**Kenya Upper Western Fertilizer Use Optimizer: paper version, 2016**

**The below assumes:**

Calibration measurement is with i) a 5 ml water bottle lid (lid) that holds about 3.5 g urea and 5.5 g DAP and MOP, ii) a 500 ml water bottle of 5 cm diameter cut to height of 4m has approx. 80 ml to hold 56 g urea, and 88 g DAP and MOP.

* Row spacing: maize, Irish potatoes, sweet potatoes and climbing beans have 75 cm; beans at 50 cm; wheat at 25cm.
* Grain values per kg (Ksh): 25 maize, 30 Irish potatoes, 30 sweet potatoes, 50 rice, 60 beans 30 wheat.
* Cost of using 50 kg fertilizer (Ksh): 2850 urea; 3600 DAP; 3600 MOP.
* Application rates are in kg/ac. Minimum rates are 10 kg/acre.

**Level 1 financial ability**

* For maize HP (>3t), at planting band 10 kg DAP (1 lid for 2.2 m).
* For Irish potato, at planting band 60 kg DAP (1 lid for 0.4 m) and 20 kg MOP (1 lid for 1 m).
* For sweet potato, at planting band 39 kg DAP (1 lid for 0.6 m).
* For maize-bean intercropping, at planting band 19 kg DAP (1 lid for 1.1 m) and sidedress by banding 15 kg urea at 6 WAP (1 lid for 0.9 m).
* For climbing beans, at planting band 28 kg DAP (1 lid for 0.8 m).

**Level 2 financial ability**

* For maize HP (>3t), at planting band 36 kg DAP (1 lid for 0.6 m) and sidedress by banding 26 kg urea at 6 WAP (1 lid for 0.5 m).
* For Irish potato, at planting band 61 kg DAP (1 lid for 0.3 m) and 30 kg MOP (1 lid for 0.8 m).
* For sweet potato, at planting band 61kg DAP (1 lid for 0.3 m).
* For lowland rice, broadcast 25 kg DAP (one cut bottle for 6.7m @ 2m wide) and 20 kg MOP (one cut bottle for 5.6m @ 2m wide) at planting and sidedress by broadcast 51 kg urea (one cut bottle for 2.0 m @ 2m wide) at panicle initiation.
* For maize-bean intercropping, at planting band 34 kg DAP (1 lid for 0.7 m) and sidedress by banding 35 kg urea at 6 WAP (1 lid for 0.4 m).
* For climbing beans, at planting band 55 kg DAP (1 lid for 0.4 m).
* For wheat band at planting 19 kg DAP (1 lid for 3.5 m) and sidedress by banding 14 kg urea at panicle initiation (1 lid for 2.2 m).

**Level 3 financial ability (maximize profit per acre). fs**

* For maize HP (>3t), at planting band 61 kg DAP (1 lid for 0.3 m) and sidedress by banding 52 kg urea at 6 WAP (1 lid for 0.25 m).
* For Irish potato, at planting band 61 kg DAP (1 lid for 0.3 m) and 30 kg MOP (1 lid for 0.7 m).
* For sweet potato, at planting band 61kg DAP (1 lid for 0.3 m).
* For lowland rice, broadcast 45 kg DAP (one cut bottle for 3.7 m @ 2m wide) and 28 kg MOP (one cut bottle for 1.8 m @ 2m wide) at planting and sidedress by broadcast 61 kg urea (one cut bottle for 1.6 m @ 2m wide) at panicle initiation.
* For maize-bean intercropping, at planting band 53 kg DAP (1 lid for 0.4 m) and sidedress by banding 58 kg urea at 6 WAP (1 lid for 0.25 m).
* For climbing beans, at planting band 61 kg DAP (1 lid for 0.3 m) and sidedress by banding 14 kg urea at 6 WAP (1 lid for 1 m).
* For wheat band at planting 54 kg DAP (1 lid for 1.2 m or broadcast with cut bottle for 5 m) and sidedress by banding 37 kg urea at panicle initiation (1 lid for 1.1 m or broadcast with cut bottle for 2.9 m).