Vol. 42, No. 1, pp 85-97, 2014
Indian Journal of Soil Conservation
Online URL:http://indianjournals.com/ijor.aspx?target=ijor:ijsc&type=home

Biomass production, carbon sequestration and water transmission properties as influenced by densified plantations raised on old river bed lands in the north west Himalayas

A. Raizada[1], B.N.Ghosh[2], J. Jayaprakash[2] and Charan Singh[2]

[1]Central Soil and Water Conservation Research and Training Institute, Research Centre, Bellary- 583104, Karnataka;[2]Central Soil and Water Conservation Research and Training Institute, 218, Kaulagarh Road, Dehradun-248 195 Uttarakhand.
[1]E-mail: soilcons2bly@gmail.com

ARTICLE INFO

Article history :
Received : December, 2012
Revised : August, 2013
Accepted : October, 2013

ABSTRACT

Old river bed lands in the North West Himalayas have generally been utilized for the production of fodder and firewood but its quantative biomass production and resource (carbon and water) conservation potential have not been worked out. Plantations of three tree species-*Grewia optiva* Drumm, *Bauhinia variegata* L. and *Dalbergia sissoo* Roxb.were raised during 1996, at 2x2m (close), 3x2m (medium) and 4x2 m (wide) spacings and were thinned mechanically at the age of 7, 12 and 15 years. The performance of *D.sissoo* was the best with trees attaining an average height of 9.87 m and 10.3 m in the 7th year and 12th year, respectively. *G.optiva* trees attained an average height of 5.67 m and 6.20 m at the same age. Foliage (as fodder) availability from annual prunings in *G.optiva* declined from the 11th year and woody biomass from the 8th year. More woody biomass was obtained at medium spacing and that of foliage at close spacing. First thinning in the 7th year yielded 54.70, 20.45 and 13.65 t ha^{-1} of woody biomass at close spacing in *D.sissoo*, *G.optiva* and *B.variegata*, respectively, followed by production from medium and wide spacing. During the 2nd thinning at the 12th year, maximum woody biomass (100.50 t ha^{-1}) was obtained from *D.sissoo* at medium spacing followed by 53.43 t ha^{-1} from *G.optiva* at wide spacing and 34.94 t ha^{-1} from *B.variegata* at medium spacing. Annual rate of increase of SOC in the 0-45 cm soil depth ranged from 502 to 1410 kg C ha^{-1}. The humification rate was determined to be 0.195. Carbon sequestration rate varied from 1.32 to 0.55 t ha^{-1} yr^{-1} and followed the trend of *D.sissoo* < *B.variegata* < *G.optiva*.

Key words:
Degraded lands,
Fire wood,
Plantation,
Short rotation forestry,
Soil properties,
Thinning