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Packhouse Action Group Water and Energy Project

2023 Water Usage Results

March 2025

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List of Abbreviations

CA	Controlled Atmosphere
ORP	Oxidation-Reduction Potential
PAG	Packhouse Action Group
RA	Regular Atmosphere
kL	Kilolitres

1 Introduction

In 2017, Blue North Sustainability (Pty) Ltd. (Blue North) was contracted by the Packhouse Action Group (PAG) to conduct a study on the water risks faced by pome fruit packhouse and cold storage operations and provide water consumption benchmarks for these facilities. Since 2017, Blue North has concluded five more phases of benchmarking (2018, 2019, 2020, 2021& 2022).

This report concludes the seventh phase of water consumption reporting and includes data from **January to December 2023**. The objectives of this phase were to:

- replicate the water use benchmark study undertaken in the previous phases;
- increase packhouse participation;
- conduct year-on-year water use intensity comparisons;
- collect data on recycling technologies and processes;
- collect and summarise categorised data on water management practices;
- simplify data collection and data validation where possible.

This report presents the results from Phase 7 (2023 data) and draws a comparison between the water use intensity results of previous phases – Phase 1 (2017 data) to Phase 6 (2022 data). The report also summarises the different water management and recycling methodologies applied at the packhouses.

Electricity consumption results are available in a separate report.

2 Methodology

Previous and potential new participants were approached via phone call, WhatsApp, and email. Packhouses new to the project were provided with the project details and, if required, offered virtual onboarding. The functionality of the data collection tool did not increase in complexity, thus in-depth training was not required.

2.1 Development of the Data Collection Tool

Data was collected via the data collection tool and sense checked by the project team. Data anomalies were discussed with participants and, where applicable, rectified or reasons for the anomalies recorded.

Phase 7 followed a similar approach to the previous phases, but included the following updates and changes to the data collection tool:

- incorporation of 2022 data to reduce errors and support data validation.
- additional data capture fields for drenching protocol (single or multiple drench).
- additional data fields for water recycling and water reuse.

2.2 Scope of the Data Collection

The following five areas in pome fruit packhouses were isolated in terms of water consumption:

- **Drenching** – This includes water consumption for the drenching of fruit or bins.
- **Dedicated presort** – This includes all dedicated presorting line water consumption.
- **Packing lines** – This includes all packing line water consumption, of which flume water use makes up the majority.
- **Hybrid line** – This includes the water consumption of all packing lines where presort and packing occur simultaneously.
- **Cold storage** includes the water consumption of Regular Atmosphere (RA) and Controlled Atmosphere (CA) facilities. Cooling tower water consumption makes up the majority of cold storage water consumption.
- **Ablutions, canteen & offices** – This includes staff water consumption.

2.3 Participation

Thirty-two packhouses were invited to participate, of which nine packhouses provided data.

Three packhouses (A, B, C) have been participants since the first phase of the project.

One new potential participant showed interest in the project, but upon receiving the data collection tool, realised that they would not have the capacity to participate in this phase yet.

Twelve packhouses did not provide any response to our request to participate and ten packhouses declined to participate.

The primary reasons for packhouses not participating are:

- Limited capacity for data collection.
- Lack of sufficient record-keeping, e.g., no metering or sub-metering.
- Limited resources (time and human resources) for data capturing.

It is positive to note that one of the participants who declined to participate due to lack of metering in 2023 has indicated that meters are planned to be installed in 2025, and they will thus be able to participate in future phases of the project.

2.4 Data Quality and Notes

Table 1 summarises the quality of the data received from each of the participating packhouses, for each area of operation.

Table 1: Summary of packhouse data quality for the different areas/activities

Packhouse	Drenching	Dedicated Presort	Dedicated Packing line	Hybrid Line	Cold storage	Ablutions, canteen & offices
A	Metered	N/A	Metered	Metered	Metered	Metered
B	No data[1]	N/A	Metered	N/A	Estimated[2]	Metered
C	N/A	N/A	Estimated	N/A	Estimated[3]	Estimated
D	Did not participate in Phase 7					
E	Did not participate in Phase 7					
F	Did not participate in Phase 7					
G	N/A	N/A	Metered	N/A	Estimated[4]	Estimated
H	Estimated	N/A	Estimated	N/A	Estimated[5]	Estimated
I	Did not participate in Phase 7					
J	Did not participate in Phase 7					
K	No data	No data	No data	N/A	No data	No data
L	N/A	Estimated[6]	Estimated	N/A	Estimated[7]	Estimated
M	Metered	Estimated	Estimated	Estimated	Metered	Estimated
N	Did not participate in Phase 7					
O	Did not participate in Phase 7					
P	N/A	Estimated[8]	Estimated	Estimated[9]	Estimated[10]	Estimated[11]
Q	Did not participate in Phase 7					

- All datasets for Phase 7 correspond to the 2023 calendar year (January to December).
- Packhouses are anonymised in the report (named A to P).
- Most packhouses (Packhouses B, C, H, K, L, M & P) cannot do accurate allocation, as they do not have separate water meters to measure water consumption of the different facilities e.g., packing operations, cooling, and ablutions.
- Due to a lack of metering, Packhouse K could only report on their water management practices and water recycling technologies.

[1] Drenching data was not metered separately, it is supplied by the same borehole that supplies irrigation for gardens. The drenching water use was thus included as part of "other" water use.
[2] Tonne.Days were estimated.
[3] Tonne.Days and water use were estimated.
[4] Tonne.Days were estimated.
[5] Tonne.Days and water use were estimated.
[6] Fruit packed and water use were estimated.
[7] Tonne.Days and water use were estimated.
[8] Tonnes packed and water use were estimated.
[9] Tonnes packed and water use were estimated.
[10] Tonne.days and water use were estimated.
[11] Employee man days and water use were estimated.

3 Water Use Intensity

3.1 Drenching

3.1.1 Calculation: Drenching per tonne (litres per tonne)

The drenching water use intensity, expressed in litres of water per tonne of pome fruit, is calculated as follows:

Drenching water consumption (m^3) x 1 000 / Tonnes of pome fruit drenched

3.1.2 Calculation: Drenching per bin (litres per bin)

The drenching water use intensity, expressed in litres of water per bin of pome fruit drenched, is calculated as follows:

Drenching water consumption (m^3) x 1 000 / Number of pome fruit bins drenched

3.1.3 Results

The drenching results include packhouses that provided drenching data. Some packhouses do not drench.

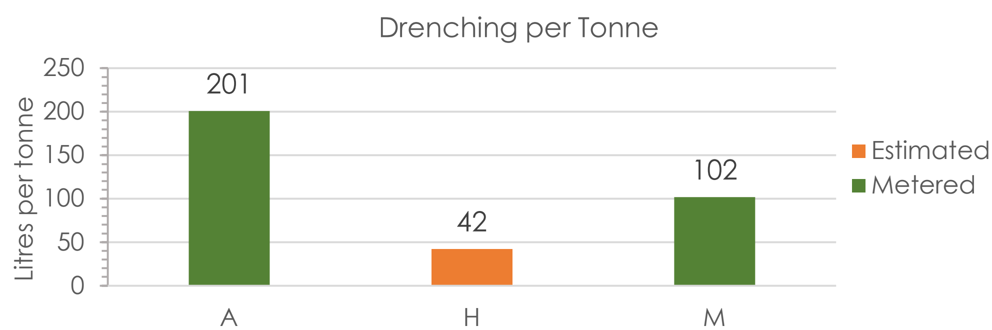

Figure 1: Drenching per tonne of fruit water use intensity

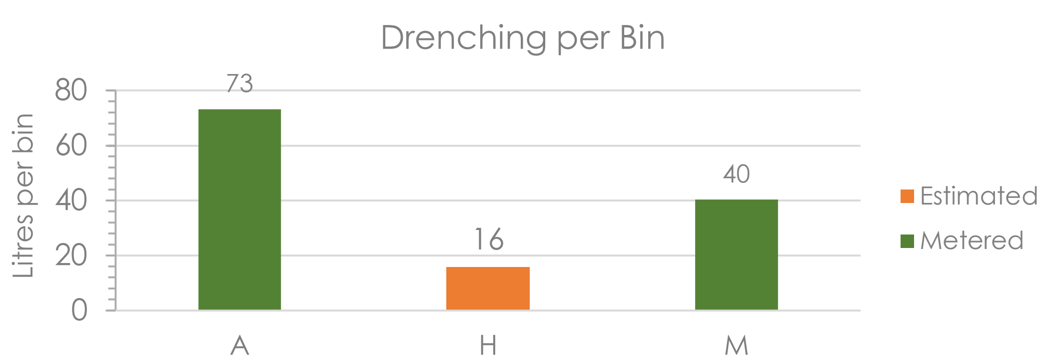

Figure 2: Drenching per bin water use intensity

The variation in the drenching intensities could be attributed not only to metering inaccuracy but also to different drenching protocols applied by the packhouses (e.g., tonnage drenched, number of times fruit gets drenched).

Water used in drenching by Packhouse H was estimated due to insufficient metering. This packhouse drenches 46% of the total volume received and does not have meters to measure drenching water separately.

Packhouse B: The packhouse drenches their fruit, but drenching water use is not metered separately. Water used from drenching is sourced from the same borehole that supplies irrigation for gardens, and thus drenching water use was included as part of "other" water use.

Packhouse G: The packhouse drenches their fruit, but drenching water use is not metered separately.

Packhouse K: The packhouse drenches their fruit, but the water used for drenching is not recorded and could not be estimated.

Packhouses A and M double-drench their bins, while packhouses B, G, H and K all single-drench their bins.

The water recycling technologies and water management practices are explored in subsequent sections of this report.

3.2 Dedicated Presort Water Use Intensity

3.2.1 Calculation

The water use intensity for a dedicated presort line, expressed in litres of water per tonne of pome fruit, is calculated as follows:

Presort water consumption (m^3) x 1000 / Tonnes of pome fruit for dedicated presort line

3.2.2 Results

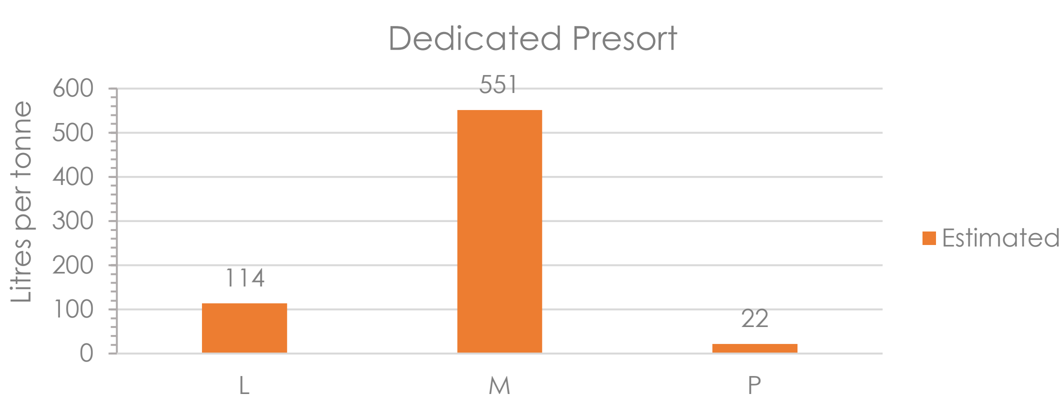

Figure 3: Dedicated presort line water use intensity

Only Packhouses K, L, M, and P make use of a dedicated presort line. However, Packhouse K does not have water meters installed and could not provide estimated data.

All dedicated presort values are estimated. Packhouse P estimated data for both tonnes presorted and water use for presort. Packhouse M does have separate water meters installed at the presort line, but they were faulty during the 2023 data period.

Differences in intensities can be ascribed to different practices. For instance, at Packhouse L, presort flumes are filled only once per season if no breakdowns occur, while Packhouse M replaces the water in its presort plants every four weeks after filling them.

3.3 Dedicated Packing Line Water Use Intensity

3.3.1 Calculation

The water use intensity for a dedicated packing line, expressed in litres of water per tonne of pome fruit packed, is calculated as follows:

Dedicated packing line water consumption (m^3) x 1000 / Tonnes of pome fruit packed

3.3.2 Results

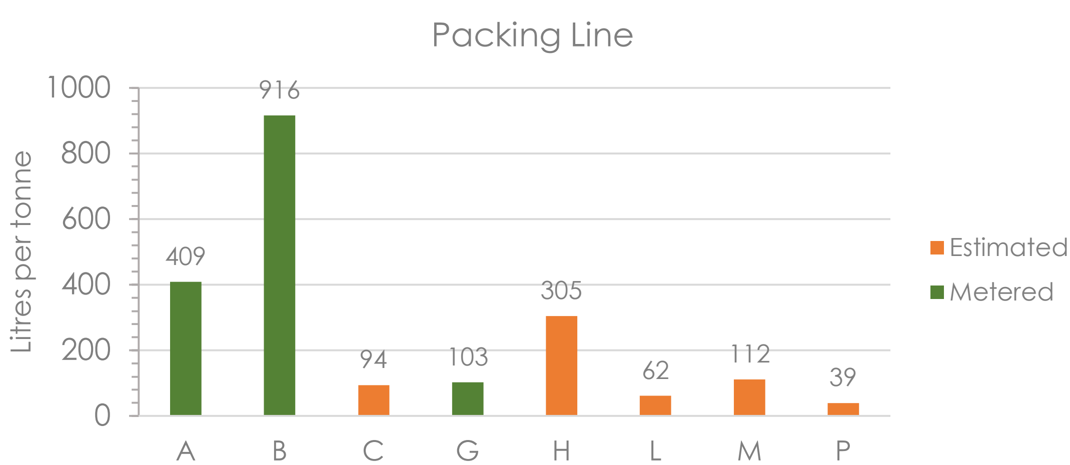

Figure 4: Packing line water use intensity

Water consumption of Packhouses C, H, L, M and P were estimated due to insufficient metering.

Packhouse B has a mix of older (more than 10 years) and younger flume technologies (less than 10 years old). Packhouses A, C, H, L and M have flume technologies older than 10 years, while the other packhouses have newer flume technology. Flume technology is also discussed in Section 7 of this report.

The low values of Packhouses C, L and P could be due to a water allocation or inaccurate estimation. The water consumption for each section of these packhouses was estimated.

Packhouse L also had a very low packing water use intensity in the previous phases. This packhouse's flume draining occurs two or three times a year, only if breakdowns occur. The total water consumption is metered, but water consumption for each area of activity is estimated (not metered). Therefore, the low value could be due to a water allocation issue.

The packing line is a major water consumer in the packhouses. The lack of packing line water metering should be addressed to improve data quality.

3.4 Hybrid Line Water Use Intensity

3.4.1 Calculation

The hybrid line refers to simultaneous presorting and packing. The water use intensity for a hybrid packing line, expressed in litres of water per tonne of pome fruit for hybrid packing line, is calculated as follows:

Hybrid packing line water consumption (m^3) x 1000 / Tonnes of pome fruit packed

3.4.2 Results

Only packhouse M could provide both water use and tonnage data for the hybrid packing line.

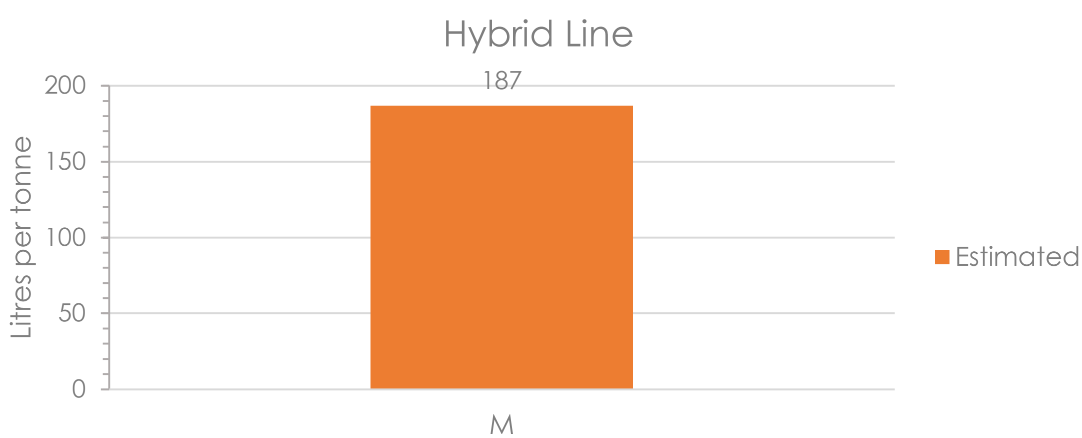

Figure 5: Hybrid Packing Water Use Intensity

Packhouses A, L, and P also make use of hybrid packing lines, but water use intensities could not be calculated because of:

- lack of tonnage data (Packhouse A and P) and
- lack of water consumption data (Packhouse L).

3.5 Cold Storage

3.5.1 Calculation

This metric includes all cold storage water consumption, of which cooling towers comprise the majority.

The water use intensity for cold storage, expressed in litres per tonne.day of fruit stored is calculated as follows:

Cold storage water consumption (m^3) x 1 000 / (CA & RA tonne.days)

The unit [tonne.days] is explained in more detail below.

The cold storage benchmark cannot only be based on the tonnes of fruit stored as cold storage because protocols vary widely from one operation to the next. Some packhouses store pome fruit for short periods (days or weeks), while other packhouses store fruit for longer periods (several months to almost a year). A tonne.day addresses this issue by representing the storage of one tonne of pome fruit for one day, for example, if:

- 200 tonnes are stored for 1 day = 200 tonne.days
- 200 tonnes are stored for 3 days = 600 tonne.days

3.5.2 Results

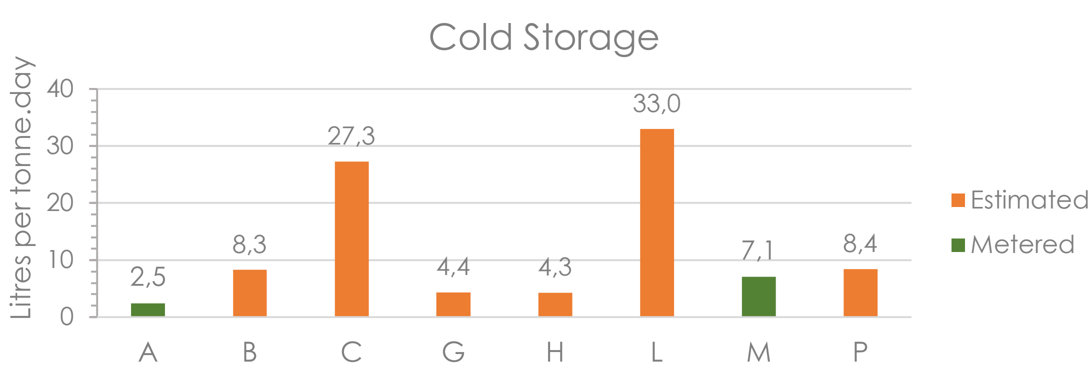

Figure 6: Cold storage water use intensity

Water consumption of Packhouses C, H, L and P were estimated due to insufficient metering. These packhouses also had estimates for cold storage tonne days.

Considering only packhouses with good quality data, Packhouse M used nearly three times as much water for cold storage as Packhouse A. Packhouse A uses automated bleeding[12], which has a big impact on savings. Furthermore, Packhouse A makes use

[12] Bleeding cooling tower blowdown water can be done by manually turning the valve, but an automatic system paired with a controller increases consistency. The number of cycles of

of harvested rainwater and defrost water to supply water for their refrigeration plant (condensers).

3.6 Ablutions, Canteens & Offices Water Use Intensity

3.6.1 Calculation

This metric includes the water consumption of ablutions, canteens & offices, and is measured in litres of water per person per day. It is calculated as:

Ablutions, canteens & offices water consumption (m^3) x 1000 / (Staff man-days)

3.6.2 Results

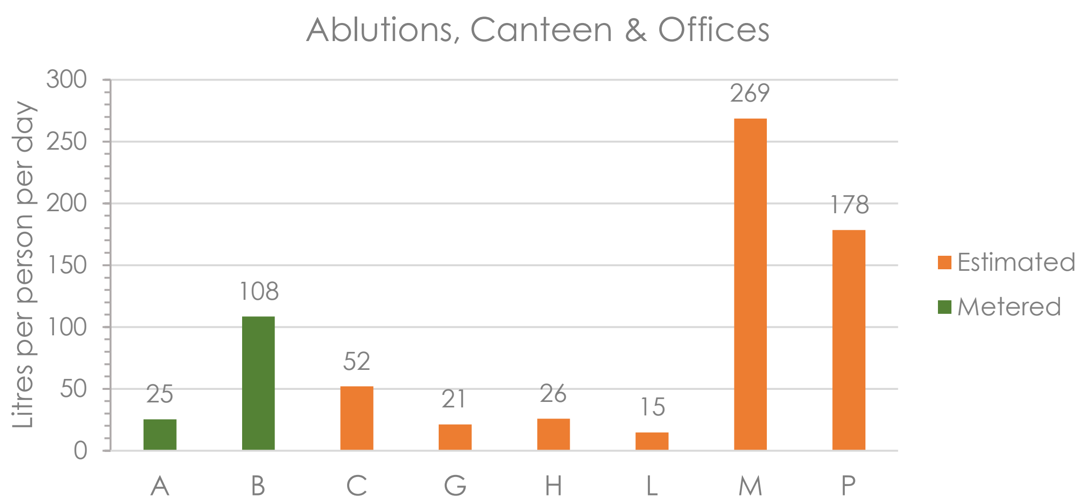

Figure 7: Ablutions, canteens & offices water use intensity

As seen in Figure 7, water used by staff is not typically measured separately.

Any value above 50 (the daily allowance during the "Day Zero" drought of 2017, which included showering) can be considered very high.

As noted in the previous phases, there is potential for improvement in this area of the packhouse facilities. Besides improved record-keeping, key solutions include raising awareness, offering training to staff, and implementing inexpensive recycling technology, especially for ablutions.

3.7 Overall Packhouse Water Use Intensity

The overall usage for each packhouse incorporates all sections of the packhouse, except for water consumption allocated as "other", for example, housing, gardening

concentration water in the tower can go through varies, based on various factors e.g., the water hardness.

and other non-production uses. It is acknowledged that cold storage protocols, especially, vary from one operation to the next, thereby impacting overall water use results. The unit of measure for this metric is kilolitres (or cubic metres) of water per tonne of pome fruit packed. Overall Packhouse Water Use Intensity is particularly relevant to packhouses who have participated in the project for several years, and for which year-on-year trends (see Chapter 6) are presented in this report. Figure 8 displays the results per packhouse. Only packhouse A could provide metered data for all areas of the packhouse and its water use index is below the average of 2022, which indicated that packhouses with metered data consumed just below 1.5 kL of water per tonne of fruit packed.

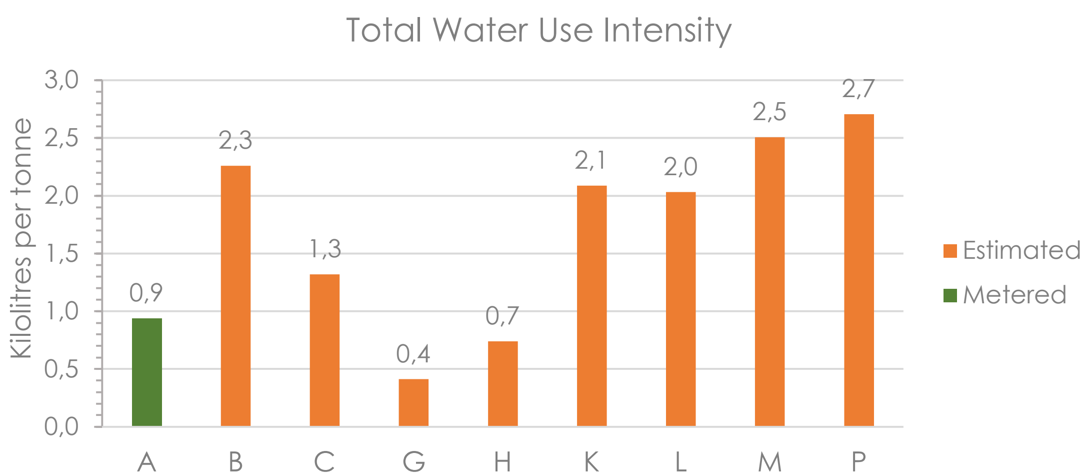

Figure 8: Overall pome fruit packhouse water use intensity

As in previous years, overall water use intensities show large variation. The variation can be ascribed to different water management practices applied at the packhouses (e.g., flume drainage cycles, flume technology age, cold storage protocols, cold storage duration, water recycling technology, etc.).

4 Water Usage Profiles

It is valuable to compare the water use profiles of different packhouses to identify which areas of the operations use the most water (hotspot areas).

4.1 Results

Figure 9 displays the percentage of water consumed by the different areas/activities in each participating packhouse and excludes water use allocated to "other". As seen in the figure, cold storage comprises a large portion of the water consumption. In all packhouses with cold storage water values, cold storage consumes more than half of the total water used. Packhouse A provided accurate data for all areas of operation and this profile can be used for comparison.

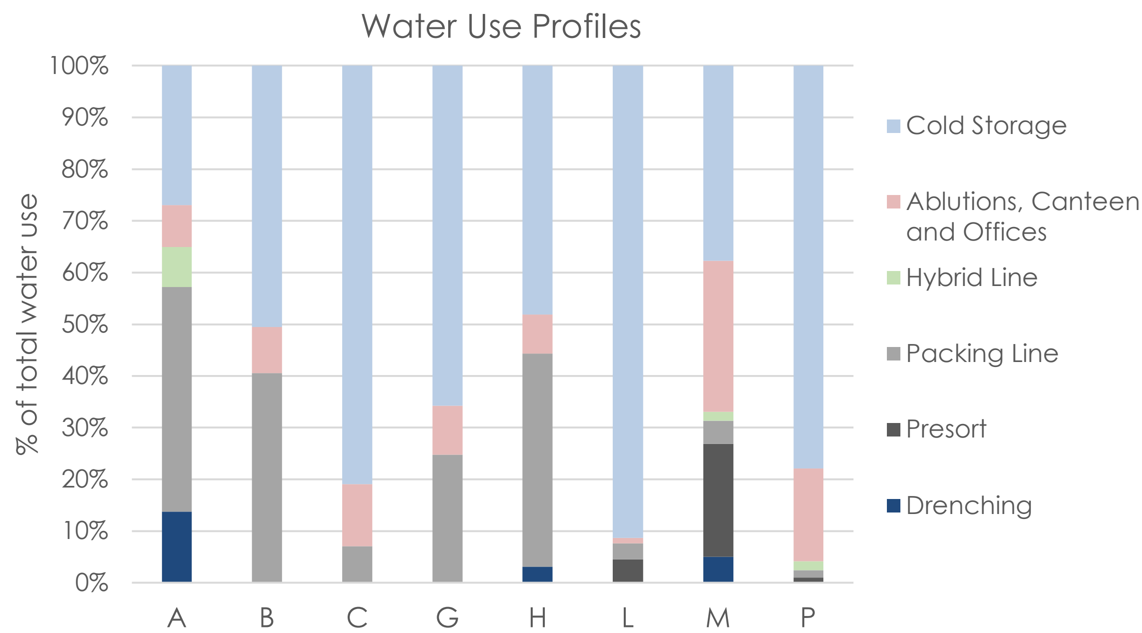

Figure 9: Water use profiles of the packhouses

There is a large variation in the water use profiles of participating packhouses. This could be attributed to:

- A lack of metering (thus estimations).
- Water allocation – i.e., where totals are metered, but individual areas of use are not.
- Lack of, or errors in, water consumption records.
- The use of different types of flume technology.
- The application of different water recycling technologies.

5 Water Sources

When investigating the water sources used by the participating packhouses, it is interesting to note that the largest volumes are obtained from dams and boreholes, with municipal water being the third largest source. Figure 10 displays total water volumes per source, while Figure 11 provides a breakdown per packhouse.

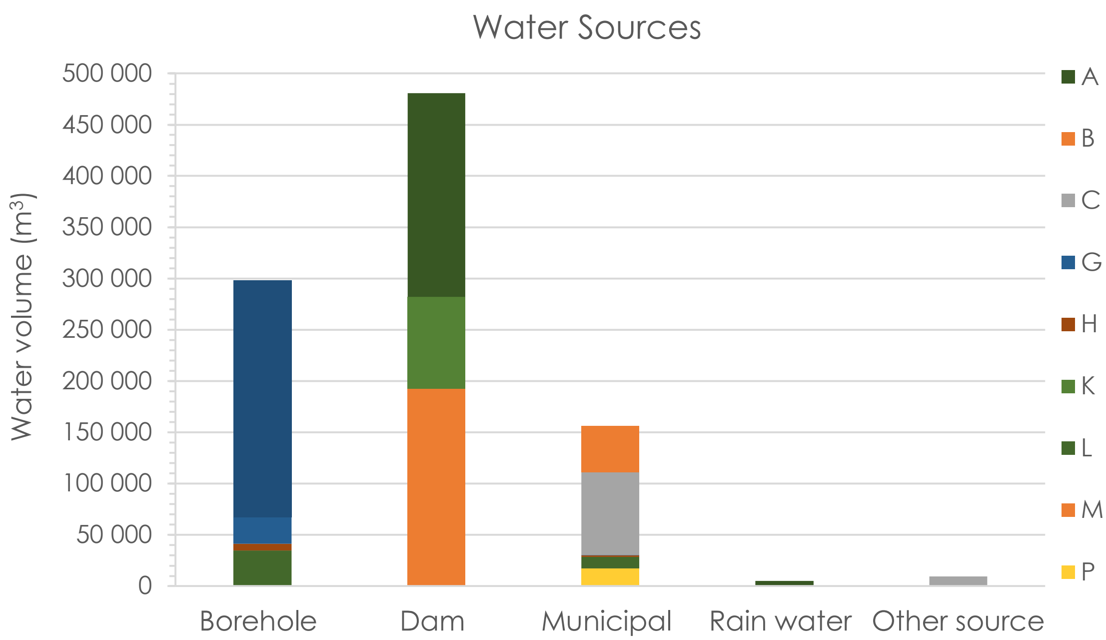

Figure 10: Water volumes obtained per source per packhouse

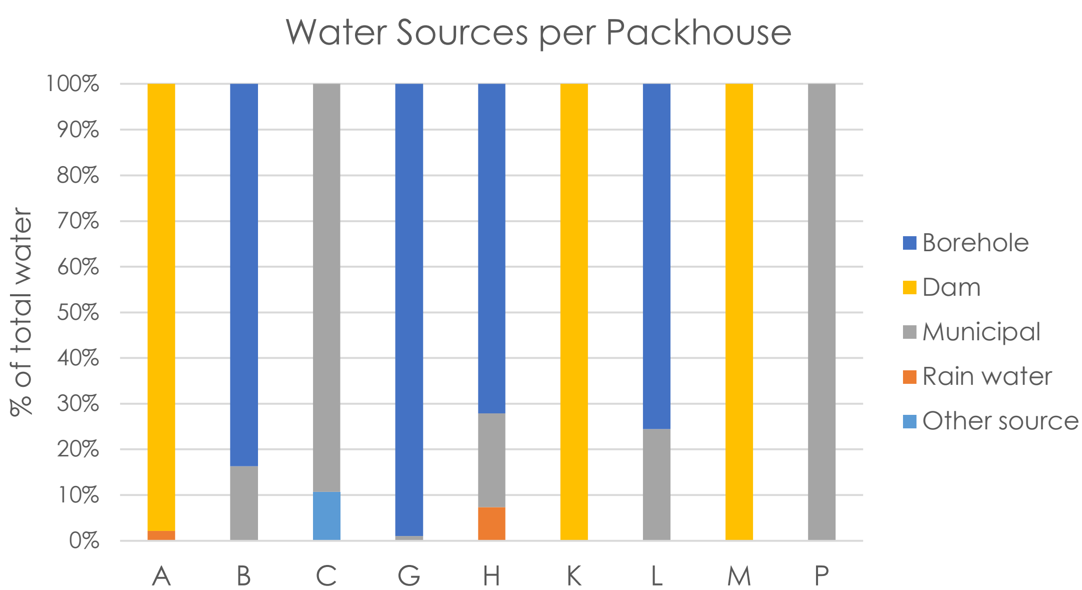

Figure 11: Water sources per packhouse

Part of Packhouse C's water is sourced from recycled water from their packhouse flumes, allocated as "other source".

Rainwater use increased by 22% (from 4189 m^3 to 5090 m^3) since 2022.

6 Year-on-Year Comparison of Water Use Intensities

To reduce water consumption, it is beneficial and necessary to consider year-on-year comparisons. This section presents a year-on-year water usage intensity comparison for Phases 1 (2017) to 7 (2023) of this project. For the visualisation of trends, only packhouses with more than two years of data were included. Outliers were also detected and removed.

For comparison purposes, Packhouse A's data was of good quality.

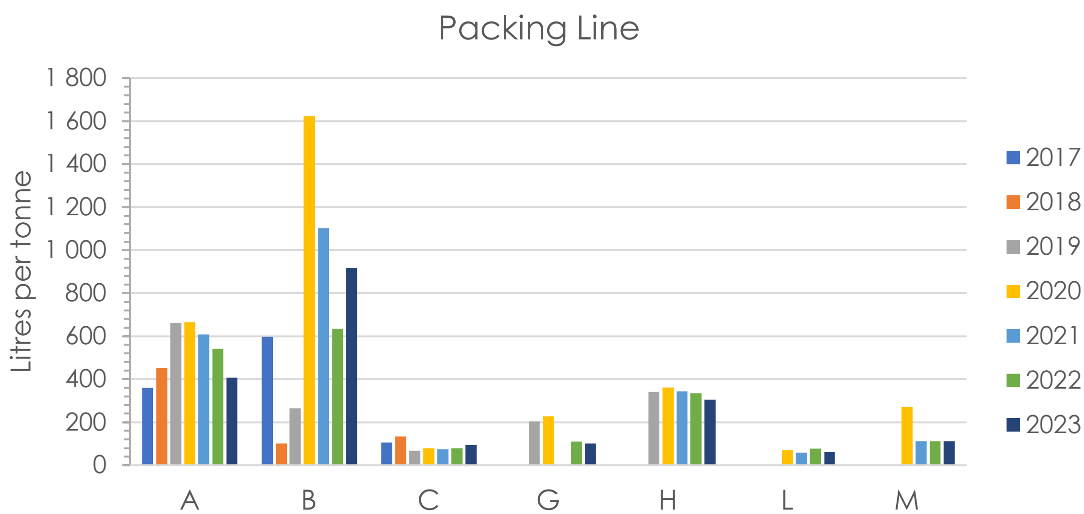

Figure 12: Year-on-year comparison of packing line intensities

Figure 12 presents a rather positive outlook, showing a downward in the packing line water intensities of at least four packhouses. Packhouses B, C, G, and H packed less fruit in 2023 because of hail damage.

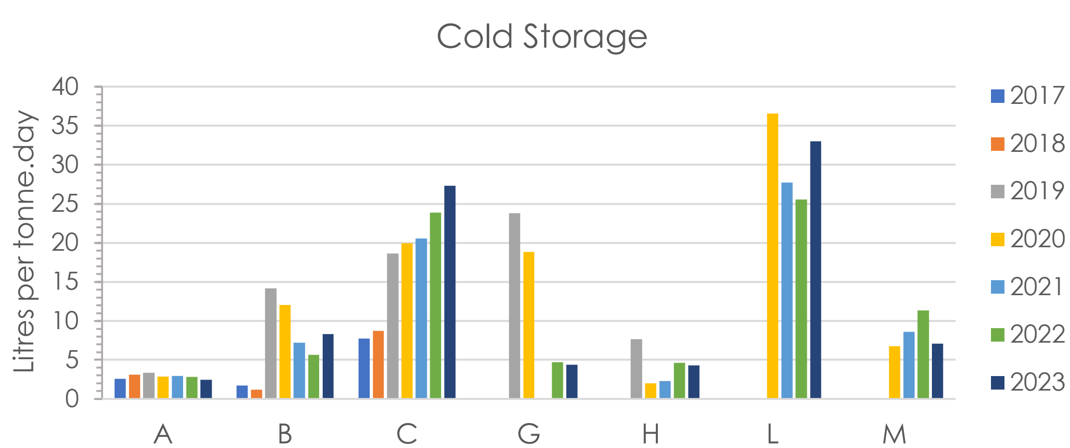

Figure 13: Year-on-year comparison of cold storage water use intensities

It is positive to note that for the majority of the packhouses, cold storage water use intensities showed a decrease in 2023. Cold storage water use increased for only three of the packhouses, namely Packhouses B, C and L. Packhouse B had less fruit packed, but more fruit stored from juice factories because of hail damage in 2023. Packhouse C changed their cold storage strategy in 2023 from more external storage of their fruit (off-site by other packhouses) to storing fruit more internally in 2023.

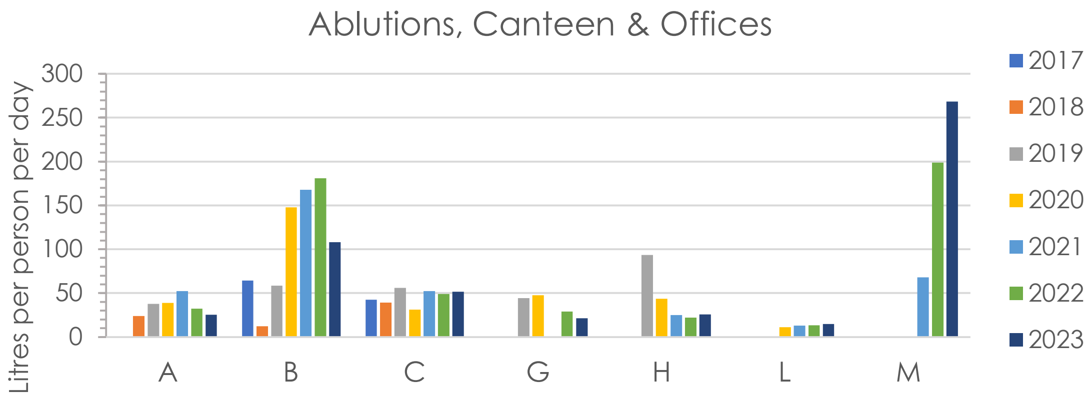

Figure 14: Year-on-year comparison of ablutions, canteen & offices water use intensities

It is positive to note that three of the packhouses (A, B, and G) showed a downward trend for daily staff water use in 2023 in comparison to 2022. Packhouses C, H, L, and M saw a rise in water use for ablutions, canteens, and offices in 2023 compared to 2022.

Implementing water-saving measures, like installing low-flow faucets, dual flush cisterns, repairing leaks, and implementing awareness campaigns, in these areas is crucial to enhance water use efficiency.

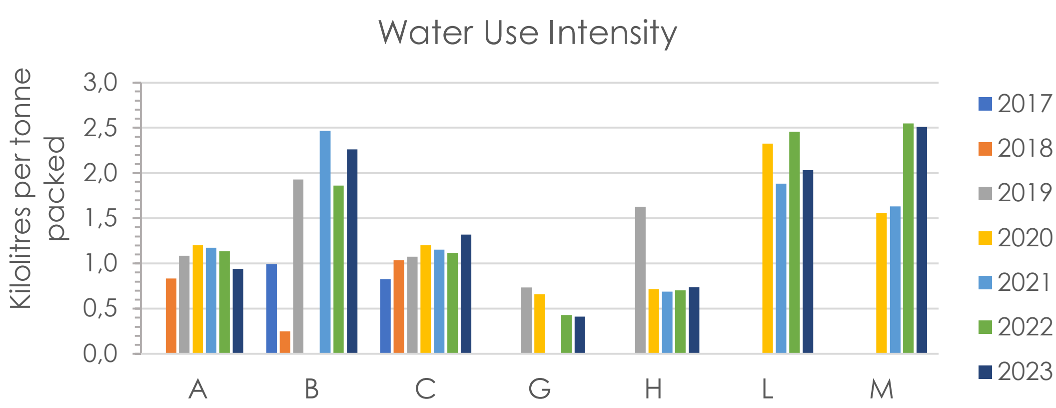

Figure 15: Year-on-year comparison of overall packhouse water use intensities

The overall water use intensity, measured in cubic meters per tonne of pome fruit packed, considers total water consumption excluding "other" water use. It is important to note that packhouses cannot be compared to one another, but trends can be explored per packhouse.

7 Water Management Practices

Participating packhouses indicated their water management practices via qualitative and quantitative data, using checkboxes and free text in the data collection tool. These questions aim to understand the management practices and water reuse technologies implemented throughout the packhouse. This section presents the summarised results.

7.1 Flume Technology Age

In contrast to previous phases, the flume technology age is now more than 10 years old for the majority of the packhouses (Figure 16), showing the ageing of the technology with each phase of the project. It is recommended that packhouses consider upgrading their flume technology to aid with water use efficiency. Note that this information was not available for all participants.

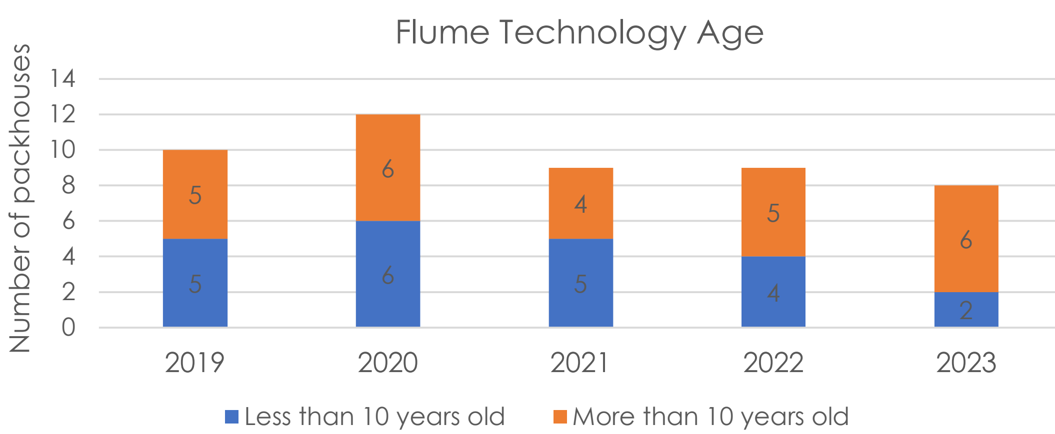

Figure 16: Flume technology age of the packhouses

7.2 Flume Water Management

In previous phases, participants were required to provide written descriptions of their flume water management practices. Using previous responses, these questions were simplified with check boxes and optional free text in this phase of the project.

7.2.1 Standard water management processes

7.2.1.1 pH management

pH is measured to determine the acidity or basicity of solutions.

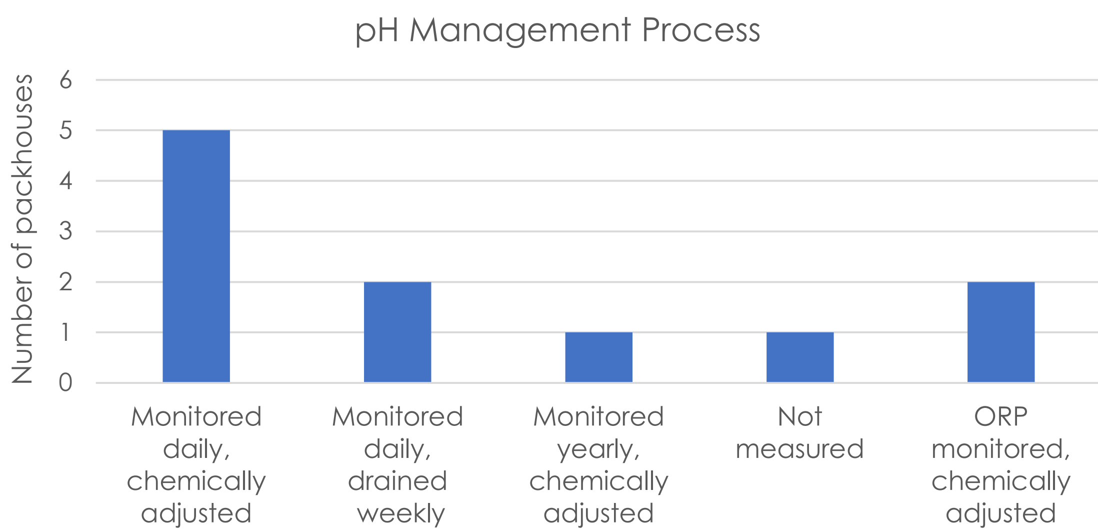

Figure 17: pH management processes of the packhouses

Seven of the nine packhouses monitor their flume water pH levels at regular intervals throughout the day, Packhouse H monitor their pH yearly, while Packhouses K (in addition to daily monitoring and draining weekly) and L manage their oxidation-reduction potential (ORP) levels. Packhouse M does not measure their flume pH levels.

7.2.1.2 Chlorine management

Chlorine compounds are often used in flume water as a disinfectant to kill bacteria. The management of chlorine levels is vital for fruit quality and food safety.

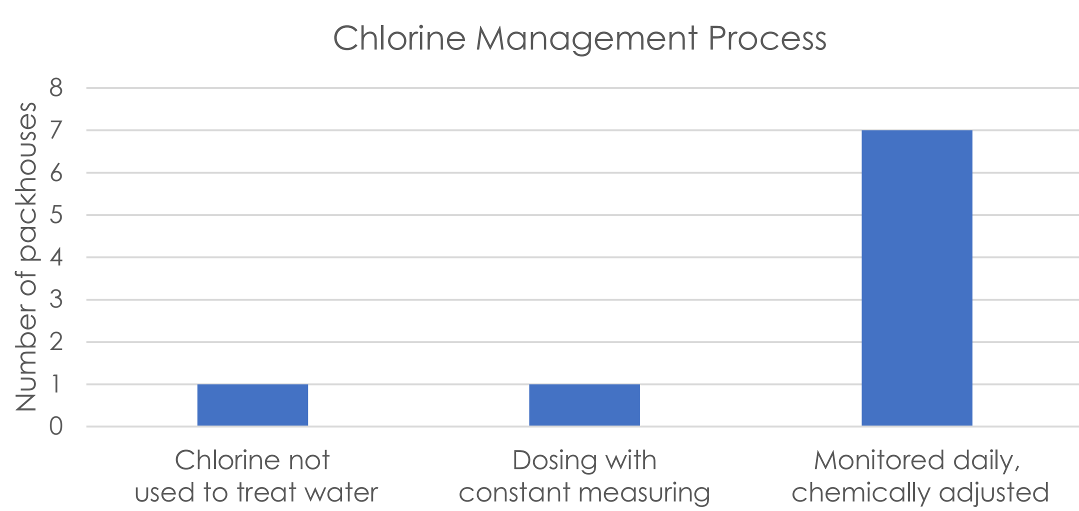

Figure 18: Chlorine management processes of the packhouses

Figure 18 shows how chlorine is managed by the packhouses. Packhouse L indicated that chlorine is not used in water treatment, while Packhouse M does real-time dosing with constant measuring.

7.2.2 Flume water drainage cycle

Significant water savings can be achieved by minimising flume drainage and refill frequency. Implementing efficient presorting and optimised flume systems can further enhance water conservation in this area.

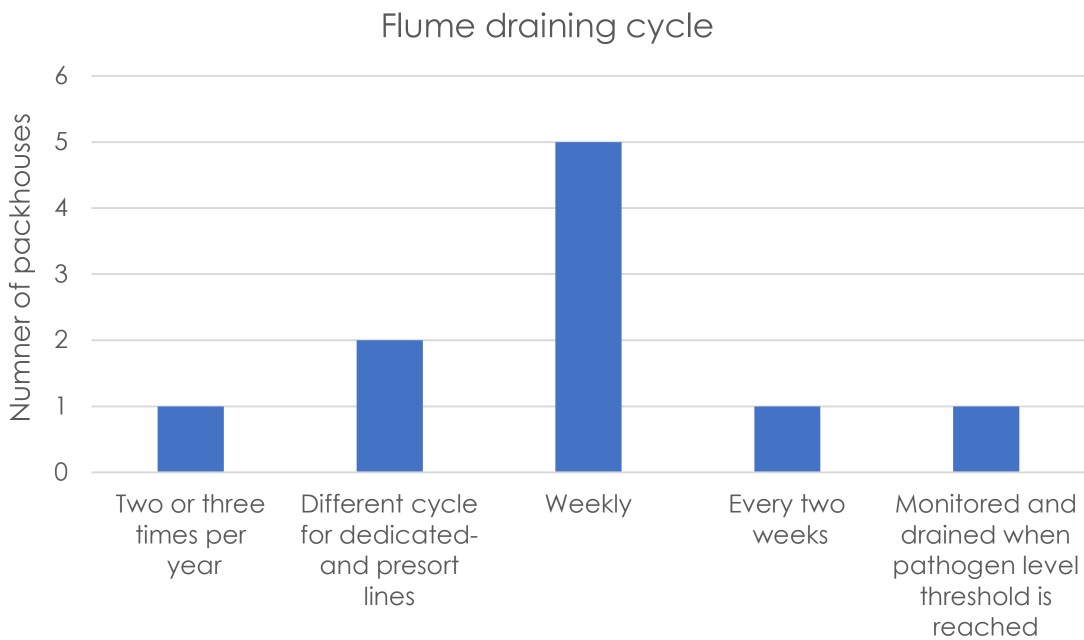

Figure 19: Flume draining cycle of the packhouses

Five of the nine packhouses drain 100% of their flume water once a week.

Packhouse L drains its flumes only two or three times per year if breakdowns occur, otherwise, the flumes are just topped up.

Packhouse K drains its flume water every two weeks, or it replaces its flume water on an indication of raised pathogen levels. Packhouses M and P have different cycles for the different lines (packing vs dedicated presort). Packhouse M drains its packing line flumes twice a week, its pear packing line flumes weekly and its presort plant flumes every month.

7.3 Water Saving and Water Treatment Methods

Fruit packing operations present numerous opportunities for both water conservation and reuse. This section provides a summary of specific water conservation and treatment methods employed by the participating packhouses in different areas of their operations. The purpose of this section, apart from showcasing successful implementations, is to identify potential areas for further collaboration and knowledge sharing.

By highlighting best practices, this report aims to encourage packhouses to adopt sustainable water management strategies, contributing to a more responsible and environmentally conscious industry.

7.3.1 Flume water

The chart in Figure 20 answers the question, *What happens to flume water once drained, e.g. is it recycled?*

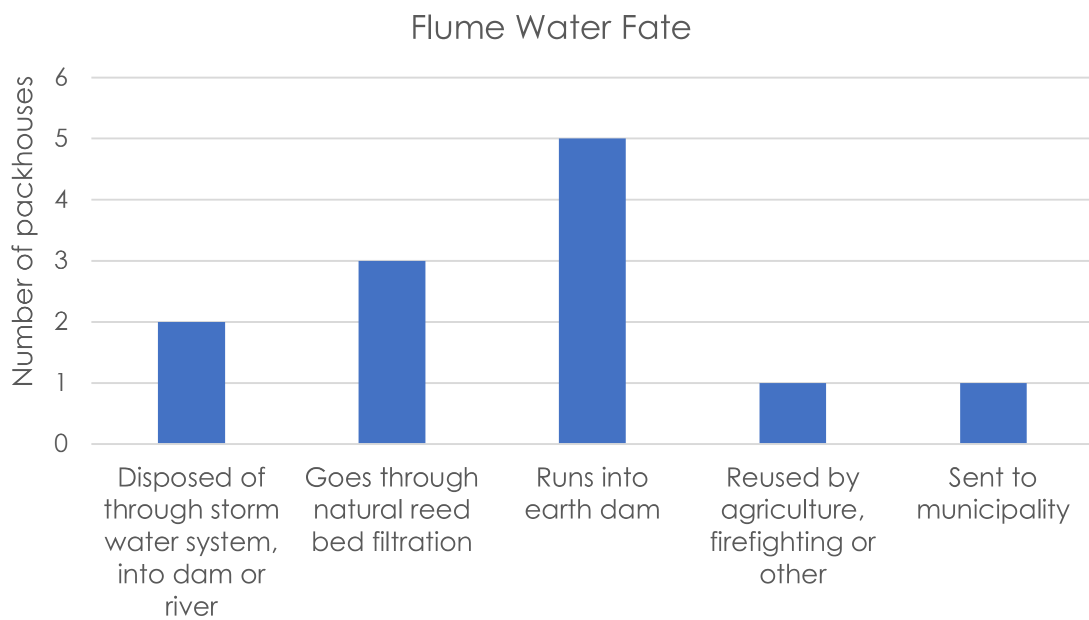

Figure 20: Destinations of drained flume water

Most packhouses let the flume water run into an earth dam. Only Packhouse M reuses the water for irrigation, firefighting or other uses.

7.3.2 Rainwater

Capturing and utilising rainwater for non-potable uses can significantly reduce reliance on finite freshwater sources. This strategy offers environmental and some economic benefits. Figure 21 shows how harvested rainwater is used by the packhouses.

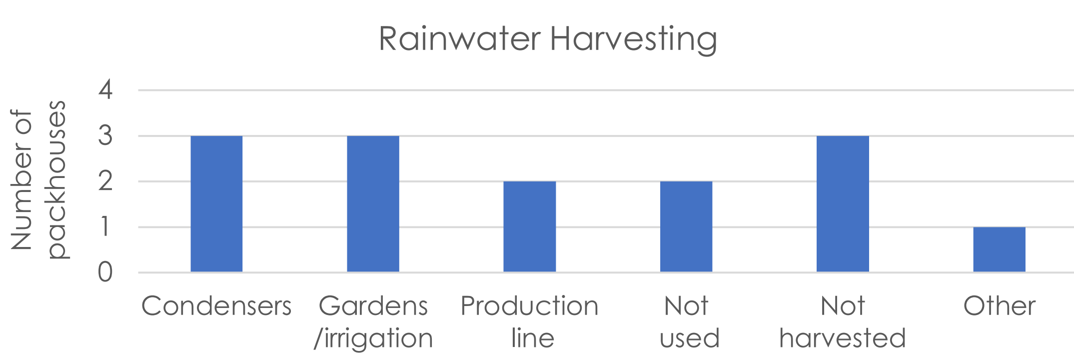

Figure 21: Use of harvested rainwater at packhouses

Only three out of the nine packhouses do not harvest the rainwater. In the previous phase, five out of the twelve packhouses harvested rainwater. There is still room for improvement, as two of the nine do not use rainwater. "Other" refers to Packhouse M's harvested rainwater that is fed to its main source and then used in all areas of the packhouse after it underwent filtering.

7.3.3 Drenching

Four packhouses use recycling technologies in their drenching process (Figure 22).

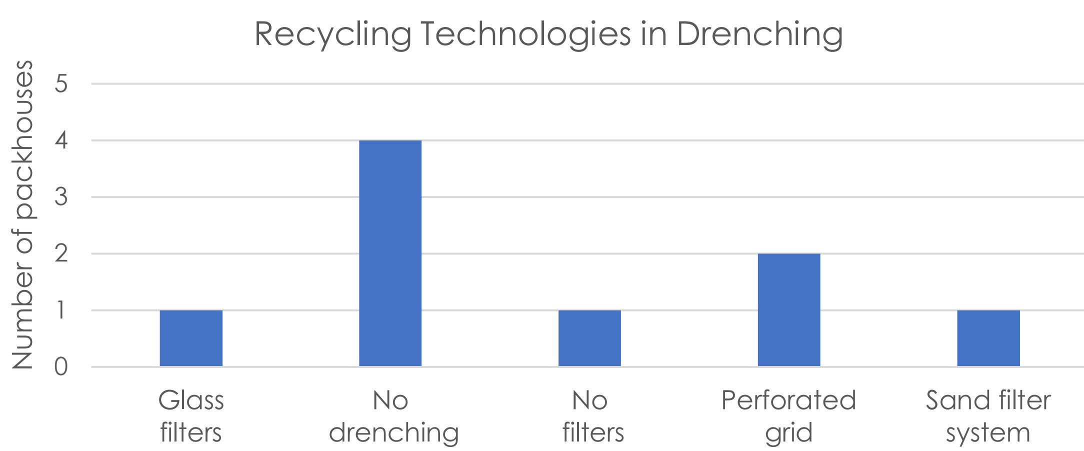

Figure 22: Recycling technologies used in the drenching process

Two packhouses use a perforated grid in the drenching line to separate particles, consisting of leaves and other matter, from the water flow. This increases the chlorine's active duration. One packhouse has glass filters and one has a sand filter system in its drenching line.

7.3.4 Presort/packing line

Seven packhouses make use of recycling technologies in their presort line and/or packing line (Figure 23).

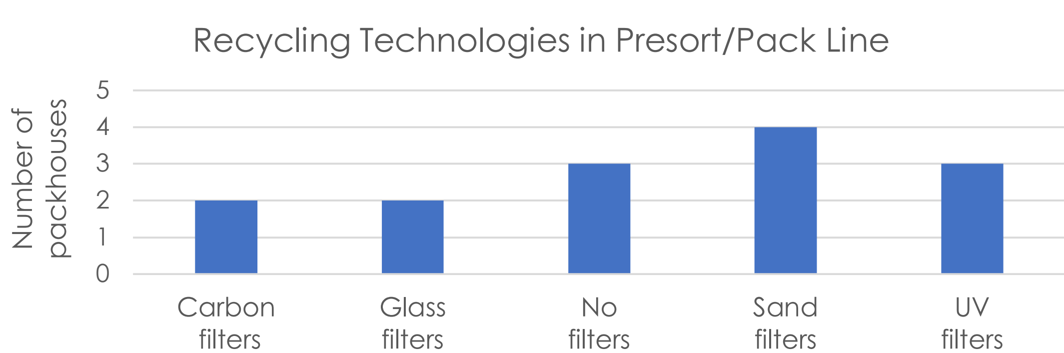

Figure 23: Recycling technologies used in the presort line and packing line of packhouses

Only Packhouses A, B and M did not indicate that filters are used in the packing line. The most popular technologies are sand filters and UV treatment.

7.3.5 Cold storage

Packhouses A, G and M make use of recycling technologies in their cold storage. Both Packhouse A and G direct defrosted cooling eater to each plant room's makeup tank, while Packhouse M collects cooling condensate as part of the inflow into settling dams.

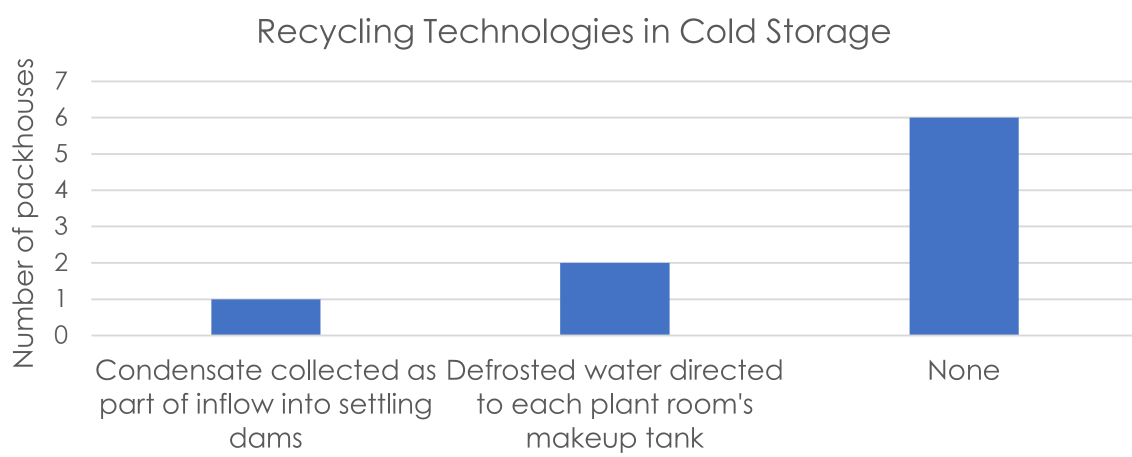

Figure 24: Recycling technologies used in the cold storage of packhouses

7.3.6 Ablutions, canteen and offices

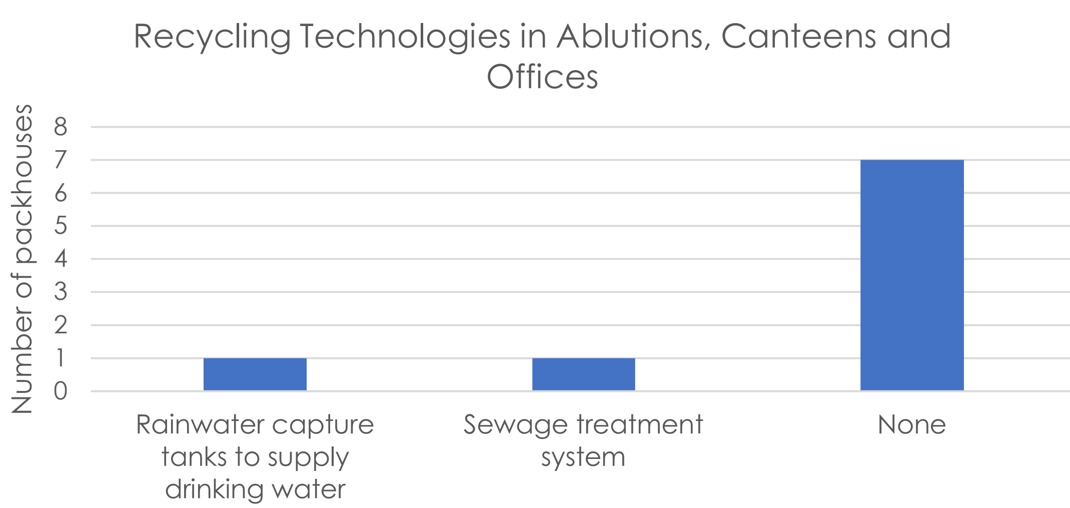

Figure 25: Recycling technologies used in the ablutions, canteens and offices of packhouses

Just like in 2022, recycling of water used in the ablution, canteen and offices remains a less common practice. One packhouse has a sewage treatment system, while another utilises rainwater capture tanks exclusively to supply drinking water for staff due to occasional issues with the municipal water's drinkability (Figure 25).

7.3.7 Wastewater treatment method

Wastewater holds potential for reuse, and its environmental impact can be greatly reduced when properly treated to remove contaminants. To prevent environmental contamination, packhouses must treat their wastewater using appropriate filtration or treatment methods before discharge. Figure 26 shows the different treatment methods used by the packhouses.

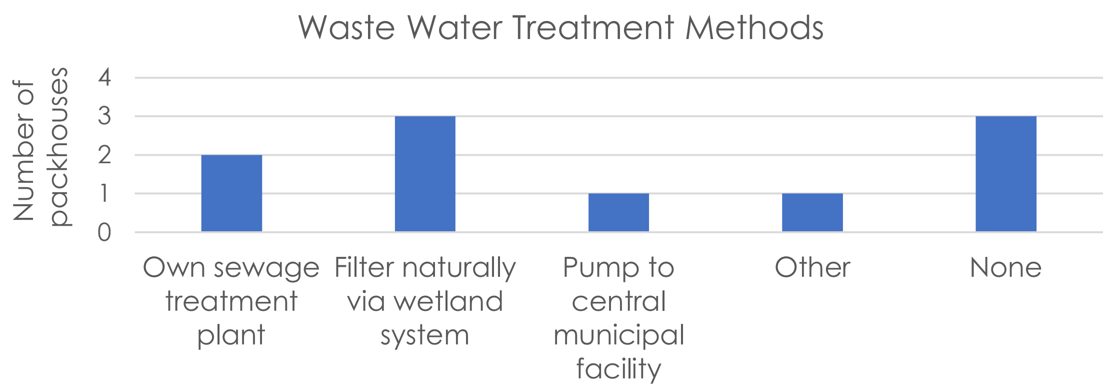

Figure 26: Wastewater treatment methods used by the packhouses

Most packhouses filter their wastewater via a wetland system. One packhouse uses a silver bromide solution during the production process.

7.3.8 Water recycling and re-use

Water recycling and reuse in pome fruit packhouses is crucial for both sustainability and cost. It conserves scarce freshwater, minimises pollution, and reduces water and wastewater costs. Additionally, it improves operational efficiency and mitigates production risks from water shortages. Figure 27 shows the percentage of water recycled (used again in the same process) or reused (repurposing of water from one process into another) by the participants.

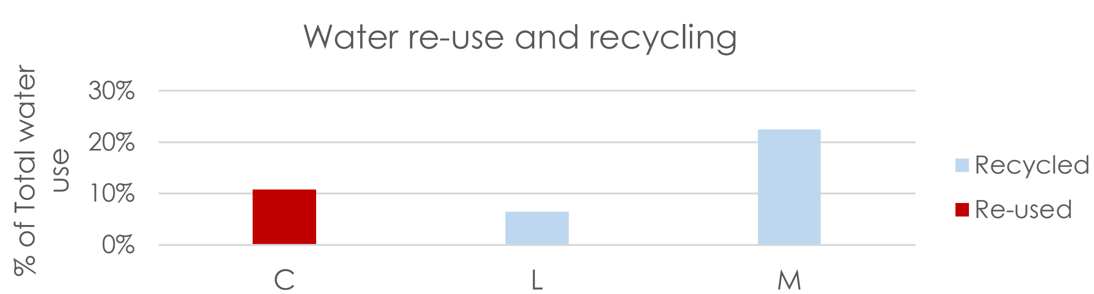

Figure 27: Water recycling and water re-use %

Only three of the packhouses, C, L and M, indicated that they either recycle or reuse water in the packhouse. Packhouse C re-uses their packhouse flume water for irrigation. Packhouse L recycles their flume water in the packing line. Packhouse M recycles all their water, which then goes back into their water supply line and is used again across the whole packhouse site.

8 Conclusion

Phase 7 of the water benchmarking project demonstrates continued value, evidenced by sustained participation, despite challenges in securing new entrants due to metering and data management constraints. Promising trends in water use intensity are observed, although reliance on estimated data necessitates cautious interpretation.

Outreach efforts in Phase 7 successfully attracted at least one new participant for future phases. However, inadequate metering infrastructure and data collection capacity remain significant barriers. Participation should however be encouraged even without established systems, as it fosters learning and initiates efficient water use practices. Optimal project timing, initiating no later than mid-September to align with packhouse operational windows, is also recommended.

The expanding database facilitates valuable year-on-year comparisons, revealing encouraging reductions in water consumption, particularly in packing line and cold storage operations. This project underscores the potential for enhancing water sustainability through reuse, recycling, alternative sourcing, and waste reduction. Collaborative knowledge exchange on water recycling technologies is vital to promote best practice adoption.

While diverse water management and recycling technologies contribute to benchmark variations, robust data collection is essential for accurate impact quantification. Key challenges to address include:

- **Inadequate Metering:** Incomplete metering within packhouses limits comprehensive water consumption analysis.
- **Data Collection Limitations:** Insufficient data collection capacity restricts new participant integration.
- **Suboptimal Renewable Source Utilisation:** The potential of renewable sources, such as rainwater harvesting, remains underutilised.

Addressing these challenges through improved metering, enhanced data collection infrastructure, and increased adoption of renewable water sourcing is critical to maximising the project's impact and ensuring long-term water sustainability in pome fruit packhouses.

9 Recommendations

This section highlights recommendations for implementation by industry and at packhouses.

Industry ESG reporting

Industry ESG reporting will play an increasingly important role in future. Establishing ESG data collection and reporting systems takes time. Fortunately, this project has established water data collection, methodology and tools. It is recommended that Hortgro places a requirement on packhouses to at least report the following via the PAG project:

- Overall water use [m^3]
- Water sources [m^3]

Industry-Wide Action:

- **Metering Campaign:** Launch an industry-wide campaign or standard to promote consistent metering, recording, and data integrity across packhouses. This initiative, previously recommended and supported by PAG members, should be budgeted for in the next funding cycle.
- **"Water Heroes" Initiative:** Implement a recognition program (e.g., "Water Heroes") to celebrate and incentivise packhouses demonstrating water use excellence, encouraging wider participation. Year-on-year reductions in water consumption can be recognised through a designated award system.

The following recommendations on water management practices apply to the packhouses:

- **Metering and Data Recording:** Implement consistent monthly/annual water consumption record-keeping using accurate meters. Focus on the allocation of water use per activity or area of operation, which will enable increased accuracy of water use intensities and usage profiles in the project.
- **Formalised Strategy and Plan:** Establish a water policy and a detailed water management plan to guide water-saving decisions.
- **Water Reduction Targets:** Set ambitious yet achievable water reduction targets to drive ongoing improvement.
- **Staff Training and Water-Wise Behaviour:** Educate staff on water conservation and promote water-conscious practices within the packhouse.
- **Alternative Water Sources:** Explore and utilise alternative water sources like rainwater and treated wastewater where feasible.
- **Water Reuse:** Implement water reuse wherever possible, such as for floor cleaning, ablutions, or cooling tower make-up.
- **Wastewater Treatment and Reuse:** Treat and reuse wastewater appropriately to minimise freshwater consumption.
- **Cooling Tower Optimisation:** Implement automated bleeding systems for cooling towers.

- **Drenching and Flume Water Management:** Extend retention times for drenching and flume water to minimise waste of water.
- **Leak Detection and Repair:** Conduct regular inspections and repairs to address leaks and faulty equipment promptly.
- **Water-Efficient Technologies:** Install and utilise water-saving technologies like flow restrictors, tap aerators, and automatic shut-off valves.

Following these recommendations, packhouses can significantly improve their water use efficiency, contributing to a more sustainable and environmentally responsible fruit industry.