

Powder Flow Workshop

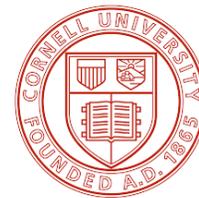


Konrad Herbst (Topsoe), Navin Venugopal (Corning),
Willie Hendrickson and Jim Michaels (IFPRI), Michel Louge (Cornell)
hosted by Purdue University, June 9-10, 2022

special thanks to Paul Mort (Purdue) and Poom Bunchatheeravate (Vertex)

TOPSOE

CORNING



Previous IFPRI Powder Flow Workshops

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- 2003 Bremen PFW
(Roger Place, Paul Mort, Gaby Tardos, MYL)

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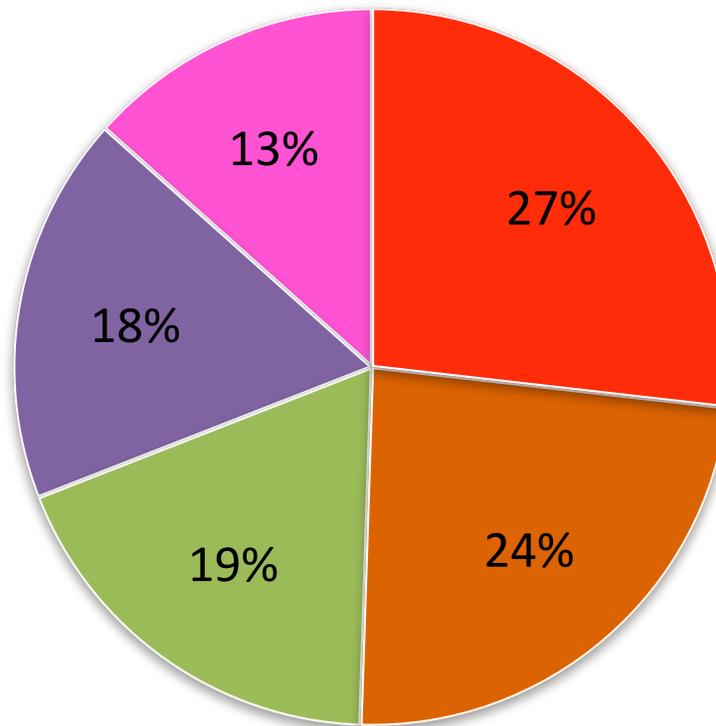
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- 2020 Philadelphia 'Cohesion Wkshp' (Massih Pasha, Jeremy Lechman, Marty Murtagh, MYL)

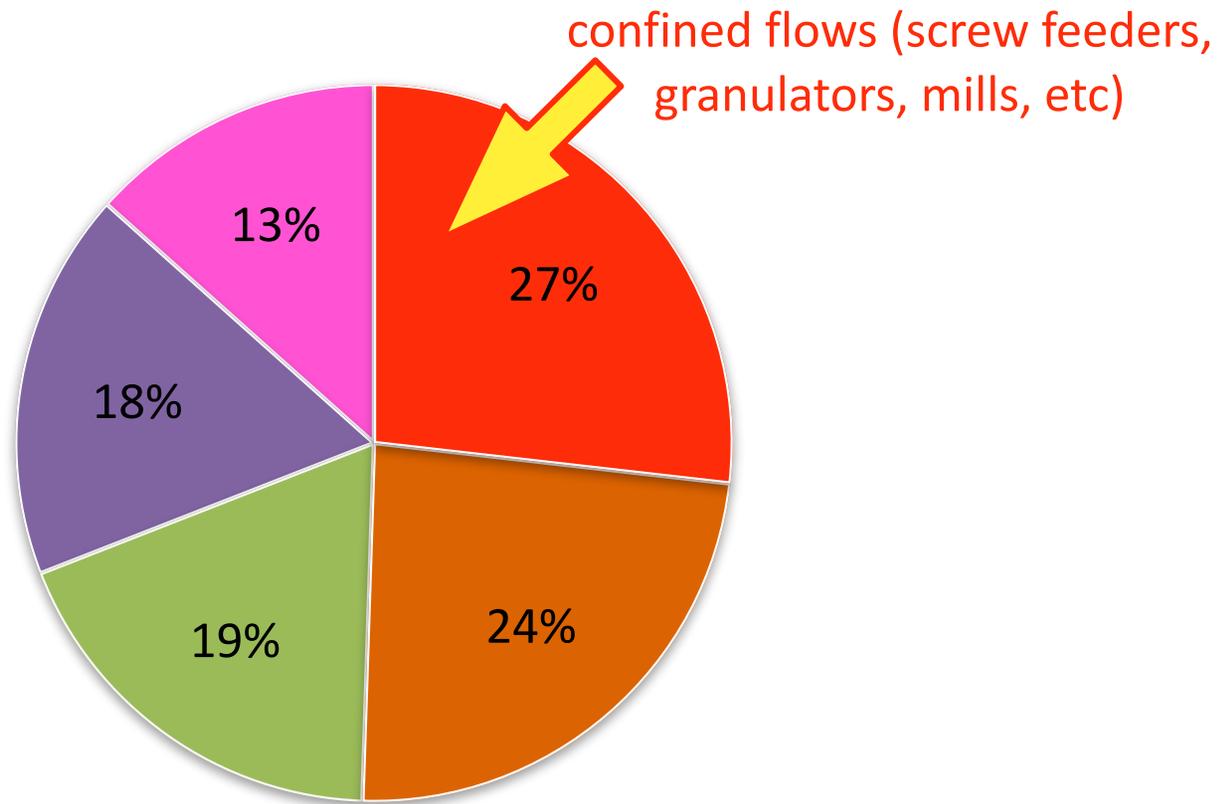
IFPRI Members Survey - powder flow configuration(s)

“[...] powder flow configurations of your interest?” ⇒ added and sorted



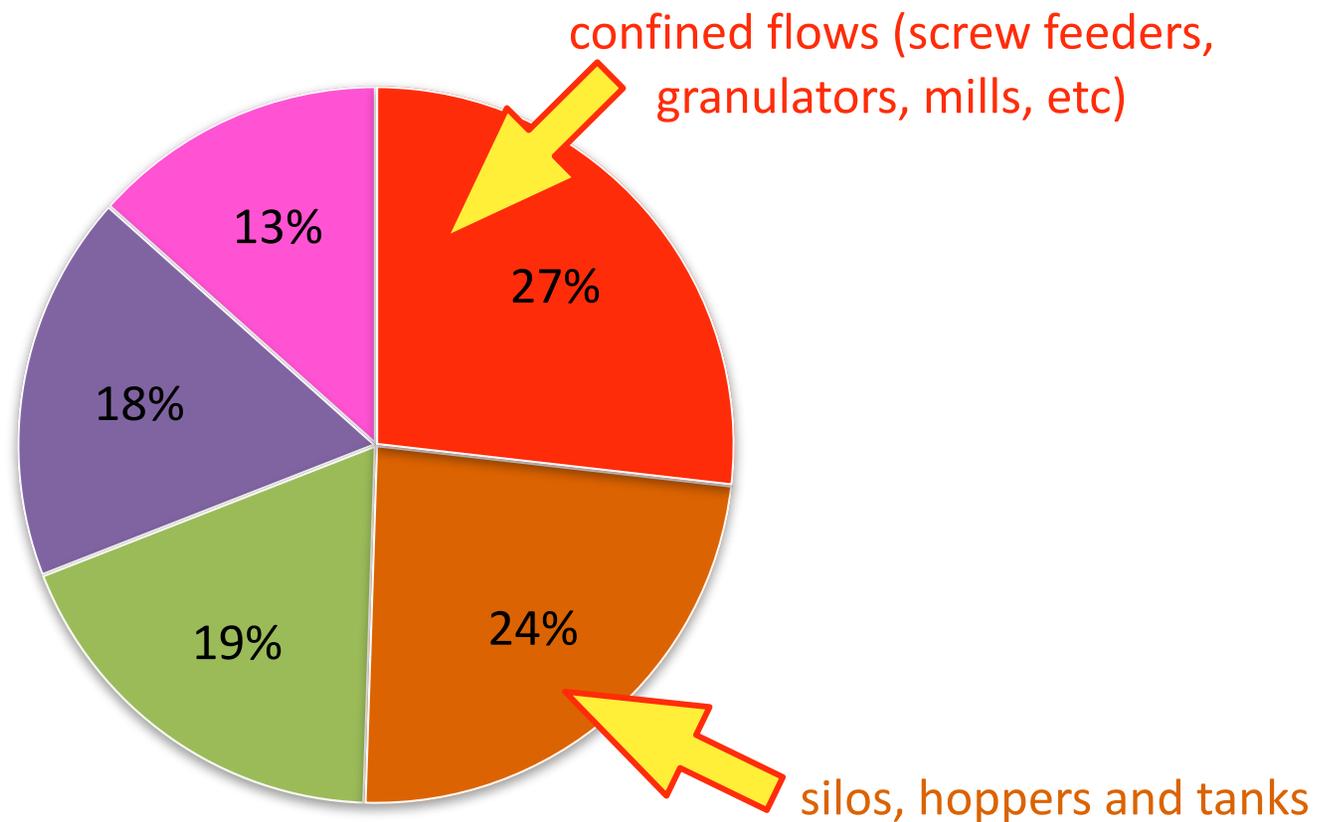
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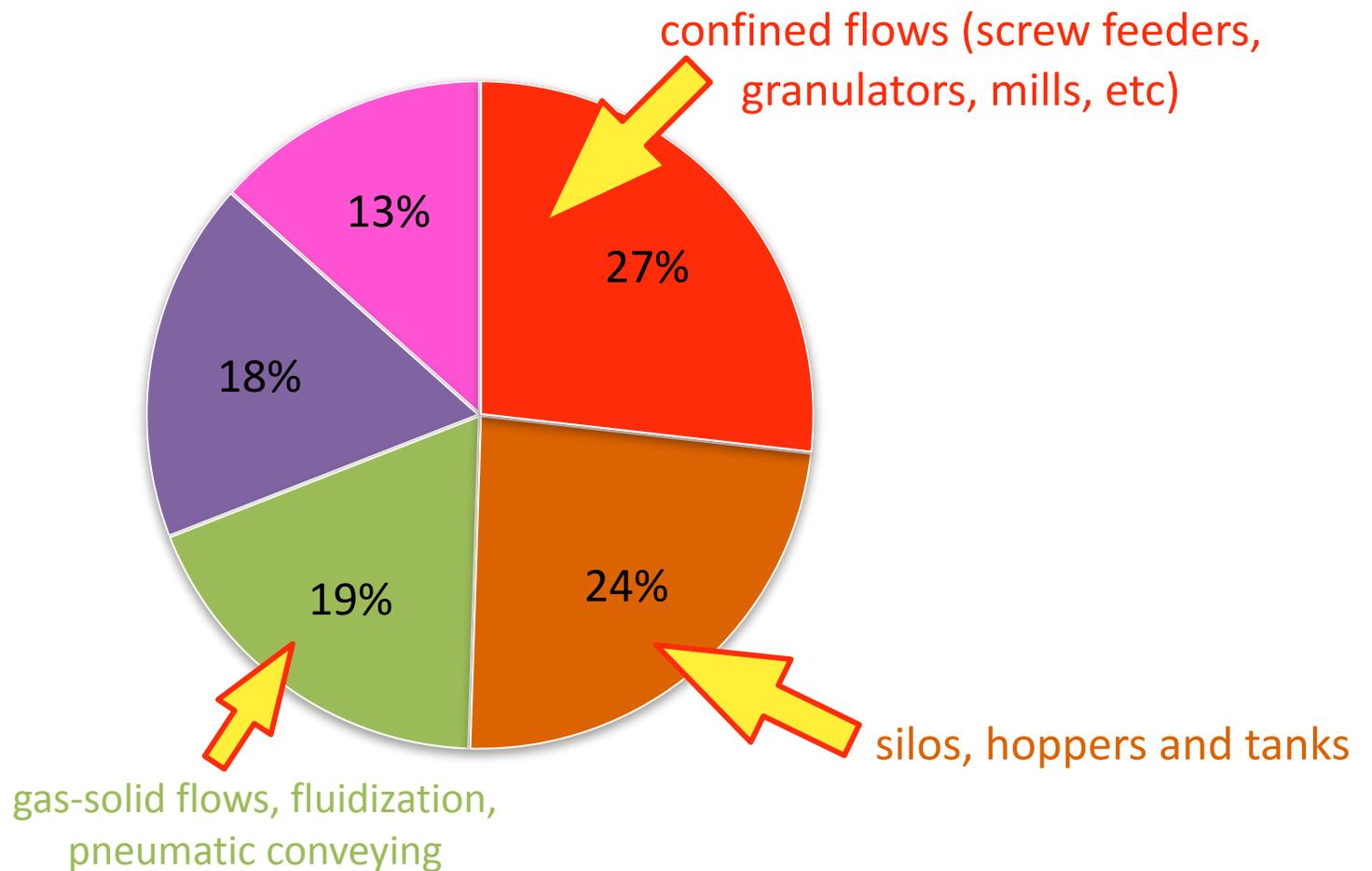
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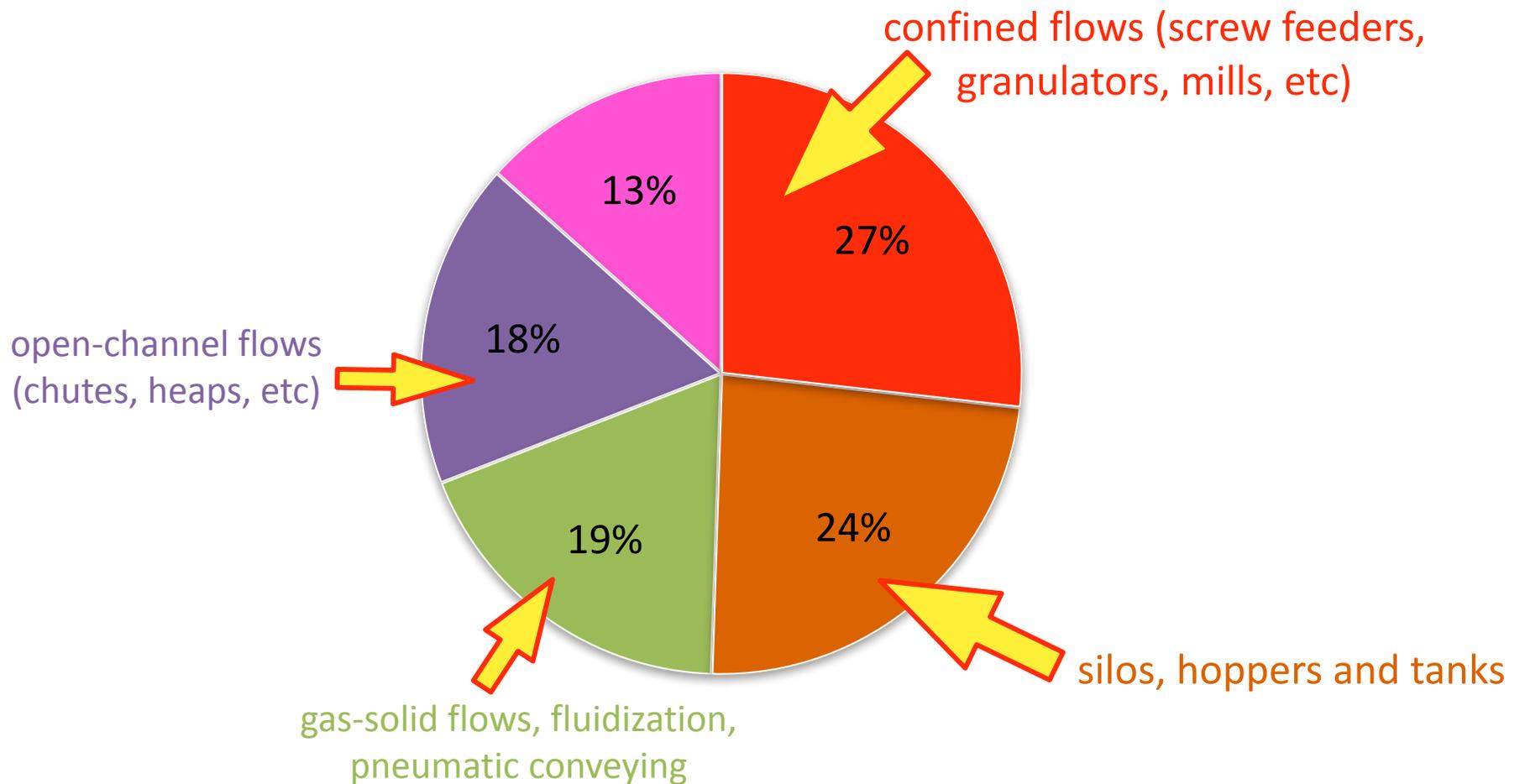
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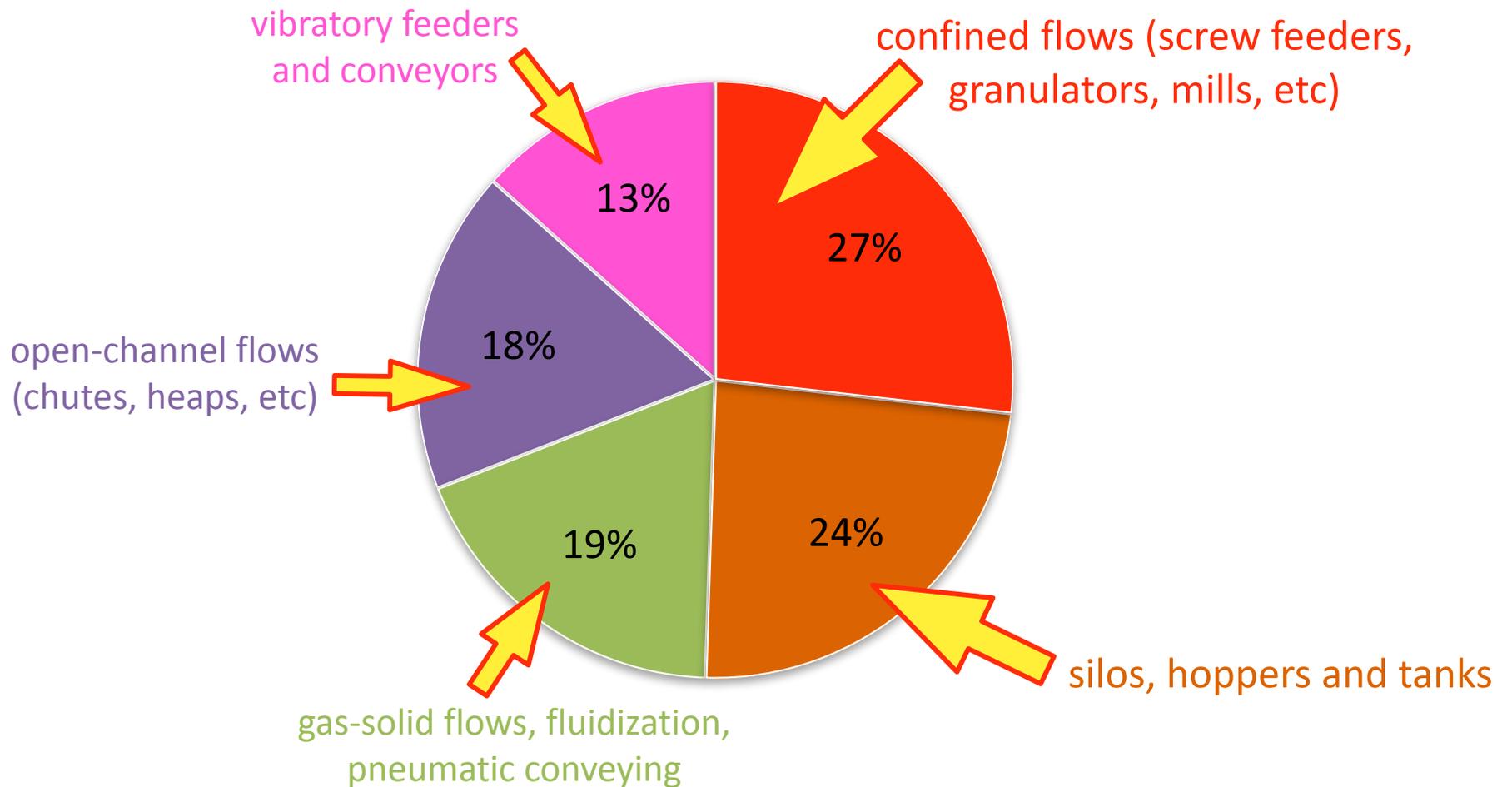
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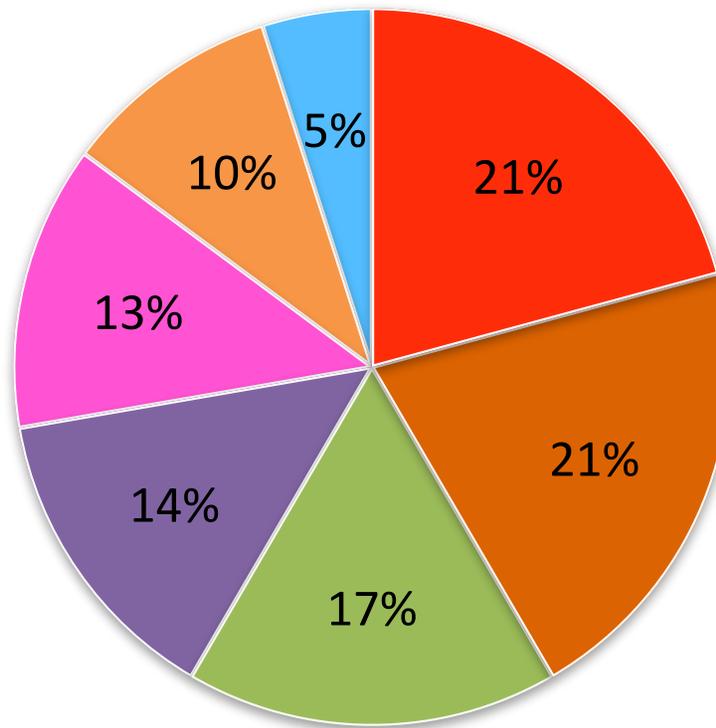
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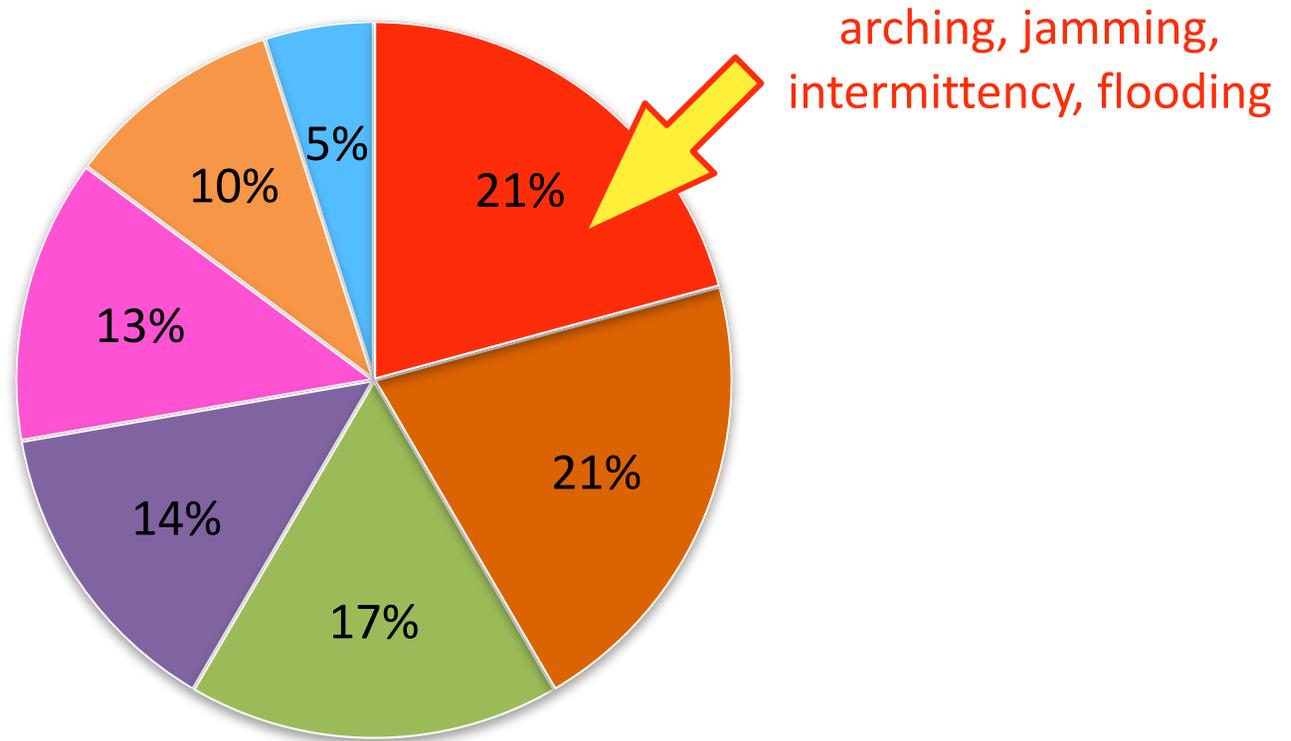
IFPRI Members Survey - issues with powder flow

“Please rank-order your issues with powder flow” ⇒ weighed by importance and sorted



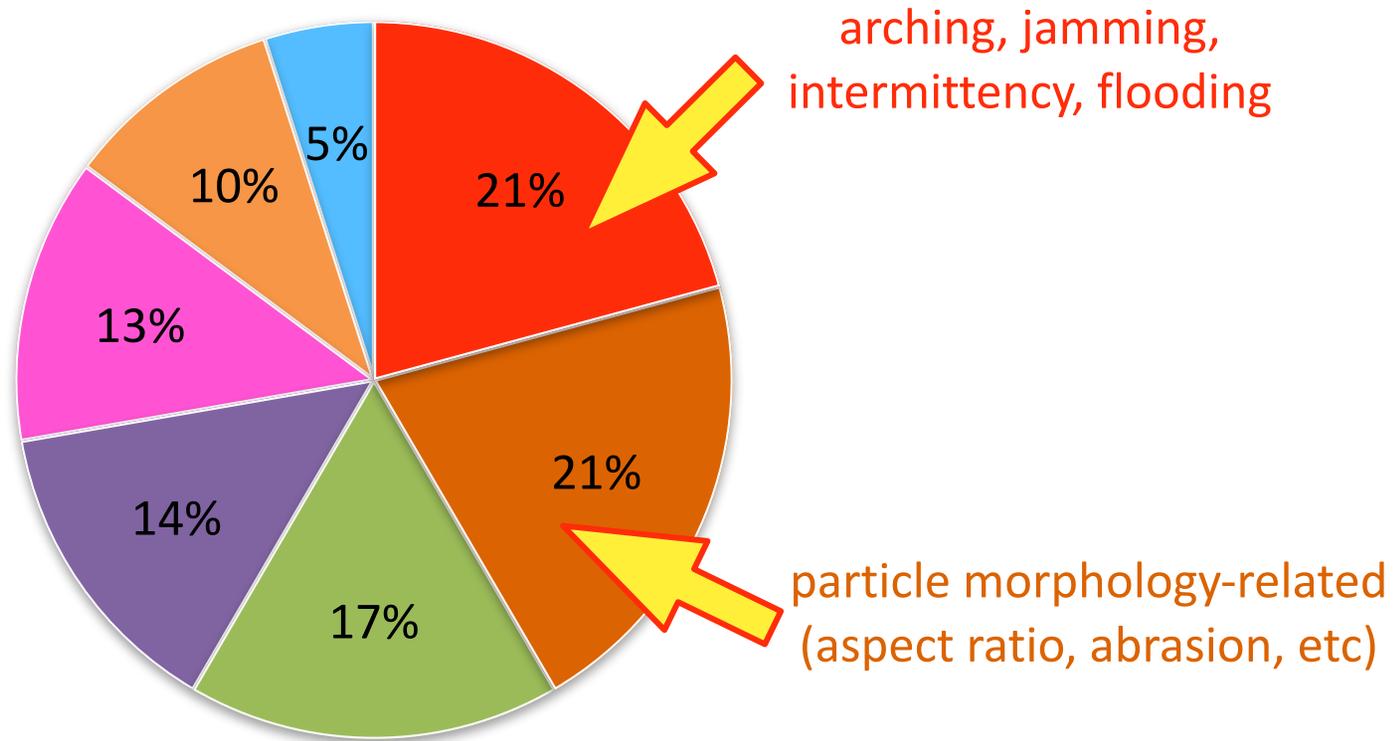
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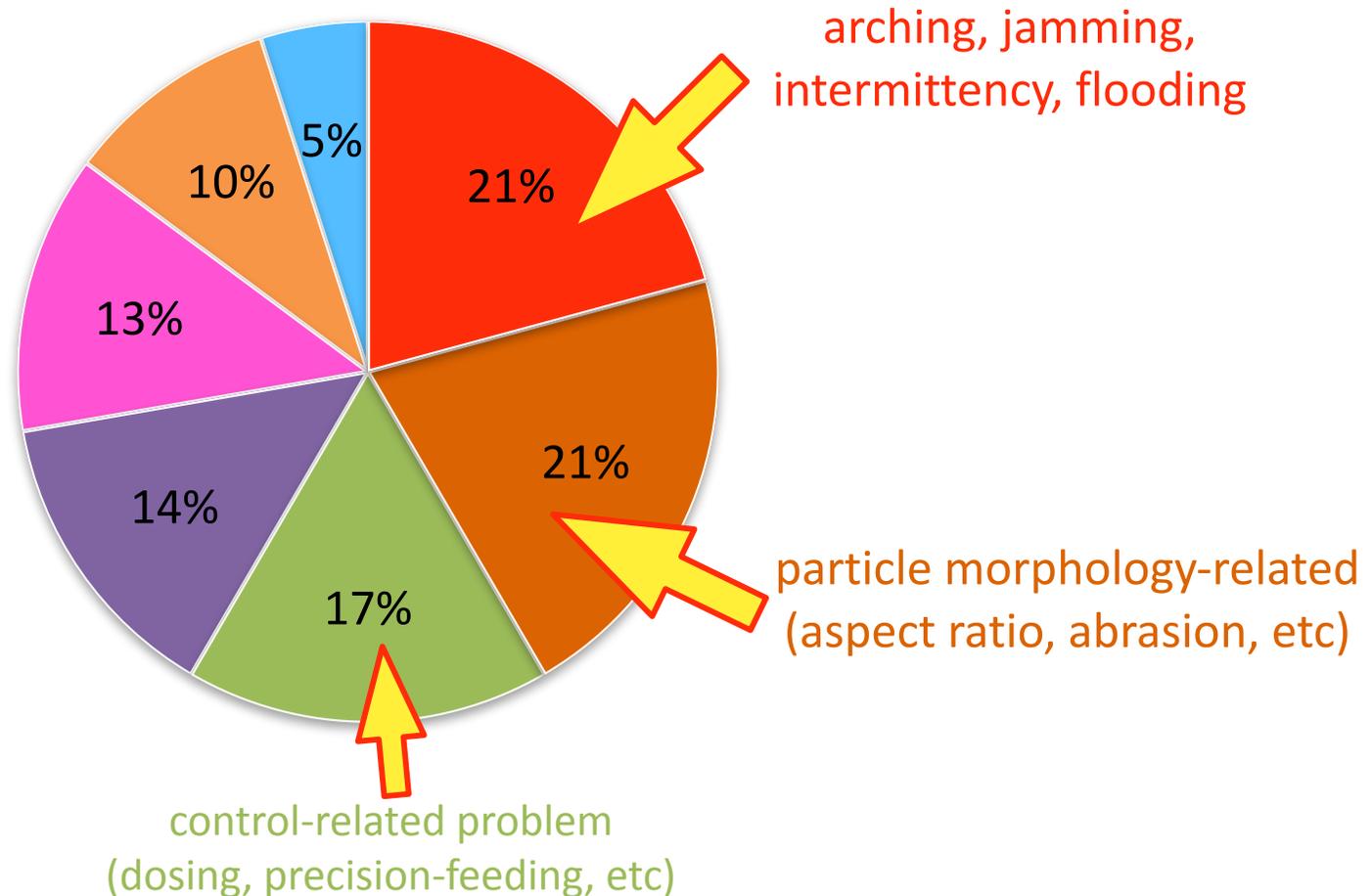
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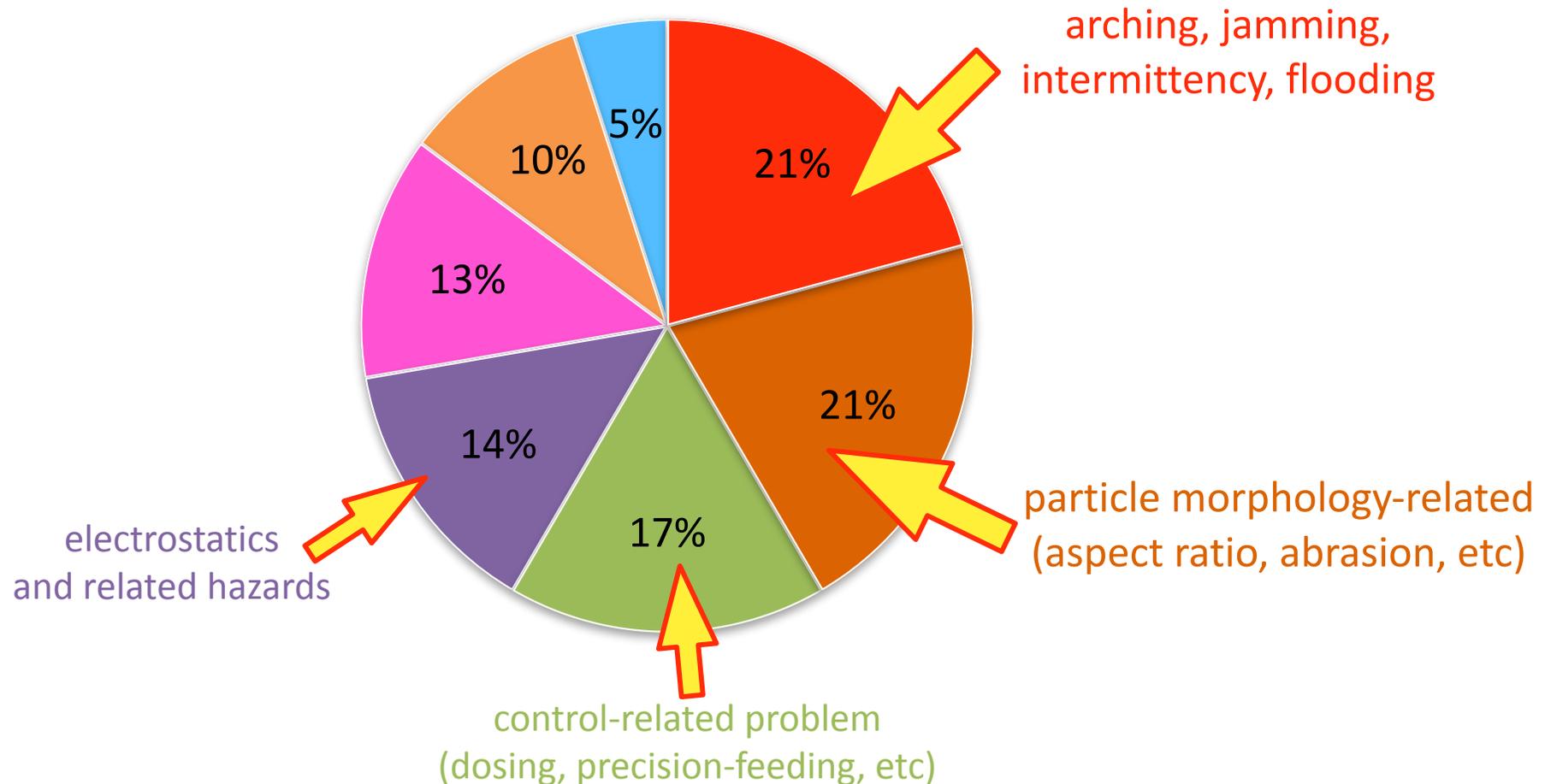
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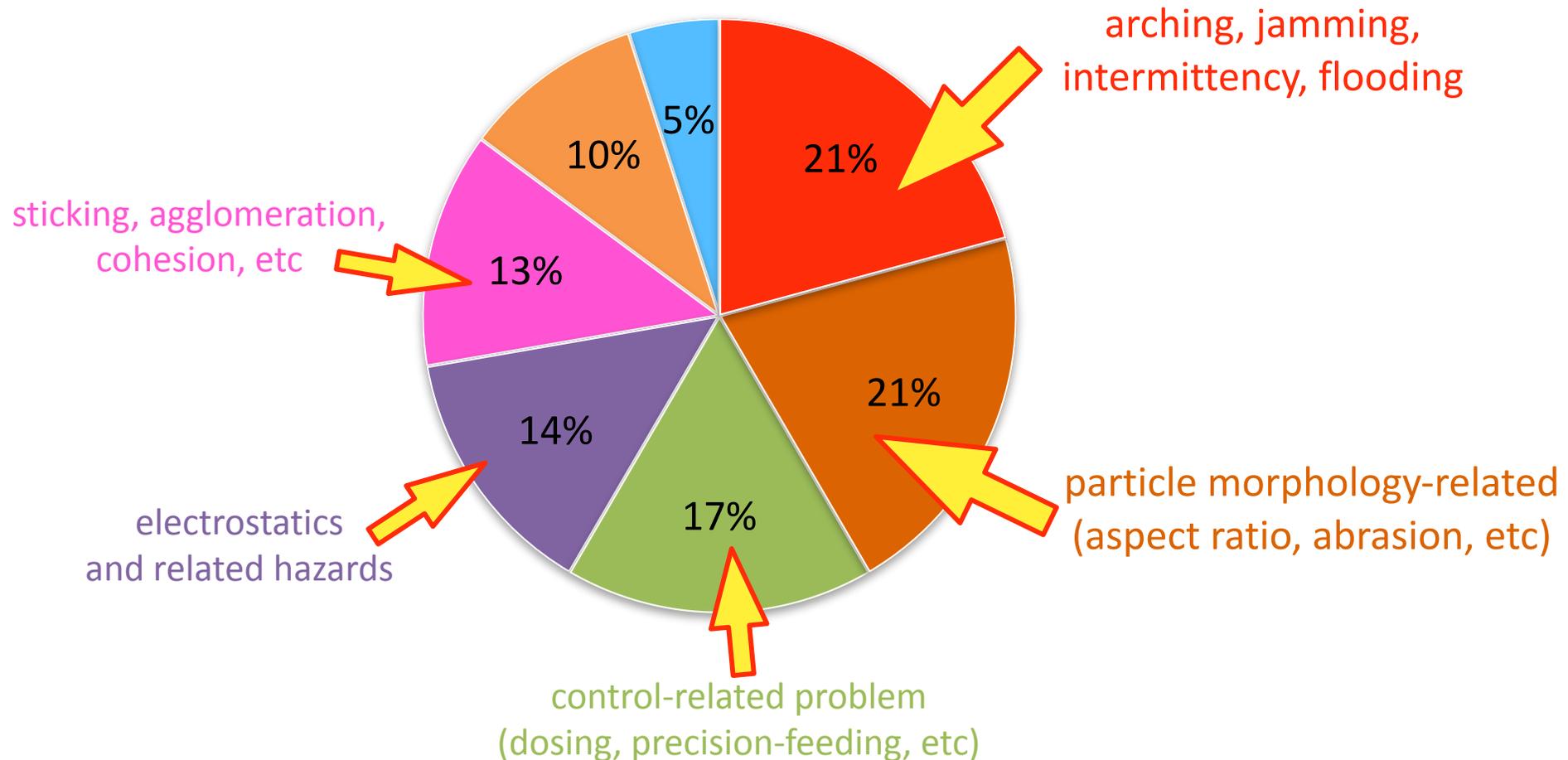
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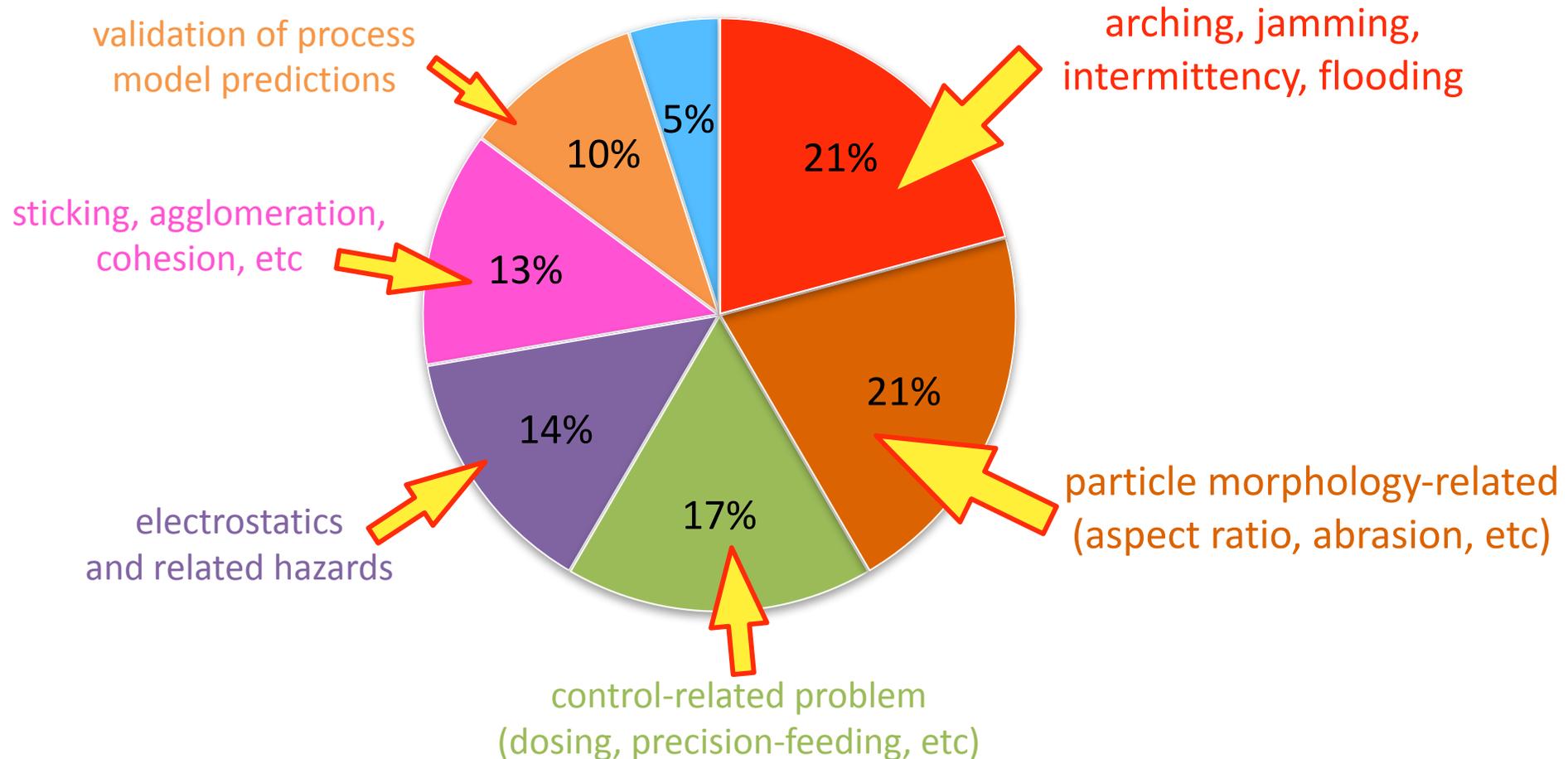
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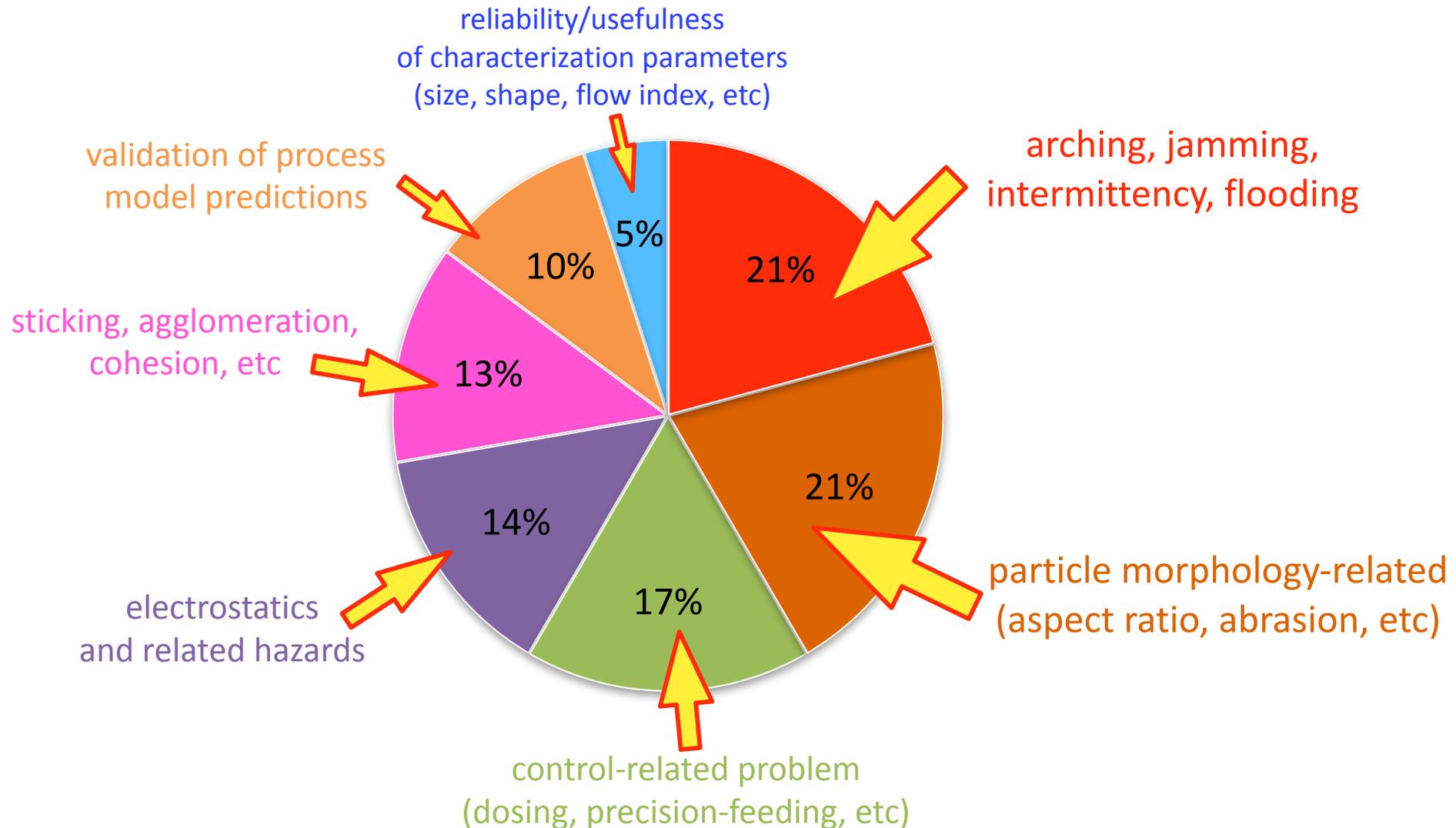
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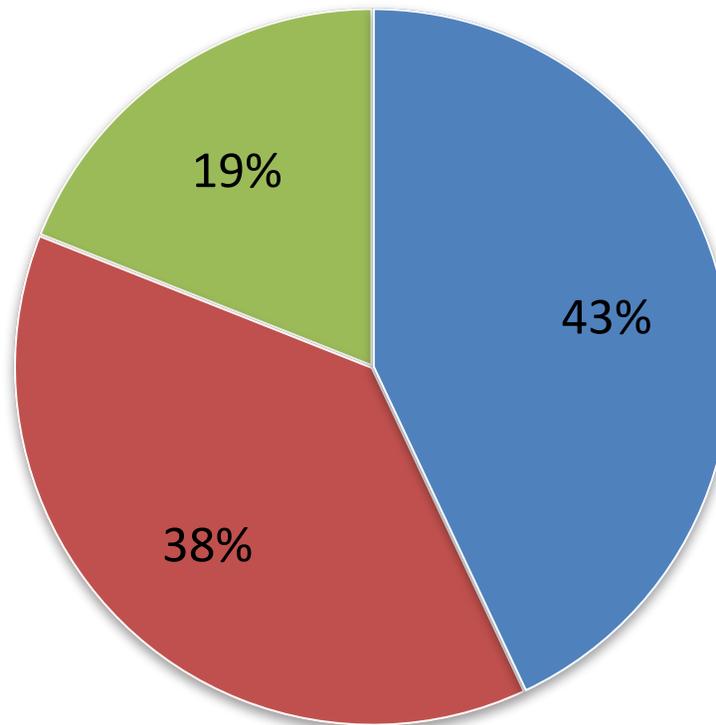
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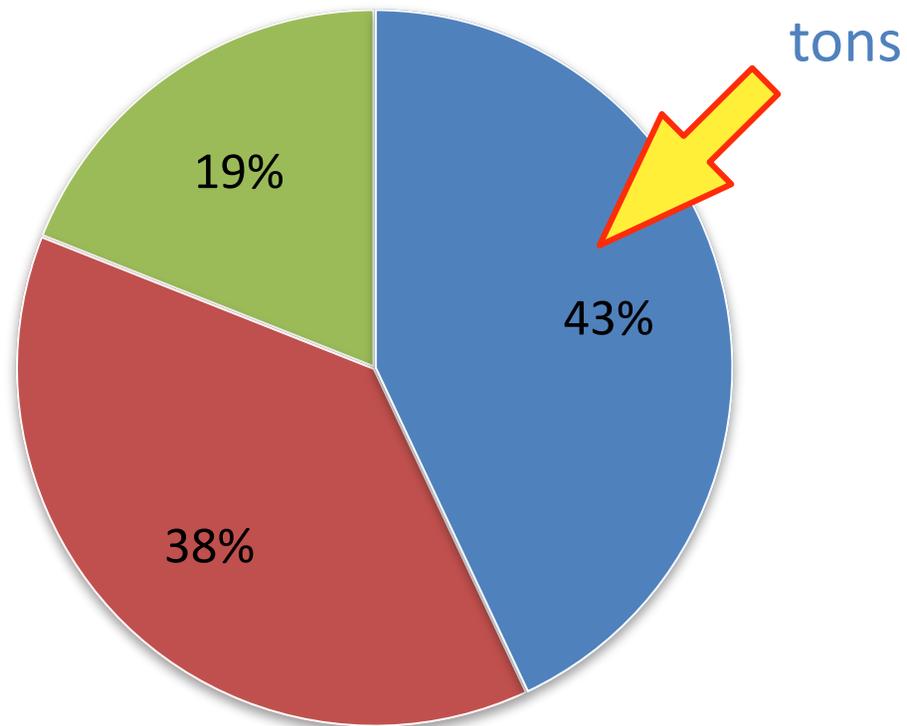
IFPRI Members Survey - typical process size

“What is the typical size of your process?”



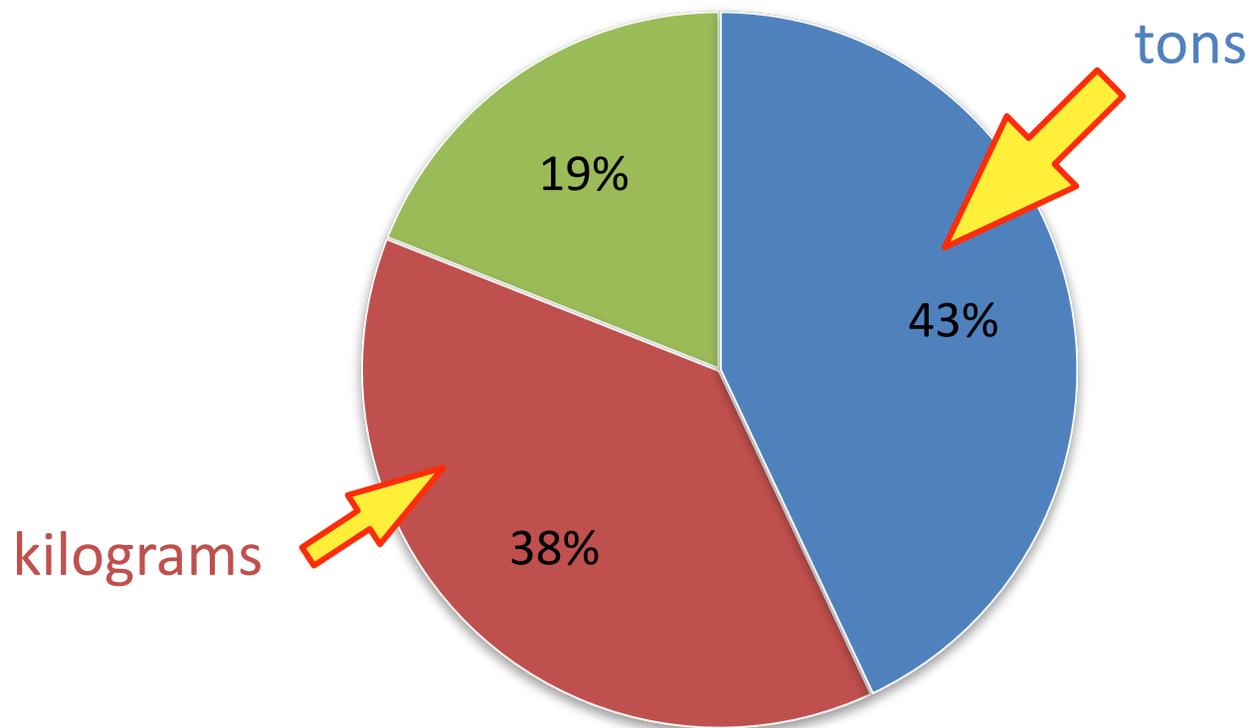
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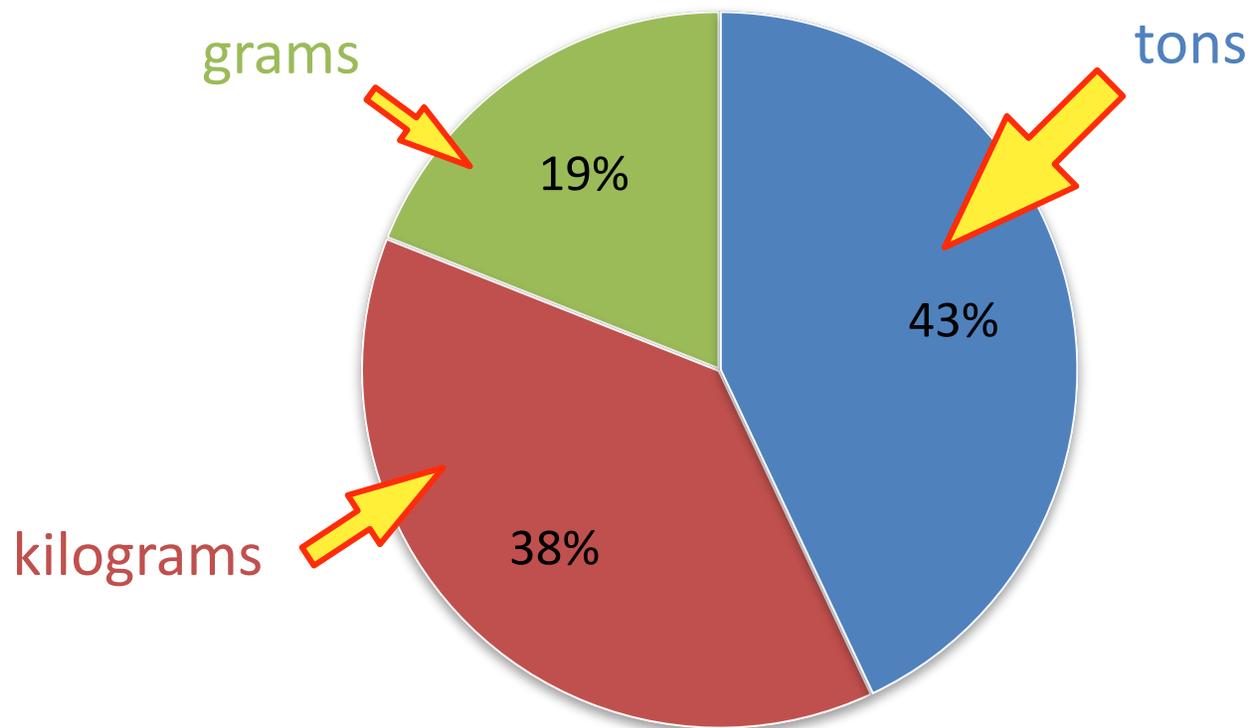
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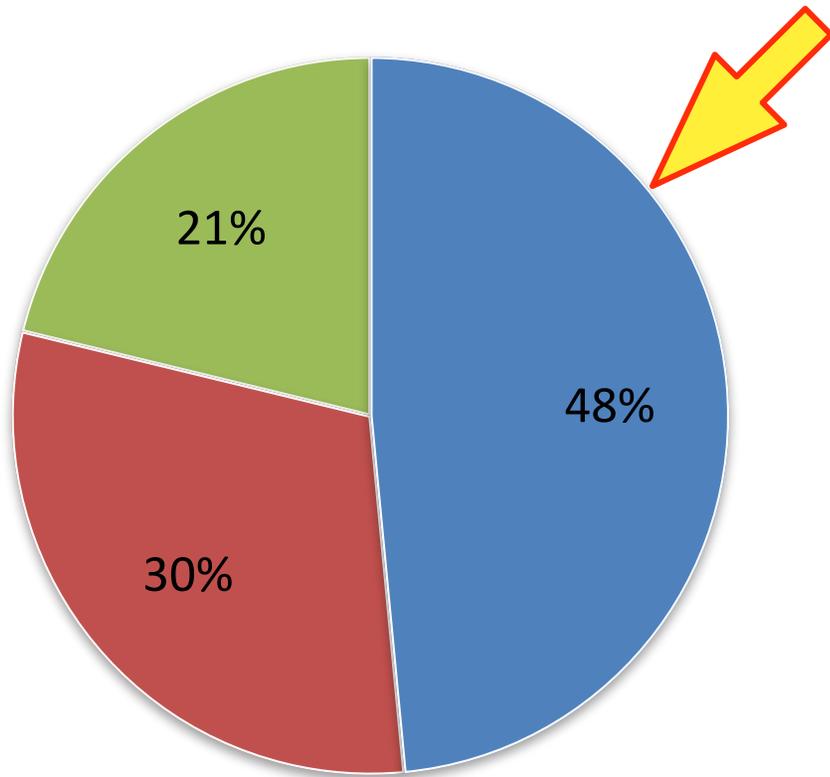
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IFPRI Members Survey -
capabilities companies have and want

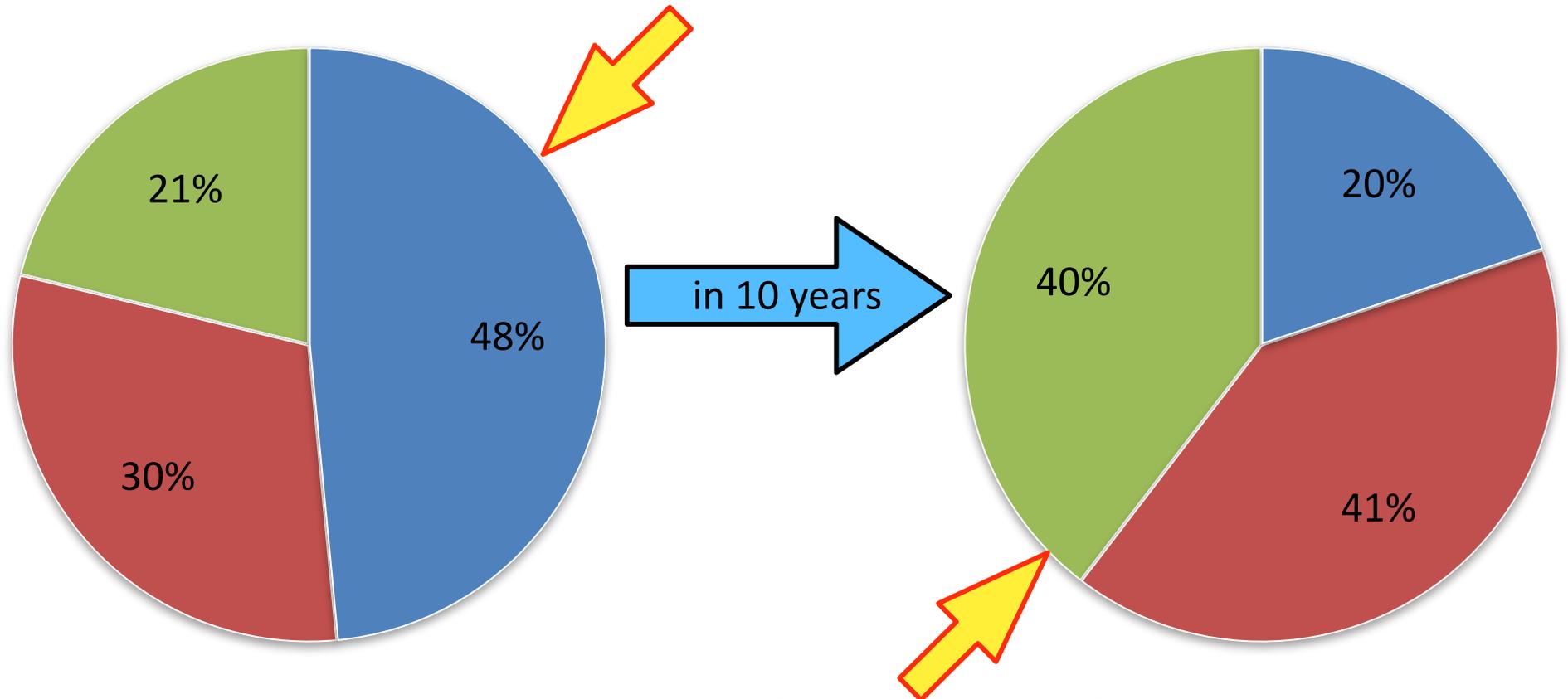
“Please [...] describe your company's current capability in powder flow modeling”



- Empirical correlations
- Discrete Element Modeling (DEM)
- Partial Differential Equations (PDEs)

IFPRI Members Survey - capabilities companies have and want

“Please [...] describe your company's current capability in powder flow modeling”



“Please rank-order capabilities [...] your company [wishes] in 10 years”

- Empirical correlations
- Discrete Element Modeling (DEM)
- Partial Differential Equations (PDEs)

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- Discussions informed by industrial and academic insight.

Three questions



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- “Outline the state-of-the-art in powder flow.”



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(⇒ **history**, **current knowledge** and **gaps**)



Three questions

- “Outline the state-of-the-art in powder flow.”
(\Rightarrow **history**, **current knowledge** and **gaps**)
- “How can qualitative predictions evolve toward a **quantitative understanding** that will allow system design **at the industrial scale**.”



Three questions

- “Outline the state-of-the-art in powder flow.”
(\Rightarrow **history**, **current knowledge** and **gaps**)
- “How can qualitative predictions evolve toward a **quantitative understanding** that will allow system design **at the industrial scale**.”
- Define **three scientific questions** that IFPRI and other funding agencies should promote.



Organization