

# Chapter 1

## Bioenergy: Social, Economic, and Environmental Impacts

**Shweta Arun Avhad**

*Savitribai Phule Pune University, India*

### **ABSTRACT**

*As we know that escalating population demand and technological advancement lead us towards a new world dominion power; but with that, there is huge pressure on resources due to an increase in consumption at all levels globally. This leads to revamping environmental motifs all over the world and non-renewable sources are estimated to be not rehabilitating soon. In this case, bio-energy is energy presented as a major opportunity to address the issues of climate change by reducing carbon emissions. This chapter explore bioenergy.*

### **INTRODUCTION**

As we know that escalating population demand and technological advancement lead us towards a new world dominion power, but with that, there is huge pressure on resources due to an increase in consumption at all levels globally. This leads to revamping environmental motifs all over the world and non-renewable sources are estimated to be not rehabilitating soon. In this case, bio-energy is energy presented as a major opportunity to address the issues of climate change by reducing carbon emissions.

### **BACKGROUND**

Bio-energy can be defined as a flexible renewable energy source that can be obtained from organic matter, which includes husbandry, and food waste, forestry sector includes timber, also sewage, and so on. In this, all energy is obtained from a biological source, which produces heat energy (thermal energy), electricity or power, transport biofuel, cooling purposes, etc. Bio-energy makes up nearly 15% of global primary energy consumption substantially from fuel wood and 50% of global renewable energy sources.

DOI: 10.4018/978-1-6684-5269-1.ch001

(Gheewala Shabbir, et al., 2011). Unlike other renewable energy sources, bio-energy spare on a raw material feedstock that can use within energy processes.

## **BIOMASS**

Bioenergy is energy deduced from biomass. It has appertained as a material which is produced by photosynthesis and which is residue from husbandry, forestry, and related diligence, a beast and vegetal composites, algae, fungi, and biological wastes which all are of biological origin and are biodegradable. They are obtained as feedstock in the manufacture of bio-oils, biofuels like petrochemical substances, and other products. The key challenge for bioenergy is arising due to changing environmental substitute patterns that adversely affect the supply chain of biomass, as it is sensitive to environmental impacts. This change in biomass use for energy has an insinuation associated with changes in land use patterns, which affects the subjection of biodiversity to feedstock production.

In this chapter, we are going to discuss the impacts of bioenergy socially, economically, and environmentally.

As its major threats of bioenergy have not been instigated at greater risk for the world, yet hence it seems to be a good solution for now. In short, bioenergy can act as a key part of a future demand solution. According to the IEA Bioenergy report, bioenergy includes efficient and increasing the sustainable use of biomass for biomaterial production. Also, power and thermal energy for transportation purpose as the major opportunity to reduce carbon dioxide emission including clean efficient renewable energy solution this efficient source act as an alternative source of energy for non-renewable source for sustainable bioenergy use (IEA Bioenergy report, 2020). This also helps to step forward to achieve sustainable development goals.

According to IPCC (intergovernmental panel on climate change) 6<sup>th</sup> assessment report, global temperature speed up in the last 100 years and reach its peak and in the next 20 years, global warming will breach the threshold of 1.5 degree Celsius. If GHG (greenhouse gases) continue to emit global warming, will be above 2 degrees Celsius by the mid-2100s. The rise in sea level started affecting sea-lined countries and Small Island are at greater risk .as per researchers, this bioenergy can act as a stabilizer to control GHG emission and help to reduce extreme weather events. Nevertheless, demand for bioenergy feedstock increases due to bioenergy demand escalating, this feedstock is primarily sowing the seeds of agricultural and forest material. The IPCC determined that the average amount of BECCS(bioenergy with carbon capture storage) in the climate framework requires 25 to 45% of fertile and permanent cropland that is nearly 6,500,000 km square of area up to the next 80 years (Vaughan, A., 2021). Hence, to keep our energy supply pristine, bioenergy must emanate from sustainable resources. This biomass production to derive bioenergy should not affect food material production. Impacts on the environment (including animal welfare, plants, air, water, and ecosystem) must be superintended aptly. LUC i.e. land use consumption has to be sustainable.

## **IMPACTS OF BIOENERGY**

Bioenergy is act as an alternative to fossil fuels, and energy suppliers and increases the energy security of rural communities. Further, it has accommodated sustainably and carefully towards affecting socially,

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