



Agrisoft Systems NEWSLETTER

Twenty-ninth edition, Apr.— Jun. 2019

Message from the Management

News from Agrisoft Systems

Dear Customers and Friends,

the second quarter of 2019 at Agrisoft Systems has been very much a continuation of the first three months of the year, with the majority of our efforts still going into the ongoing OMP 10 development. This project was already discussed in much more detail in the previous newsletter. Over the past three months we have managed to pretty much complete development of all the new program features we are planning to add. In particular, this includes significant changes in the OMP Crop Forecast (BBC) module, which will contain additional options to calculate the ABW used in the production forecast in OMP 10. We have also been working on making our OMP Field Survey data collection app compatible with Apple iOS devices such as iPhones and iPads.

Over the coming months we are aiming to wrap up the final feature additions and bug fixes that we have scheduled for the upcoming release. Then the program will have to go through a quite extensive phase of peer reviewing and testing, as the changes to the backend database have entailed changes to pretty much all areas of the OMP suite and so all processes need to be re-checked and tested. In parallel to this, part of our team will be working on finishing up several other important components that are not part of the core program but nevertheless necessary for a smooth transition. This includes things like a data import / export mechanism for sharing data between different SQL Server installation and a new setup program that can create the necessary SQL Server data structure and handle the migration of data from OMP 9.3. Besides this

parts of our dev team are working on some more experimental topics, to explore and try out some avenues for possible future additions. The most important things we are working on here at the moment are machine learning algorithms to predict yield performance and fertilizer responses, and a standalone GIS mapping application.



The main feature article in this newsletter edition contains a discussion of the most important concepts of crop budgeting for oil palm plantations. Done correctly, crop budgets can provide a powerful management tool and OMP contains various tools and functions to help you achieve this. An overview of some of our ongoing development topics in bullet point form is given in the “What’s new” section at the end of this newsletter.

Yours sincerely,

Max Kerstan





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Crop budgeting with OMP

In any business, accurate budgets are very important for managers looking to plan sales, investments and other business activities. For oil palm plantations, the income side of the budget is basically given by the expected crop harvest multiplied by the price of CPO (and secondary products like PKO). While the prices are largely out of the control of the individual company, it makes a lot of sense for plantation managers to focus on the crop budget to estimate and plan the physical output of the plantation.

Of course, it is possible to create crop budgets on

different time scales, which serve different purposes. The OMP suite contains two dedicated modules for crop budgeting, where OMP TYCB (Ten Year Crop Budget) is for long term budgets whereas the OMP Crop Budget module (which is part of the standard OMP Plantation installation) focuses on annual crop budgets. Long term crop budgets are typically used for larger investment decisions, for example to plan when it will be necessary to increase mill capacities. Such long term trends are typically mainly driven by plans for planting and replanting, which in turn determine the projected age spread of the plantation

Division	Yearly crop budget									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Center D01										
Area (ha)	1,306.4	1,306.4	1,306.4	1,306.4	1,306.4	1,306.4	1,301.1	1,299.5	1,299.5	1,299.5
Yield (t/ha)	24.8	25.9	27.0	27.3	27.7	18.0	14.7	15.6	17.5	19.8
Production (t)	32,371.4	33,880.0	35,322.6	35,643.8	36,138.1	23,512.4	19,099.3	20,235.5	22,746.1	25,714.7
Variance (%)	-	4.7	4.3	0.9	1.4	-34.9	-18.8	6.0	12.4	13.1
Center D02										
Area (ha)	1,688.3	1,688.3	1,688.3	1,688.3	1,688.3	1,688.3	1,686.0	1,682.5	1,682.5	1,677.0
Yield (t/ha)	26.1	26.8	27.7	27.8	28.0	24.5	18.9	18.5	11.6	9.0
Production (t)	44,039.5	45,193.8	46,760.1	46,972.6	47,282.8	41,300.0	31,851.0	31,163.7	19,492.5	15,153.2
Variance (%)	-	2.6	3.5	0.5	0.7	-12.7	-22.9	-2.2	-37.5	-22.3
Center D03										
Area (ha)	1,099.1	1,099.1	1,099.1	1,099.1	1,099.1	1,099.1	1,099.1	1,094.0	1,094.0	1,094.0
Yield (t/ha)	24.1	24.8	26.4	27.3	27.8	28.1	17.3	16.7	17.7	19.5
Production (t)	26,460.2	27,260.4	29,018.0	30,053.7	30,568.0	30,827.3	19,006.3	18,217.8	19,380.7	21,335.0
Variance (%)	-	3.0	6.5	3.6	1.7	0.9	-38.4	-4.2	6.4	10.1

Figure 1: Long-term crop budgets with OMP TYCB.



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at any time. Yield profiles with an expected yield by palm age can then be used to convert this into a crop budget. OMP TYCB also supports defining multiple yield potentials to take into account that modern planting materials used in replanting typically have steeper and higher yield curves than old planting materials. Generally speaking, the inherent unpredictability due to the long timeframes involved means that it is not necessary or useful to try to take into account more detailed factors like weather, pests and diseases, nutrition etc. beyond what is incorporated in the overall averaged yield profiles.

For annual crop budgets, it is feasible to go into far more detail and OMP Crop Budget supports budgeting at block and month level. At this more granular level, it makes sense to take into account agronomic factors which might affect the output of an individual block. The data entry screen in OMP Crop Budget (Figure 2) shows the most important factors such as the palm age, soil type, land class and planting material as well as the potential yield and the yield performance of the last four years for each block. This information provides a basis for managers to go through and define the expected crop budget for the coming year.

Of course, the information displayed here covers only a part of the many factors that could affect the performance of any particular block. We therefore recommend that managers also refer to the many additional details stored in the main OMP database while going through and defining crop budgets, including but not limited to things like leaf and soil nutrient levels, past fertilization records, field upkeep data and data on pest and disease attacks. On a larger scale, it can also be useful to take into account climate predictions if there is reason to expect any significant effects such as e.g. an El Niño year.

In areas where the climate exhibits a high degree of seasonality, it is important to correctly account for the monthly crop distribution. This is also very important if blocks are being newly planted or replanted, or for blocks which are in the steep ascent phase of their yield profile. For this reason, OMP Crop Budget makes it possible to edit the monthly distribution for each individual block. Figure 4 shows an example of a monthly spread for a block coming into production in the middle of the year, with 0 production in the first half of the year and then increasing production throughout the second half. A similar but inverse distribution would be used to

Division	Field	Block	Potential Budget	Yield (t/ha) by actual size				Palm	Land class	Planting				
Size (ha)	Mature (ha)	Age	MOP	YOP	Age group	Topography	(t/ha)	2016	2015	2014	2013	dens	Soil type	material
Center D01	MT06	301A	38.3	32.4	32.5	32.1	32.7	31.2	138	LC1_Other_1	ASD			
28.3	0.0	18	Jan	1999	DYP	Hilly							Acrisol	
Center D01	MT08	301B	33.5	31.0	30.0	28.4	30.0	30.5	136	LC3_Other_1	ASD			
36.2	0.0	18	Jan	1999	DYP	Hilly							Acrisol	
Center D01	MT07	301C	38.3	32.6	32.2	31.9	32.9	33.9	136	LC1_Other_1	ASD			
31.9	0.0	18	Jan	1999	DYP	Hilly							Acrisol	
Center D01	MT09	301D	30.0	29.5	27.9	27.9	27.6	26.4	129	LC3_Marihat	Marihat			
27.9	0.0	18	Jan	1999	DYP	Hilly							Acrisol	

Figure 2: OMP Crop Budget entry by block.



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View block data

Year	Division	Field	Block	Palm age: 18 yr	Area: 28.26 ha
2017	Center D01	MT06	301A	Planting month: 01-1999	Mature area: 27.19 ha

Base data | Yield/Harvesting | Planting | Palm census | Upkeep | Veg. Growth | **Leaf nutrients** | Soil data | Fertilization | Climate

Leaf analysis

Date: 18/04/2017 Laboratory: AAR Frond sampled: 17
 Sample ID: PC06/AP308 Analysis method: Dry ash

	% DM									mg/kg				cmol/kg	% TLC	
	N	P	K	Mg	Ca	Cl	S	Si	B	Cu	Zn	Mn	Fe	TLC	K	Mg
Leaf actual	2.38	0.145	0.79	0.26	0.54	0.62	0.30		21	6	17	13		69	29	31
Leaf critical	2.45	0.15	0.9	0.24	0.5	0.5	0.25	1.5	15	5	12	12	50	65	30	30
Rachis actual	0.49	0.108	1.47	0.079												
Rachis critical	0.55	0.09	1.4	0.07												

Visual deficiency scoring

Palm deficiency							LCP deficiency			Hard weed status
N	P	K	Mg	B	Cu	S	P	K	Mg	
0		0	0	1						

Figure 3: Detailed block data should be considered when defining budgets.

model a block which is currently producing but which is scheduled to be replanted in the middle of the year. Of course, it is possible to copy across monthly distributions to other blocks, so that it is not necessary to manually enter these numbers for every block.

The main aim in crop budgeting is of course to get a reasonably accurate prediction of the expected output. However it is important to keep in mind that the crop budgets also specify targets which are an important motivational tool for field managers. In this context it can be tempting to „aim slightly high“ with the crop budget. It is however critical not to overdo this, and the field managers must accept the crop budget as a realistic aim for their specific blocks. For this reason, we strongly recommend that the estate manager who is responsible for signing off the overall crop budgets should sit down with the individual field managers at the

start of the year and go through their blocks one by one, specifying the crop budget together. This not only guarantees that the field managers will not be able to dismiss the budget targets as unrealistic, but also of course helps in obtaining more accurate budget numbers as the field managers have the detailed knowledge of the precise condition of their blocks that is needed to accurately predict the coming year's production.

As outlined above, we feel that it is important for managers to manually define or at least review and sign off the crop budget for the blocks they are responsible for. Nevertheless, it is of course interesting to see whether it is possible to automatically derive a „calculated budget“ or prediction from the existing OMP data. This kind of problem is particularly suited to so-called „machine learning“ algorithms, where the computer program analyzes the available data



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Division	Field	Block	Potential Budget	Monthly distribution															
Size (ha)	Mature (ha)	Age	MOP	YOP	Age group	Topography	(t/ha)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
13.4	0.0	2 Jun	2015	IGP	Sloping	4.0	5.1	-	-	-	-	-	0.4	0.6	0.7	0.7	0.8	0.9	0.9
						%		-	-	-	-	-	8.8	11.8	13.2	14.7	16.2	17.6	17.6

Figure 4: Monthly distribution for block coming into production.

and can even try to derive predictions without having to be fed with a specific model beforehand. Over the past months we have started exploring options in this direction, to possibly include such machine learning functionality into OMP in the future. Clearly the biggest challenge here is to obtain a sufficiently large and accurate data set to work with, as inaccuracies in the underlying historical data are of course sure to be reflected in errors in the resulting predictions.

A well-made crop budget can provide a very handy tool for managers to keep an overview of whether they are on track throughout the year by looking at the ongoing crop budget vs actual production comparisons. OMP provides a number of data analysis forms and reports focusing on this, with a new flexible data analysis form to be added in the next version shown in Figure 5. Especially using right-click filtering and

sorting on the dedicated columns, these forms make it very easy to see at a glance which divisions, fields or blocks are lagging behind the budget. This kind of budget vs actual data can also be displayed in map form with OMP-GIS. Regular monitoring of the budget vs actual gap on a monthly basis can give managers the tools to swiftly see where problems are appearing and to take action if required.

Preparing crop budgets on a block-by-block basis at the start of the year can seem like an odious and perhaps even unnecessary task, and in many cases there might be a temptation to simply go through quickly and „guess“ a rough budget. However, as outlined in this article we feel that a well-made crop budget provides many advantages and is very much worth the effort, particularly when using the OMP tools which help to simplify the budgeting process.

Year	Division	Field	Block		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
2017	Center D01	MT08	301B	Act. yield t/ha	3.2	2.7	2.3	2.4	3.4	2.2	2.3	2.3
				Bud. yield t/ha	2.3	2.5	2.6	2.9	3.1	3.3	2.9	2.8
				YTD Act. - Bud. t/ha	0.9	1.2	0.8	0.3	0.5	-0.5	-1.2	-1.7
2017	Center D01	MT08	302C	Act. yield t/ha	3.2	2.4	2.2	3.3	1.9	3.1	2.1	2.3
				Bud. yield t/ha	2.0	2.1	2.3	2.5	2.7	2.8	2.5	2.4
				YTD Act. - Bud. t/ha	1.2	1.5	1.4	2.1	1.4	1.7	1.2	1.1
2017	Center D01	MT08	303C	Act. yield t/ha	2.1	2.2	3.6	2.3	2.4	3.2	1.9	3.0
				Bud. yield t/ha	1.3	1.4	1.5	1.7	1.8	1.9	1.7	1.6
				YTD Act. - Bud. t/ha	0.8	1.6	3.6	4.3	4.9	6.2	6.4	7.8

Figure 5: New yield analysis form in upcoming OMP version.



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From the developers desk

A selection of the on-going developments and plans which are part of our constant efforts to continue to improve Agrisoft products.

OMP BBC Crop Forecast

- Completely rewritten and streamlined queries for data analysis forms and reports
- Option to choose different ways of calculating the ABW for production forecasts
- Support for seasonal variations in ABW increase rate
- Support for ABW calculation based on previous month's ABW in each block
- Option to take into account expected bunch loss rates
- Redesigned data analysis charts
- Improved bunch per palm forecast vs actual analysis report

OMP data analysis features

- Active filtering instead of reloading on activate for more responsive program
- Data analysis form for monthly yield distribution by parameter
- Export form data to Excel for OMP-DBMS forms
- Include 12MRT yield and thinning data on block agronomic summary reports
- Additional category „vacant“ for palm census
- Additional grouping options for yield charts

OMP Survey App

- Support for iPhone and iPad
- Multi-estate mode for managers and consultants who work in multiple OMP estates
- Option to export results to file on device
- Bug fixes and stability improvements

