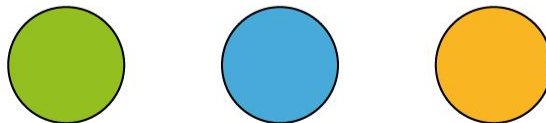




# MOMENTUM SOLUTIONS ROADMAP 1.0

Aiming to minimize the human health impact  
of exposure to micro- and nanoplastics (MNPs)



Nov. 2024

Micro- and nanoplastics (MNPs, plastic particles < 5 mm) are increasingly found in our environment, our food and our bodies. Though there are still knowledge gaps regarding their potential human health risks, it is clear that strategies for mitigating health risks are urgently needed. The Dutch ZonMw/Health Holland project MOMENTUM (2021-2024) ([Momentum | Universiteit Utrecht | Homepage](https://momentummicroplastics.nl), <https://momentummicroplastics.nl>) aims to unravel the human health effects of MNPs and to propose solutions to minimize their potential health impact.

To create a first version of a roadmap leading to long-term solutions, three main solution routes to minimize the health impact of exposure to MNPs were identified, developed, and refined during sessions with MOMENTUM consortium partners. Solution routes are long-term plans that outline the innovations from MOMENTUM's scientific achievements and define the major steps, conditions, and requirements for practical solutions to minimize the health impact of MNPs in various real-life situations.

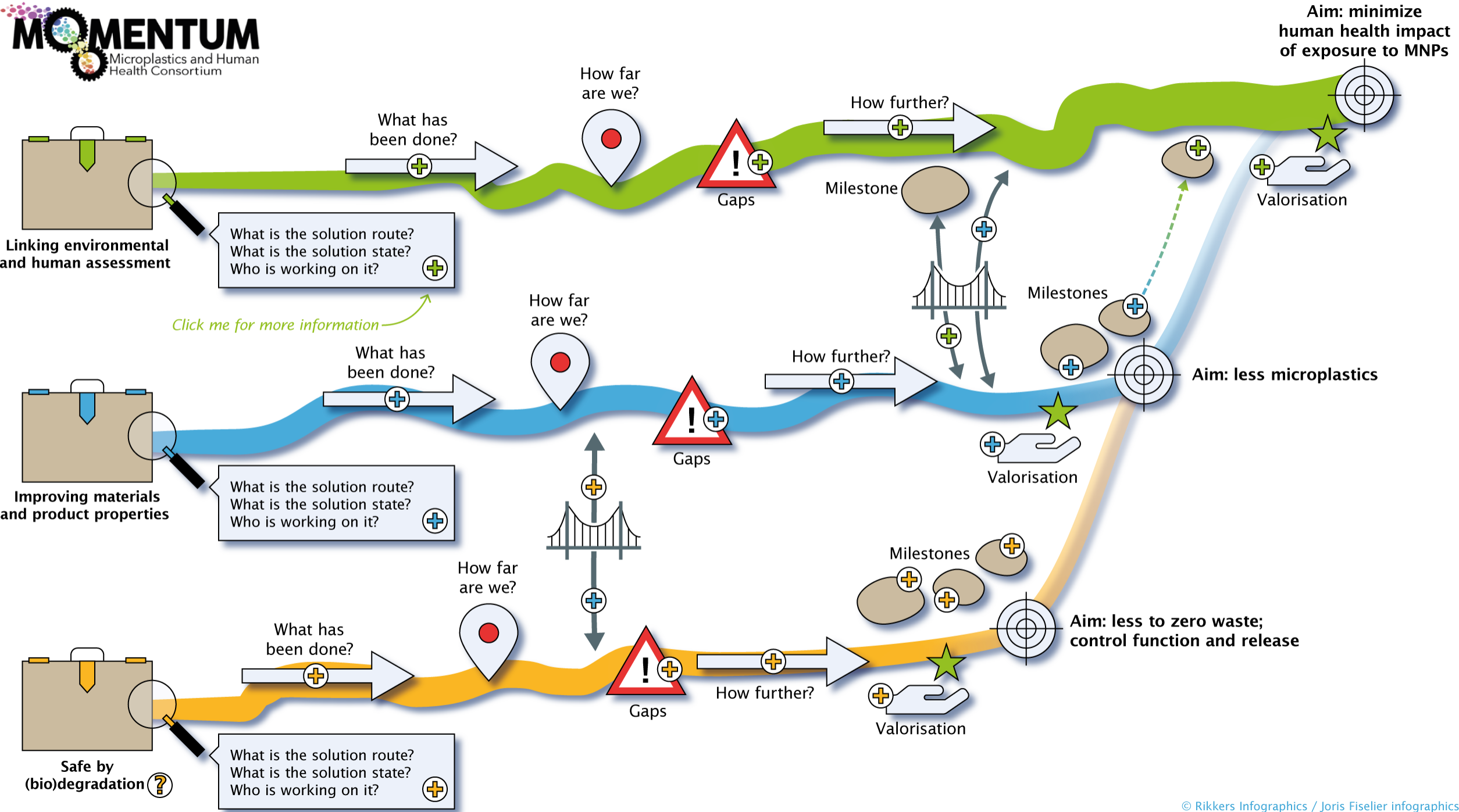
In addition to consolidating the scientific expert knowledge in the MOMENTUM project, international research initiatives like the European H2020 CUSP projects, were taken into account, along with international private sector initiatives. The ZonMw “Knowledge Agenda on Microplastics and Health” from 2020, commissioned by the Dutch government, was also integrated.

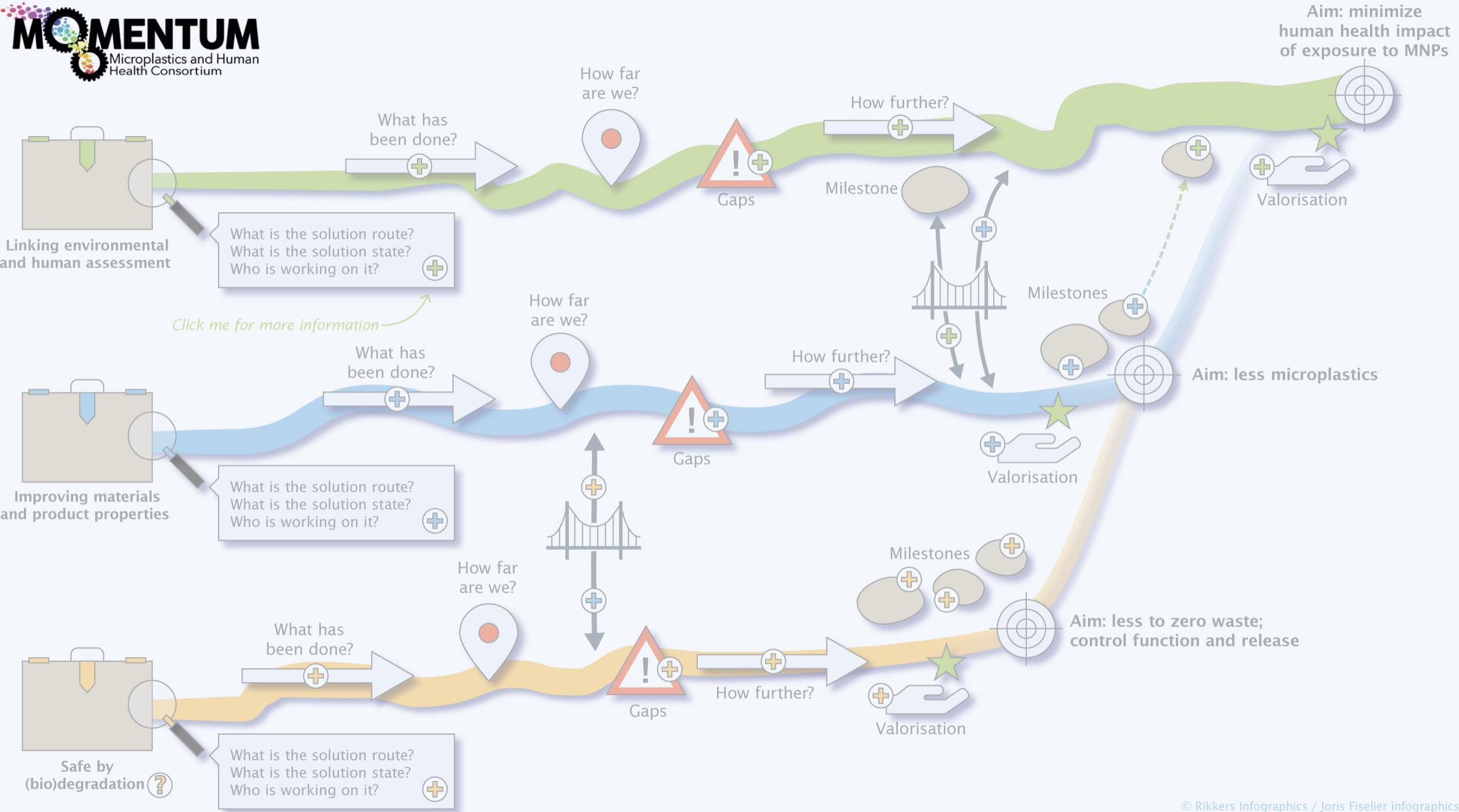
The obtained roadmap is illustrated as an infographic which shows the three solution routes developed in the period 2021-2024. The infographic provides information on the current state of the solution routes and the milestones and collaborative efforts needed to move the solutions forward, as well as indicating knowledge gaps.

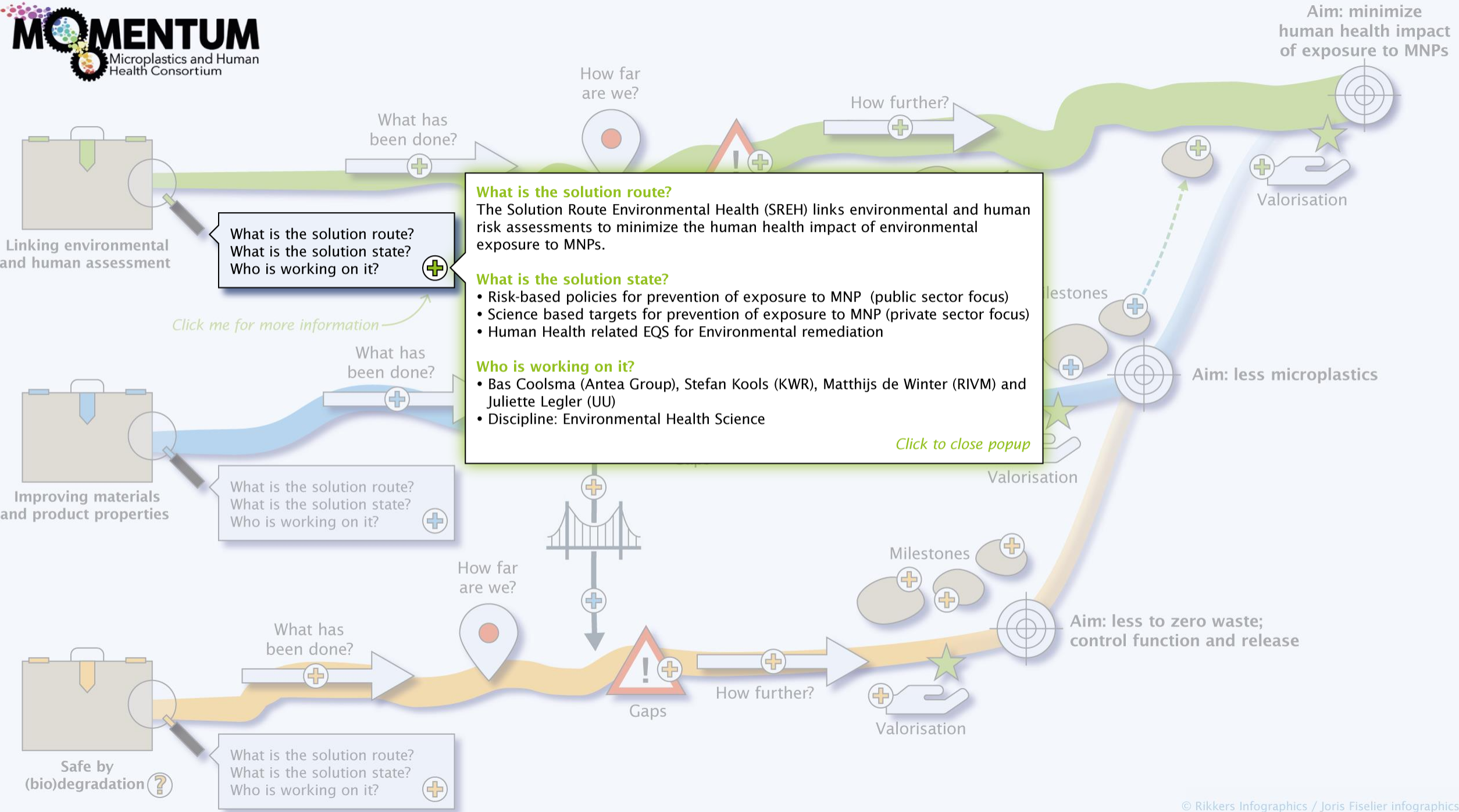
During the ongoing project MOMENTUM 2.0, this roadmap will be reviewed and refined, and other solution routes such as social behavior will be included.. Any questions on the infographic can be directed to [petra.krystek@deltares.nl](mailto:petra.krystek@deltares.nl) and via <https://momentummicroplastics.nl/contact/>.

### ***Acknowledgement***

*We gratefully acknowledge financial support from ZonMw and Health Holland [Grant ID 458001101].*







**What is the solution route?**  
The Solution Route Environmental Health (SREH) links environmental and human risk assessments to minimize the human health impact of environmental exposure to MNPs.

**What is the solution state?**

- Risk-based policies for prevention of exposure to MNP (public sector focus)
- Science based targets for prevention of exposure to MNP (private sector focus)
- Human Health related EQS for Environmental remediation

**Who is working on it?**

- Bas Coolsma (Antea Group), Stefan Kools (KWR), Matthijs de Winter (RIVM) and Juliette Legler (UU)
- Discipline: Environmental Health Science

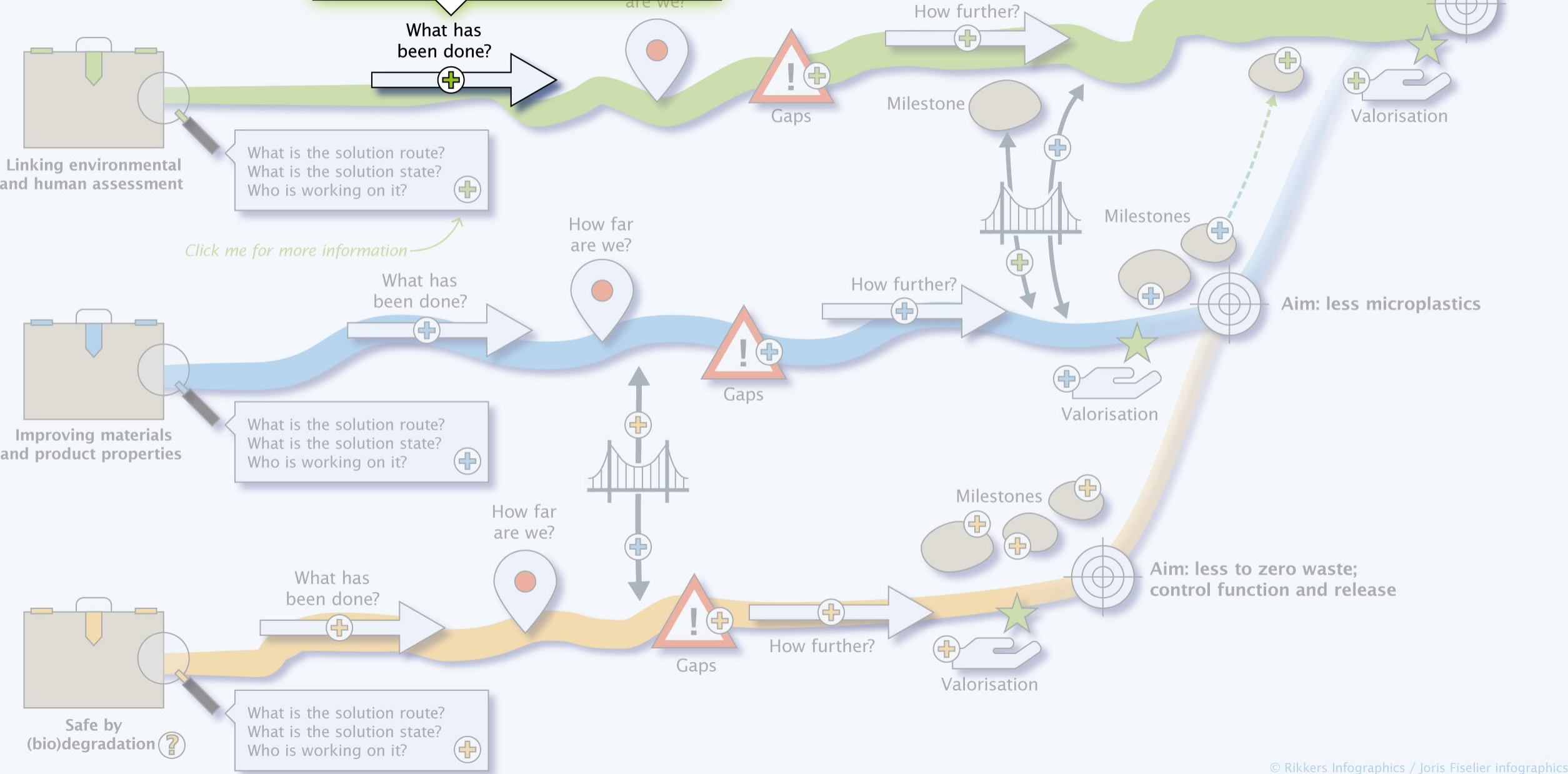
What is the solution route?  
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Who is working on it?

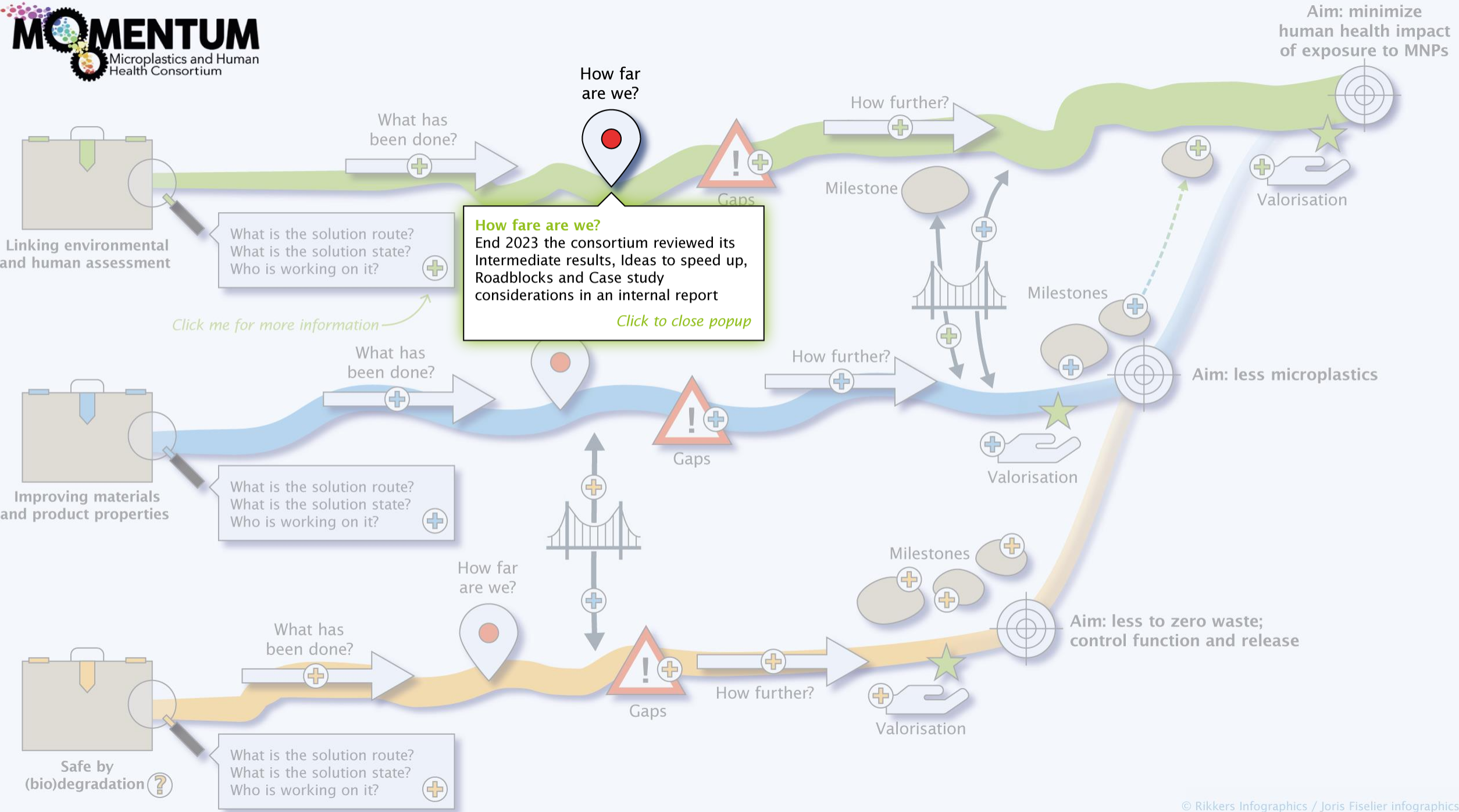
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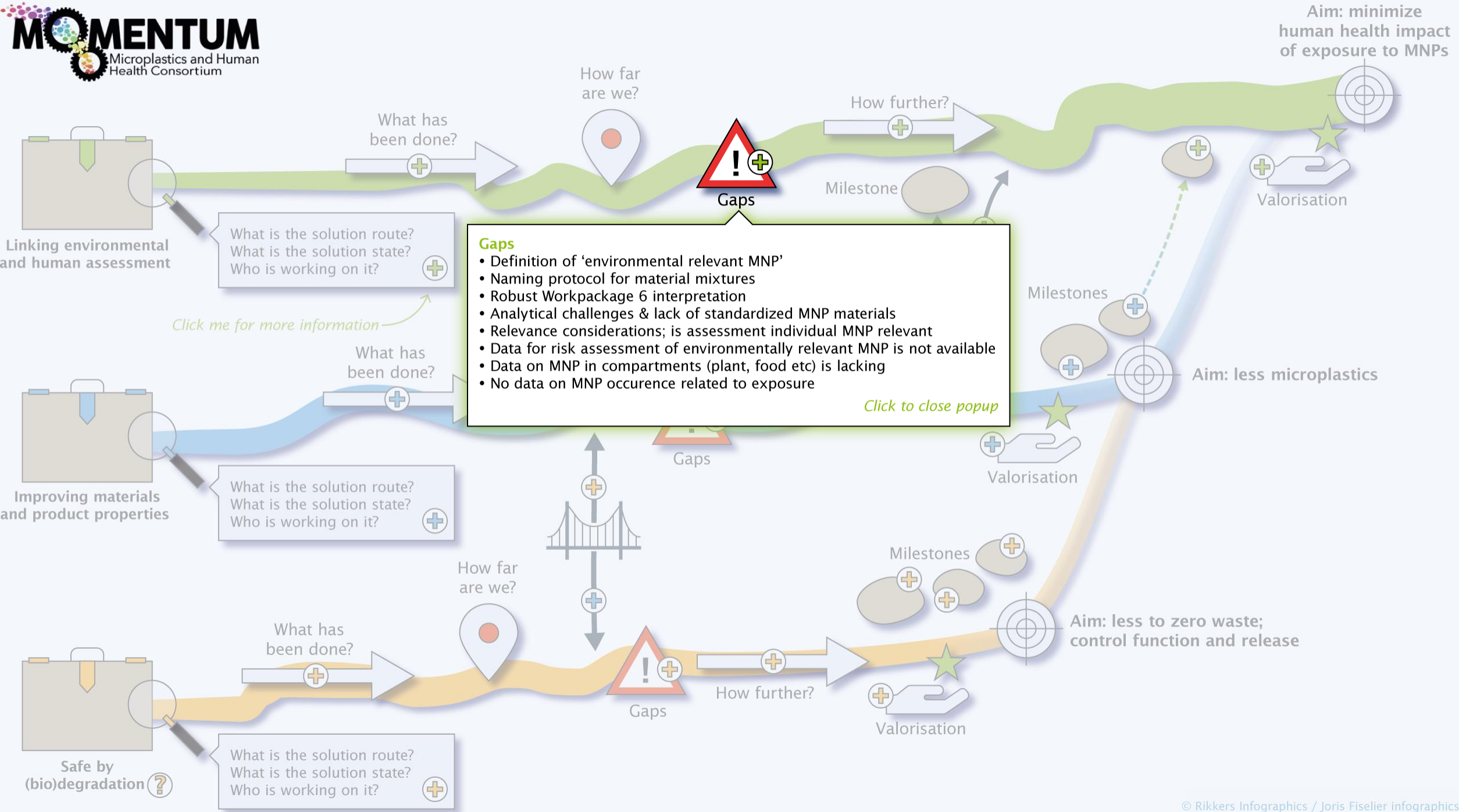
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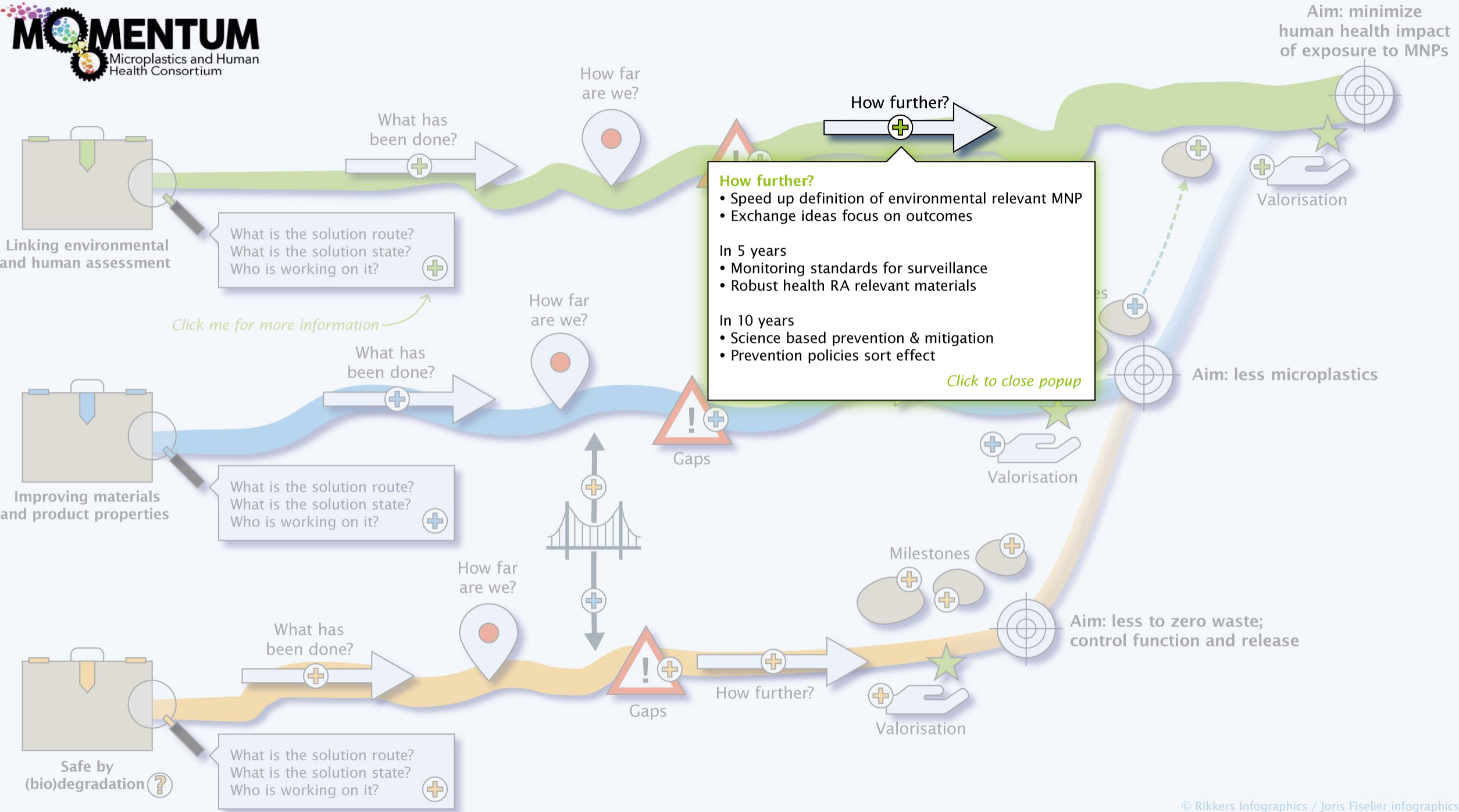
**What has been done?**  
Progress and results are reviewed during consortium meetings.  
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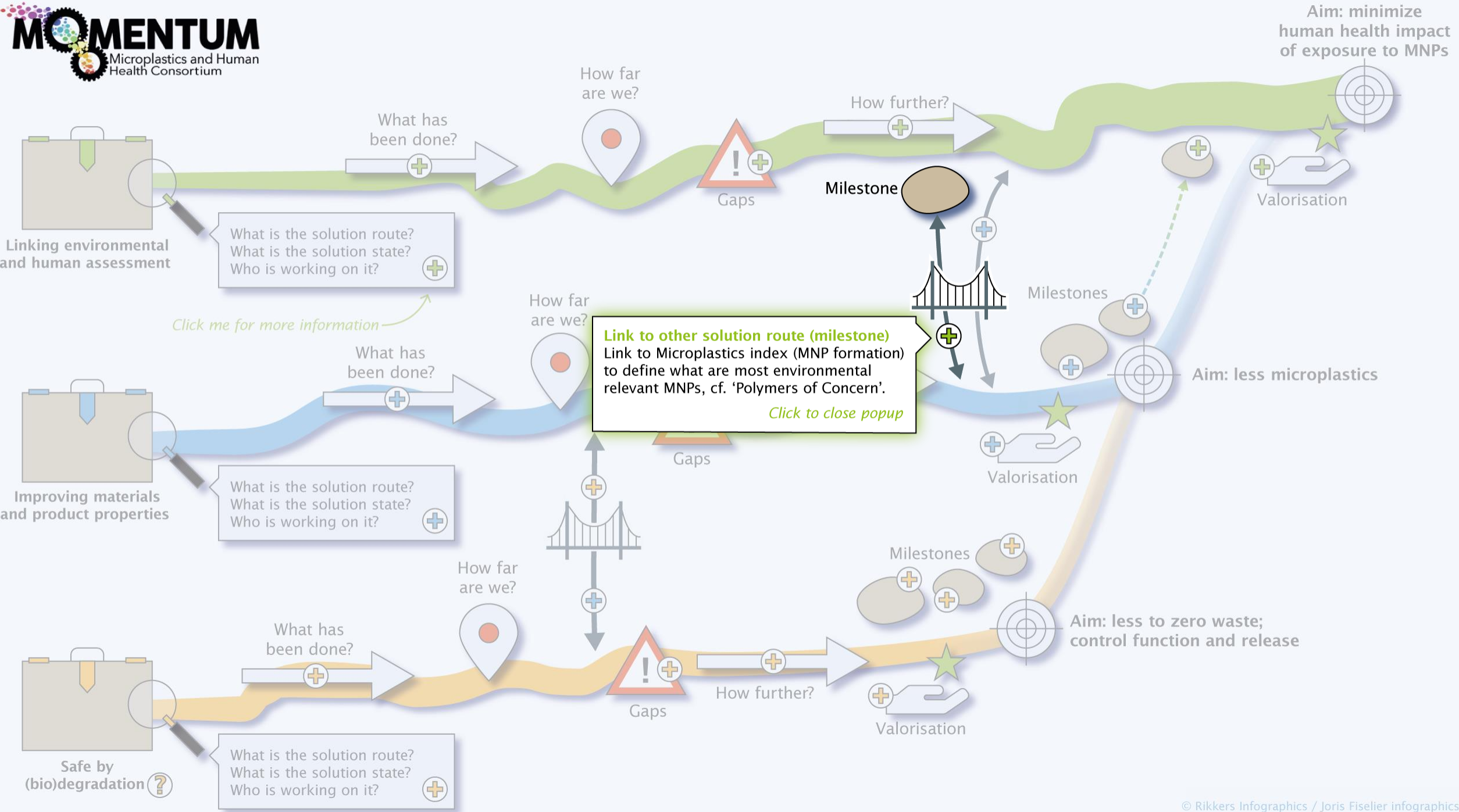


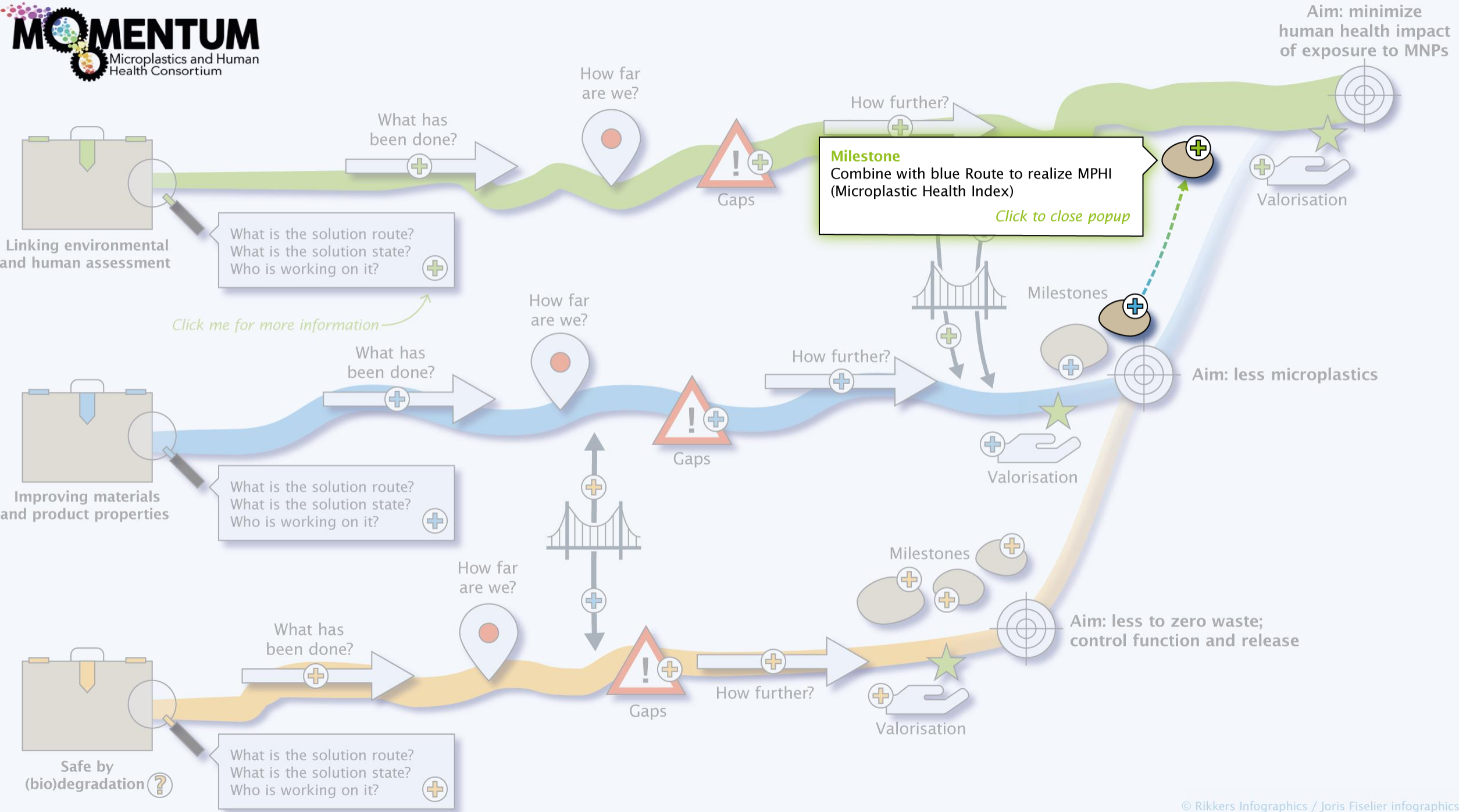














Aim: minimize human health impact of exposure to MNPs

Linking environmental and human assessment

What is the solution route?  
What is the solution state?  
Who is working on it?

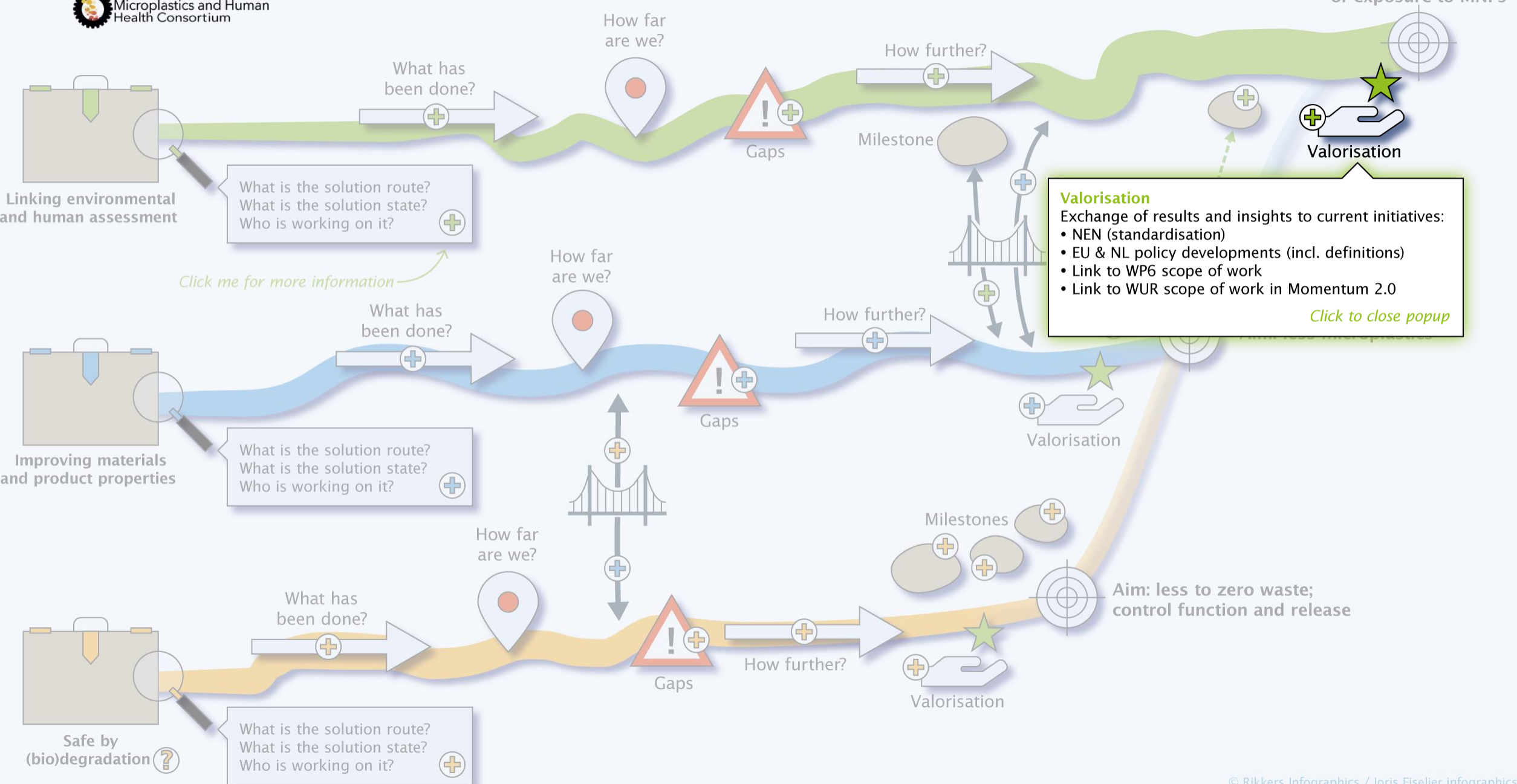
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Improving materials and product properties

What is the solution route?  
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Who is working on it?

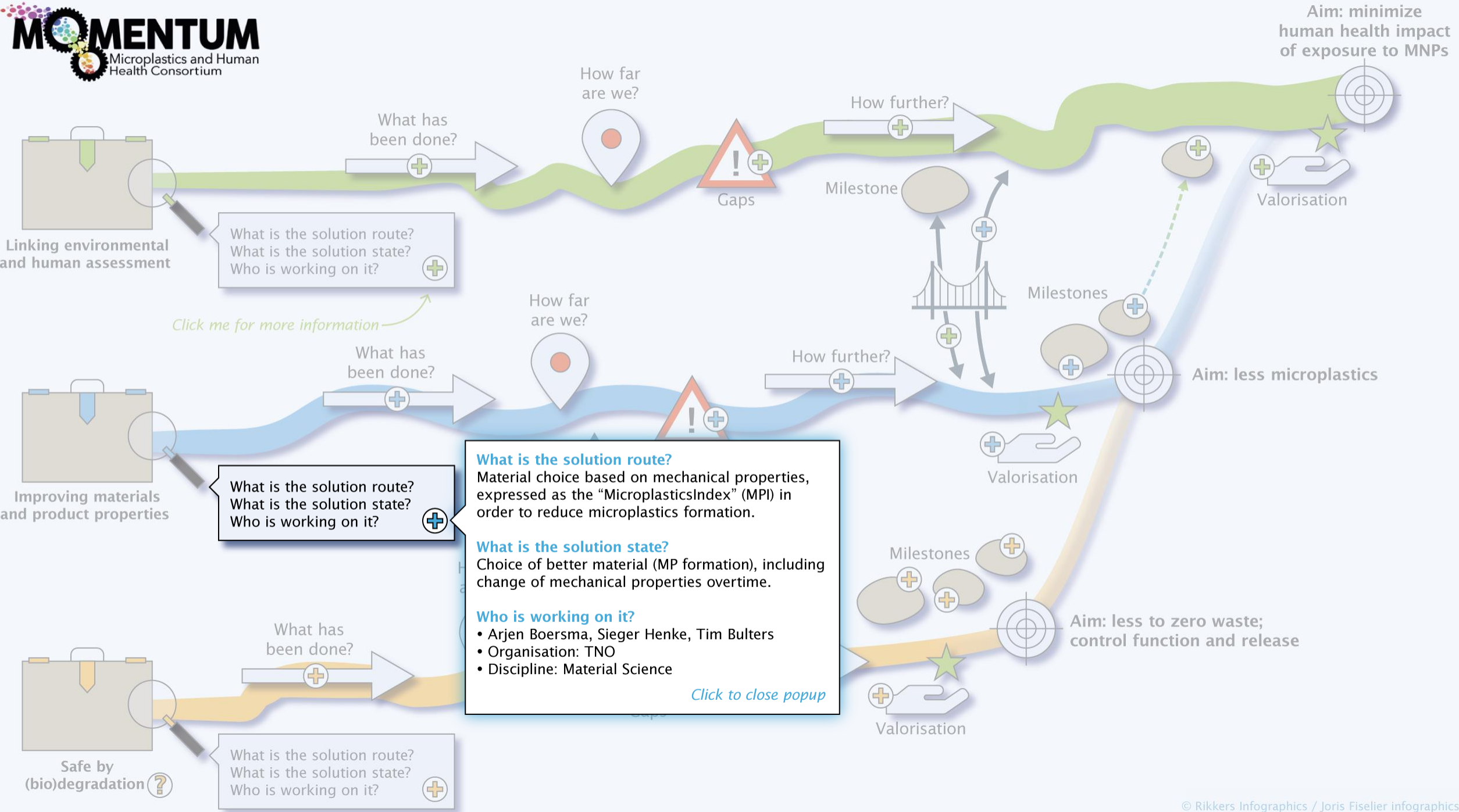
Safe by (bio)degradation

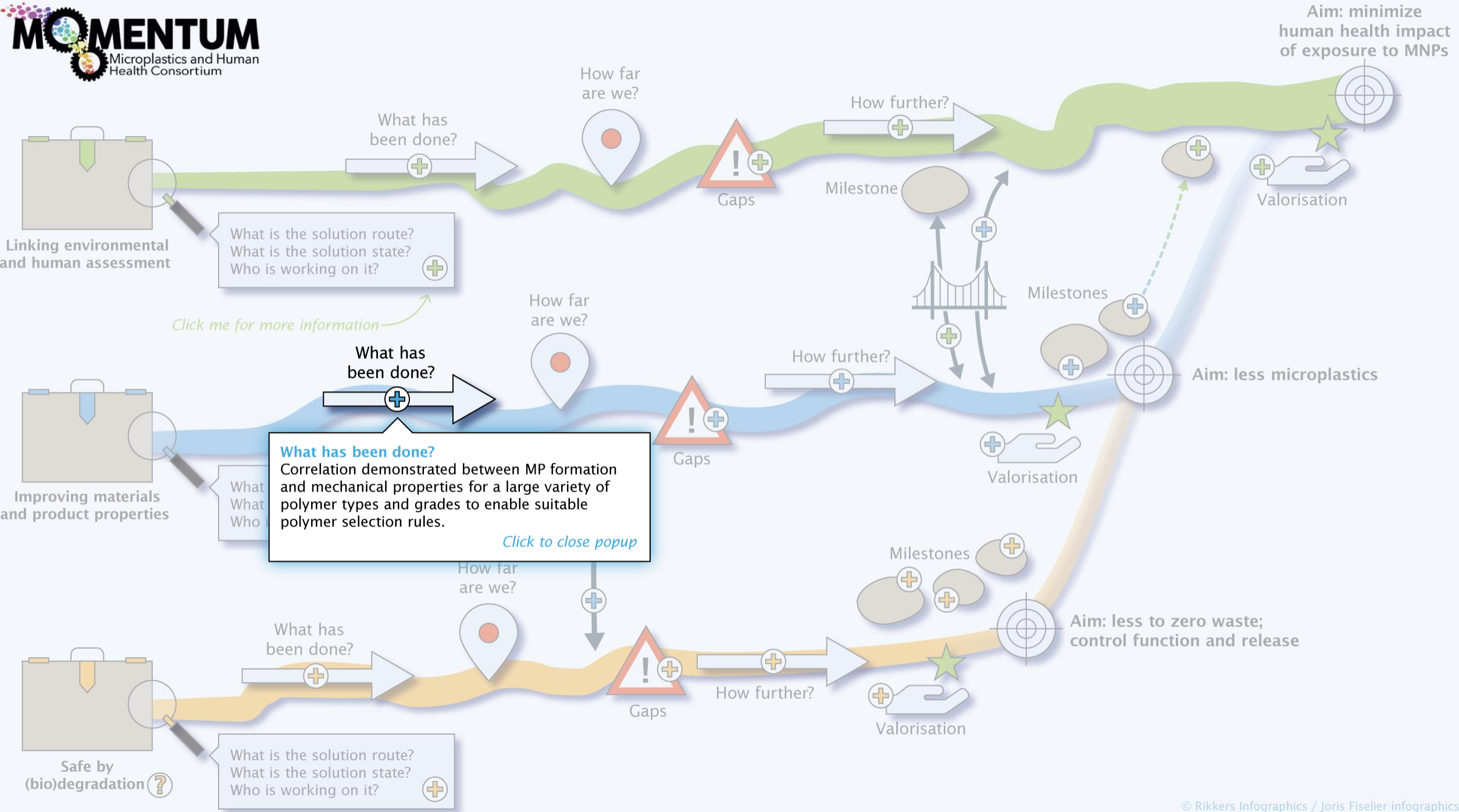
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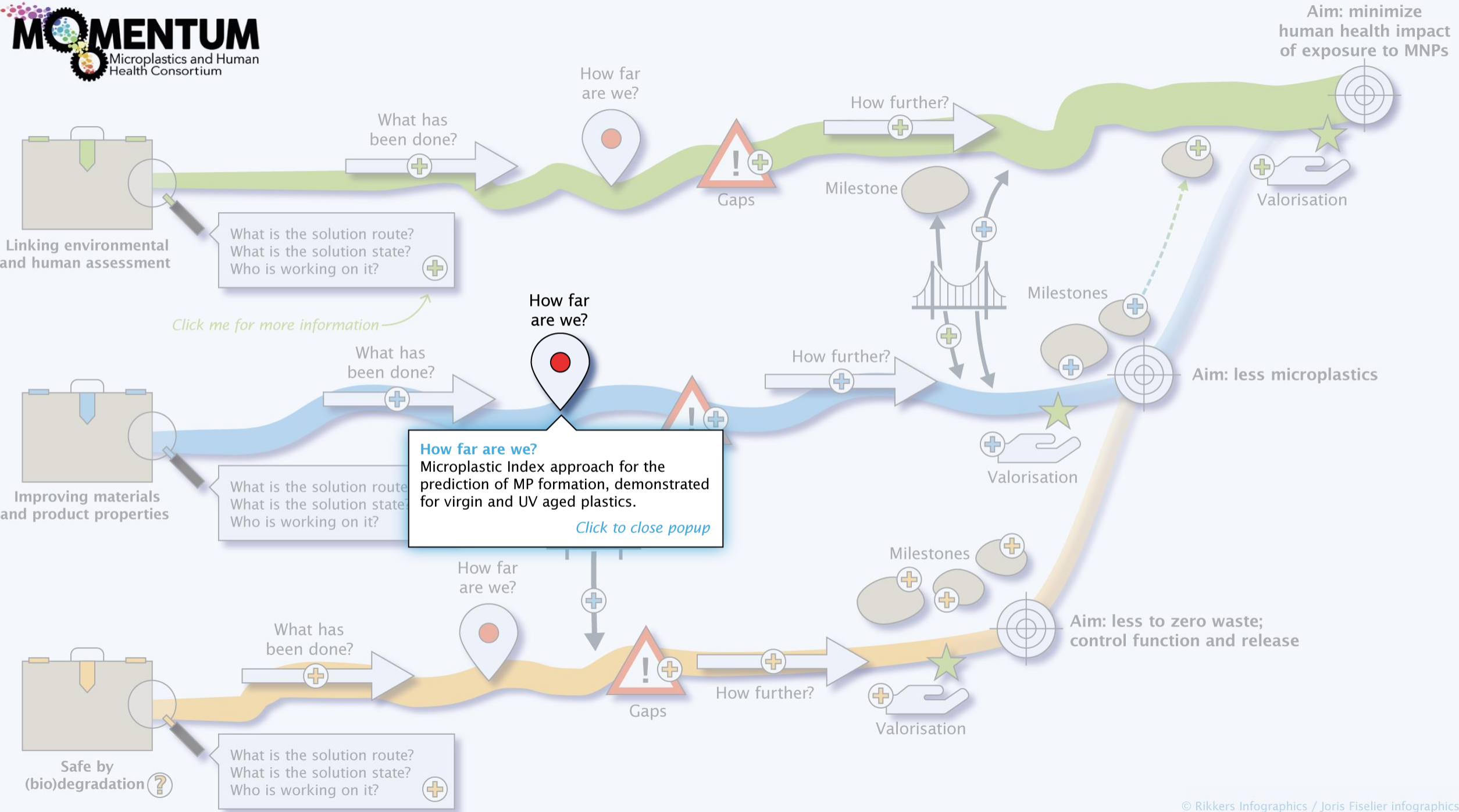


Aim: less to zero waste; control function and release

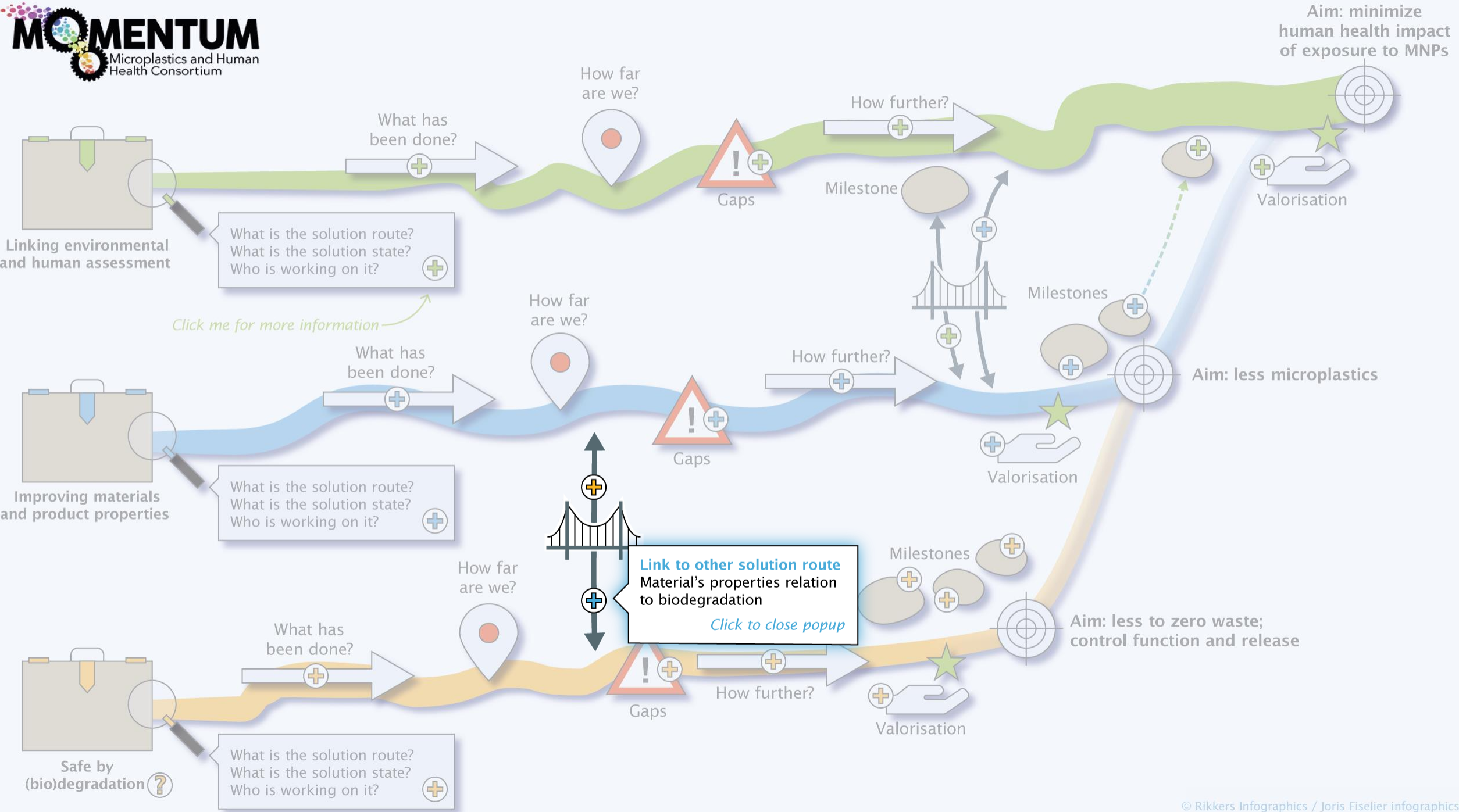




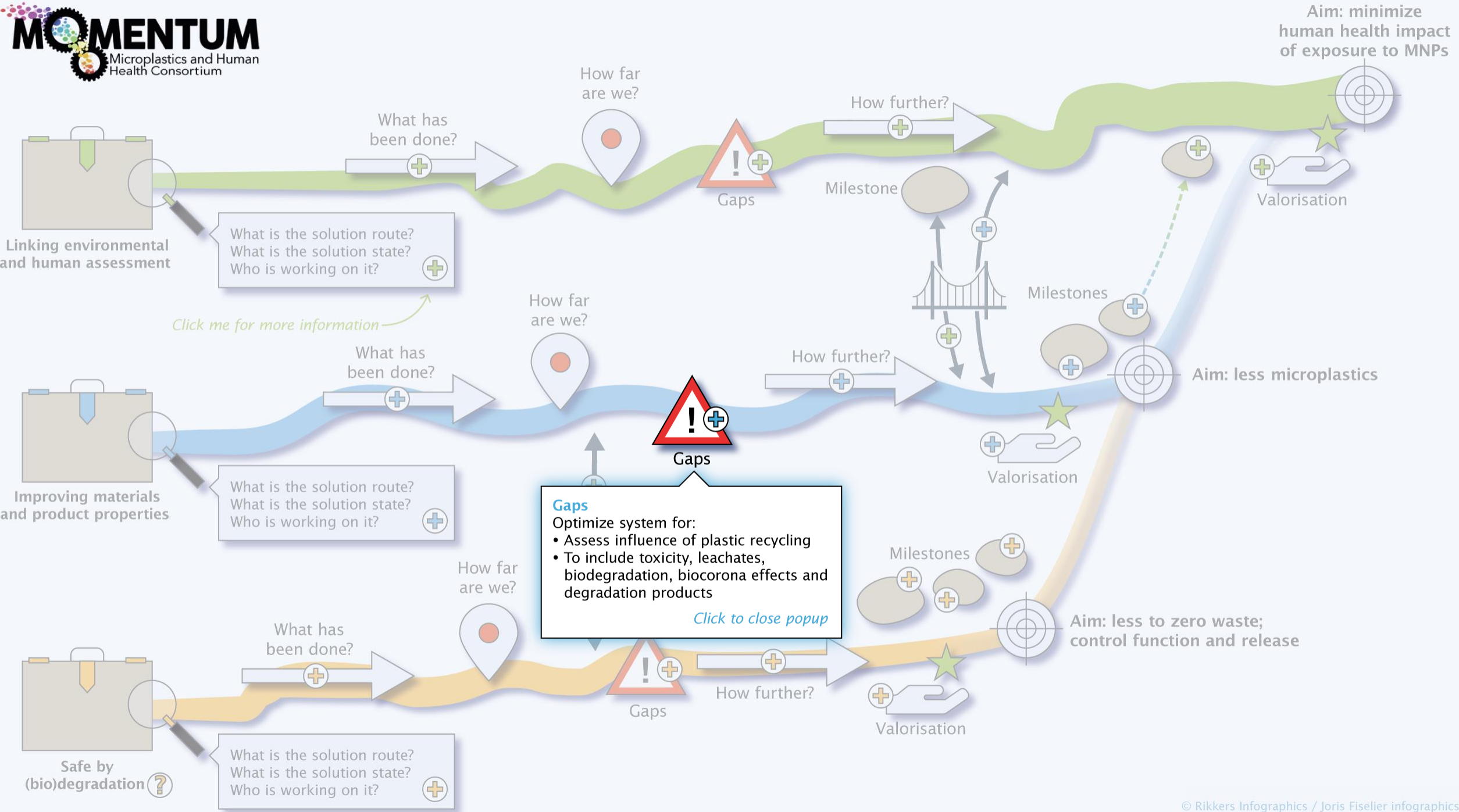












Aim: minimize human health impact of exposure to MNPs

Linking environmental and human assessment

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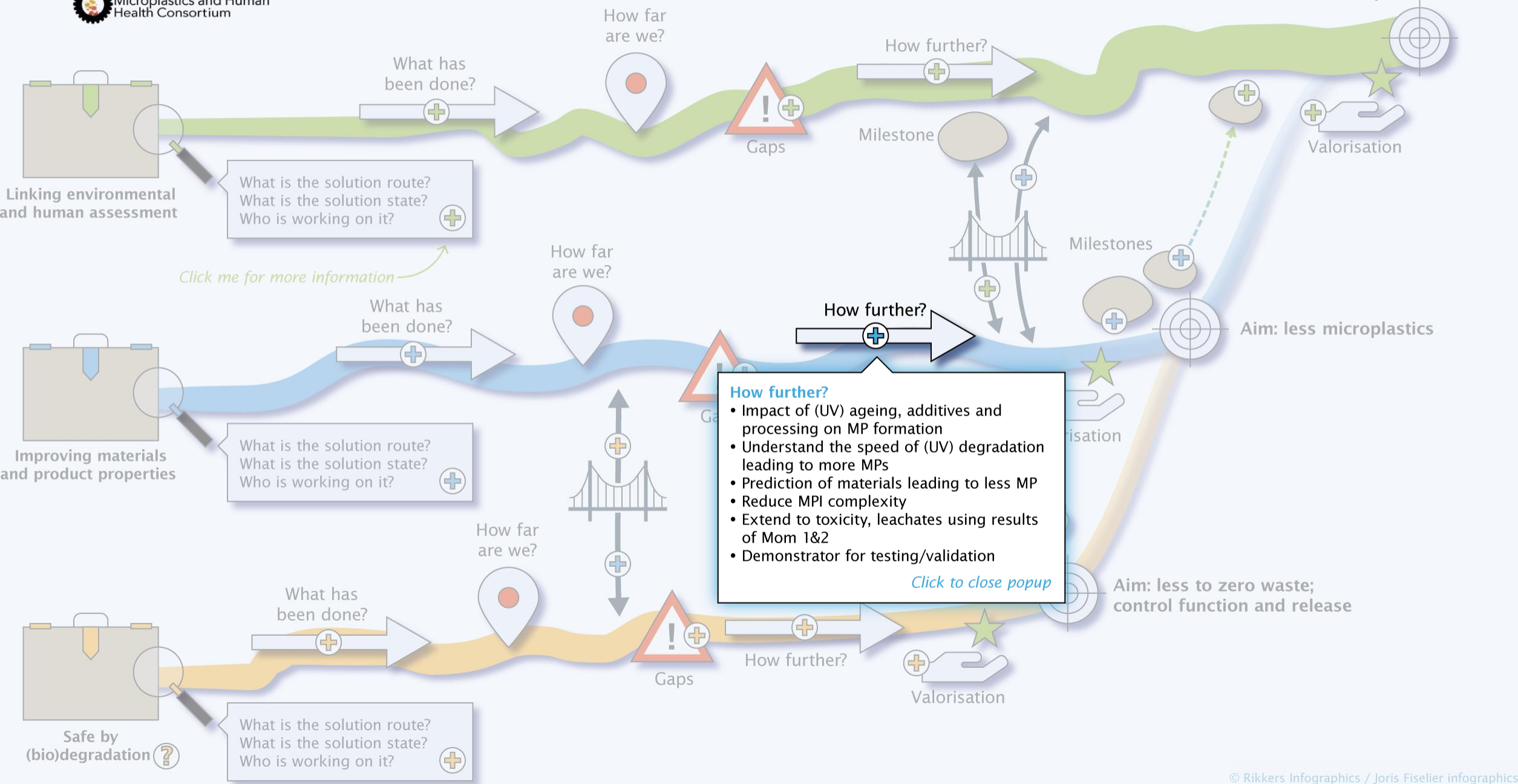
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Improving materials and product properties

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Safe by (bio)degradation

What is the solution route?  
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Aim: minimize human health impact of exposure to MNPs

Linking environmental and human assessment

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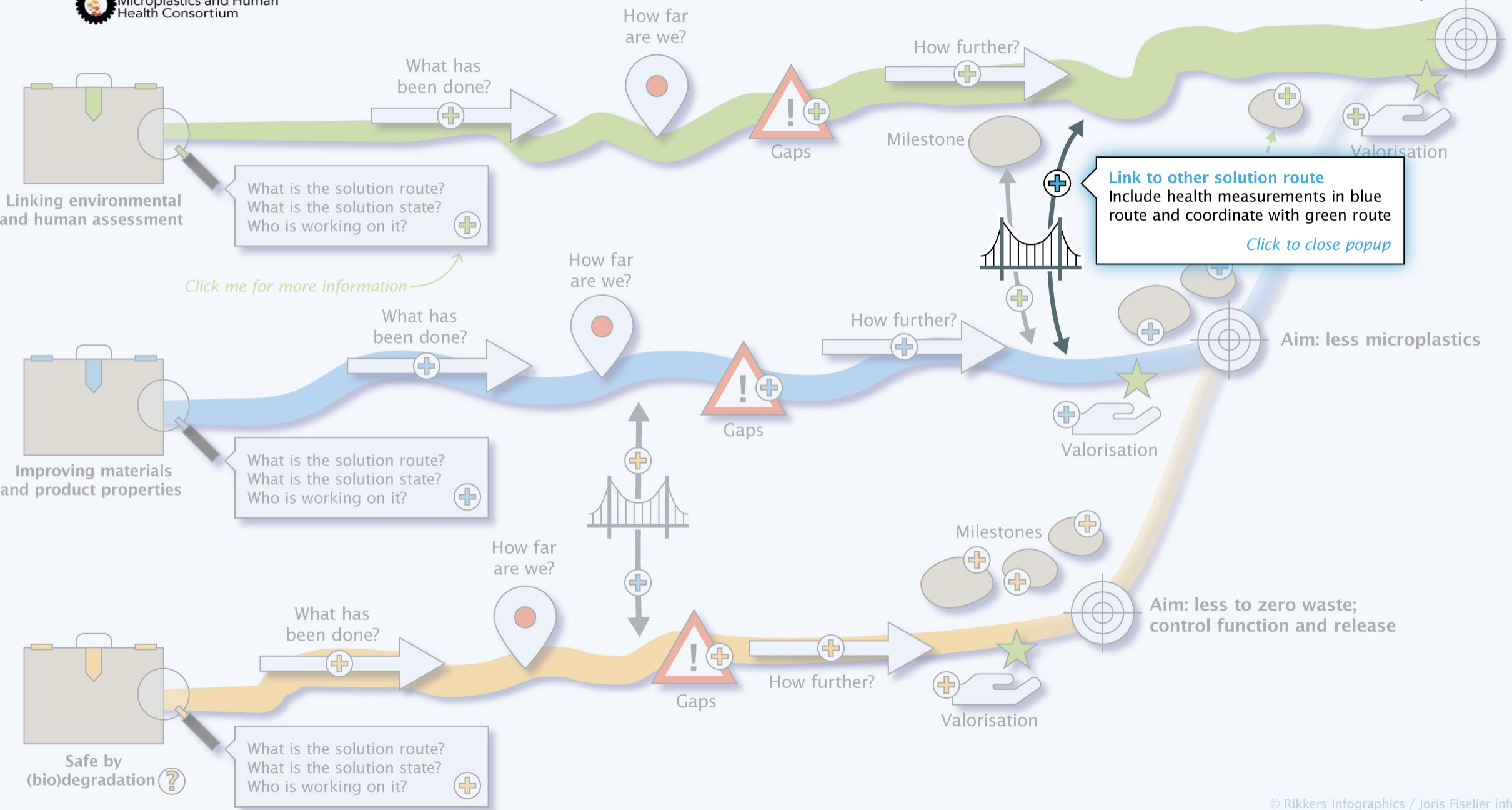
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Improving materials and product properties

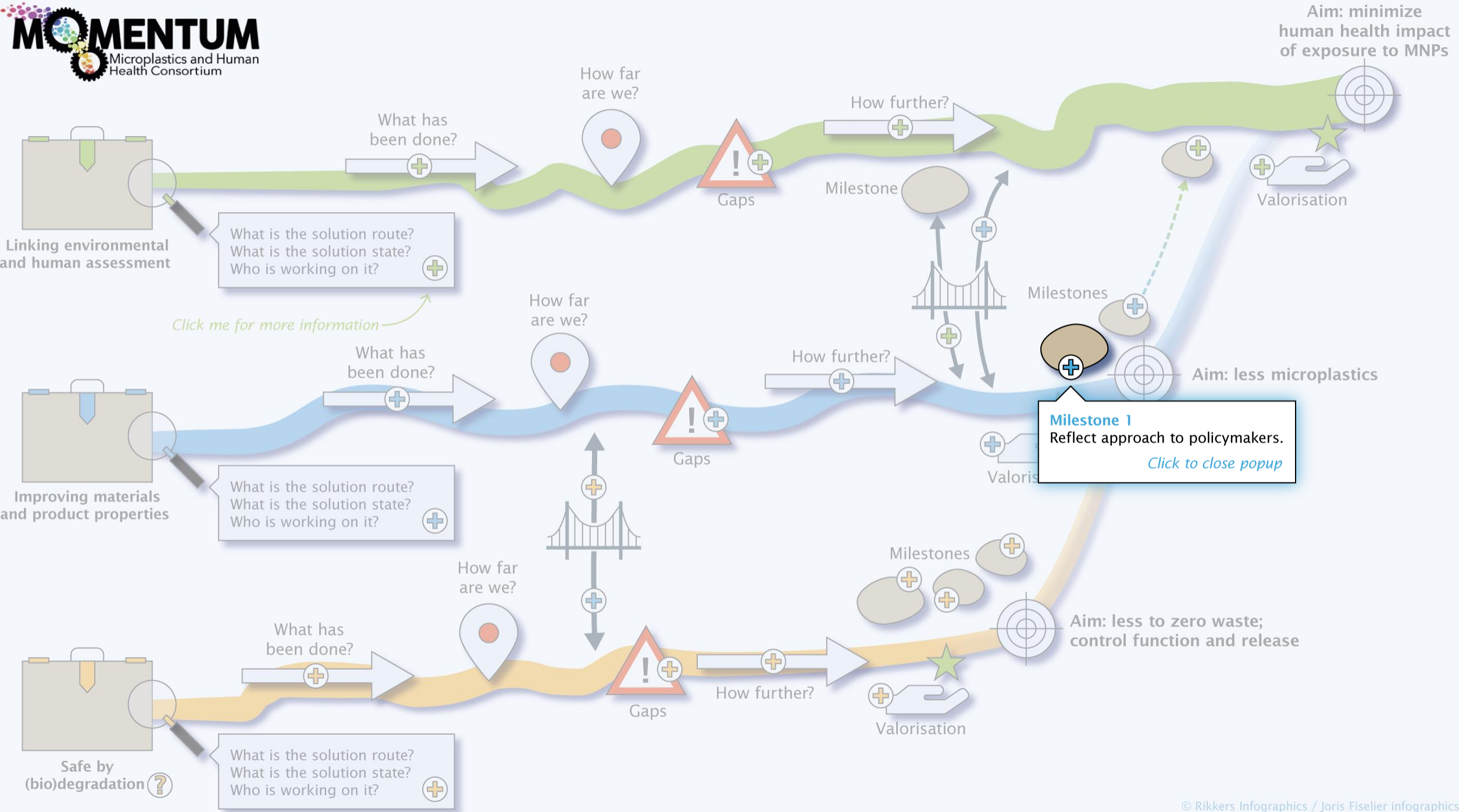
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Safe by (bio)degradation

What is the solution route?  
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Aim: minimize human health impact of exposure to MNPs

Linking environmental and human assessment

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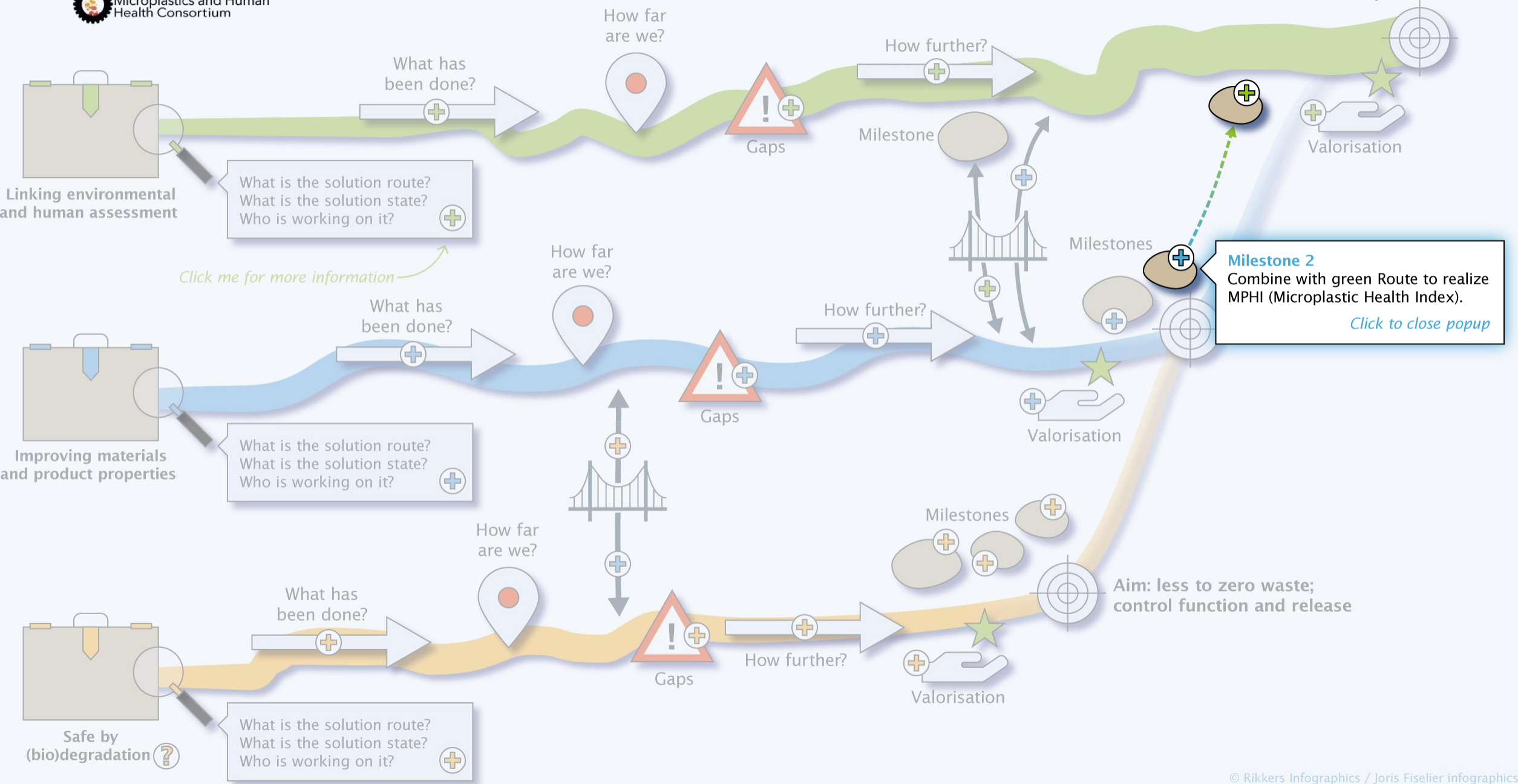
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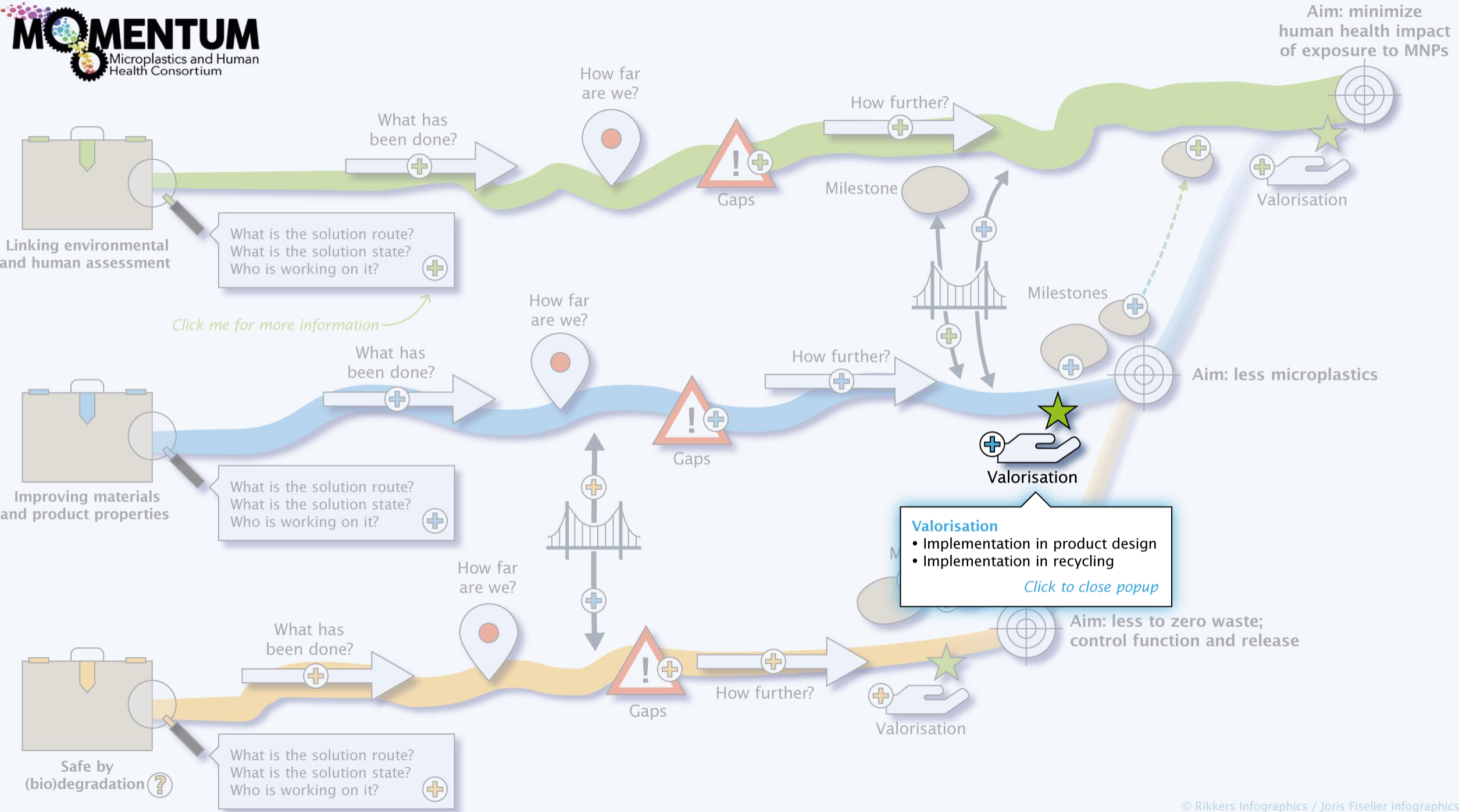
Improving materials and product properties

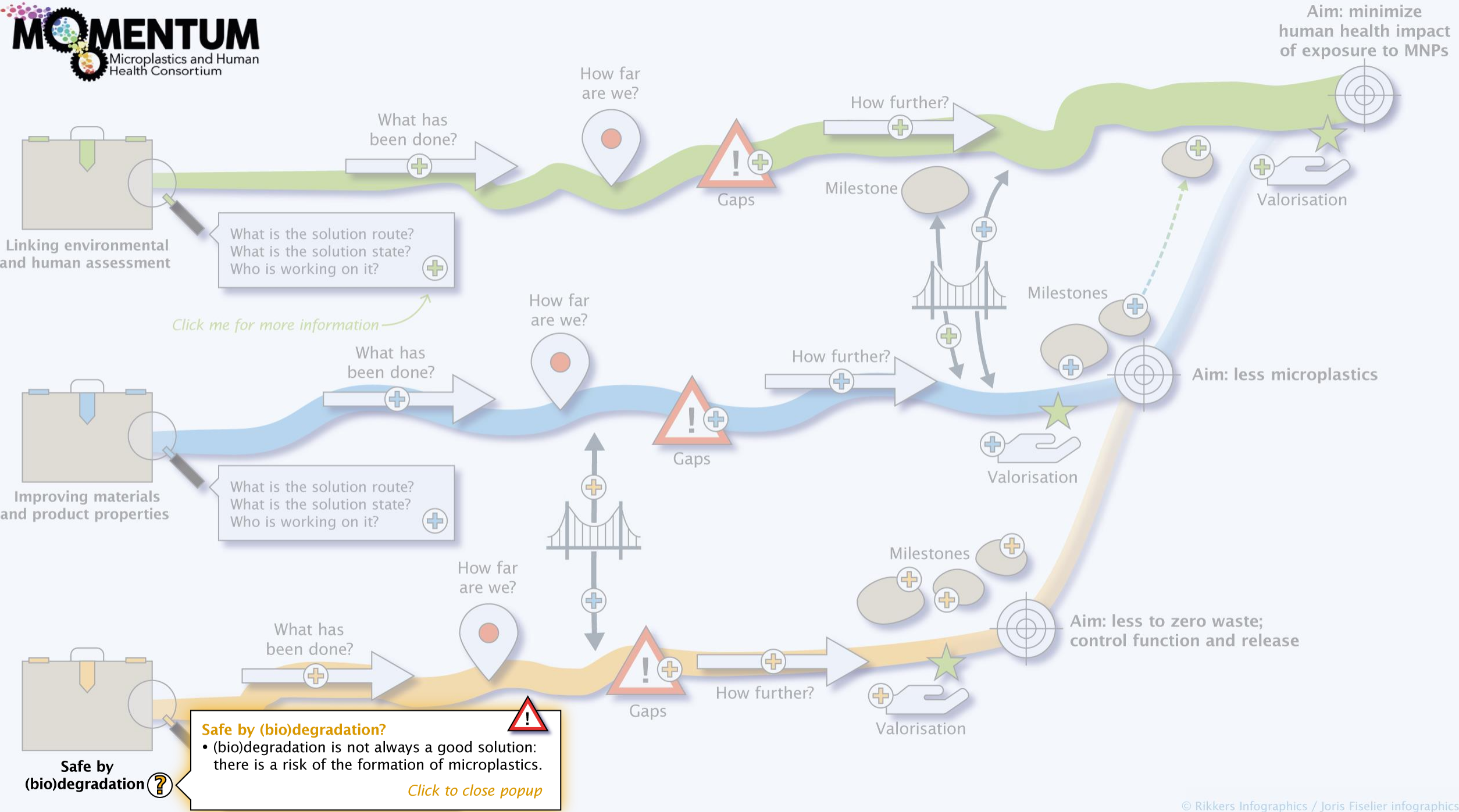
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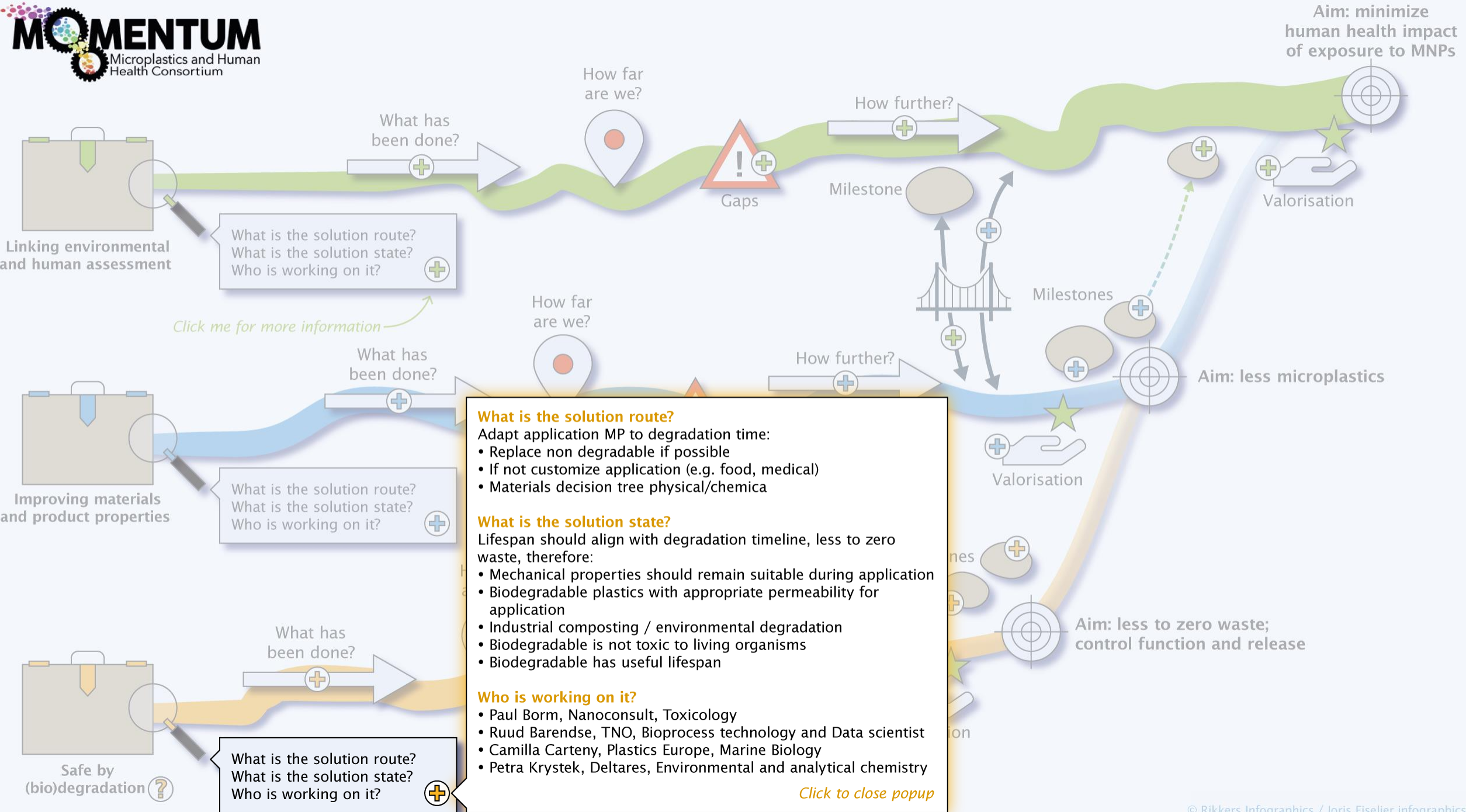
What is the solution route?  
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Linking environmental and human assessment

What is the solution route?  
What is the solution state?  
Who is working on it?

*Click me for more information*

Improving materials and product properties

What is the solution route?  
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Who is working on it?

Safe by (bio)degradation ?

What is the solution route?  
What is the solution state?  
Who is working on it?

**What is the solution route?**  
Adapt application MP to degradation time:

- Replace non degradable if possible
- If not customize application (e.g. food, medical)
- Materials decision tree physical/chemica

**What is the solution state?**  
Lifespan should align with degradation timeline, less to zero waste, therefore:

- Mechanical properties should remain suitable during application
- Biodegradable plastics with appropriate permeability for application
- Industrial composting / environmental degradation
- Biodegradable is not toxic to living organisms
- Biodegradable has useful lifespan

**Who is working on it?**

- Paul Borm, Nanoconsult, Toxicology
- Ruud Barendse, TNO, Bioprocess technology and Data scientist
- Camilla Carteny, Plastics Europe, Marine Biology
- Petra Krystek, Deltares, Environmental and analytical chemistry

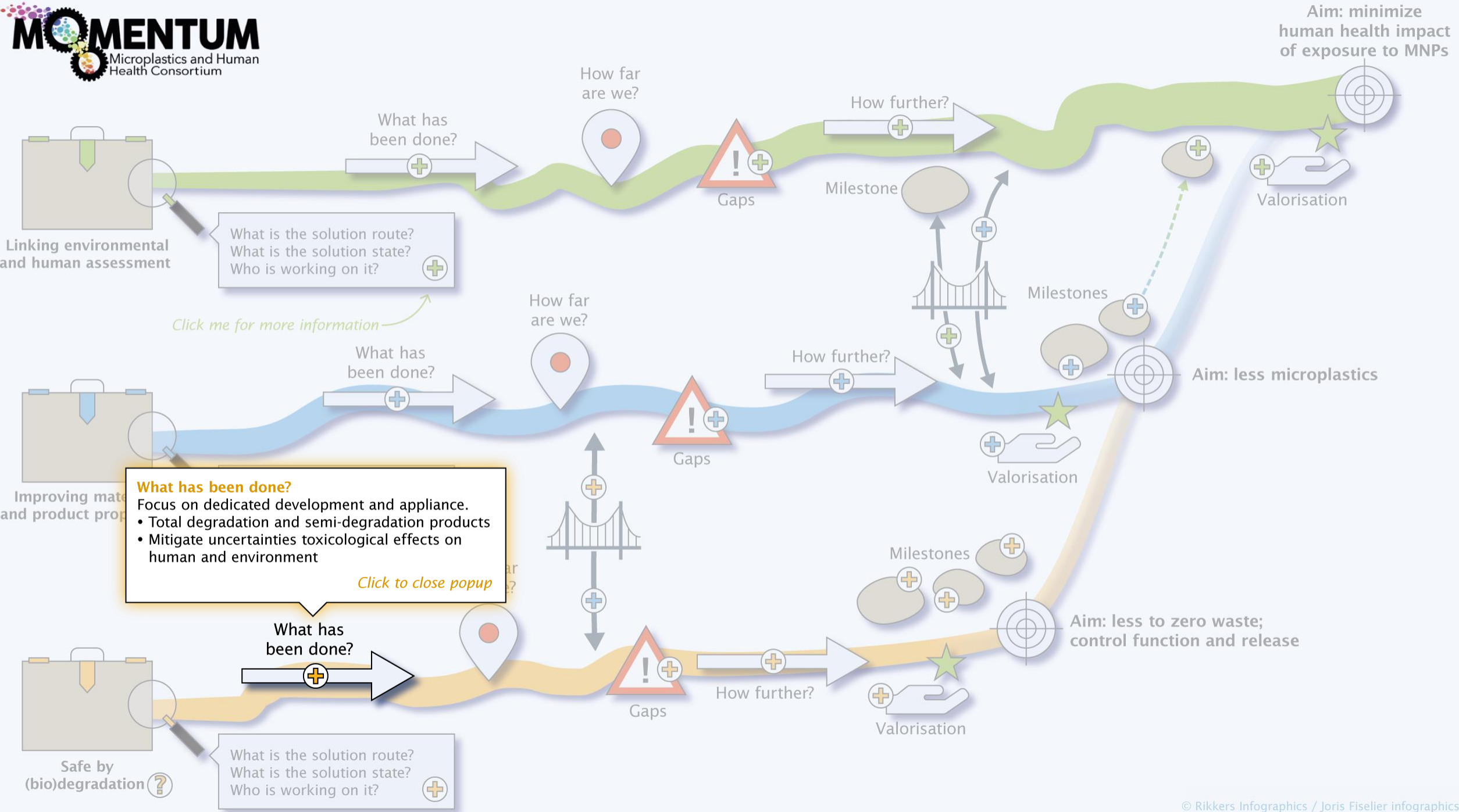
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Aim: minimize human health impact of exposure to MNPs

Aim: less microplastics

Aim: less to zero waste; control function and release





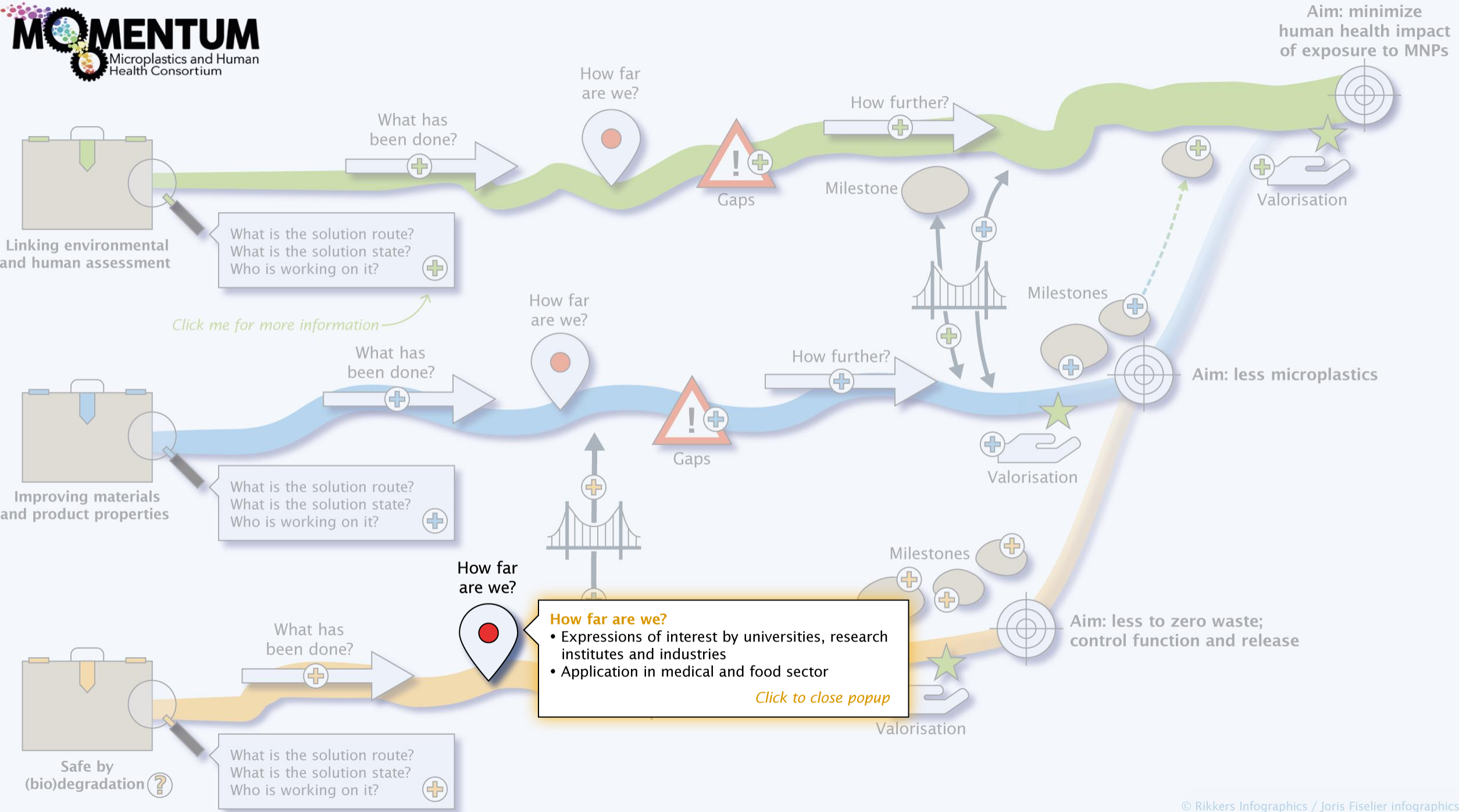
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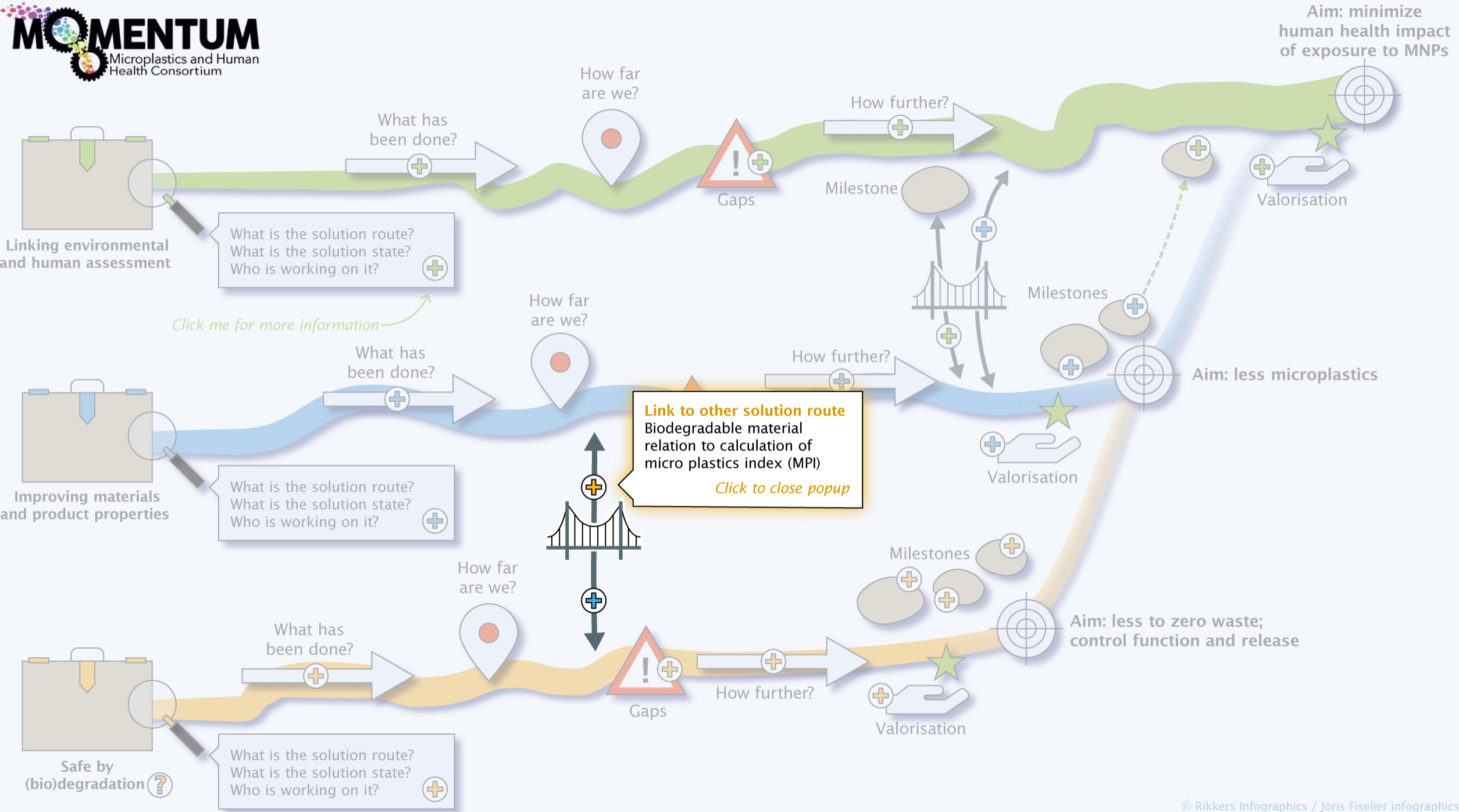
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**What has been done?**  
Focus on dedicated development and appliance.  
• Total degradation and semi-degradation products  
• Mitigate uncertainties toxicological effects on human and environment

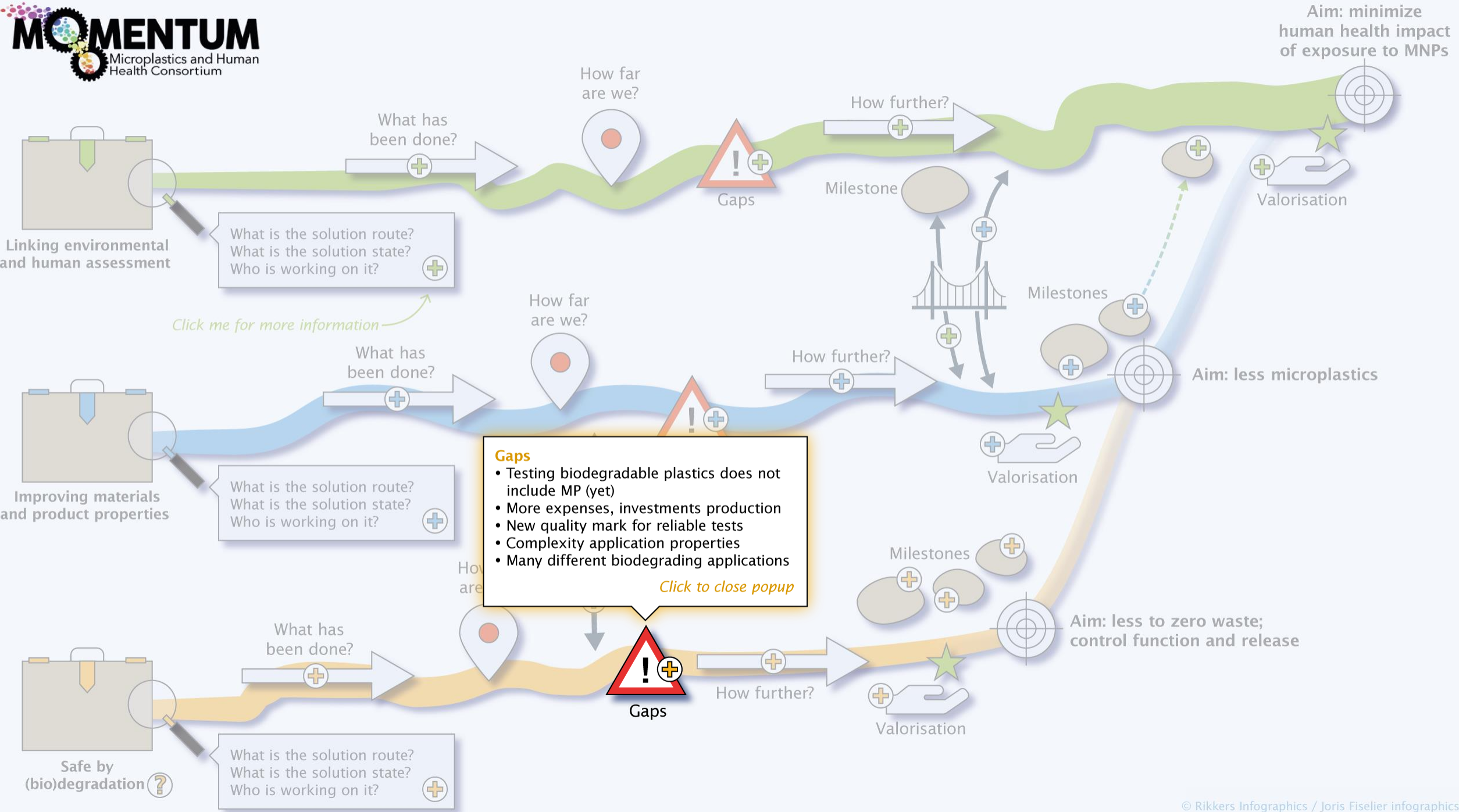
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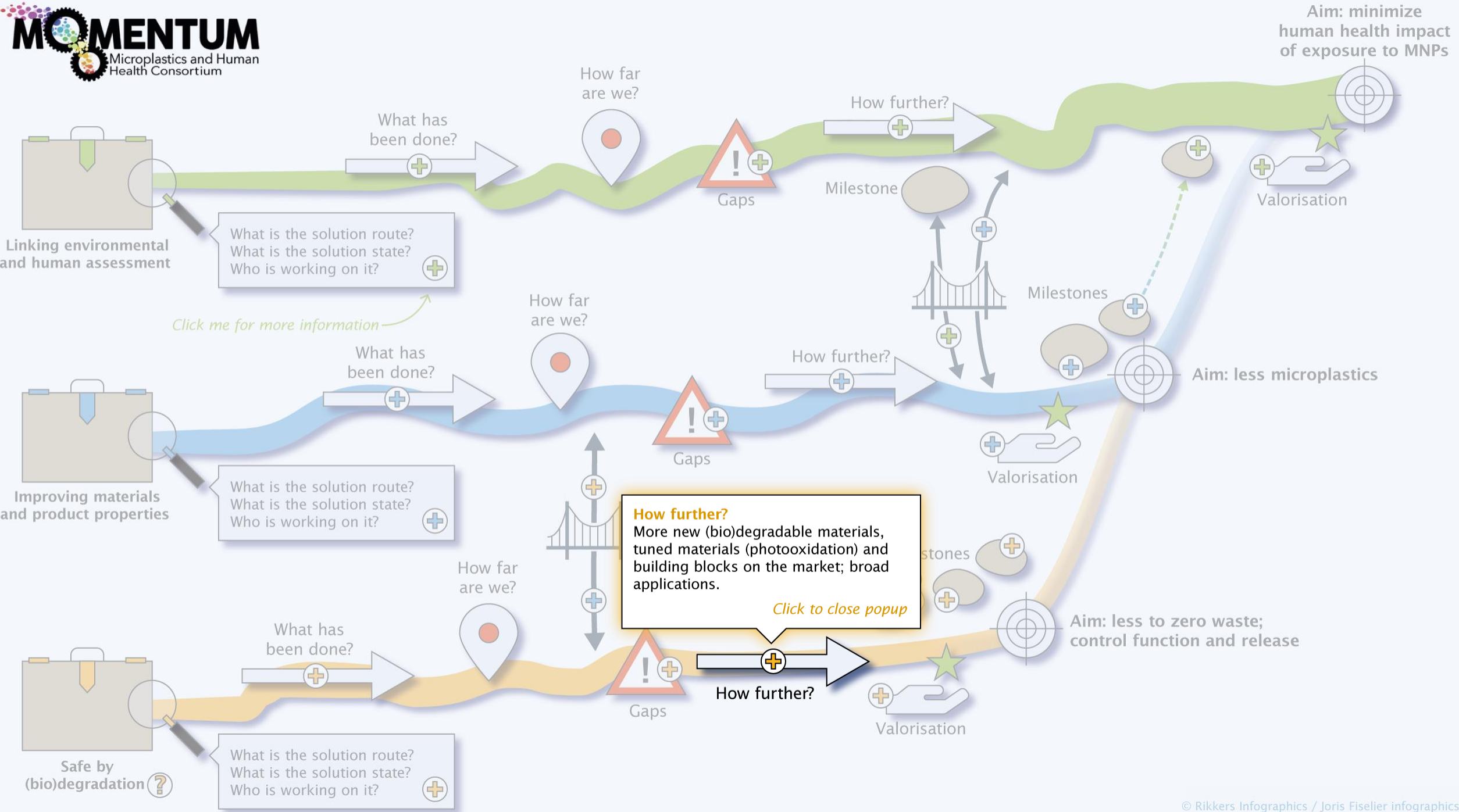
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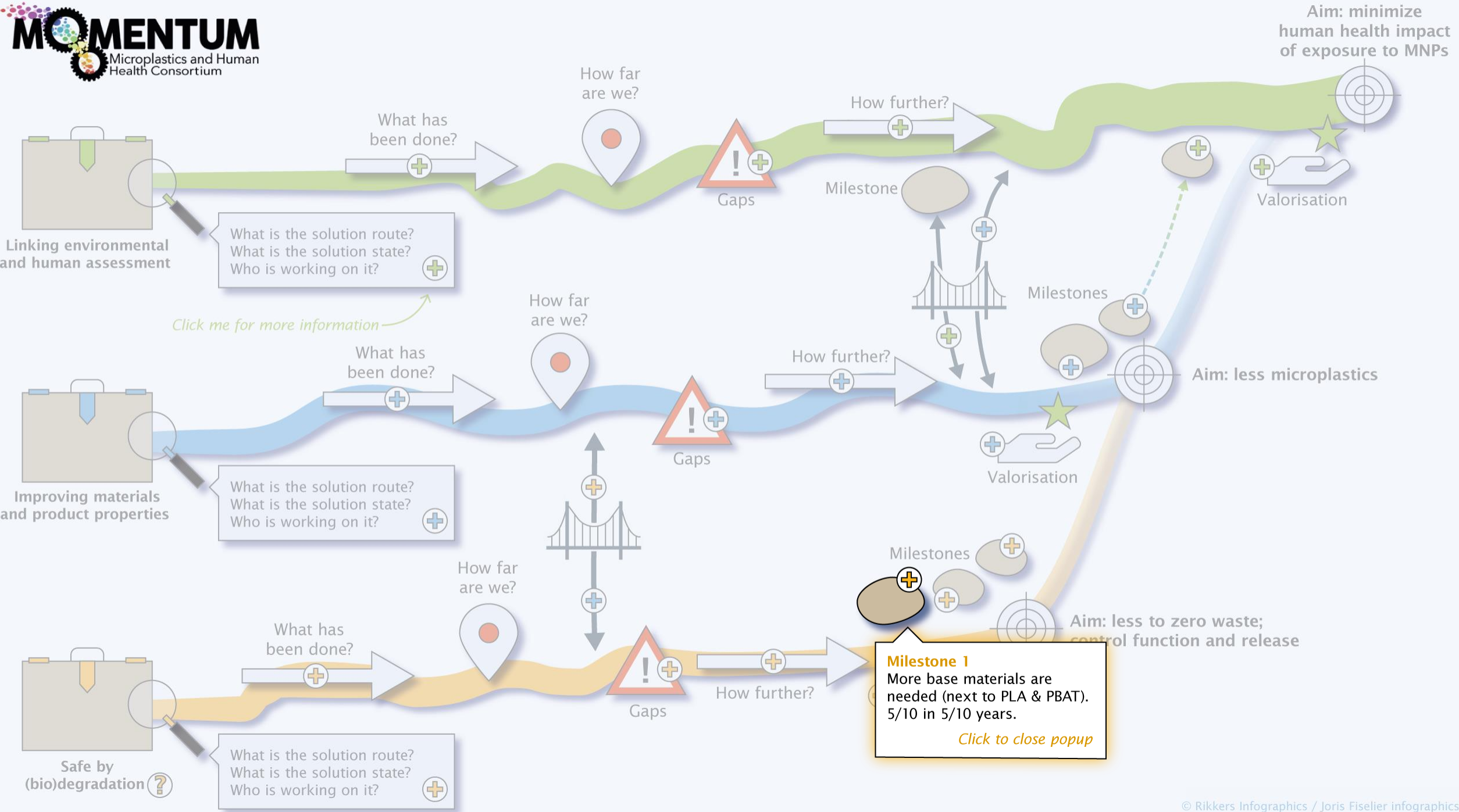














Aim: minimize human health impact of exposure to MNPs

Linking environmental and human assessment

What is the solution route?  
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*Click me for more information*

Improving materials and product properties

What is the solution route?  
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Safe by (bio)degradation

What is the solution route?  
What is the solution state?  
Who is working on it?

How far are we?

What has been done?



Gaps

How further?

Milestone

Valorisation

How far are we?

What has been done?



Gaps

How further?

Milestones

Aim: less microplastics

How far are we?

What has been done?



Gaps

How further?

Milestones

Aim: less to zero waste; reduction and release

**Milestone 2**  
New quality mark for testing.  
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Valorisation

Aim: minimize human health impact of exposure to MNPs

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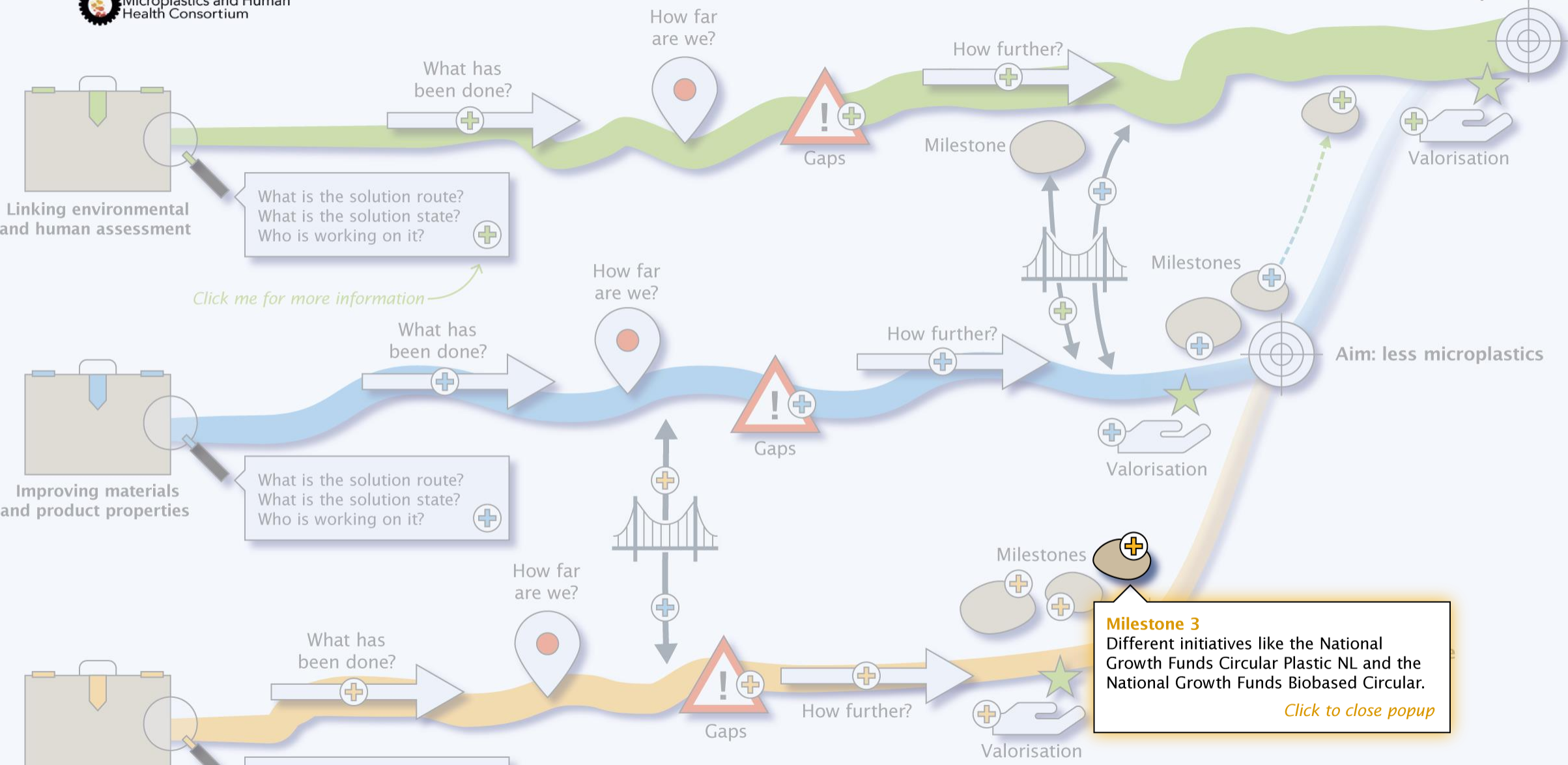
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Safe by (bio)degradation

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**Milestone 3**  
Different initiatives like the National Growth Funds Circular Plastic NL and the National Growth Funds Biobased Circular.  
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