

**Management of Biomass resources (Wood and Agriculture Residue) in  
Bhiwani District ( Haryana )**

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**Abstract**

Biomass is the dominant energy resources for the developing country. Biomass is the main household energy source for the rural people. The woods have the capacity to produce large volume of biomass, high energy potential, and can be obtained from the natural forest. Biomass can contribute to nearly 4 percent of primary source of energy and reduce the overall consumption of fossil fuels. Biomasses take the form of solid material for combustion. Fire wood is used as bio energy for small scale rural industries such as brick burning, lime making and other food processes. It can help to fulfill the requirements of rural industries and boost up the rural economy. Present study emphasis on the Management of biomass resources in Bhiwani District (Haryana).

**Keyword:** - Biomass, Fossil Fuel, Rural industry, firewood ,Bio energy

**Introduction**

Biomass consists of organic matter derived from trees, plants, crops or from human, animal, municipal and industrial wastes (Meshram and Mohan, 2007). In the rural areas the wood is used as fuel and the firewood is collected by the woman from the farmland and the near by woodland. It can take the form of solid material (biomass) for combustion or liquid products (Biofuels) that can be used to power vehicles. fire wood obtained from the natural forest and woodland sources are extremely cheap because there is no maintenance costs. Both biomass and Biofuels can be derived from dedicated energy crops, agricultural co products or waste materials. Switchgrass (*Panicum virgatum* L.), elephant grass (*Pennisetum purpureum* Schum.), poplar (*Populus* spp.), willow (*Salix* spp.), mesquite (*Prosopis* spp.), etc. have been touted as the crops with the most widespread promise (Dipti and Priyanka 2013). Biomass energy is rapidly expanding as a source of commercial energy with the emphasis being placed

on developing biomass-derived fuels for transport. A large-scale expansion of biofuels for transport has the potential to make a significant positive contribution to the climate problem and to provide a source of income to support rural livelihoods.

Historically, biomass has been a major source of household's energy in India. Biomass meets the cooking energy needs of most rural households and half of the urban households (Shukla,1996). Despite significant penetration of commercial energy in India during last few decades, biomass continues to dominate energy supply in rural and traditional sectors. An estimate of the share of biomass in total energy in India varies from nearly a third (36%) to a half (46%) of total energy (Ravindranath and Hall, 1995). Biomass energy constitutes wood fuels (including charcoal, wood waste wood), crop residues (such as bagasse, rice husk and crop stalks) and animal dung (including biogas).

#### STUDY AREA

The study is conducted in Bhiwani district Haryana. It is located between latitude 28°19' N and 28° 15 N and longitude 75° 28' E to 76° 28E'. The area is bounded in north by Hisar district in the East by Rohtak district in the South by Mohindergarh district of Haryana and Jhunjhunu district of Rajasthan. Bhiwani district has a total area of 5140 sq.km. (12% of Haryana). The amount of rainfall in Bhiwani District is about 483 mm mainly in the month of July and August. Soil of this district is loamy in North region and Sandy in South West region. The district does not have any seasonal and perennial river. The main source of the water is the canal net work of Bhiwani District. This area is semiarid. The vegetation is scattered and irregular in the age and density. The common plant species are Acacia nilotica (kikar) and Delbergia sisoo (shisham). Strip forests are present in this area. In Bhiwani district xerophytes vegetation in present. According to the champion and Seth 1968 bone pioneer of revised survey of the forest type of India. Acc. to this survey we categorized the forest of Bhiwani into tropical Dry Deciduous forest category 6B. Vegetation of Bhiwani district is scattered and Patchy (Sharma, Yadav, Parwari and Hooda 2013, Champion and Seth 1968).

### MATERIAL AND METHOD

The present work depend upon the survey and observation. The observation taken with the help of natives and forest deparment of bhiwani district.Study was conducting during October 2015-january 2016 . The survey for biomass resources were conducted in the Bhiwani through regular field visits. D,uring our field visits plant sample were collected from agriculture lands, natural habitat ,wastelands,roadsides,railway track,park,ponds and relevent localities to cover almost all the district in a systematic manner. Identification was done with the help of various floras(Mishra and verma 1992) and live specimens in field itself.

### DISCUSSION

Biomass would be the future source of sustainable energy supply at no extra cost. Biomass almost supplies 14 percent of primary source of the energy. Nutrient recycling in the soil–plant ecosystem is an essential component of sustainable productive crop enterprise. Incorporation of crop residues improves soil environment, which influences the microbial population and activity in the soil and subsequent nutrient transformations (Blanco-Canqui and Lal 2009). Thus, indiscriminate removal of crop residues can adversely impact soil properties, soil organic matter (SOM) dynamics, water and wind erosion and crop production (Kludze et al 2013). However, Blanco-Canquia and Lal (2009) remarked that a fraction of the crop residue produced may be available for removal from soils. It is further reported that adverse changes occur only after excessive or complete residue removal. In certain cases changes due to crop residue removal are found insignificant. There is about 30% to 50% corn Stover, especially in the US Corn Belt region can be removed for alternative uses without causing severe negative impacts on soil (Lindstrom et al 1979). However it is still uncertain where, when and how much residue can be removed sustainable. The crop residue generated in the field has to be made available to the user facilities. The supply chain involves collection, storage and transportation of residue from field to user site. All these processes influence the resulting feedstock cost. The bulky nature or low energy density of agricultural residues possesses problems in handling, storage, transportation and conversion processes. Densification increases energy density of biomass and also makes transportation and storage economical. Biomass densification can be done via

two processes (i) mechanical (e.g. bales, pellets, cubes, briquettes) and (ii) pyrolysis (e.g. torrefaction, slow pyrolysis, fast pyrolysis) (Omafra, 2013). Appropriateness of the processes is to be judged based on the situation specific consideration. Harvesting and transportation costs are major components of crop residue based bio energy planning. Prevailing practices of harvesting vis-à-vis scope for introducing mechanical methods of harvesting also influence the viability of crop residue based power project. Again, biomass transportation cost is a function of the quantity of available biomass in a region and the transportation distance (Voivontas et al, 2001). Therefore, it is desirable to ensure availability of adequate crop residue in the vicinity of power plant location.

Use of Geographical Information System (GIS) tools is found to use for investigation of power plant location, cost effective transportation network to minimize the overall cost of biomass feedstock (Voivontas et al, 2001 and Hiloidhari et al. (2012)). In a recent study, Hiloidhari et al. (2012) estimated the cost of rice straw production, harvest and transportation using GIS. Incorporating all the three cost parameters (production, harvest and transportation), they estimated the overall cost of rice straw as approx. \$25 t<sup>-1</sup>. Further, the manual harvest of residue is predominant in several parts of India.

Crop residue fuel characteristics including moisture content would influence the decision Of appropriate conversion route. In general, thermal conversion of biomass requires low moisture content (less 50%) while bio-conversion can utilize high moisture feedstock.

Thermal conversion technologies can also use high moisture content feedstock's but the Overall energy balance for the conversion process is adversely impacted (McKendry, 2002). Chauhan (2010) reported that out of the 25 MT crop residues generated annually in the state of Haryana, 71% is consumed in various domestic and commercial activities within the state. Citing a rural area of Haryana, Joon et al. (2009) reported that more than 80% of rural households use wood, dung, crop residue or all of them along with LPG, while 48% of household use dung cake and crop residue for water heating purpose.

Moisture in biomass fuel reduces the heating value, thus if too much moisture is present, the fuel will not spontaneously react (Jenkins et al, 1998). Moisture content of herbaceous and agricultural vary from about 9 to 35% depending on the plant species (Vassilev et al 2010). Thus, it is seen that there are several important issues concerning the bio energy utilization of crop residues viz., (i) soil health, (ii) practices of collection, handling and

storage, (iii) appropriate technology of conversion suiting fuel characteristics, and (iv) economy of fuel substitution which are expected to vary amongst the states of India. Historically, biomass has been a major source of households energy in India. Biomass meets the cooking energy needs of most rural households and half of the urban households. Despite significant penetration of commercial energy in India during last few decades, biomass continues to dominate energy supply in rural and traditional sectors. Estimates of the share of biomass in total energy in India varies from nearly a third (36%) to a half (46%) of total energy (Ravindranath and Hall, 1995). Biomass energy constitutes wood fuels (including charcoal, wood waste wood), crop residues (such as bagasse, rice husk and crop stalks) and animal dung (including biogas). Wood fuels contribute 56 percent of total biomass energy in India (Sinha et. al, 1994). According to the report of the National Council for Applied Economic Research

(NCAER, 1985), biomass fuels contributed 90% energy in the rural areas and over 40% in the cities. According to this report, twigs accounted for 75% of household energy needs. The household energy consumption thus appears scarcely a cause of deforestation. Biomass energy is used by over a two thirds of Indian households. Chipeta (1995) attempted to identify the key factors influencing the growth prospects of

the forest-based small-scale enterprises. These factors are existence of demand for their products, whether the macroeconomic environment favors the development of small enterprises, whether the Forest Based Small Scale Enterprises have access to infrastructure and finance, the availability of raw materials, and the most important factor-entrepreneurial skill. The ability of the proprietor is placed as the most important factor by the author because the efficiency and productivity of the enterprise is not enhanced by labor-saving technology or specialized skills and adequate funding, and the weaknesses are worsened by lack of supportive aids. Biomass is the traditional source of fuel but the industrialist are not much aware about the source of bio energy because these are not cheap. Bioenergy plantation is labor oriented process. So bioenergy help to increase employment opportunity. Bioenergy requires the transportation because bioenergy grow in forest and rural sides. Transportation gives new jobs to the natives. If we grow energy crops on 1000 hectares on barren land can generate 3mw of electricity and also it give support to fuel wood and charcoal. complete the energy needs of 125 families and 100 native people will get a new job from the energy plantation. So bioenergy crops indirectly help to increase the economy of the district.

bioenergy we can use the waste of crops and other biomass waste which cause the pollution. It help in the improvement of forest resources, release the pressure on logging and some environmentally fragile lands and replace the traditional energy resources(fossil fuel).

Energy crops for bhiwani district are *Acacia nilotica* , *Ailanthus excelsa* ,*Prosopis cinnaria*, *Zizyphus mauritiana* , *Pongamia pinnata* .

After plantation energy crops should not require a more care. The potential estimates of the present research would require to be considered keeping in mind of such varying dynamics.

### **Result And Conclusion**

Biomass is the main source of food production in the Haryana. So management of biomass is necessary for food and bio energy. For bio energy the main biomass was fire wood and agriculture residue. So for the bio energy improving the growth of biomass is very necessary. Management of the forest should be done for the biomass. A forestation programmed should be launched for the timber growth. The fast growing tree species having greater biomass should be selected for the energy plantation. This programmed should be launched under the guidance of the government forest department and native of the Bhiwani district. Under these programmed social forestry should be done to give timber ,fire wood ,fodder and other valuable product to meets the needs of native people by growing the plants on waste land , barren land , community land , deforested land and bountries of the farm land. For the development of forest engagement of native people should be necessary so that they can take care of plants along with their farming. This can also give financially support to the farmers. Biomass energy is rapidly expanding as a source of commercial energy with the emphasis being placed on developing biomass-derived fuels for transport. A large-scale expansion of biofuels for transport has the potential to make a significant positive contribution to the climate problem and to provide a source of income to support rural livelihoods. The resarcher recommends management activities that ensure a truly sustainable system of exploiting non-timber resources in which fruits, nuts, latexes, gums and other plant products can be harvested indefinitely from a limited area of forest with negligible impact on the structure and function of the plant population being exploited. In bhiwani district pay more attention to bioenergy plantation programmed. This can Improve the forest area in semi arid region of bhiwani district. The way of harvesting and collecting the crop residue should

be promoted. bioenergy programmed should be done in a managed way so that during the harvesting proper amount of residue should be left so that soil erosion and run off the minerals should not takes place. The bioenergy tree species which have the capacity for rapid growth and adjust according to environment. They have ability to produce high biomass per unit area and grown even a short duration of time and grown in a rapid rotation i.e. in 4-8 years it can be change into complete tree. The conversion of solar energy efficiency should be high. The coppicing ability of energy should be high i.e. they have fast regeneration ability after harvesting. Energy crops help to setting the small industries in rural areas and improve the quality of life.

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