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Comparison of old and new procedure for exposure assessment

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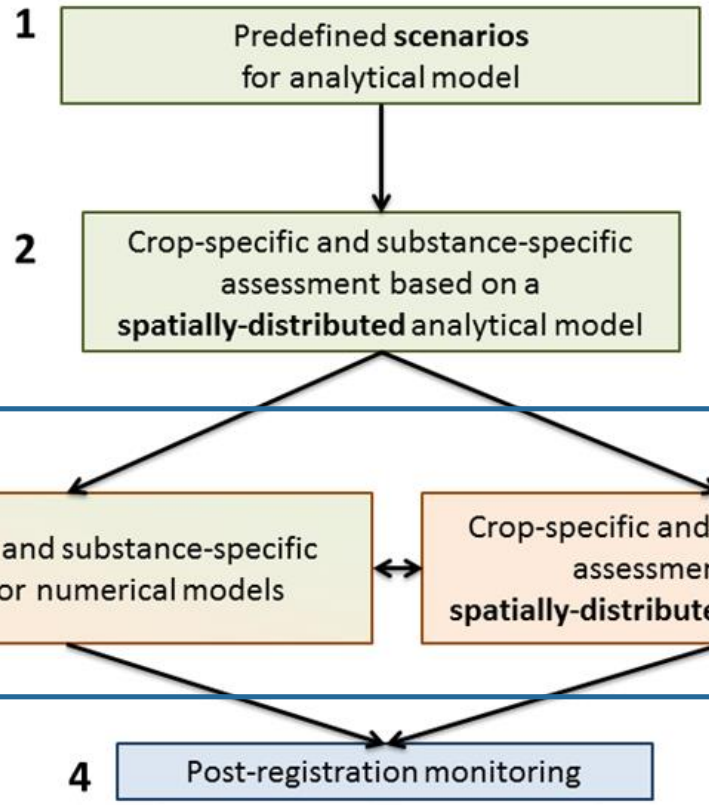
Content

- The new reference tier (Tier-3)
- Old vs. new PEC soil assessment
  - At reference tier (Tier-3)
  - At lower tiers (Tier-1 & Tier-2)
  - Examples

The new reference tier (Tier-3)

- The tiered approach



New reference tier (Tier-3):
Spatial modelling
with numerical models,
EU data on soils, weather and crops

Old vs. new assessment – at reference tier

Old assessment

New exposure assessment goal (90th spatial percentile)

New assessment

Tier-3
(Reference tier)

Spatial modelling, EU data on soil, weather and crops

Old vs. new assessment – at reference tier

- Example properties of Tier-3A locations (90th spatial percentile)
  - Maize
  - *DegT50* = 250 d, K_{om} = 1000 mL/g
  - 1 × 1 kg/ha, pre-emergence

Scenario	Soil density (kg/dm³)	T_{avg} (°C)	Rainfall (mm)
Old approach	1.50 (fixed)	Undefined (20 °C if based on lab, *ambient* if based on field data)	Undefined
New approach – **North**	0.93	5.8	647
New approach – **Centre**	1.03	7.7	671
New approach – **South**	1.13	10.4	680

Initial concentration

Plateau concentration

Old vs. new assessment – at reference tier

- Short living vs. persistent compounds
  - Example: sunflowers, Central Zone

Increase/decrease (factor) in PEC soil

K_{om} (L/kg) \ *DegT50* (days)	10	31	100	316	1000
10	1.4	1.4	nc	nc	nc
31	1.4	1.4	1.2	nc	nc
100	1.4	1.4	1.3	1.0	nc
316	1.4	1.4	1.3	1.1	0.8
1000	1.4	1.4	1.3	1.2	1.0

nc not calculated

Short living substances:
Shift in **soil density**

Assumptions

- 1 × 1 kg/ha pre-emergence
- Worst-case ***DissT50***
  = **3 x** geomean ***DegT50***

Persistent substances:
Addition of **leaching** and shift in ***DegT50***

Old vs. new assessment – at reference tier

Old assessment

New exposure assessment goal (spatial 90th percentile)

Increase/decrease of PEC soil by factor of

- Short living substances*:* **~ 1.3 – 2.1**
- Persistent substances: **~ 0.5 – 1.5**

Foliar wash-off

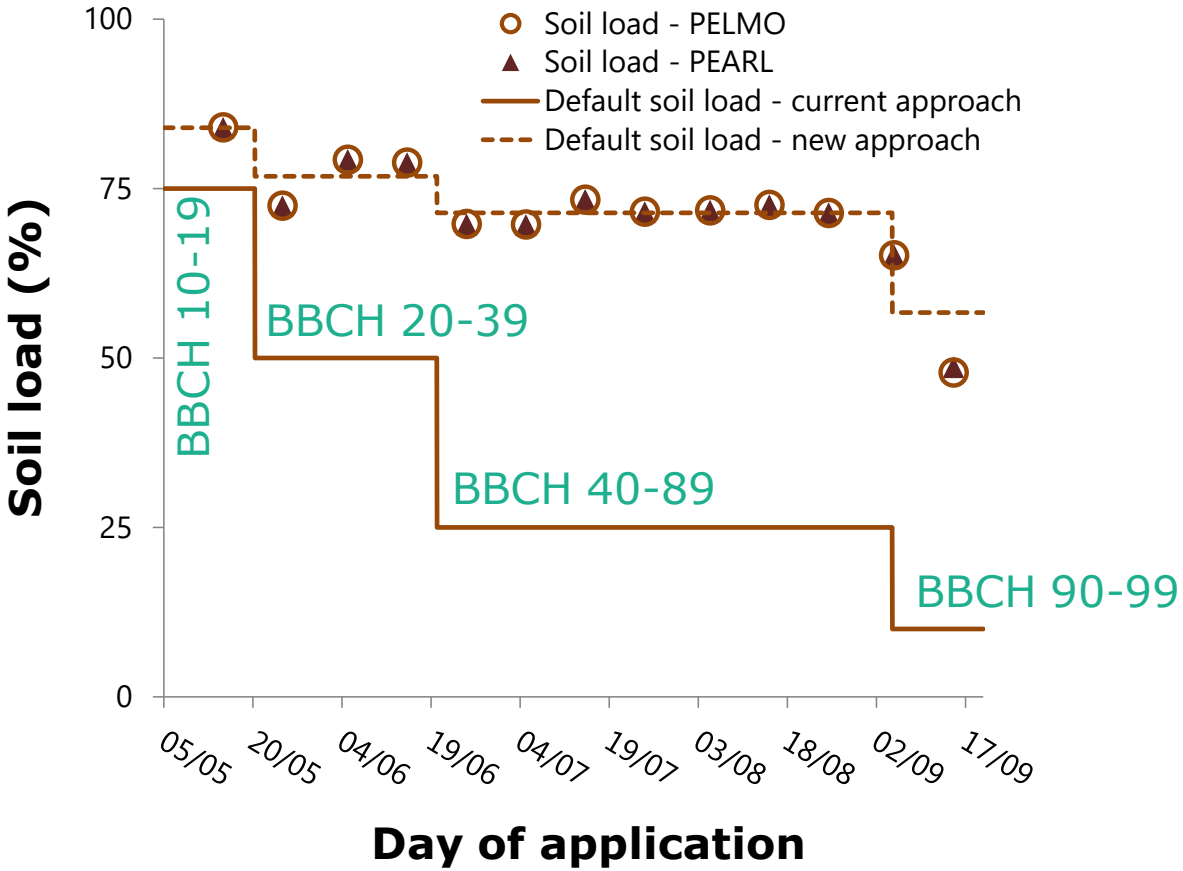
New assessment

Tier-3
(Reference tier)

Spatial modelling, EU data on soil, weather and crops

Old vs. new assessment – at reference tier

- Foliar wash-off & soil load
  - maize, Hamburg, average of the 20-yrs assessment period



Assumptions

- $DT50_{crop}$ = 10 days
- Wash-off factor = 0.1 mm^{-1}

Old vs. new assessment – at reference tier

Old assessment

New exposure assessment goal (spatial 90th percentile)

Increase/decrease of PEC soil by factor of

- Short living substances*:* **~ 1.3 – 2.1**
- Persistent substances: **~ 0.5 – 1.5**

Foliar wash-off

Increase of PEC soil by factor of
~ 1.0 – 4.0 (on average)
(depending on BBCH)

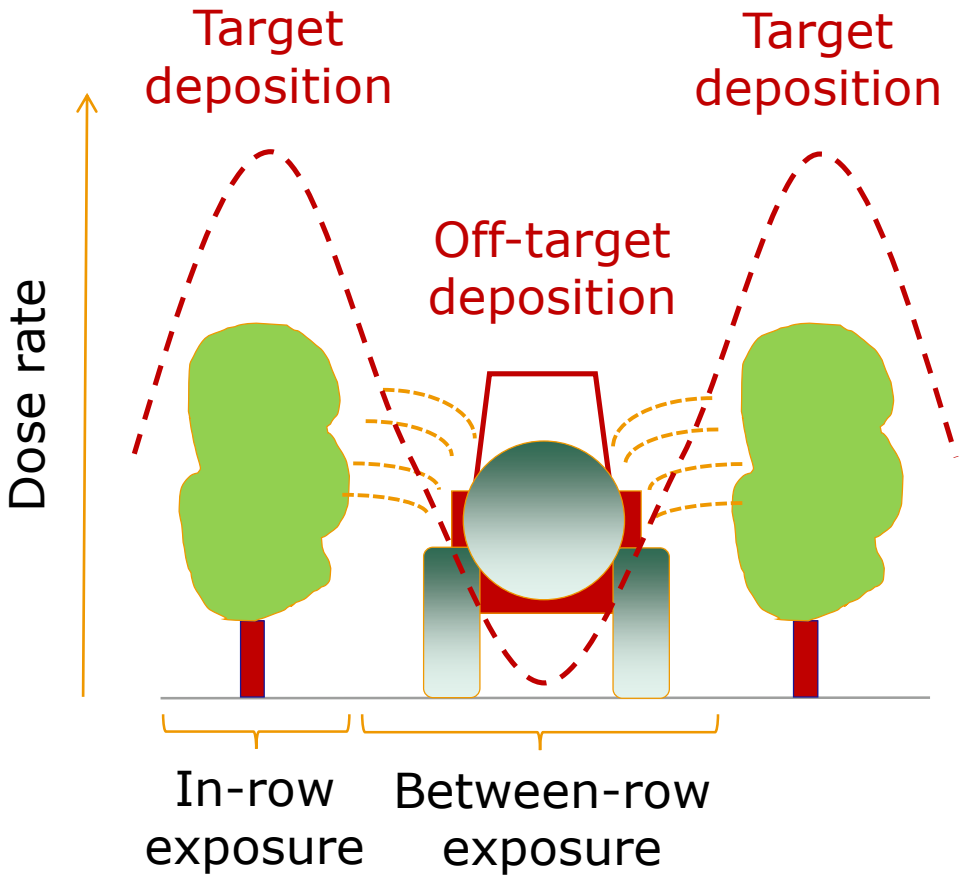
Non-uniform soil load

New assessment

Tier-3
(Reference tier)

Spatial modelling, EU data on soil, weather and crops

Old vs. new assessment – at reference tier



Air blast spraying

- **non-uniform load** to crop canopy (*target deposition*) and soil (*off-target deposition*)
- Soil dose related to the **surface area treated** drives the exposure assessment
- **Dose rate assessment factor** needed if application rate averaged over the whole field

f_{dose} = 2.9
assuming a row distance of 3.5 m & crop canopy width of 1.2 m (EPPO, 2012)

Old vs. new assessment – at reference tier

Old assessment

New exposure assessment goal (spatial 90th percentile)

Increase/decrease of PEC soil by factor of

- Short living substances*:* **~ 1.3 – 2.1**
- Persistent substances: **~ 0.5 – 1.5**

Foliar wash-off

Increase of PEC soil by factor of
~ 1.0 – 4.0 (on average)
(depending on BBCH)

Non-uniform soil load

Increase of PEC soil by factor of **2.9**
(air blast application in permanent crops only)

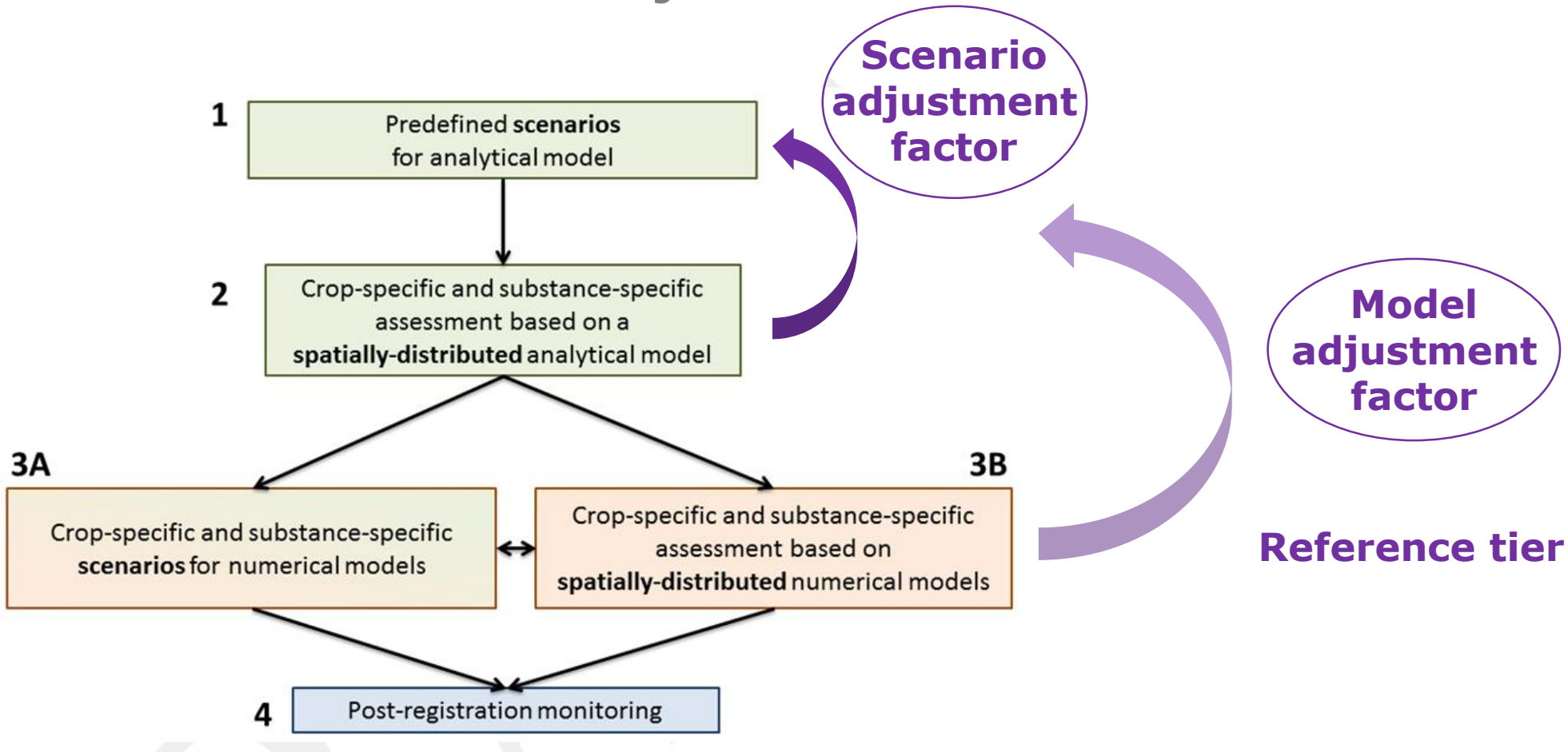
New assessment

Tier-3
(Reference tier)

Spatial modelling, EU data on soil, weather and crops

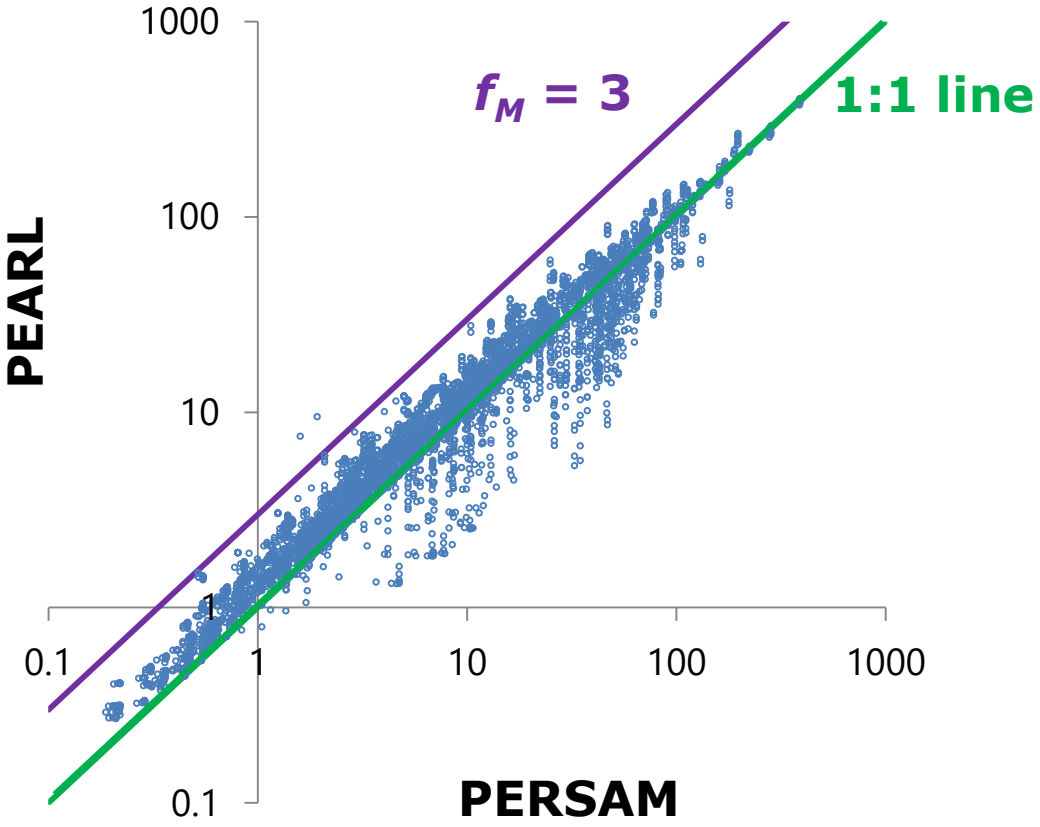
Old vs. new assessment – at lower tiers

- Reference tier & adjustment factors



Old vs. new assessment – at lower tiers

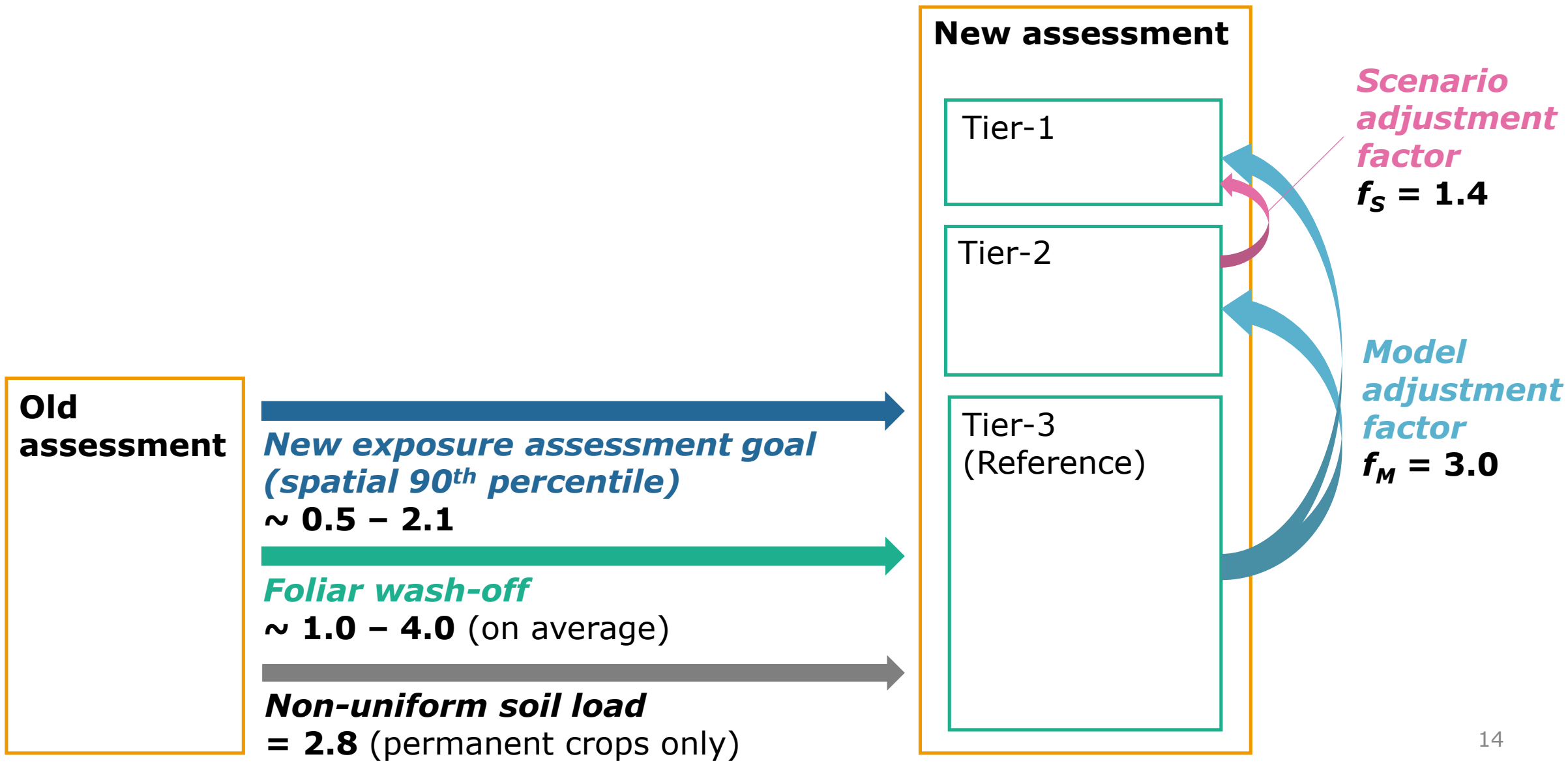
- Model adjustment factor
  PERSAM vs. PEARL (PEC soil, mg/kg)



Settings:

***DegT50* (d), K_{om} (mL/g):**
10 – 1000 each (19 combinations)
1/*n*: 0.7, 1.0
Crop: winter cereals, tomatoes, apples, vines
Application: 1 x 1 kg/ha,
5 x 1 kg/ha (14 day int.)
Appl. timing: 1 day pre-emergence (annual crops), 1st of May (permanent crops)
Evaluation depths:
1, 5 and 20 cm
Results: Peak and 56 TWA

Old vs. new assessment – all tiers



Old vs. new assessment – examples

	GAP	Old assessment		New assessment	
		Maximum *DissT50* (d)*	PEC soil (mg/kg)	Geomean *DegT50* (d) / K_{om} (mL/g)	PEC soil (mg/kg) (North/Centre/South)
GD WE 1	Maize 1 × 1 kg/ha pre-emergence (No CI)	750	2.2	250 / 1000	Tier 1: 18.6 / 13.0 / 9.9 Tier 2: 9.4 / 8.0 / 6.9 Tier 3A: 4.1 / 3.1 / 2.6
GD WE 2	Maize 2 × 1 kg/ha, 14 d int. BBCH 10-39 (25/50 % CI)	750	2.7	250 / 1000	Tier 1: 37.0 / 25.9 / 19.6 Tier 2: 15.7 / 13.4 / 11.6 Tier 3A: 7.2 / 5.6 / 4.8
GD WE 3.1	Potatoes (ridge appl.) 1 × 1 kg/ha treated BBCH 10-19 (15 % CI)	750	1.8 (no dedicated ridge assess.)	250 / 1000	Tier 1: 18.6 / 13.0 / 9.9 Tier 2: 9.3 / 7.6 / 6.0 Tier 3A: 4.2 / 3.1 / 2.4
GD WE 5.1	Apples 1 × 1 kg/ha (whole field) BBCH 71–75 (65 % CI) (no tillage)	750	1.6 (no dedicated in-row or between row assessment)	250 / 1000	**In row:** Tier 1: 191 / 105 / 65.5 Tier 2: 75.9 / 47.9 / 26.9 Tier 3A: 33.4 / 20.9 / 8.0 **Between rows:** Tier 1: 65.8 / 36.3 / 22.6 Tier 2: 21.1 / 13.3 / 8.3 Tier 3A: 11.0 / 6.8 / 3.6

* Assumption: Max. ***DissT50*** = 3 × geomean ***DegT50***

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