Livestock systems in the tropics are characterized by extensive management, consisting of native/naturalized pastures (native savanna) of low productivity and nutritional quality resulting in low animal live weight gain. In addition, this low forage quality can impact the enteric fermentation process causing large methane (CH4) emissions. To assess the existing forage-based production systems in the Llanos region of Colombia (Casanare Department, 2016), six farms, representing different edaphoclimatic environments in the region, were selected. On each farm, forage yield, forage quality and animal productivity were measured from three different pasture systems: improved pastures (*Brachiaria humidicola and Megathyrsus maximus*) (IP), improved pastures with scattered trees (*B. humidicola, B decumbens* and *M. maximus* in combination with *Acacia mangium* and *Anadenanthera peregrina* trees) (IPT) and native savanna (*Axonopus purpusii*) (NS). Measurements taken included; nutritional content of forages, *in vivo* dry matter digestibility, *in vitro* gas production followed by CH4 quantification. The data were analyzed with the PROC GML of SAS® statistical software. Mean forage biomass production for IP and IPT systems was similar (1.9 Mg DM-1ha-1) while for NS system mean production was 0.3 Mg DM-1ha-1. The mean crude protein content ranged between 5.5 and 6.2% and the neutral detergent fiber content averaged about 75% among treatments. Mean animal productivity, measured as kg of live weight gain was 46, 32 and -7.7 kg-1ha-1yr-1 for IPT, IP systems and NS system respectively. The total net volume of gas accumulated after 48h of incubation was 173, 163 and 123ml resulting in dry mater degradation percentages of 57, 54 and 42% for IP, IPT and NS systems respectively (P=‹0.001). Additionally, the percentages of gross energy transformed to CH4 (Ym) were 3.5 for IP and IPT and 4 for NS system (*P*=0.007). The low animal productivity observed could be due to low forage productivity and nutritional quality together with substantial energy loss in the form of CH4. These results indicate a positive effect of the IPT system on both animal productivity and forage digestibility, supporting the use of improved pastures in combination with scattered trees as a means of sustainable intensification of livestock production systems in the region.