045
3	Employment (person days per hectare per year)	248

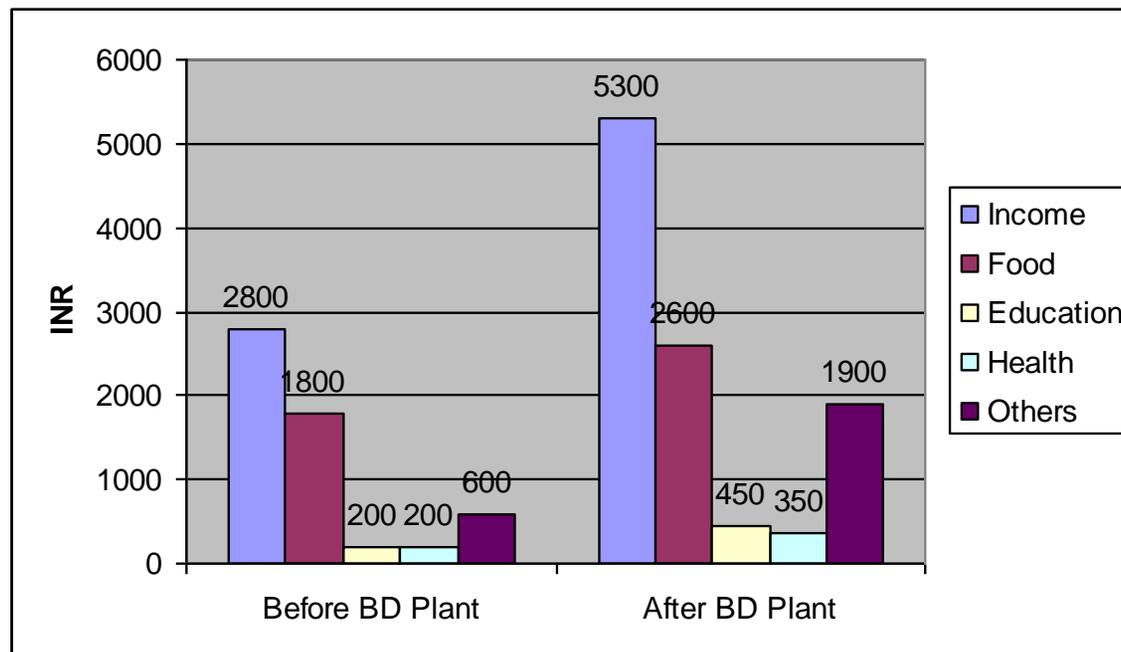
Monthly Spending Pattern and Income of Families affected by TOIL (INR2500 to INR4000 pm)



- **Employment in Biodiesel Production Stage**

SN	Items	Values
1	Total Production (L)	14600000
2	Employment (Person days per years)	40150
3	Employment (person days per hectare per year)	42

Monthly Income and Expenditure of Workers at SBTL (INR2800 to INR5300 pm)



CONCERNS AND CHALLENGES

Ineffective Environment Education

- Despite a large number of students studying environment, very few are trained as experts who can make concerted efforts to suggest effective solutions to the real problems
- It has been observed that Education and Training are critical enablers for employment in EE Sector

Dearth of Experts

- While emerging India offers tremendous opportunities for green jobs at all levels, the sustainable development process also poses a major challenge in terms of substantial need of trained human resource, particularly at the highly skilled and experts' levels
- Both public and private sectors organizations will contribute to job creation but they will also compete with each other
- While unskilled or semi-skilled human power could be available in plenty, there is a dearth of skilled expertise in most of the organizations
- Shortages of skilled work force are already creating bottlenecks - Some 78% of companies surveyed judge it either difficult or very difficult to find suitably trained staff

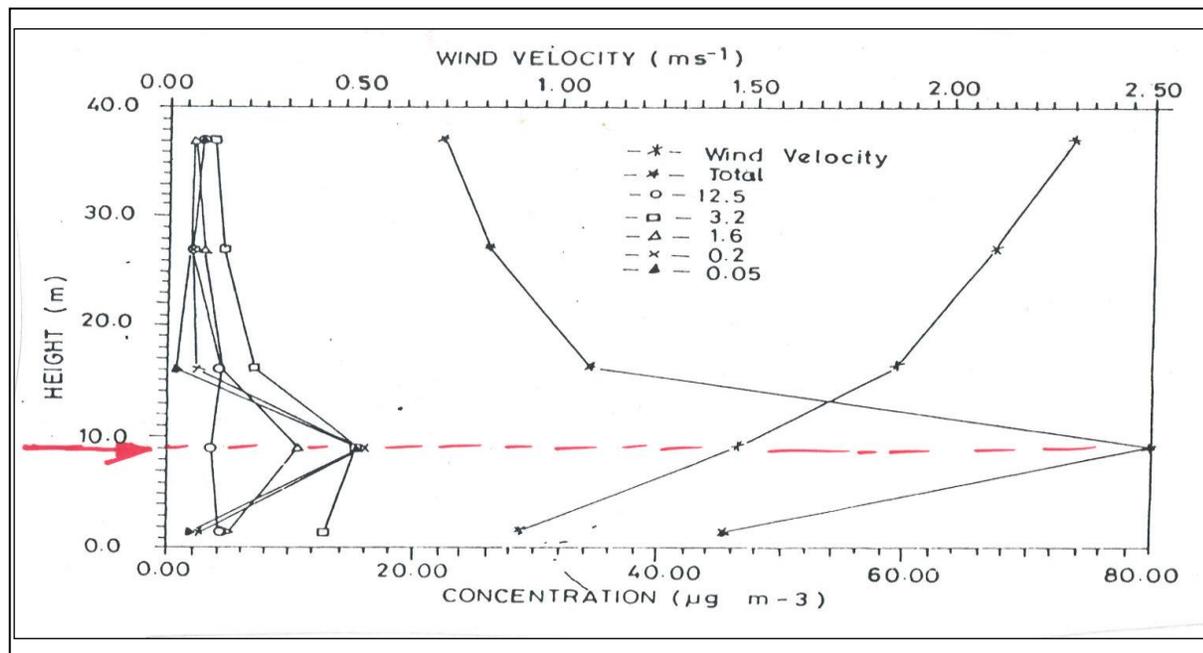
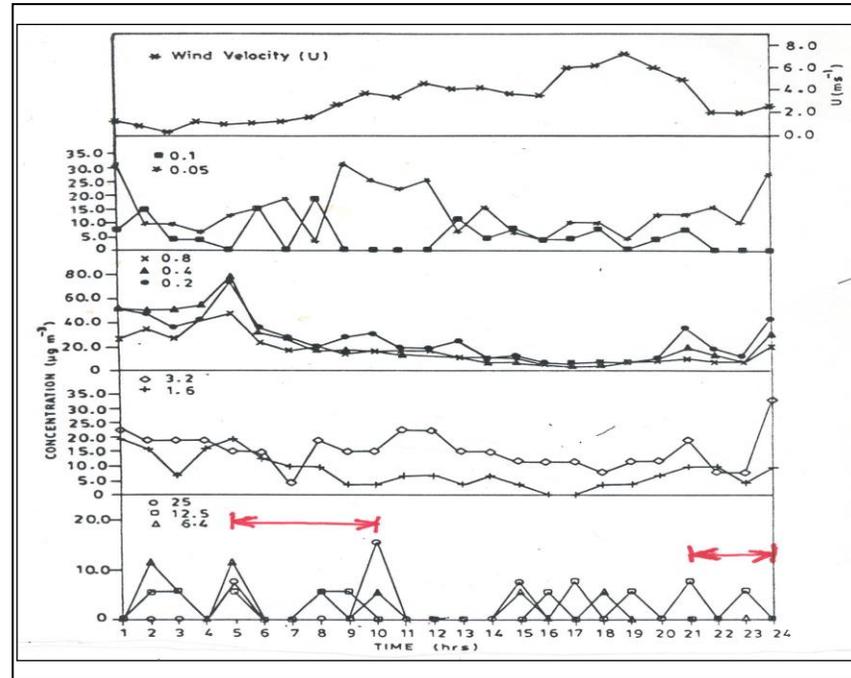
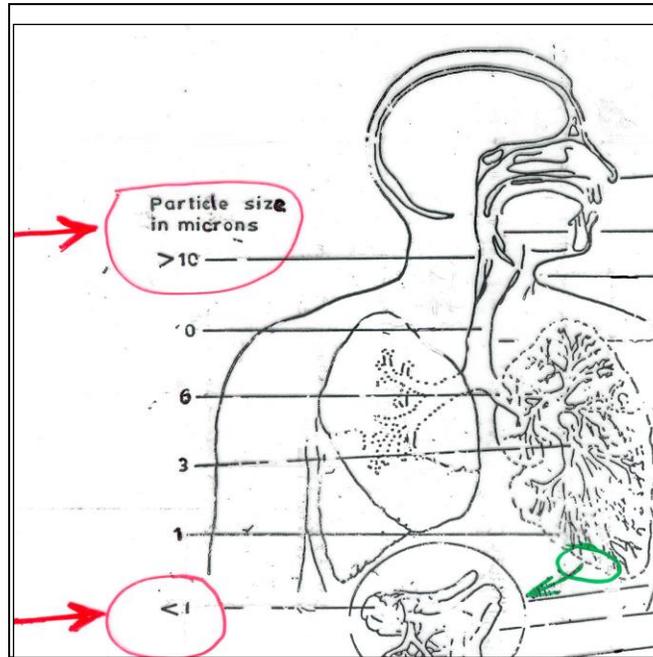
Lack of Practical Applications

- In most organizations only theoretical concepts are taught and practical applications of Environment Education in research and on the field are lacking

Lack of Awareness

- Very few students know the job potential in the EE sector, particularly, from other than Sci/ Engg

Example of Aerosols- Not only Concentration-Toxicity, Temporal and Spatial variation, Size Distribution – also needed



EDUCATION FOR THE EE SECTOR

- In general, quality of education is not upto the mark as none of the Indian institutions is ranked among the top 200 Universities of the world
- In ancient times Indian universities attracted students from all over the world but, in present times, many of our students go abroad for a better quality of higher studies resulting in a “brain-drain”
- India’s National Policy on Education (1986) of India states that protection of environment is a value which must be an integral part of the curriculum at all stages of education.
- Despite a large number of degree awarding institutions and colleges (over 650 and 3000) in the country, there are very few institutions offering good quality Education on EE.
- There is a paucity of books and literature, hampering the readers understanding of the basic aspects of this broad inter-disciplinary area
- For example, an environmental engineer or scientist may not understand the basic aspects related to management and policy issues. Similarly, an economist working on environmental issues may not be familiar with the basic fundamentals of physical and chemical processes and the modelling aspects of environmental engineering
- Research is not a preferred option and, in general, it accounts for less than 0.4 per cent of our higher education enrolments and, it may be even lower in the EE sector

SOME REMEDIAL MEASURES

Improve level of EE Education at all level

- All stakeholders should recognize the importance of developing human capital in EE Sector
- A holistic and well designed structure of environmental education at all levels

Increase Awareness and Motivation

- Basic knowledge of EE sector should be completed at school level only
- Strategies to Maximize Effectiveness and Impact EE should be imparted through schools, higher education, mass media, experiencing nature, etc.
- Make students aware of opportunities in the EE Sector and motivate them to take up such jobs

Special Focus on Higher Education and Research

- For creating highly skilled professionals and experts, who can understand the intricacies of various aspects of the developmental process and provide innovative solutions for sustainable development.
- To promote a healthy environment for EE research, we must increase the number of fellowships, support inter-disciplinary and inter-university collaborations and accelerate industry-academic links

Encourage Practical Applications in the Field

- For real contribution of Education in sustainable development hands-on-trainings, vocational trainings, etc. are required