Agrisoft Systems
NEWSLETTER
Thirtieth edition, Jul.— Sep. 2019

Message from the Management

Reducing our carbon footprint with remote support

Dear Customers and Friends,

As highlighted again at the recent UN Climate Action Summit, it looks increasingly certain that man-made climate change will form one of the biggest challenges to the human race as a whole over the coming decades. In this context, it is important that every effort is undertaken to minimize these effects at every level, ranging from every one of us in our daily routines to wide-ranging policy decisions at government or even trans-national level – and we at Agrisoft Systems are of course no exception. In terms of our software products, it has always been our aim to help our users in increasing productivity and yields not only to increase profits but also to increase resource use efficiency and to reduce land area and effects on the environment. However, besides this we have also been looking more directly at how we can change our own practices to reduce our impact on the environment.

The biggest challenge for us stems from the fact that our customer base is distributed throughout the entire oil palm growing world. By far the single largest factor in terms of our carbon footprint as a company stems from on-site software trainings, meetings and support site visits. In some cases, this can mean intercontinental flights from Indonesia to Latin America and back for just a few days of training. According to German non-profit organization Atmosfair, a single return flight from Jakarta in Indonesia to, say, Bogota in Colombia has a climate effect equivalent to releasing about 11.5 tons of CO2. This single flight is over five times the annual “carbon budget” amount that the average person can spend if we are to limit global warming to below 2 degrees Celsius by 2050, and over 7 times as high as the average current annual per capita emissions in India!

The above numbers make it clear that it is not at all sustainable to continuously visit our customers all over the world. On the other hand, we realize that effective training and support is critical for our customers to be able to use our software efficiently. Thankfully, modern information technology and the increasing availability of reasonably reliable internet connections mean that it is now feasible to do a lot of this training and support remotely. The possibilities range from screen sharing presentations and group call discussions to logging in on the customer’s server to carry out data maintenance to even remote controlling the user’s computer for remote debugging and error tracing.

Of course, in some cases an in-person site visit may still be deemed necessary, and we remain committed to providing this service if required. However, it is important to realize that remote support or remote trainings actually have some significant advantages of their own that can more than offset the lack of direct personal interaction that is possible in an on-site visit. Most obvious is the lack of travel costs for the trainer, which can otherwise often be a significant part of the cost of a new OMP installation. Perhaps less obvious is the advantage offered by the fact that timing is very flexible and trainings can be spread out over a time frame suitable to the needs of the customer which can be multiple weeks or

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even months. In an on-site training of 4 to 5 full days, it is very easy for the new OMP users to be somewhat overwhelmed by the volume of new information, and it is very tough to absorb all the information in such a short time frame. Remotely, the same information can be imparted over a longer time frame, for example a 3 hour session every couple of days. The shorter sessions make it easier for participants to stay focused and the time between sessions provides the opportunity for users to practice and digest the previous topics before moving on to the next things. Certainly our experience so far with online remote trainings suggests that the training outcome can easily be just as good or even better than with a high intensity on-site training.

The main feature article in this newsletter focuses on the importance of controlling harvesting round lengths in oil palm plantations, and how OMP can help you with this. The “What’s new” section at the end of this newsletter as usual contains a bullet list selection of some of the topics that our development team is currently working on.

Yours sincerely,
Max Kerstan

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Monitoring harvest rounds with OMP

The effective actual yield achieved in an oil palm plantation can be viewed as a product of two quite separate factors that may be referred to as "yield making" and "yield taking". The first factor refers to all activities undertaken to ensure that the palms produce as much fruit as possible, including for example field preparation and planting, field work such as pruning, nutrient management and fertilization, irrigation as well as pest control. However, just as important as the first part is "yield taking", or in other words ensuring that fruit is harvested efficiently, completely and at the correct ripeness. In this article we take a look at some of the features in OMP that can be used to help in monitoring the harvesting process.

In most oil palm plantations, harvesting is carried out by multiple work teams or harvest gangs who are respectively responsible for harvesting a particular set of blocks. The number of people and the techniques and equipment (e.g. buffalo carts or tractors) used by each harvest gang can vary significantly and depends on the topography, palm age and general condition of the blocks. Each harvest gang will work on the blocks assigned to it in a certain fixed order, returning to any given block after a fixed number of days known as the "round length".

Viewed purely in terms of the quality and quantity of fruit harvested, it would be best to keep the harvest round length as short as possible. This would allow harvesters to harvest fruit as closely as possible to their ideal ripeness point and would reduce furthermore reduce losses of ripe fruit to pests, rotting etc. However on the other hand, a shorter round length clearly requires more labor input, and if the round length is too short then the slight gains in fruit quality and quantity no longer justify the higher labor costs. The ideal round length is therefore an economic compromise between the best possible harvesting results and restrictions due to labor costs and availability. The precise number will depend on the agronomic and socio-economic factors relevant for each plantation, but most plantations aim for a round length of somewhere between 10 and 15 days. The target harvest round length may of course vary between different parts of the plantation, and can furthermore vary significantly between peak

Form 5.01: Harvest rounds record

Harv. date	Division	Field	Block	Work team	Yield (kg)	Bunches	LF (kg)	Mandays	Harvest Method
31-Oct-17	Center D04	LL11	123D	HT0405	28,088.7	1,105	622.1	7.6	Mech
31-Oct-17	South D01	EB04	212A	HT0701	8,030.1	351	208.5	3.3	Man_Team
31-Oct-17	Center D04	LL12	127B	HT0401	33,682.8	1,261	929.6	12.8	Man_Indiv
31-Oct-17	North D01	KB04	518B	HT0602	1,952.7	371	51.2	4	Buffalo
31-Oct-17	Center D04	LL13	118A	HT0402	26,840.5	1,072	550.8	22	Man_Team
31-Oct-17	North D01	KB04	518E	HT0602	157.5	20	4.0	0.2	Buffalo
31-Oct-17	Center D02	PS09	105C	HT0202	5,550.3	214	134.2	1.9	Mech

Figure 1: Part of the OMP HRR data entry form

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and low crop periods in plantations which experience strong seasonality. One of the field manager's most important jobs is to ensure that harvesting follows the target round length as closely as possible and that appropriate action or reallocation of labor and resources is undertaken if there are any disruptions.

In "OMP Harvest Round Recording" or "OMP HRR", the OMP Plantation suite contains a dedicated add-in program for recording and monitoring the daily production process. Here it is possible to record all the most important parameters of the daily harvest work. These include the blocks harvested per day and work team, the weight and number of bunches harvested and the weight of loose fruits collected, the number of mandays used and the area harvested in each block as well as the harvest method that was used (figure 1).

In order to make the recording of the daily harvest data as easy as possible, it is possible to import the data from Excel using a straightforward data template that can usually be easily extracted from payroll or weighbridge software systems. In many cases, we have also worked directly with our customers to build bespoke custom tools that are used to extract the data from their other data capture systems in a format ready for inserting into OMP HRR.

Of course, it is not always possible to finish harvesting a given block on a given day, so that harvesting teams will frequently leave a partially harvested block at the end of the working day and then return to it the next morning. In some cases a harvest may span multiple days, including possibly days in between without any harvesting if the weekend or a holiday got in the way. This is a challenge for the calculation of harvest round lengths, because continuing on a block from the previous day or from a couple of days ago should not be counted as a new harvest round. However, OMP HRR includes an automatic assignment of daily harvest records to harvest rounds that can be easily tweaked using the OMP system settings to the requirements of

OMP8 *Agrisoft Demo Estate* — *Report 9.07 printed: 02-Oct-19*

Daily production overview — **Date: 01/03/2017**

Summary by division

Estate / Division	Area [ha] In yield	Area [ha] Harvested	# Blocks In yield	# Blocks Harvested	# Blocks DSLH > 12	Actual (Day) Output t	ABW kg	LF %	Productivity t/md	Productivity ha/md	Actual (YTD) Yield t/ha	Actual (YTD) Output t	Actual (YTD) vs Budget %	Budget (YTD) Yield t/ha	Budget (YTD) Output t
Agrisoft Demo Estate	**12,696.9**	**537.2**	**546**	**31**	**25**	**518.7**	**18.5**	**2.4**	**2.08**	**2.15**	**3.3**	**42,309**	**149.8**	**2.2**	**28,248**
Center D01	1,306.4	97.0	57	4	2	98.7	20.3	2.4	2.25	2.21	4.2	5,487	158.4	2.7	3,464
Center D02	1,688.3	84.6	68	4	0	105.2	21.5	2.4	2.29	1.84	4.1	6,929	132.5	3.1	5,228
Center D03	1,099.1	37.8	49	3	0	39.4	17.6	2.2	3.23	3.10	4.0	4,359	143.2	2.8	3,043
Center D04	1,933.8	82.7	71	5	2	111.2	21.0	2.3	2.56	1.90	4.7	9,107	152.3	3.1	5,980
Center D05	1,771.9	83.6	73	5	11	98.4	24.1	2.7	2.24	1.90	4.7	8,262	151.4	3.1	5,458
North D01	1,433.2	50.0	78	4	0	12.3	5.3	2.1	0.68	2.76	1.0	1,468	158.1	0.6	928
South D01	1,548.7	54.9	74	3	9	40.2	20.3	2.5	2.04	2.79	3.4	5,261	149.0	2.3	3,531
South D02	592.8	14.9	26	1	0	2.1	3.4	1.7	0.23	1.69	0.6	344	159.4	0.4	216
South D03	1,322.6	31.8	50	2	1	11.1	6.7	2.2	0.84	2.41	0.8	1,091	272.7	0.3	400

Figure 2: Daily production overview report in OMP HRR, summary section

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Details for harvested blocks

Block		MOP	Area [ha]			Rd. length	Actual (Day)						Actual (YTD)			Budget (YTD)	
			Total	Harvested		Latest	Output	ABW	Bunches	LF	Productivity		Yield	Output	vs Budget	Yield	Output
		mt-yr		Day	Round	d	t	kg	b/p	%	t/md	ha/md	t/ha	t	%	t/ha	t
Division: Center D01	Field: MT04																
302E		01-99	37.1	18.6	37.1	12	33.4	27.2	0.3	2.4	2.37	1.32	5.5	206	206.6	2.7	100
Division: Center D01	Field: MT08																
304A		01-99	43.0	43.0	43.0	13	50.5	29.2	0.3	2.4	2.90	2.47	5.4	232	171.7	3.1	135
Division: Center D01	Field: MT09																
305C		01-99	39.2	19.6	19.6	12	3.6	25.5	0.0	2.1	2.24	12.24	3.7	144	93.5	3.9	154
Division: Center D01	Field: MT10																

OMP-AI HRR — Daily overview reportRep. 9.07 (20 Dec 2017) — Page 1 of 4
http://agrisoft-systems.de

Figure 3: Daily production overview report in OMP HRR, block details section

each plantation. This means that users do not need to worry about manually summing and aggregating up their data in a given harvest round, instead they can simply and easily update the harvest data of every day and let the program do the rest.

One of the key tools reports in OMP HRR is the daily production overview report. This report contains a summary section either by field or division (figure 2) and a block details section containing detailed data for the blocks harvested on the selected day (figure 3). Both sections include the key output parameters and in particular productivity measures including t/manday and ha/manday to allow managers to quickly spot if something has gone wrong in a particular block. Columns with the year to date actuals and a comparison with the YTD crop budget provide the bigger picture. The block details part shows the current round length, i.e. the number of days since the same block was

DA Form 9.04.3: Latest harvest rounds by field

Estate | Division | Field | Block

Division	Field	0 - 6 days				7 - 10 days				11 - 15 days			
		Blocks		Area		Blocks		Area		Blocks		Area	
		(#)	(%)	(ha)	(%)	(#)	(%)	(ha)	(%)	(#)	(%)	(ha)	(%)
Center D01	MT04	3	42.9	103.5	73.7	-	-	-	-	4	57.1	36.9	26.3
Center D01	MT05	3	33.3	72.2	31.5	4	44.4	112.1	48.9	2	22.2	44.7	19.5
Center D01	MT06	5	83.3	143.9	84.6	1	16.7	26.1	15.4	-	-	-	-
Center D01	MT07	4	50.0	108.6	53.2	1	12.5	31.9	15.6	3	37.5	63.5	31.1
Center D01	MT08	2	25.0	39.1	20.0	5	62.5	120.0	61.4	1	12.5	36.2	18.5
Center D01	MT09	3	33.3	81.1	36.7	1	11.1	39.2	17.8	5	55.6	100.4	45.5
Center D01	MT10	-	-	-	-	-	-	-	-	6	85.7	81.7	86.7
Center D02		3	60.0	54.5	88.5	2	40.0	7.1	11.5	-	-	-	-
Center D02	PS04	4	66.7	137.2	68.8	2	33.3	62.1	31.2	-	-	-	-

Figure 4: Data analysis form "Latest harvest rounds" in OMP HRR

Feature

harvested the previous time, as well as the area harvested during the day and cumulatively during the harvest round if the harvest in this block spanned multiple days. The summary section furthermore contains a column showing the number of blocks where the days since last harvest (DSLH) exceeds a certain bound that can be defined by the user (12 days in the screenshots provided). This is a very important quick overview for managers to see where in the plantation there are significant problems resulting in high numbers of blocks exceeding the target round length. We recommend that the Daily production overview report should be printed or exported as pdf and circulated to all field managers responsible for harvesting on a daily basis, filtered for the part of the estate they are respectively responsible for.

Another important tool for monitoring the on-going harvest process in OMP HRR is the "Latest harvest rounds" data analysis form, shown in figure 4. Here it is possible to view the harvest status as of a user-chosen date. At higher spatial levels, the form shows the distribution of the area and number of blocks where the round length falls into a certain range. The ranges can be defined as required in the system settings, and the form is capable of showing either the days since last harvest, the length of the previous completed round, or the maximum of the two (which is frequently used as a measure of the round length in "end of month" or "end of week" reports). At block level, the form displays the days since last harvest or chosen round length parameter for each block. Using a right-click filter, it is very simple to extract a list of blocks where the round length exceeds a certain bound and then to print this list to Excel or pdf for further checking.

The report "Harvest days per month", shown in figure 5, displays the information on the harvest process in a form that will be familiar to many plantation managers from paper recording patterns. The report contains a column for each day in the month and a row for each block, and for each day this displays the number of days since the block was last harvested. Days on which a harvest took place are marked with an x.

OMP8 *Agrisoft Demo Estate* — *Report 10.01.1 printed: 02-Oct-19*

Days since last harvest for each day of month

Month August 2017
Division Center D01

Days since last harvest for each day of month

Block	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
301A	5	6	7	8	9	10	11	12	13	14	x	1	2	3	4	5	6	7	8	9	10	11	12	13	x	x	2	3	4	5	6
301B	12	13	14	x	x	2	3	4	5	6	7	8	9	10	11	12	13	x	x	2	3	4	5	6	7	8	9	10	11	12	13
301C	8	9	10	11	12	13	14	x	x	2	3	4	5	6	7	8	9	10	11	12	13	x	x	2	3	4	5	6	7	8	9
301D	6	7	8	9	10	11	12	13	14	x	x	2	3	4	5	6	7	8	9	10	11	12	13	x	x	2	3	4	5	6	7
301F	14	15	x	1	2	3	4	5	6	7	8	9	10	11	12	13	x	x	2	3	4	5	6	7	8	9	10	11	12	13	x
302A	13	14	x	x	2	3	4	5	6	7	8	9	10	11	12	13	14	x	1	2	3	4	5	6	7	8	9	10	11	12	x
302B	x	2	3	4	5	6	7	8	9	10	11	12	13	14	15	x	x	2	3	4	5	6	7	8	9	10	11	12	13	x	1
302C	4	5	6	7	8	9	10	11	12	13	14	x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	x	x	2	3
302D	10	11	12	13	14	15	x	x	2	3	4	5	6	7	8	9	10	11	12	13	x	x	2	3	4	5	6	7	8	9	10
302E	3	4	5	6	7	8	9	10	11	12	13	x	1	x	x	4	5	6	7	8	9	10	11	12	13	x	1	x	3	4	5
302F	11	12	13	14	x	1	x	3	4	5	6	7	8	9	10	11	12	13	x	1	x	3	4	5	6	7	8	9	10	11	12
303A	3	4	5	6	7	8	9	10	11	12	13	x	1	x	3	4	5	6	7	8	9	10	11	12	x	x	2	3	4	5	6
303B	4	5	6	7	8	9	10	11	x	x	2	3	4	5	6	7	8	9	10	11	12	x	x	2	3	4	5	6	7	8	9
303C	10	11	12	13	x	1	x	3	4	5	6	7	8	9	10	11	12	x	x	2	3	4	5	6	7	8	9	10	11	12	x

Figure 5: Report "Harvest days in month"

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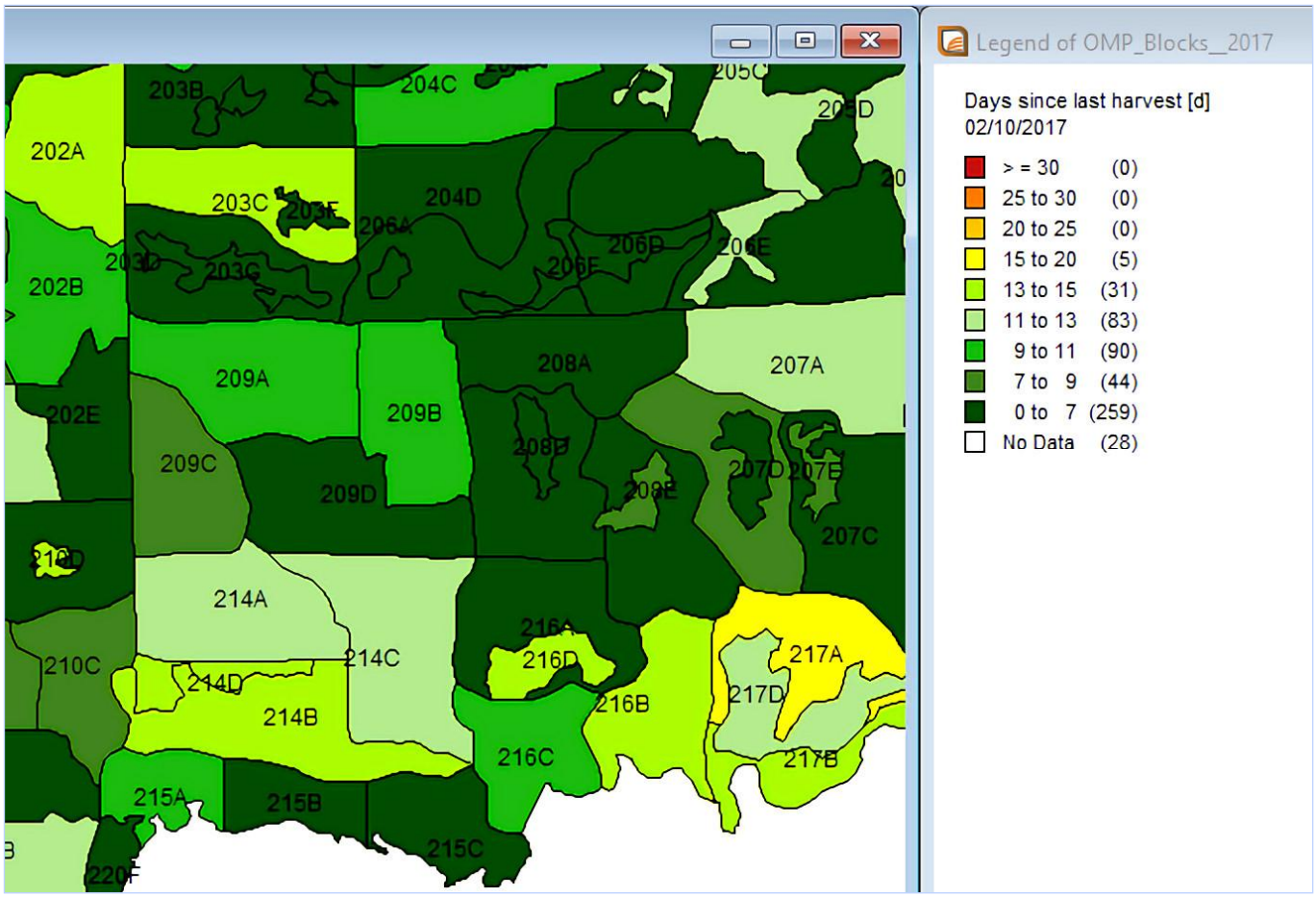

Figure 6: OMP GIS map for days since last harvest

OMP GIS provides the functionality to display the days since last harvest for each block in the form of a thematic map (figure 6). This provides an excellent overview of the overall current harvest situation for plantation managers, making it very easy to identify areas where there are problems with the harvest process.

All the OMP features described so far focus on the current situation and are designed as management tools to help field managers monitor the harvest process and quickly spot any areas where things are going wrong and action is required. From the point of view of the field manager, any problem in the past which has been handled is no typically longer relevant to his job of keeping the harvest running smoothly in the future. However, historical records of harvesting round lengths stored in OMP provide an important piece of data for an agronomist trying to understand past yield performance.

Even a single long harvest round means that some fruit is irrevocably lost, and this loss cannot be compensated by harvesting more frequently later on. Therefore, as a measure of whether any yield was lost due to overly long harvest rounds, it is more instructive to look at the length of the longest harvest round in a month rather than an average of the lengths of the harvest rounds

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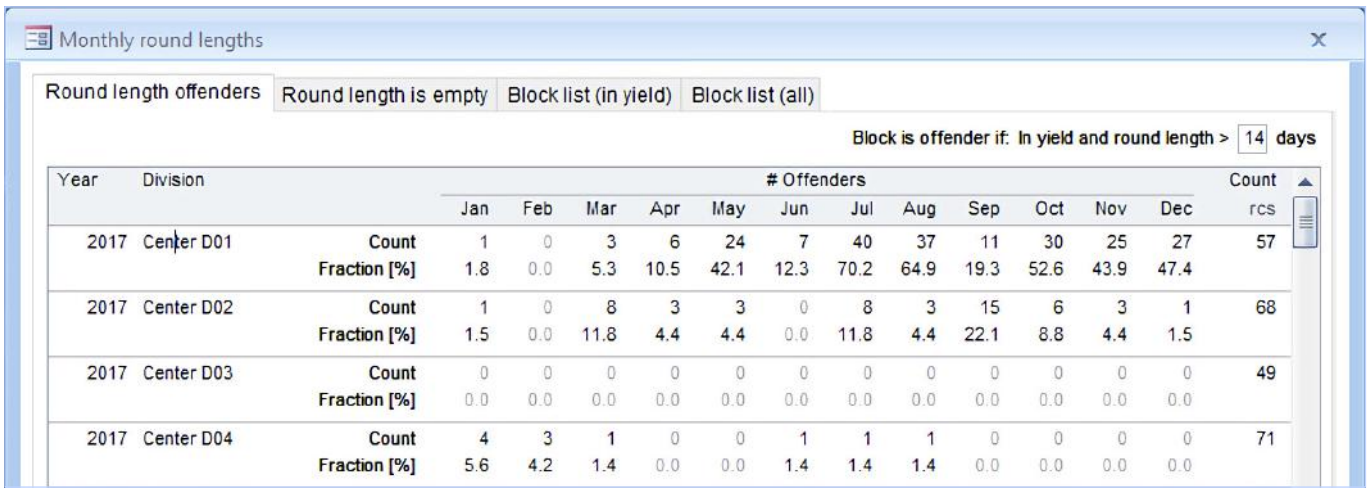
falling into the month. For example, assume a block was harvested in a given month on the 1st, the 25th and the 29th. The average harvest round length is thus 14 days, but the longest harvest round in the month was 24 days long! This results in more fruit lost than a block harvested on the 1st, the 15th and the 29th, even though the average harvest round length is the same. For this reason, the monthly harvest round length calculated and stored in the main OMP DBMS application is the maximum of the round lengths in each month and not the average. Figure 7 shows a data analysis form in OMP DBMS which displays the number of blocks and the fraction of the total number of blocks where the maximum round length exceeded a bound of 14 days by month.

When an agronomist identifies some potentially underperforming blocks in the OMP data, one of the first things to look at in the course of the yield gap analysis should be the historical harvest round lengths in this block. The harvesting process can relatively easily be disrupted in a very sudden manner (for example due to flooded roads or worker strikes), which can significantly reduce the production of the affected blocks in a limited time frame. This means it is important for an agronomist to be sure that harvesting ran smoothly throughout the time frame in question before looking for other, longer term agronomic factors for low yield such as nutrient or water deficiencies.

Of course, harvesting round lengths are only part of the "yield taking" picture. Other important aspects are to monitor fruit quality and ripeness grading, crop losses during harvest, and to ensure that pick-up and transport of fruit from the field to the mill is handled efficiently. OMP includes other tools focused on these aspects, for example the OMP Field Survey application is ideally suited for managing and analyzing regular crop loss audits and fruit quality audits, but a detailed discussion is beyond the scope of this article and will have to wait for a future edition of the Agrisoft Systems newsletter. Nevertheless, I hope that this article has provided an idea of the tools available in OMP and in particular OMP HRR for the monitoring of harvest round lengths, and that it is very useful to ensure that OMP HRR data import and circulation of daily production reports is carried out on a daily basis.



Year	Division		# Offenders Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Count rcs
2017	Center D01	Count	1	0	3	6	24	7	40	37	11	30	25	27	57
		Fraction [%]	1.8	0.0	5.3	10.5	42.1	12.3	70.2	64.9	19.3	52.6	43.9	47.4	
2017	Center D02	Count	1	0	8	3	3	0	8	3	15	6	3	1	68
		Fraction [%]	1.5	0.0	11.8	4.4	4.4	0.0	11.8	4.4	22.1	8.8	4.4	1.5	
2017	Center D03	Count	0	0	0	0	0	0	0	0	0	0	0	0	49
		Fraction [%]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2017	Center D04	Count	4	3	1	0	0	1	1	1	0	0	0	0	71
		Fraction [%]	5.6	4.2	1.4	0.0	0.0	1.4	1.4	1.4	0.0	0.0	0.0	0.0	

Figure 7: OMP DBMS data analysis form on monthly round lengths

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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.

Import for FS survey specifications

- Option to load FS survey specifications (survey types, questions, expressions) from FS definitions files
- Solution to share definitions between different estates
- Automatic verification to prevent overwriting existing data
- Possibility to provide aliases to resolve naming conflicts when overwriting existing data
- Option to load built-in default survey specifications, including recommended TCCL survey types

Improved multi-user support and data security

- Avoidance of write conflicts in multi-user data entry setting via pessimistic locking implementation
- Restricted locking by block, FP scenario or FS survey type to minimize lock overlaps
- Additional user account control modes with more fine-grained protection
- Separate protection classes for pick-up lists, FS definitions and FP settings
- Backup file restoring with overwriting of existing data only for sysadmin users on the SQL Server

New data sharing and backup format for SQL Server version

- Possibility to export / import data in form of SQL Server .bak files
- Option of selecting full database export or partial data export
- Restrictions by division or by year
- Handling for data sharing / synchronization in particular for distributed separate data entry by division
- Single-file data sharing and backups for the whole OMP Plantation suite including all add-ins