

The Household Simulation Model

Webinar

How it could help you to reduce food and packaging waste

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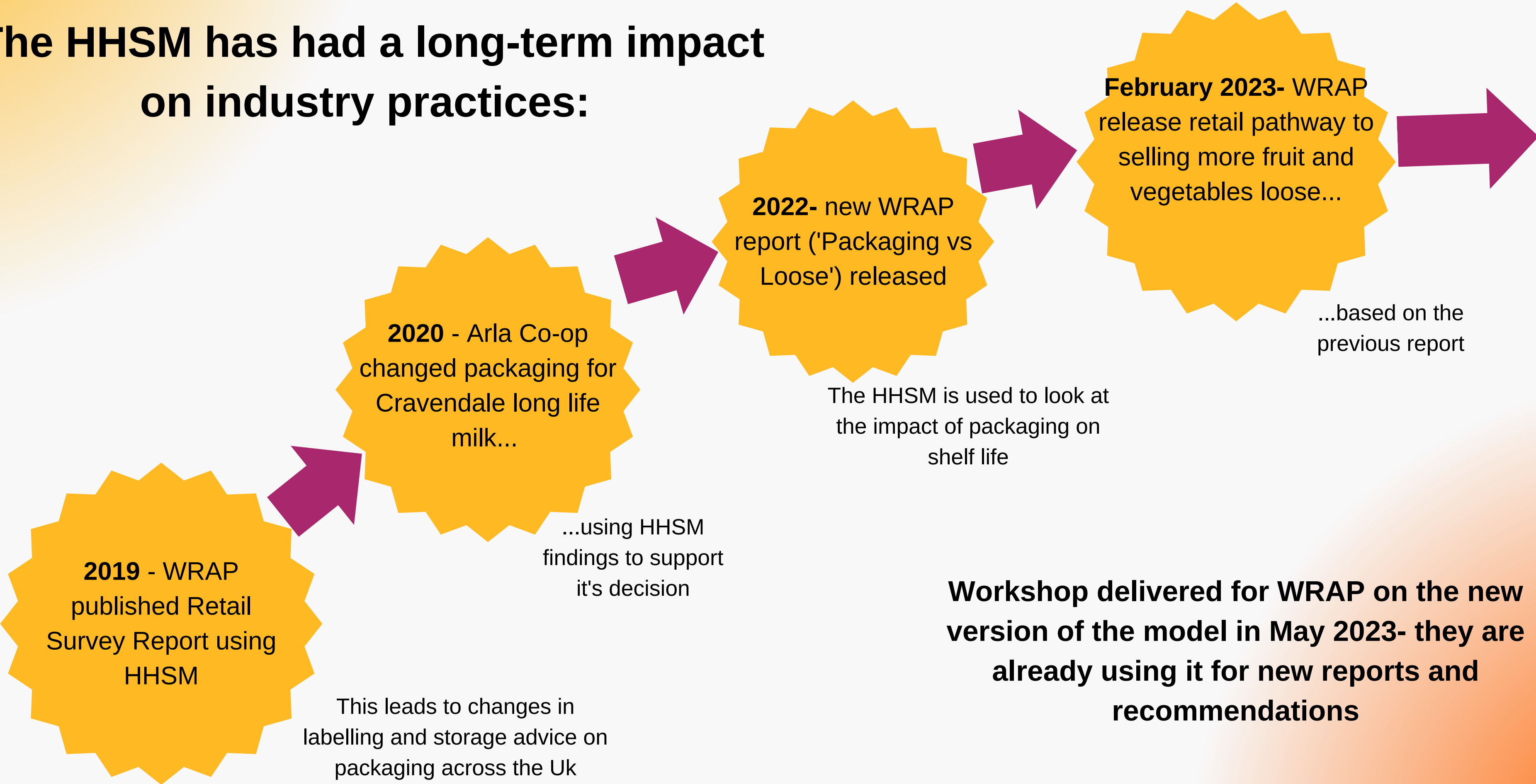
I'm Jack Pickering

- I do qualitative research for the HHSM project, and also coordinate Impact activity.
- This webinar will introduce the Household Simulation model, what it is, how it works, what you can do with it, and how to use it.

The model is a product of long-term collaboration between WRAP and academic partners:



The HHSM has had a long-term impact on industry practices:



The new version of the model can estimate the *food and packaging waste* effects of changes to packaging and household behaviour

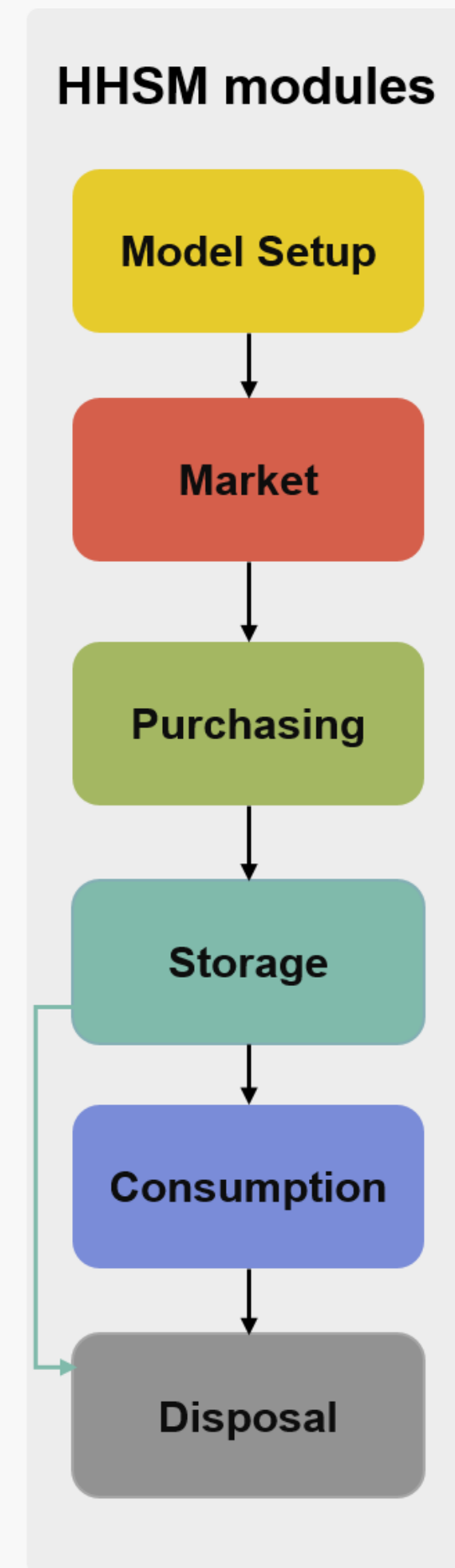


Previous versions could only model Household food waste. Now, users can look for trade-offs between food and packaging waste, and quantify them.



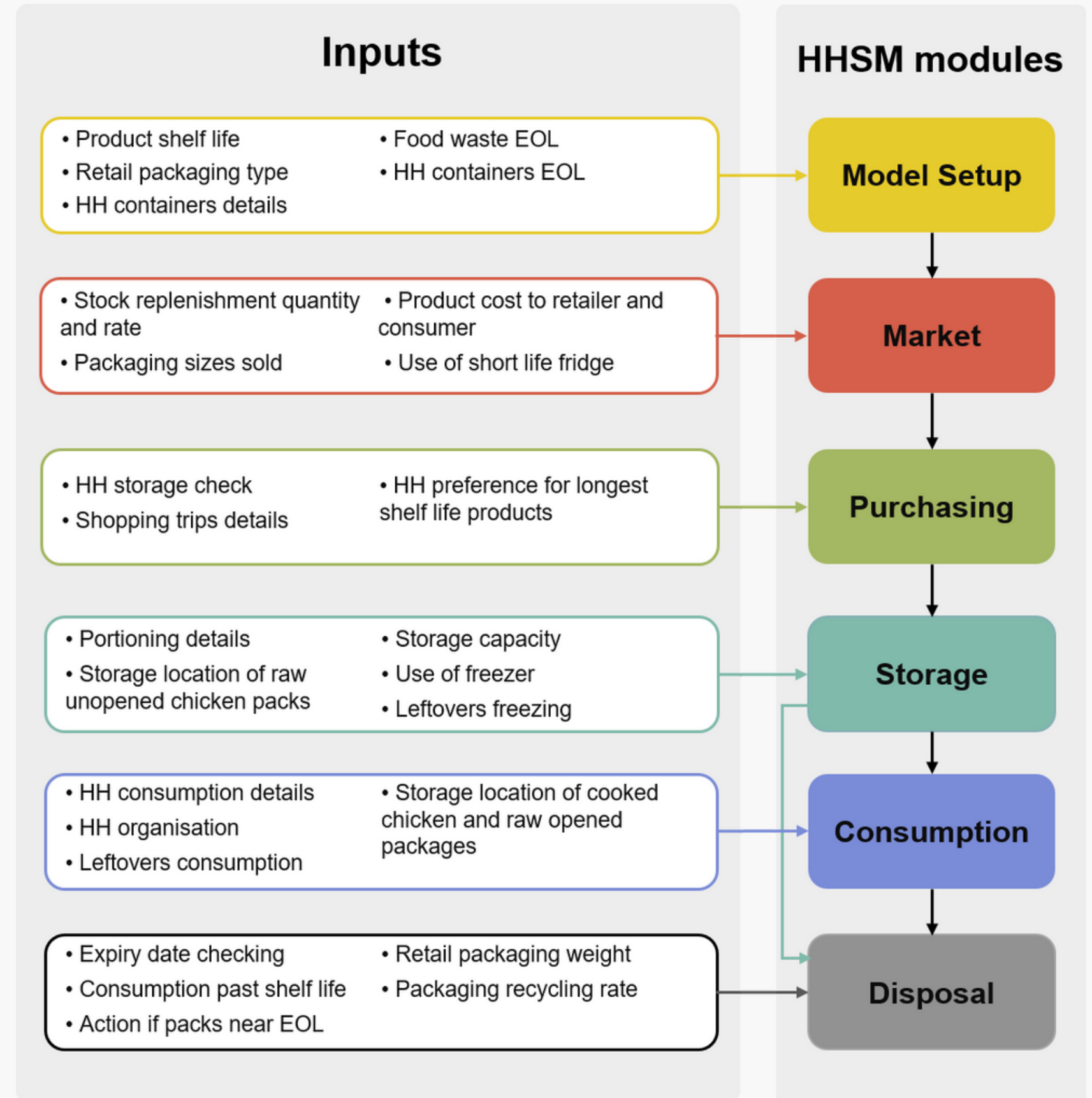
**It works by simulating
how a product moves
through the home**

The model simulates each decision made about a product and its packaging as it moves from the shop shelf, through the consumers' home, to disposal.



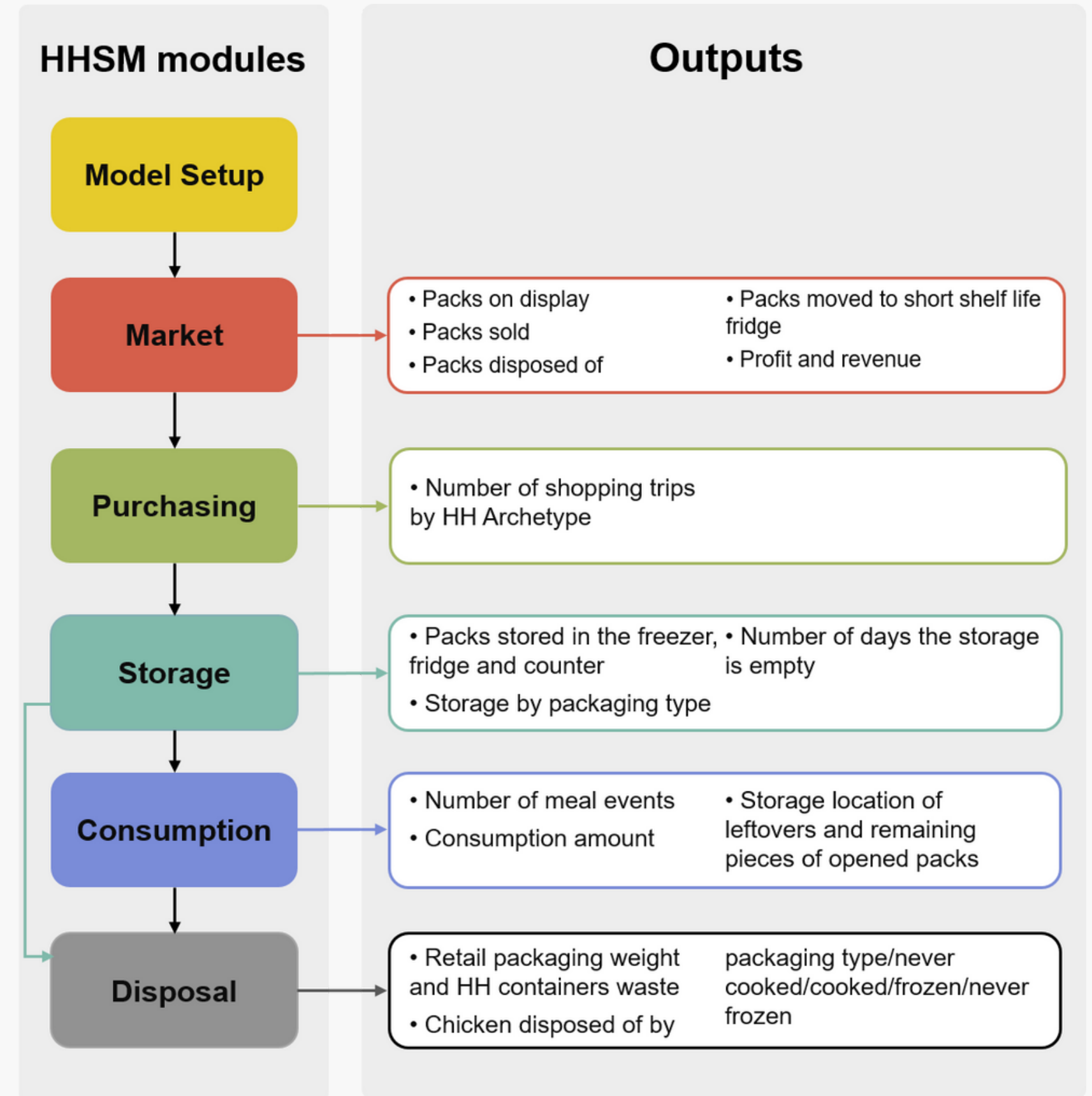
Model input parameters are set to imitate what real or imagined consumers do...

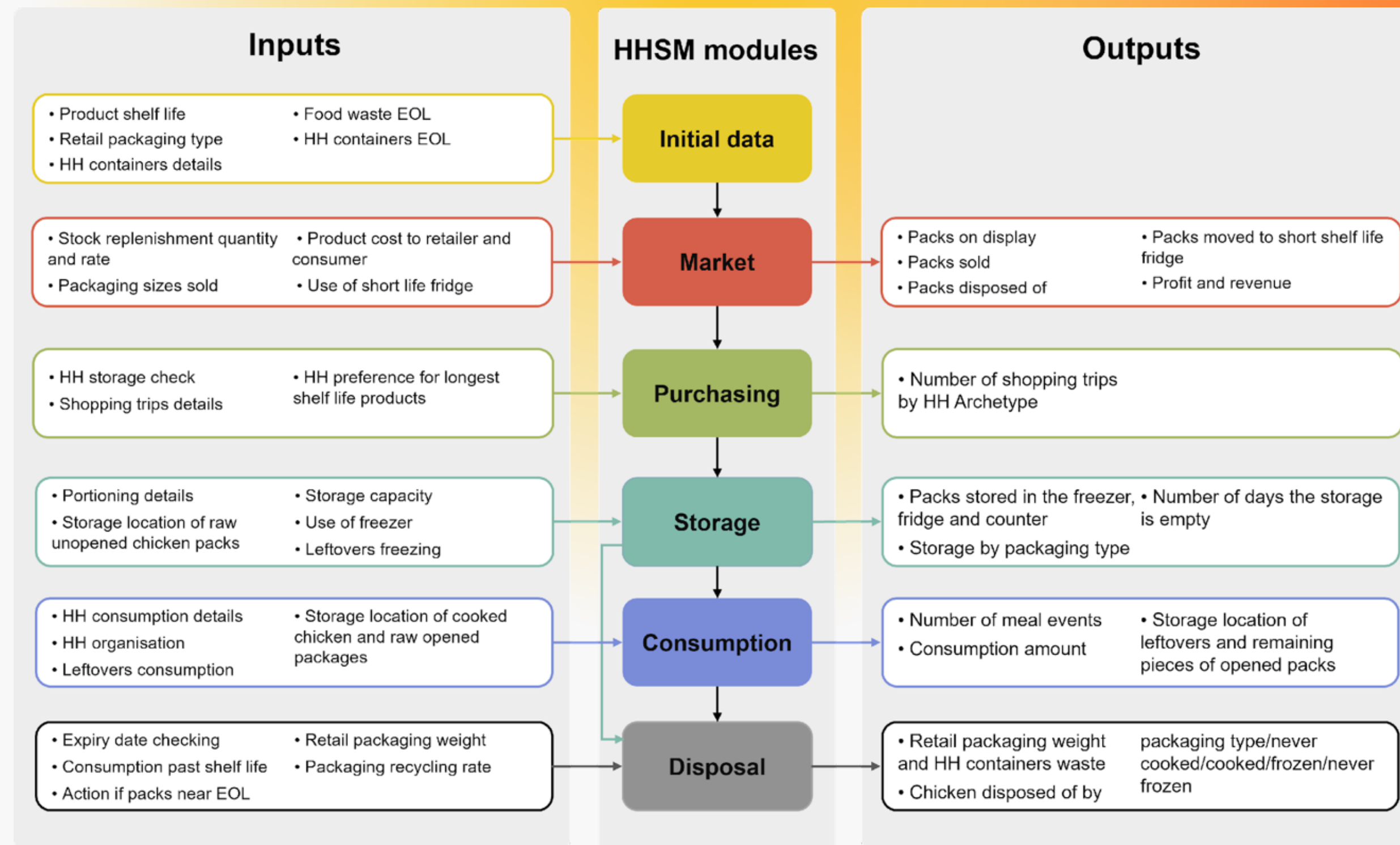
These are set probabilistically, and can model a wide range of behaviours, consumption types, and products



..and provides detailed outputs on the results.

Outputs include packaging and food waste weights, but also costs to the retailer and consumer, among other things.





Here's an overview of the model structure - it can run different configurations/settings at the same time



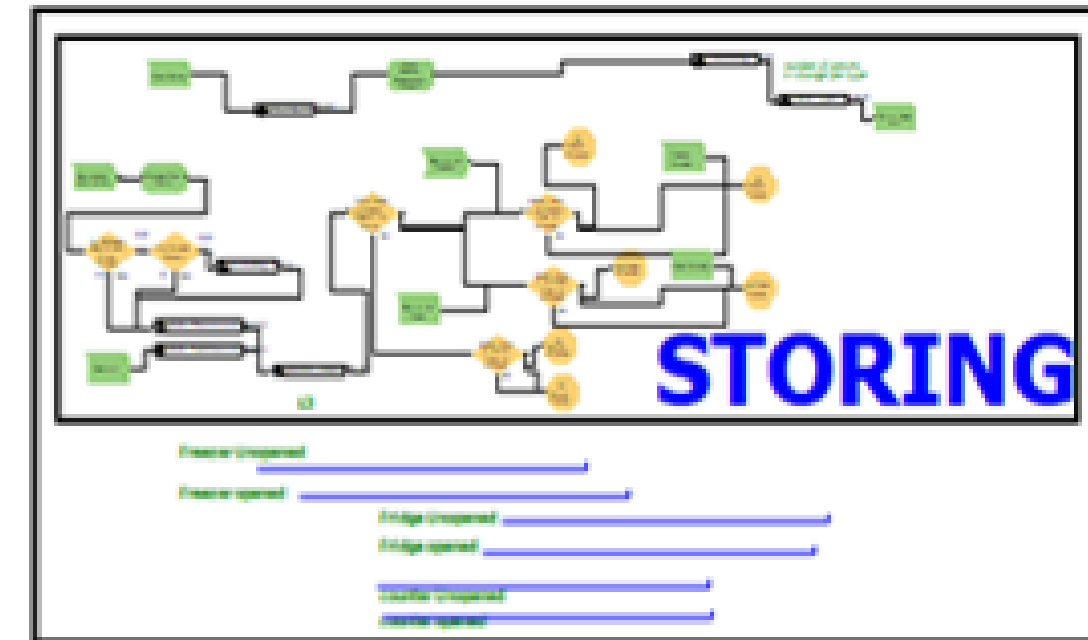
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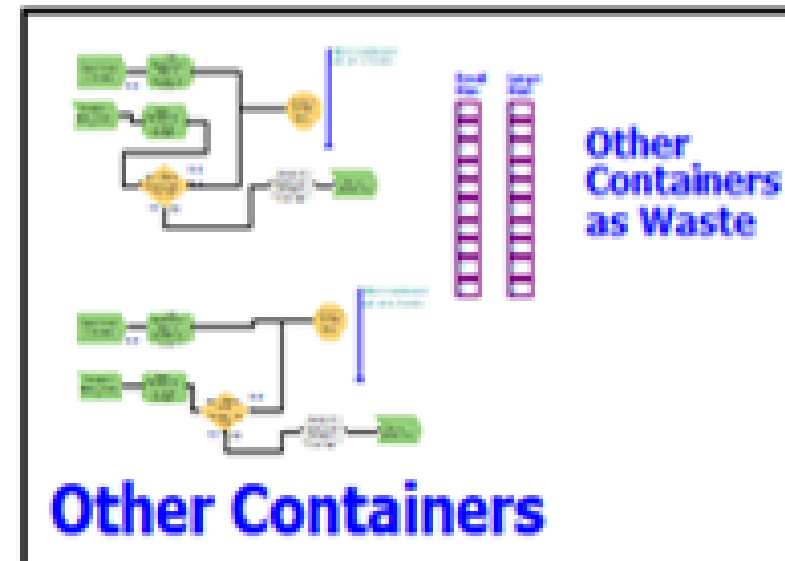
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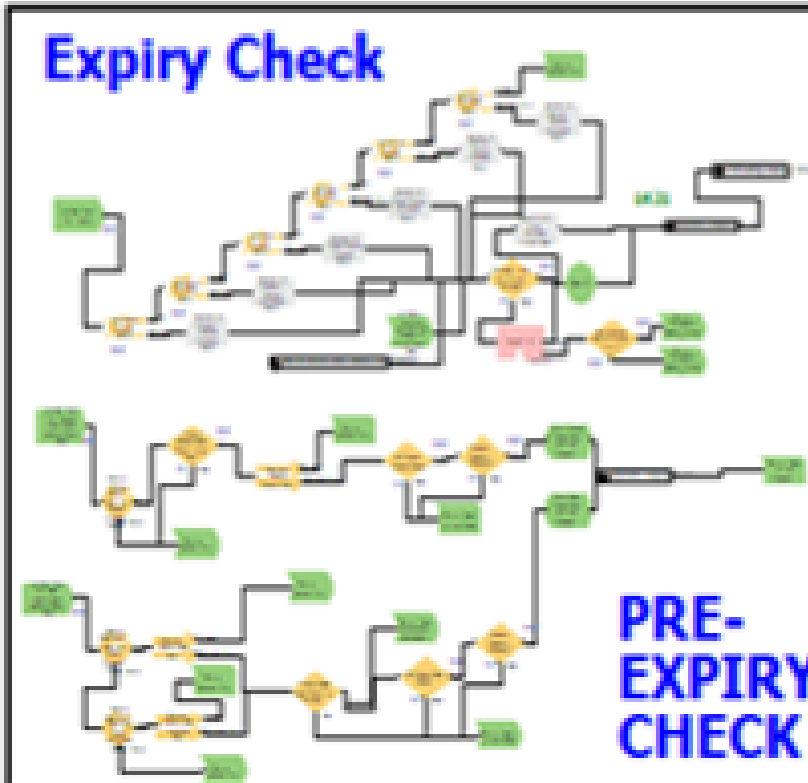
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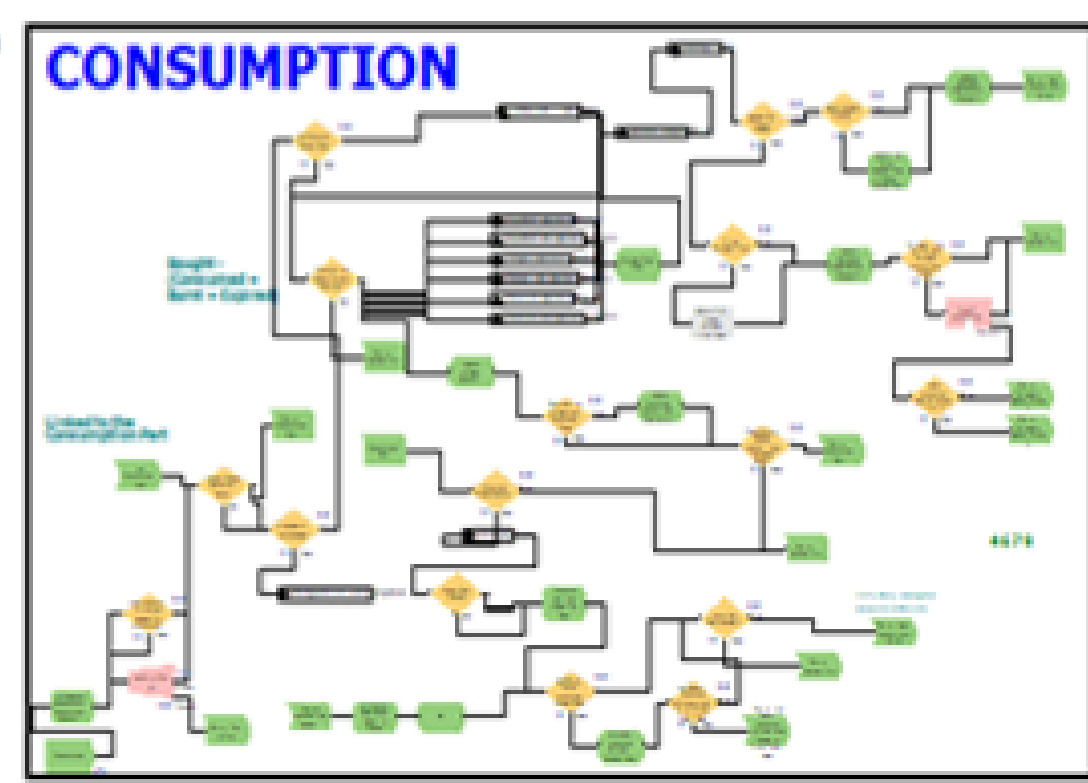


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Here's a diagram of the entire logic flow of the model- as it appears in Arena.

How do you use the model, in practical terms?

Arena[®]



Excel

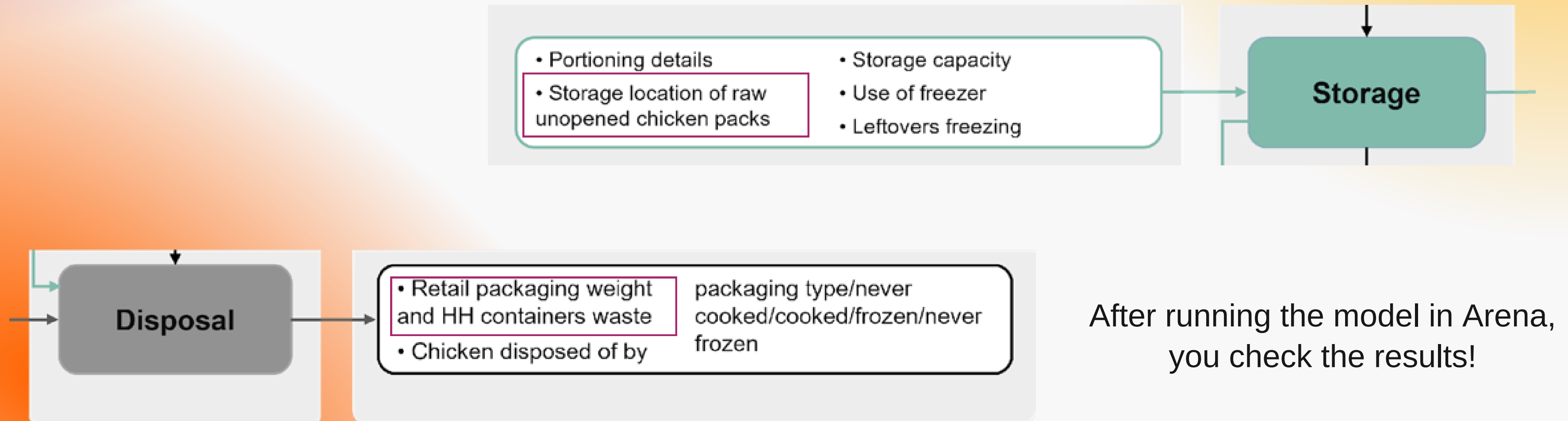
Modelling software

Linked input/output file sets the conditions for each set of model runs

Free manuals and technical videos for the model be available online soon

Let's look at a simplified example:

Imagine you wanted to understand the impact of consumers *storing unopened packages of food only on kitchen counters*. You would **set the storage location parameter "counter" to 100**, which would mean that the household selects this storage location every time.



After running the model in Arena, you check the results!

Pack size trade offs are a good example of how the model can be used

Based on model results for chicken:

Making sure smaller pack sizes (2 piece packs) are available – could reduce chicken waste by 7%.



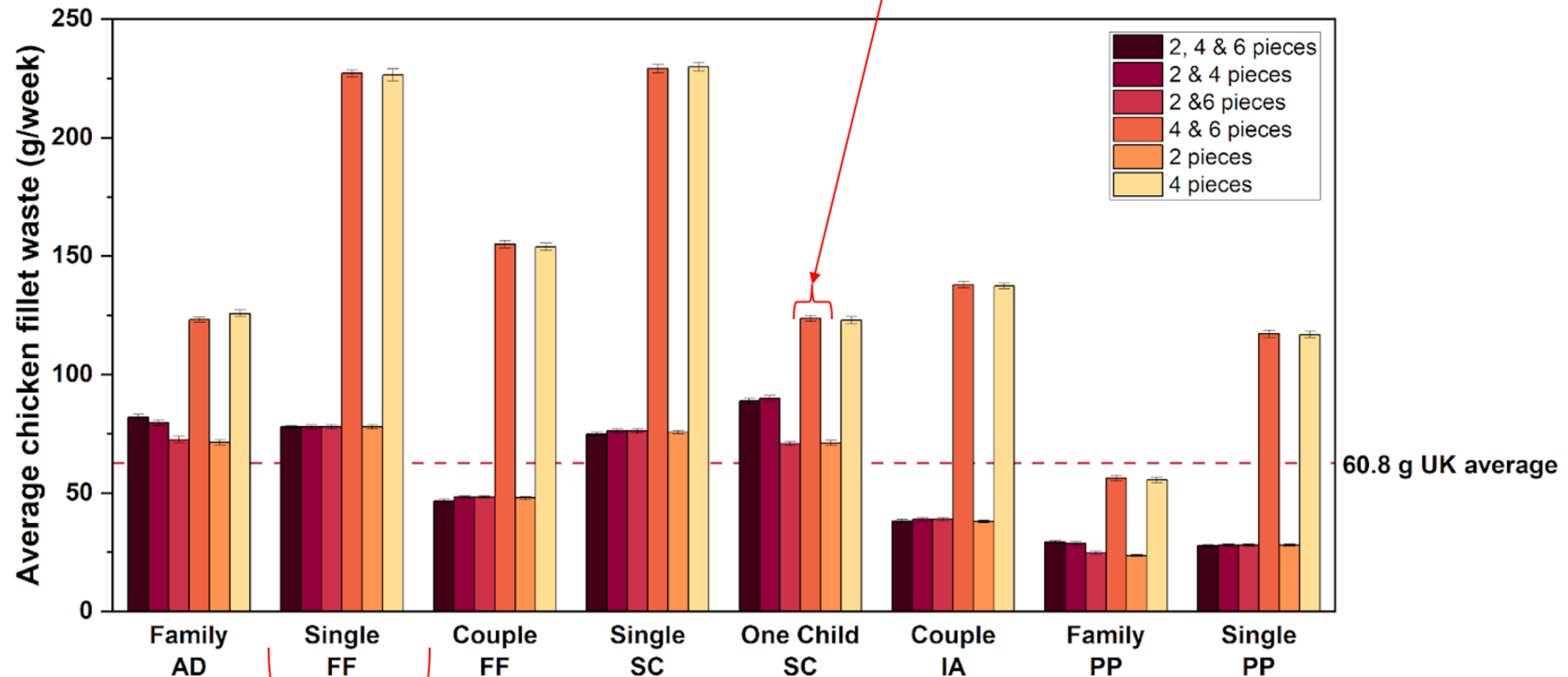
Increasing small pack size availability could increase packaging waste up to 12%.



Only having large pack sizes (4 & 6 piece packs) on shelf could increase waste up to 148%!



Each of these bars represent the waste for a different product intervention,
within a particular household type



Each of these sets of bars represent the waste for a different type of
household

What would you find useful to study using the model?

What Scenarios or Products are you considering?

Can we help you develop product development scenarios that you might be interested in?

How would you want to use the model?

What materials can we produce that will help you to benefit from the model?

Current project end date: April 2024
Reduced capacity on project from: December 2023

The model we use is informed by current consumption data *and* new research

Living Costs and Food Survey, and National Diet and Nutrition Survey used for **data on purchase and consumption.**

Qualitative research used to inform model structure & functionality, and fresh produce research also provided shelf life data.

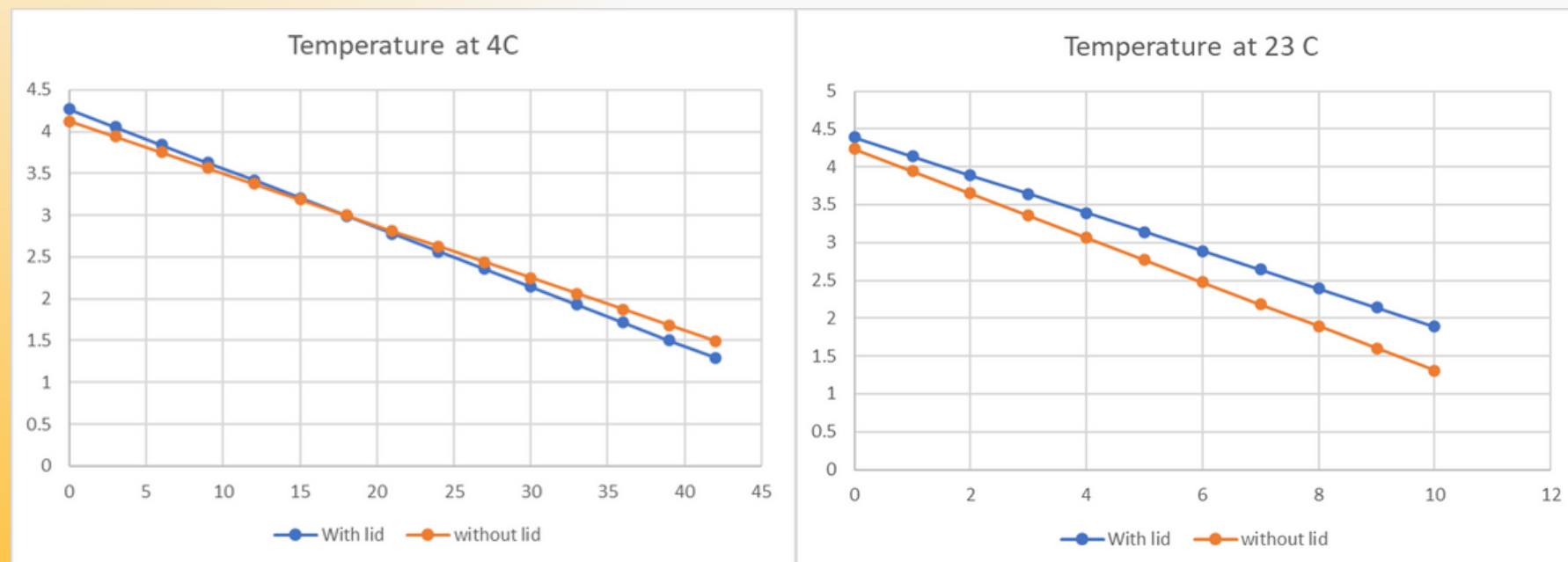
Packaging weights informed by Valpak data.

WRAP data also used to inform settings for storage locations.

If you have better data, then we can use it!

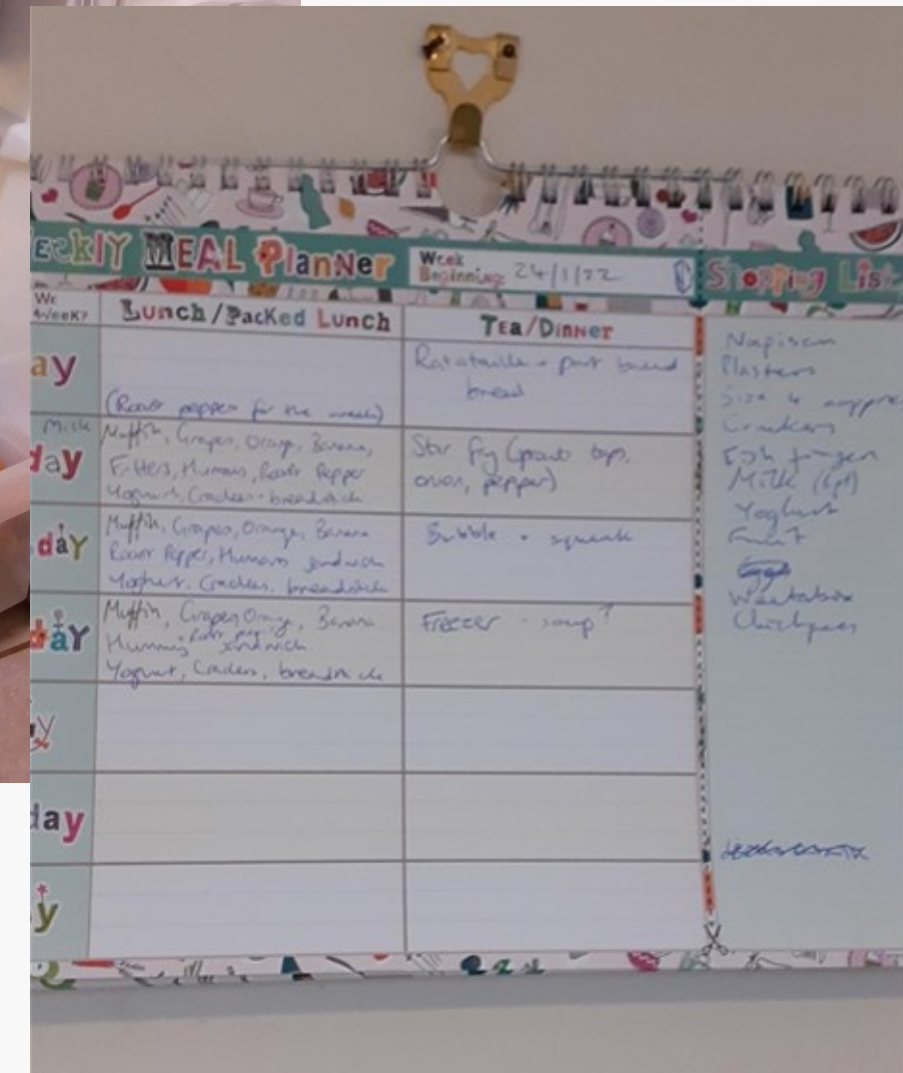
We produced fresh produce visual degradation rates

So that we can incorporate this into the model directly, rather than using expected expiry dates.



The qualitative work package helped inform how the model was built

Key findings include: the importance of home containers, consumer meal planning, and de-packaging behaviours for fresh produce



Photos from participants



Project team:

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Tom Quested [WRAP],
Rachel Devine [WRAP].

**Please get in touch if
you'd like to use the
model or know more!**

We're working on a website where we will link to
all available resources and documents related to
the HHSM:

<https://blogs.city.ac.uk/householdfoodsimulation>

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