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Abstract: Among different maize based cropping systems, maize-wheat ranks Ist and is the 3rd most important cropping systems after rice-wheat and rice-rice having 1.8 M ha area that contributed about 3% in the national food basket (Dass et al.,2009). Traditionally, maize and wheat are grown in row geometry or by random broadcasting; mostly after thoroughly tilling the field till proper tilth is obtained for good seedling emergence. The traditional practice of growing these crops has limitations such as inconvenient input management when sown by broadcasting, improper plant geometry, and uneven plant population resulting in inefficient utilization of space and plant competition leading to low productivity and input efficiency. Tillage practices contribute greatly to the labour cost in any crop production system resulting to lower economic returns (Labios et al., 1997). In addition, intensive agriculture has led to dramatic losses of organic matter and hence organic carbon from cultivated soils. The lesser addition of organic carbon inputs to soil coupled with oxidative losses associated with tillage (Lal et al.,1995) are the major reason for loss of soil organic carbon. Reduced or conservation tillage systems are gaining more attention in recent years with the rising concern over natural resource degradation. Hence, Conservation tillage practices, such as zero and minimum tillage and permanent beds, may be introduced to offset the production cost and other constraints associated with land preparation. Bed planting of maize helps in proper plant establishment, increases input efficiency, increases yields, and opens up avenues for double no-till system. Adoption of no-till practice helps in timely seeding of the crops, hence leads to increase in productivity. Scientists will have to evolve new genotypes and management practices or technologies to deal with conservation agriculture. However, there existed wide scale variability among maize and wheat genotype in response to different tillage practices. Hence, there is a need to evaluate maize and wheat cultivars for their suitability under different tillage technique. Keeping this in view, an experiment entitled “Performance of different genotypes under varying tillage practices in maize-wheat cropping system” was carried out in University Research farm during kharif and rabi season of 2011-12 in sandy loam soil of pH 6.2, low organic carbon (0.46%), available nitrogen (255.6 kg/ha), available phosphorus (17.65 kg/ha) and available potassium(168.3 kg/ha). The experiment was laid out in split plot design with 3 replications. The treatment comprised of 3 tillage practices (conventional, permanent narrow bed and zero tillage) in main plot and 5 cultivars of maize (HQPM-1, DHM-117, PHI 3540, Rashi 747 and Rashi 3022) and wheat (PBW 343, K 9107, WR 544, DBW 17 and BAAZ) in subplot. Result revealed that permanent narrow bed produced higher dry matter (1528.0 g/m2), number of cobs/ha (67472), cob length (18.68), cob girth (14.65 cm), number of grain/cob (398.03) and 100 grain weight (32.69 g) resulting in higher cob (74.35 q/ha) grain (62.75 kg/ha), stover (94.85 q/ha) yield, energy output by grain (92239 MJ), net energy return by grain (80021 MJ), net return (` 46148/ha)of maize. The permanent narrow bed also removes higher nitrogen (177.62 kg/ha), phosphorus (28.04 kg/ha) and potassium (141.88 kg/ha) than conventional and zero tillage technique. In case of wheat also the permanent narrow bed produced higher dry matter (1394.01 g/m2), number of spikes/m2 (422.8), spike length (10.8 cm), spike weight (3.70 g), number of filled grains/spike (53.4) and 1000 grain weight (37.69 g) resulting in higher grain (53.71 q/ha), straw (76.67 q/ha) yield, energy output by grain (78949 MJ), net energy return by grain (59998 MJ), energy use efficiency (4.17), energy productivity (331.11 g/MJ), net return (` 46174/ha) and benefit: cost ratio (2.05). with higher uptake of nitrogen (126.04 kg/ha), phosphorus (22.97 kg/ha) and potassium (112.71 kg/ha) than conventional and zero tillage method. Among the cultivars, maize cultivar PHI 3540 and wheat cultivar WR 544 was found superior to other cultivars as it produced higher grain (66.60 q/ha & 56.64 q/ha), straw (99.62 q/ha & 79.30 q/ha) yield, energy output by grain (97897 MJ & 83627 MJ), net energy return by grain (86510 MJ & 63841 MJ), energy use efficiency (8.64 & 4.31), energy productivity (587.70 g/MJ & 343.05 g/MJ), net return (` 51590/ha & ` 48692/ha), benefit: cost ratio (2.87 & 2.10) nitrogen uptake (182.11 kg/ha & 128.93 kg/ha), phosphorus uptake (27.76 kg/ha & 23.66 kg/ha) and potassium uptake (147.54 kg/ha & 114.38 kg/ha). The system productivity was also found significantly superior under permanent narrow bed (129.88 q/ha) resulting in significantly higher system net return (92322/ha) and B: C ratio (2.19) over zero tillage and conventional tillage. The cultivation of maize cv. PHI-3540 and wheat cv. WR-544 in maize-wheat cropping system also gave the highest system productivity (137.40 q/ha), system net return (`100282/ha) and B: C ratio (2.42).

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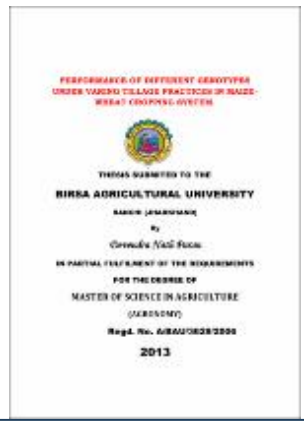

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