

Alternative methods of harvesting and storage of grass biomass in a semi-arid region

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Publication date

2012/4/12

Journal

African Journal of Agricultural Research

Volume

7

Issue

14

Pages

2166-2173

Publisher

Academic Journals

Abstract

Biomass is considered a potential feedstock for many renewable energy production systems and interest especially in grass production has increased markedly in the last two decades. The present work focuses on grass biomass in the semi arid regions of sub-Saharan Africa and includes the study of two different methods of harvesting and baling as well as two different bale storage methods. The results indicated an average dry matter yield of 22600 kg ha⁻¹. The average harvesting rate and fuel consumption were 1.57 h ha⁻¹ and 6.23 ha⁻¹, respectively. The baling rate was 0.80 h ha⁻¹ while diesel consumption during baling was 2.69 ha⁻¹. Manual harvesting using scythes varied extensively depending on time of day and the quality of the handmade bales though acceptable could at times fall below standards. The open barn storage method and open barn plus tarpaulin cover storage method could be used to store bales for a period of up to 5 months with minimum changes in neutral detergent fibre (NDF) and acid detergent fibre (ADF) of biomass. The average fuel energy required to both harvest and bale, the biomass constituted less than 1% of the energy that could be recovered from the biomass if used as a fuel.

Key words: Biomass, grass, harvesting, yield, rate, storage, quality.

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