

### 3. Torrefaction Technology to Reduce Stubble Burning

**Prelims level: Science & Technology**

**Mains level: GS-III Science and Technology-Developments and their Applications and effects in Everyday Life**

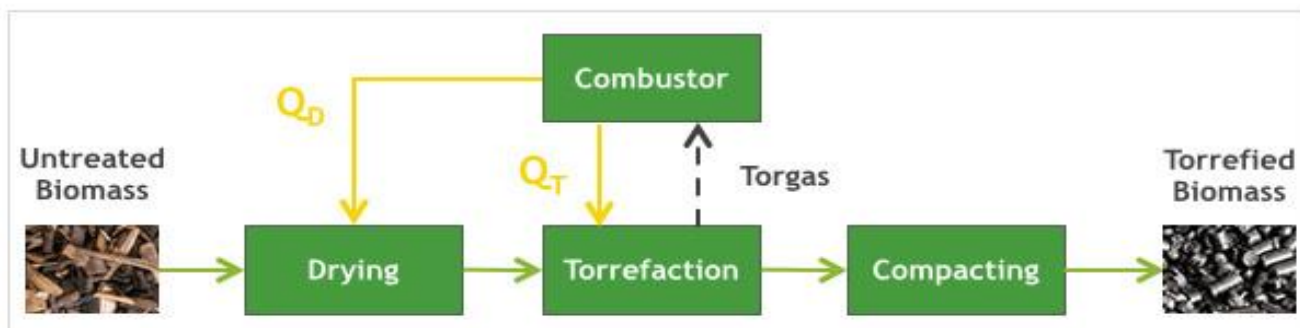
#### Why in News?

- India is planning to make use of the Swedish torrefaction technology to reduce stubble burning issue.

#### What Is Torrefaction?

- Biomass torrefaction is a thermal process used to produce high-grade solid biofuels from various streams of woody biomass or agro residues.
- The end product is a stable, homogeneous, high quality solid biofuel with far greater energy density and calorific value than the original feedstock, providing significant benefits in logistics, handling and storage, as well as opening up a wide range of potential uses.

#### BASIC TORREFACTION PRINCIPLE



#### How it Functions?

- Biomass torrefaction involves heating the biomass to temperatures between 250 and 300 degrees Celsius in a low-oxygen atmosphere.
- When biomass is heated at such temperatures, the moisture evaporates and various low-calorific components (volatiles) contained in the biomass are driven out.
- During this process the **Hemi-Cellulose** in the biomass decomposes, which transforms the biomass from a fibrous low-quality fuel into a product with excellent fuel characteristics.

- To make a biomass torrefaction plant economically viable it is crucial to use the energy “lost” in the volatiles. This can be done by burning the volatiles (torgas) in a lean gas combustor. This combustor can provide the heat for the drying and torrefaction also.

#### **Possible Benefits of the Technology:**

- Torrefaction of biomass results in a high grade biofuel which can be used as a replacement of coal in electricity and heat production and as input for gasification processes in the production of high value bio-based fuels and chemicals.
- **The Torrefied pellets becomes an ideal coal replacement because of its following features:**
  - Grinds & burns like coal – Existing Infrastructure Can be used
  - Lower Feedstock Costs
  - Lower shipping and Transport Costs
  - Minimal de-rating of the Power Plant
  - Provides Non-Intermittent Renewable Energy
  - Lower sulphur and Ash Content (compared with coal)

