**Kenya Lower 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.

* It is assumed maize and sorghum are planted at 75 cm row spacing, fingermillet at 25cm row spacing and beans and greengrams at 50 cm row spacing.
* It is assumed grain prices per kg (Ksh): 25 maize, 25 sorghum, 50 fingermillet, 60 beans, 55 green grams.
* It is assumed 50 kg of fertilizer used costs (Ksh): 2850 urea; 3600 DAP; 3600 MOP.
* Level 1 financial ability needs a benefit: cost ratio (BC) of 0.1-2; Level 2: BC **2 - 4**; Level 3: BC >4.
* Application rates are in kg/ac.
* If any fertilizer rate application is less than 10 kg/acre it is not economical and should be converted to another fertilizer.

**Level 1 financial ability**

* For maize HP (>3t), at planting band 35 kg DAP (1 lid for 0.6 m).
* For maize LP (<3t), at planting band 16 kg DAP (1 lid for 0.8 m).
* For sorghum, at planting band 22 kg DAP (1 lid for 1.0 m).
* For fingermillet, at planting band 23 kg DAP (1 lid for 1.0 m).
* For bean monocropping, at planting band 16 kg DAP (1 lid for 2.1 m).
* For greengram, at planting band 10 kg DAP (1 lid for 4 m).

**Level 2 financial ability**

* For maize HP (>3t), at planting band 32 kg DAP (1 lid for 0.6 m) and sidedress by banding 43 kg urea at 6 WAP (1 lid for 0.3 m).
* For maize LP (<3t), at planting band 28 kg DAP (1 lid for 1.4 m) and sidedress by banding 19 kg urea at 6 WAP (1 lid for 0.7 m).
* For sorghum, at planting band 19 kg DAP (1 lid for 1.2 m) and sidedress by banding 11 kg urea at panicle initiation (1 lid for 1.3 m).
* For fingermillet, at planting band 15 kg DAP (1 lid for 4.4 m) and sidedress by banding 38 kg urea at panicle initiation (1 lid for 1 m).
* For bean monocropping, at planting band 16 kg DAP (1 lid for 2.1m) with 13 kg MOP (1 lid for 2.4 m) and sidedress by banding 10 kg urea at flower initiation (1 lid for 2 m).
* For greengram, at planting band 12 kg DAP (1 lid for 3.1 m) and sidedress by banding 12 kg urea at flower initiation (1 lid for 1.7 m).

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

* For maize HP (>3t), at planting band 54 kg DAP (1 lid for 0.4 m) with 11 kg MOP (1 lid for 1.8 m) and sidedress by banding 54 kg urea at 6 WAP (1 lid for 0.25 m).
* For maize LP (<3t), at planting band 50 kg DAP (1 lid for 0.5 m) with 11 kg MOP (1 lid for 2.1 m) and sidedress by banding 25 kg urea at 6 WAP (1 lid for 0.5 m).
* For sorghum, at planting band 24 kg DAP (1 lid for 1 m) and sidedress by banding 13 kg urea at panicle initiation (1 lid for 1 m).
* For fingermillet, at planting band 21kg DAP (1 lid for 3.3 m) and sidedress by banding 49 kg urea at panicle initiation (1 lid for 0.8 m).
* For bean monocropping, at planting band 23 kg DAP (1 lid for 1.5 m) with 18 kg MOP (1 lid for 1.9 m) and sidedress by banding 12 kg urea at flower initiation (1 lid for 1.7 m).
* For greengrams, at planting band 24 kg DAP (1 lid for 1.4 m) and sidedress by banding 13 kg urea at flower initiation (1 lid for 1.5 m).