



Finger millet (*Eleusine coracana*)–groundnut (*Arachis hypogaea*) strip cropping for enhanced productivity and resource conservation in uplands of Eastern Ghats of Odisha

PRAVEEN JAKHAR¹, P.P. ADHIKARY², B.S. NAIK³ AND M. MADHU⁴

ICAR-Indian Institute of Soil and Water Conservation, Research Centre, Koraput, Odisha 763 002

Received : September 2014; Revised accepted : August 2015

ABSTRACT

A field experiment was carried out during the rainy seasons (July–October) of 2011, 2012 and 2013 at Koraput, Odisha, to access the performance of finger millet [*Eleusine coracana* (L.) Gaertn.] and groundnut (*Arachis hypogaea* L.)-based strip crop combinations in ratios 6:4, 8:4, 10:4 and 12:4. The experiment was laid out in 3 replications on 2% slope in a randomized complete-block design. Among the tested ratios, strip cropping of 6 rows of finger millet with 4 rows of groundnut steadily gave higher finger millet equivalent yield to the tune of 57, 44 and 59% than sole finger millet in 2011, 2012 and 2013 respectively. Sole finger millet cultivation recorded the minimum production efficiency of 12.3 kg/ha/day, whereas finger millet + groundnut strip cropping showed a mean improvement of 17%. The maximum net returns of ₹22,183/ha accrued from planting 6:4 ratio which was nearly double the net returns from sole finger millet cultivation and the ratio also registered the highest benefit: cost ratio (2.87). The superiority of strip ratio 6:4 was also reflected in the monetary advantage index and income-equivalent ratio, registering the maximum values of 6166 and 1.62 respectively. Pooled data of 3 years indicate that runoff conservation potential of finger millet + groundnut strip ratios 6:4, 8:4, 10:4 and 12:4 was 22.4, 11.9, 10.6 and 8.7%, respectively, compared to sole finger millet. On an average, 6:4 ratio gave the lowest values of soil loss (3.02 t/ha) and conserved soil loss by 18.1, 19.6 and 17.4% in 8:4, 10:4 and 12:4 ratios respectively. Sole groundnut arrested the maximum organic carbon loss, i.e. 44.6 t/ha, followed by 6:4 ratio (55.8 t/ha) which also recorded higher values for other nutrients conservation. Water productivity of different strip ratios specified the advantage in 6:4 systems, registering maximum values of 4.28 kg/mm. Maximum value of land-equivalent ratio (1.38) was calculated in 6:4 ratio, indicating 38% area advantage over sole cropping. All the strip cropping systems were advantageous than sole planting systems because the product of relative crowding coefficient (K) of main and intercrops was more than 1. Maximum values of K_{FM} and K_{GN} (7.84 and 1.34) were obtained from 6:4 and 8:4 strip ratios, respectively, directing greater advantage with higher values of product of K (10.15).