AGRONOMY TECHNICAL NOTE – MAY 2014
HOW MUCH MAIZE HAVE I GOT?
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Introduction

During the summer of 2012, the tough year that most of us will want to forget, the MGA produced a mailing which enabled growers to better quantify the volumes of maize they would harvest and as a result make them better able to think about alternatives to fill the clamps, sooner rather than later. The technical note proved very useful and for this reason we have reproduced it here to aid those keen to better monitor crop performance as this year progresses.

The key elements of this yield forecasting tool are established plant population and compensatory growth.

Plant populations

Actual plant population is best calculated by counting the average number of viable plants per 10 metres of one row and multiplying this number up to a field scale. This calculation has been tabulated in table 1 below. E.g. if there are on average 40.77 plants per 10m row length, the plant population per acre and per ha would be 22000 and 54362 respectively.

Table 1 Link between plants per 10 row length and plant population per hectare and per acre

Plant populations		
Plants/acre	**Plants/hectare**	**Plants/10m**
50000	123550	92.66
48000	118608	88.96
46000	113666	85.25
44000	108724	81.55
42000	103782	77.84
40000	98840	74.13
38000	93898	70.43
36000	88956	66.72
34000	84014	63.01
32000	79072	59.31
30000	74130	55.60
28000	69188	51.89
26000	64246	48.19
24000	59304	44.48
22000	54362	40.77
20000	49420	37.07
18000	44478	33.36
16000	39536	29.65
14000	34594	25.95
12000	29652	22.24

Example set out above is shown in red

Compensatory Growth

Little data is available as to the potential for compensatory crop growth of maize to make up the difference in yield between crops with low and target plant populations. That said, it is generally accepted that some form of compensatory growth does take place.

Table 2 (over the page), based on a target yield of 18 tonnes per acre (44.5 tonnes/ha), shows how yield losses can be mitigated by compensatory growth. Please note that the rates of compensatory growth are our guestimates and are not based on published data. They should be used as a guide only.

Weather related yield penalties

In addition to any compensatory growth adjustments, the likely impact of past and present weather also needs to be taken into account when forecasting final crop yields. In addition to the estimates for compensatory growth, Table 2 also shows the potential impact of a 15% and 30% weather related yield reduction. The figures can be used as a guide as to the impact of poor weather on yield potential. Using table 2, it is possible to forecast a yield for field with different plant populations, taking account of compensatory growth estimates and weather impacts. E.g. a 40000 plant per acre crop will yield in the region of 11088 kg per acre, assuming a 30% weather related yield adjustment.

Table 2 Plant population and weather factors combined to show potential overall impact on maize yield using two 15% and 30% weather related yield reductions.

Overall Crop Yield		Yield based on compensatory growth at lower plant populations (kg/acre)	Plant populations	
15% yield reduction	30% Yield reduction		Plants/acre	Plants/hectare
Kg/acre	Kg/acre			
15300	12600	18000	50000	123550
14982	12338	17626	48000	118608
14639	12056	17222	46000	113666
14272	11753	16790	44000	108724
13880	11431	16330	42000	103782
13464	11088	15840	40000	98840
13023	10725	15322	38000	93898
12558	10342	14774	36000	88956
12069	9939	14198	34000	84014
11555	9516	13594	32000	79072
11016	9072	12960	30000	74130
10453	8608	12298	28000	69188
9865	8124	11606	26000	64246
9253	7620	10886	24000	59304
8617	7096	10138	22000	54362
7956	6552	9360	20000	49420
7271	5988	8554	18000	44478
6561	5403	7718	16000	39536
5826	4798	6854	14000	34594
5067	4173	5962	12000	29652

*1% compensatory growth increase assumed as plant populations drop by 1000 plants per acre.

** Figures in red represent the example set out above.

Impact on maize quality

As well as the yield implications of reduced plant populations and the weather, both factors will also have an impact on maize silage quality. Lower plant populations tend to allow more light into a crop, with the result that cobs tend to be larger and more mature at harvest. Larger, mature cobs tend to increase the starch levels of crops. In contrast, crops affected by adverse weather tend to be slow to mature and while cobs may be present, grain maturity by be delayed or not happen at all, with the result that starch percentages in the silage are low.

Wholecrop to fill any shortfall in yield and quality?

Members will be aware of the excellent feed characteristics of wholecrop cereal silage. Cattle find the silage very palatable and its similar starch, energy and protein balance to maize silage, make it an ideal addition, or in difficult years a good substitute.

With wholecrop harvests typically happening during mid and late July, mid June is the time to review your maize crops and work out how much, if any, wholecrop is needed to fill a forage gap.

Table 3 shows the typical yield of wholecrop silage. The numbers contained in the table can be used to calculate how much cereal land needs to be wholecroped to fill an individual farms silage shortfall. The yield estimates are based on average crops of cereals. With cereal crops looking particularly well at the time of writing, these averages should be on the safe side.

To work out how much, if any wholecrop you may need, first workout using table 1 and 2 above how much different your estimated maize yield is from your original yield target. Next step, use table 3 to work out how much wholecrop you need to cut to make up the difference. Remember that due to maize and wholecrop being relatively similar forages, you can usually clamp them together. That said, urea treated crops should be kept separate from fermented silages.

Table 3 Wholecrop Cereal Silage yield data on a Dry and Fresh Weight Basis

Crop	DM yield (t/ac)	DM yield (t/ha)	Fresh Wt yield (t/ac)	Fresh Wt yield (t/ha)
Wheat	4.9	12	12-14	30-35
Barley	4	10	10-12	25-30

Harvesting wholecrop

When harvesting wholecrop, the Dry Matter (DM) of the cut crop is important. Use the guide below to improve your chances of getting the DM right. While much wholecrop is made without an additive or preservative, the MGA Additive Data sheets should provide you with an up to date list of what is currently available.

Table 4 Wholecrop Cereal DM in field crop assessment guide

DM%	Crop colour	Grain texture
32 – 35	Green	Soft Brie; some grains milky
36 - 38	Green	Soft Brie
39 - 42	Green, ears turning yellow	Soft Cheddar
43 - 46	Green going yellow	Soft Cheddar
47 - 54	Yellow, hint of green	Hard Cheddar, with some harder grains
55 - 65	Yellow, hint of green on stem	Hard Cheddar, with some grains impossible to penetrate with thumbnail
66 - 70	Yellow/brown, traces of green at nodes	Very hard, with grains impossible to penetrate with thumbnail
71 - 80	Yellow/brown	Too hard to penetrate with thumbnail; loosening in daytime

Conclusions – Mid June is the time to quantify the likely yield of your maize silage and as consequence your forage stocks for the coming winter. Plant establishment and as a result plant population and weather will both impact on maize yield and quality. The estimates contained within this technical note provide a method and some assumed numbers to help in this exercise. We would urge members to measure plant populations and estimate yields soon.