

# Spotlight on Agriculture

Ministry of Agriculture, Water and Forestry, Directorate of Agricultural Research and Training, Private Bag 13184, Windhoek

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## Using remote sensing in search of grazing capacity – an update from 2007

### INTRODUCTION

A concise rationale for and methodologies used in this project were put forward in *Spotlight on Agriculture* 99 published in January 2006. Groundtruthing data for the 2005/6 and 2006/7 growing seasons (as determined in April 2006 and April 2007) were also presented in tabular form.

In Table 1 the groundtruthing data for the 2007/8 growing season (collected from the 7 to 11 April 2008), are added, and in Table 2, comparisons are made between the three methodologies based on available data.

### RESULTS

Table 1. Pilot area grazing capacity (GC) per land cover unit for the growing periods 2005/6, 2006/7 and 2007/8

Land cover unit	GC 2005/6 (kg AB/ha)	GC 2005/6 (ha/LSU)	GC 2006/7 (kg AB/ha)	GC 2006/7 (ha/LSU)	GC 2007/8 (kg AB/ha)	GC 2007/8 (ha/LSU)	METHOD 1 Average GC from 2005/6 – 2007/8 ha/LSU (Quantitative yield)	METHOD 2 Previously estimated GC (expert opinion?) ha/LSU	METHOD 3 GC WAP <sup>4</sup> generated ha/LSU
Alt Hartbeesvlei <sup>5</sup>	86,86	5,18	0,85	528,42	9,27	48,54	194,38	12	13 – 17 (15)
Kanabis	48,85	9,21	28,02	16,06	45,31	9,93	11,73	12	8 – 13 (10,5)
Orumbe Nord	43,23	10,41	9,12	49,37	43,63	10,32	23,36	10	13 – 17 (15)
Otjiwarumendu	25,83	17,42	8,73	51,57	40,98	10,98	26,65	10	13 – 17 (15)
Smalhoek	110,69	4,07	80,27	5,61	64,59	6,97	5,55	12	13 – 17 (15)
Volmoed	77,06	5,84	2,75	163,91	68,52	6,57	58,68	10	13 – 17 (15)
Wiesesrus	55,81	8,06	76,94	5,85	106,17	4,24	6,05	10	13 – 17 (15)
Grunenthal	42,51	10,59	25,51	17,64	46,37	9,70	12,64	10	17 – 25 (21)
Merino <sup>6</sup>	39,35	11,44	–	–	–	–	3,81	10	6 – 8 (7)
Owiniekiro	65,81	6,84	54,48	8,26	56,36	7,98	7,69	10	6 – 8 (7)
Spandau	44,30	10,16	25,49	17,65	39,12	11,50	13,10	10	13 – 17 (15)
Grt Okapanje <sup>5</sup>	87,18	5,16	0,17	2 663,51	71,78	6,27	886,16	10	13 – 17 (15)
Saaleck	86,08	5,23	76,70	5,87	69,18	6,51	5,87	10	8 – 13 (10,5)
Olive	94,78	4,75	18,08	24,89	86,56	5,20	11,61	12	13 – 17 (15)
Orumbo	54,49	8,26	3,05	147,47	15,07	29,86	61,89	10	< 50
Golden Aue	69,17	6,51	14,89	30,23	69,39	6,49	14,40	10	5 – 6 (5,5)
Helene	50,68	8,88	5,66	79,51	25,38	17,73	35,37	12	25 – 50 (37)
Kaukurus Ost	23,24	19,36	30,76	14,63	61,57	7,31	13,77	10	13 – 17 (15)
Nuwe Orde	55,10	8,17	29,79	15,10	37,49	12,00	11,76	10	13 – 17 (15)
Orumbu Nord	20,44	22,01	41,75	10,78	13,88	32,42	21,74	10	13 – 17 (15)
Sandkraal	41,29	10,90	40,63	11,08	52,43	8,58	10,19	10	13 – 17 (15)
Scheidthof	24,24	18,57	2,58	174,35	10,37	43,39	78,79	10	13 – 17 (15)
Autabib <sup>7</sup>	61,94	7,27	31,33	14,36	55,31	8,14	9,92	10	–
Duvenhage	50,17	8,97	36,80	12,23	63,21	7,12	9,44	10	6 – 8 (7)
Eliza	87,32	5,15	63,14	7,13	91,64	4,91	5,73	10	8 – 13 (10,5)
Gross Osombahe	62,26	7,23	17,00	26,46	18,64	24,14	19,28	10	17 – 25 (20,5)
Kameelboom <sup>7</sup>	49,90	9,02	3,48	129,16	12,18	36,95	58,42	10	–
Herzwalde	70,70	6,37	58,87	7,64	40,21	11,19	8,40	10	13 – 17 (15)
Mountain View	92,86	4,85	12,28	36,65	64,93	6,93	16,14	12	13 – 17 (15)
Wendelstein	36,07	12,47	52,12	8,63	43,84	10,27	10,46	10	8 – 13 (10,5)

<sup>1</sup> AB/ha = Animal Biomass/hectare.

<sup>2</sup> ha/LSU = Hectare/Large Stock Unit.

<sup>3</sup> The subjective, but nonetheless highly valued opinion of farmers, agricultural extension workers and pasture scientists.

<sup>4</sup> WAP = Woodiness, Accessibility, Palatability.

<sup>5</sup> Not included in calculation of Table 2 due to outlying values in year 2006/7.

<sup>6</sup> Not included in calculation of Table 2 due to discontinuation of data gathering at this site.

<sup>7</sup> Not included in calculation of Table 2 due to WAP data not being available.



Table 2. Average grazing capacity according to three methodologies for each land cover unit in the pilot area

Land cover unit	Previously estimated GC ha/LSU (based on expert opinion) (average GC/ha per land cover unit)	GC as determined through the quantitative yield method (ha/LSU) (average GC/ha per land cover unit)	GC generated through application of WAP methodology ha/LSU (average GC/ha per land cover unit)
Grassland	10,67	22	14,25
Woodland – sparse	10	11,14	14,30
Low Shrub – sparse	10,67	26,45	25,16
Tall Shrub – sparse	10	26,57	16,79
Tall Shrub – open	10	20,56	12,67
Woodland – open	10,67	11,67	13,50

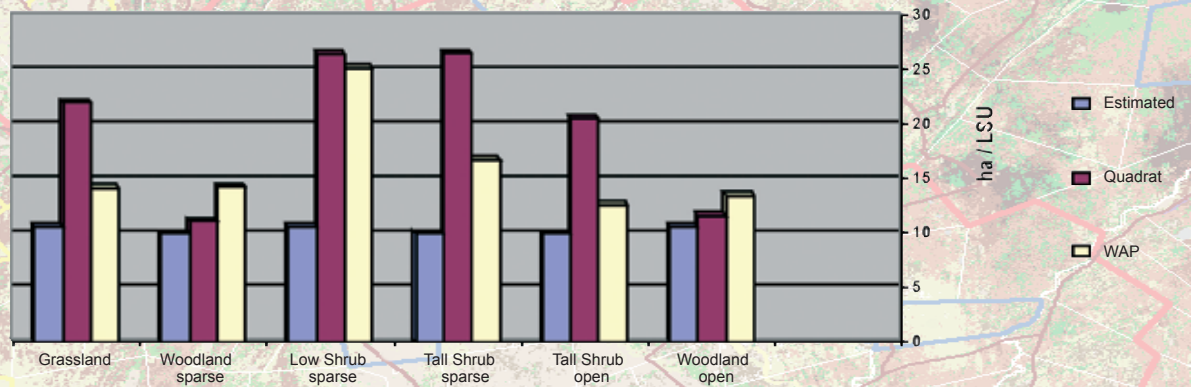


Figure 1. A comparison of the grazing capacity over six land cover units in the pilot area after application of the three methods.

## DISCUSSION

In all instances grazing capacity determined by the application of total seasonal biomass, corrected for the parameters woodiness, accessibility and palatability (WAP) indicates poorer grazing capacities than those generated through expert opinion. This may be an indication that the condition of the rangeland has deteriorated in the study area.

The figures generated through the clipping of quadrats represents only three years of data, of which 2005/6 was an exceptionally good rainfall year, while 2006/7 was dry, and 2007/8 received above average rainfall, but mostly late in the season. As data will still be gathered during the next two

years, it is expected that the figures generated by using this methodology will change substantially.

The final set of grazing capacity field data will be collected in April 2010, whereafter the final results will be calculated using (a) the total biomass corrected for WAP and (b) clipping methodologies. Grazing capacities generated using these methodologies will then again be compared. In a best-case scenario, there will be no significant differences between grazing capacities calculated according to the two “scientific” methodologies (methods 1 and 3); in the worst case scenario, they will differ substantially.

**References:** Lubbe, L.G. & Espach, C., 2006. Using remote sensing in search of grazing capacity. *Spotlight on Agriculture*, 99, 2006.

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