**Kenya Central 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 is planted with 75 cm, beans 50cm, rice 25cm row and wheat 25cm row spacing.
* It is assumed grain prices per kg (Ksh): 25 maize; 60 beans, 50 rice and, 30 wheat.
* It is assumed 50 kg of fertilizer costs (Ksh): 2850 urea; 3600 DAP and 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.
* Any fertilizer rate application that is less than 10 kg/acre is not economical and should be converted to another fertilizer.

**Level 1 financial ability**

* Maize HP >4t: Apply 29 kg Urea as a sidedress (1 lid for 0.4 m) at 6 WAP.
* Maize LP <4t: Apply 23 kg Urea as a sidedress (1 lid for 5 m) at 6 WAP.
* Maize-Beans intercropping: Apply 16 kg DAP (1 lid for 0.8 m) by banding at planting and 23 kg Urea as a sidedress (1 lid for 0.5 m) at 6 WAP.
* Lowland rice: Broadcast 22 kg DAP (one cut bottle for 8.1 m) and 17 kg MOP (one cut bottle for 9.1 m @ 2m wide) at planting and 48 kg urea as a sidedress at panicle initiation (one cut bottle for 2.1 m).
* Wheat HP>3t: Apply 13 kg DAP (1 lid for 4.1 m) at planting and sidedress by banding 24 kg urea at panicle initiation (1 lid for 1.7 m).
* Wheat LP<3t: Apply 28 kg urea at panicle initiation (1 lid for 1.5 m).

**Level 2 financial ability**

* Maize HP >4t: Apply 65 kg DAP (1 lid for 0.3 m) at planting and 22 kg urea as a sidedress (1 lid for 0.6 m) at 6 WAP.
* Maize LP <4t: Apply 31 kg DAP (1 lid for 0.8 m) at planting and 28 kg urea as a sidedress (1 lid for 0.5 m) at 6 WAP.
* Beans: Apply 19 kg DAP by banding at planting (1 lid for 1.7 m).
* Maize-Beans intercropping: Apply 30 kg DAP (1 lid for 0.8 m) by banding at planting and 35 kg urea as a sidedress (1 lid for 0.4 m) at 6 WAP.
* Lowland rice: Broadcast 36 kg DAP (one cut bottle for 4.6 m) and 23 kg MOP (one cut bottle for 7 m @ 2m wide) at planting and sidedress with 61kg urea at panicle initiation (one cut bottle for 1.6 m).
* Wheat HP>3t: Apply 36 kg DAP (1 lid for 1.8 m) and 10 kg MOP (1 lid for 6.8 m) by banding at planting and sidedress with 30 kg urea at panicle initiation (1 lid for 1.3 m).
* Wheat LP<3t: Apply 22 kg DAP (1 lid for 3 m) and 10 kg MOP (1 lid for 6.8 m) by banding at planting and sidedress with 38 kg urea at panicle initiation (1 lid for 1.0 m).

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

* Maize HP>4t: Apply 81 kg DAP (1 lid for 0.3 m) at planting and 27 kg urea as a sidedress (1 lid for 0.5 m) at 6 WAP.
* Maize LP<4t: Apply 47 kg DAP (1 lid for 0.5 m) at planting and 32 kg urea as a sidedress (1 lid for 0.4 m) at 6 WAP.
* Beans: Apply 26 kg DAP by banding at planting (1 lid for 1.3 m).
* Maize-Beans intercropping: Apply 38 kg DAP (1 lid for 0.6 m) by banding at planting and 42kg urea as a sidedress (1 lid for 0.3 m) at 6 WAP.
* Lowland rice: Broadcast 48 kg DAP (one cut bottle for 3.5 m) and 27 kg MOP (one cut bottle for 6.2 m) at planting and sidedress with 61kg urea at panicle initiation (one cut bottle for 2.4 m @ 2m wide).
* Wheat HP>3t: Apply 53 kg DAP (1 lid for 1.2 m) and 16 kg MOP (1 lid for 4.2 m) by banding at planting and sidedress with 23 kg urea at panicle initiation (1 lid for 1.7 m).
* Wheat LP<3t: Apply 39 kg DAP (1 lid for 1.7 m) and 17 kg MOP (1 lid for 4 m) by banding at planting and sidedress with 46 kg urea at panicle initiation (1 lid for 0.9 m).