

Farming without glyphosate

GRDC Excellence Award

We visited and talked with farmers, agronomists and researchers in the EU, Canada and Argentina.

Harm van Rees and Anne Jackman, Cropfacts P/L, 2022

What has changed?

How does it apply to us?

What can we do if glyphosate is banned?

Will glyphosate be the only herbicide banned?

What do we need to know re: glyphosate residues?

Should we develop an industry stewardship program?

Changing demographics/public trust in farm chemical use

- In the 1930s, 40% of our population was rural, now it is less than 15% (two-thirds of Australians live in our major cities)
- Change in public awareness and opinion (Corporate over-reach)



Benefits of glyphosate

- No-till / Min-till – stubble retention
- Reduced wind and water erosion
- Conserving fallow soil water (yield ↑)
- Optimising time of sowing (yield ↑)
- Reduced GHG emissions (fuel ↓)
- Improved soil health (soil biology ↑)

Glyphosate is used

- Summer & Pre-sowing weed control
- In-crop in RoundUp “Ready” crops
- Desiccation pre-harvest



World-wide public awareness and concerns related to farm pesticide use is increasing. Snap shots:

Europe (EU)

- July 2023, EFSA (EU Food Safety Authority): ‘no critical areas of concern in its *risk assessment* of glyphosate in relation to the risk it poses to humans and animals or the environment’. Political situation is not as straight forward
- EU Farm2Fork (F2F) policy targets 50% reduction in the use of chemical pesticides by 2030
- France maximum glyphosate use 1080g ai/ha/year (only used by min- and no-till farmers)
- Germany maximum glyphosate use 1800g ai/ha/year
- Examples of banned products: neonicotinoids, paraquat, triazines, glufosinate, haloxyfop
- Agri-chemical use per field is capped

Concerns related to farm chemical use (continued):

France: **In paddock agri-chemical advice can no longer be linked to sales**

Touchdown (Syngenta) no longer approved. December 2023 decision pending re: approval of glyphosate

Holland: Fertiliser N severely restricted (including manure). Dutch government planning to buy farm-land to reduce N inputs

Argentina:

- Some country towns are banning the use of all agri-chemicals (incl. synthetic fertiliser) for a 1000m zone around the towns' perimeter
- An agri-chemical rating system based on eco-toxiological parameters is used to assess the impact on human and environmental health

Canada: Pre-harvest application (desiccation) of glyphosate is under review

Cover crops only possible with glyphosate

Farmers in N France (annual rainfall 780mm/yr) are enthusiastic about cover crops - additional subsidies to grow covers to reduce Nitrate leaching

- Cover crops are grown between harvest (July/Aug) of the summer crop (corn) and sowing (October) of the winter crop
- Mix of species including flowers
- Purpose - reduce soil NO_3 leaching
- Sprayed with glyphosate 2 to 3 days prior to sowing the winter crop
- Without glyphosate cannot grow cover crops (tillage takes too long)



EU: Organic vs regular crop production

- F2F targets an increase in organics (25% land-use by 2030)
- Cultivation required pre-sowing
- Yield on a per crop basis is similar (wheat 7 to 8 t/ha)
- Yield per annum is less because cannot grow winter followed by summer crop
- Soil disturbance in-crop between crop rows for weed control
- Farm \$ return is similar (organic growers receive additional EU subsidies and higher price)





BioGas

- Weedy paddocks
- Farmer co-operatives
- Gas goes into the grid
- Cost is subsidised

Blackgrass is the main problem weed in the UK (Alopecurus sp.)



Optimum sowing time for winter crops is September to mid October.

Blackgrass has resistance to Group 1 and 2 herbicides and glyphosate resistance is expected. Plowing is the only alternative (with a moldboard plow) which results in delayed sowing and lower yield.

Weed control – new options



?? **Statis** ??
new mode of action
(blocks enzyme -
reducing hormone
and vitamin
development)



Replacement herbicides which need to be tested

Paraquat - ok on small weeds, not translocated, already banned in Europe

Group 13 clomazone (Command)

Group 14 saflufenacil (Heat)

Group 14 pyraflufen (Conquer)

Group 28 tetflupyrolimet

Group 28 bixlozone (Overwatch)

Group 30 cinmethalin (Luximax)

Note - these herbicides are not a glyphosate 'substitute'.

But may serve a purpose in weed control if glyphosate is no longer available

Glyphosate & AMPA soil residues – what do we know? (not enough!)

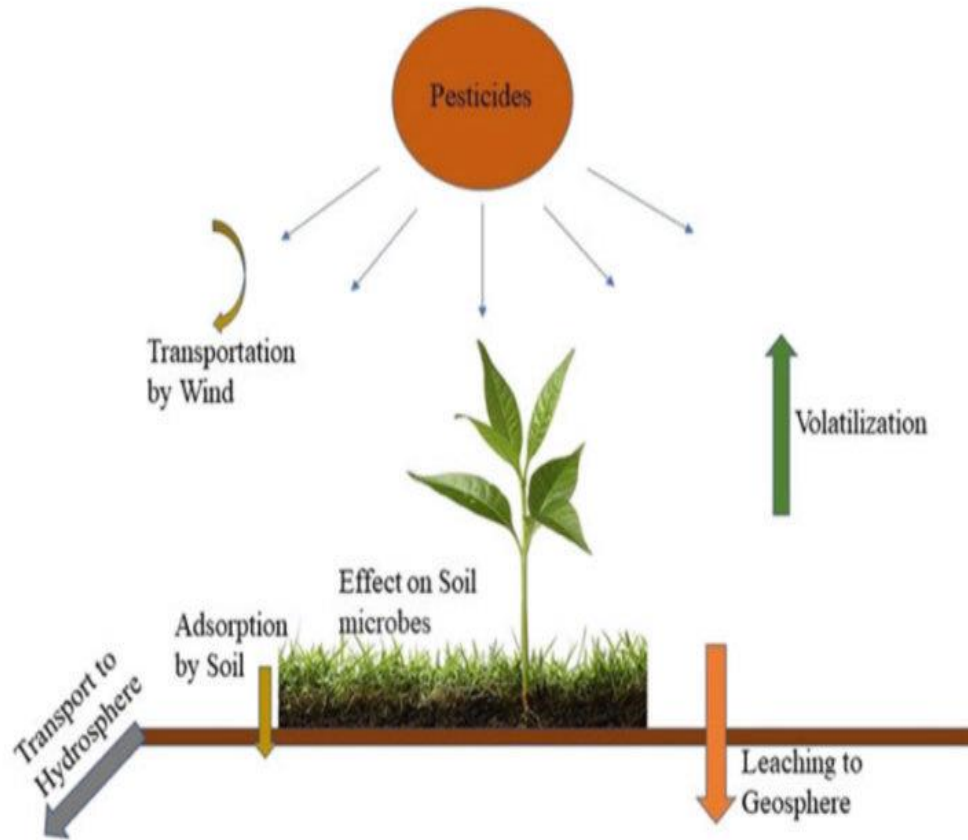


Fig. 4.1 Fate of pesticides on soil, flora, fauna and the environment

Example: 2016 National Paddock Survey (Australia)

- 42 cropping paddocks, 2 zones per paddock
- Soil sampled 0-10cm

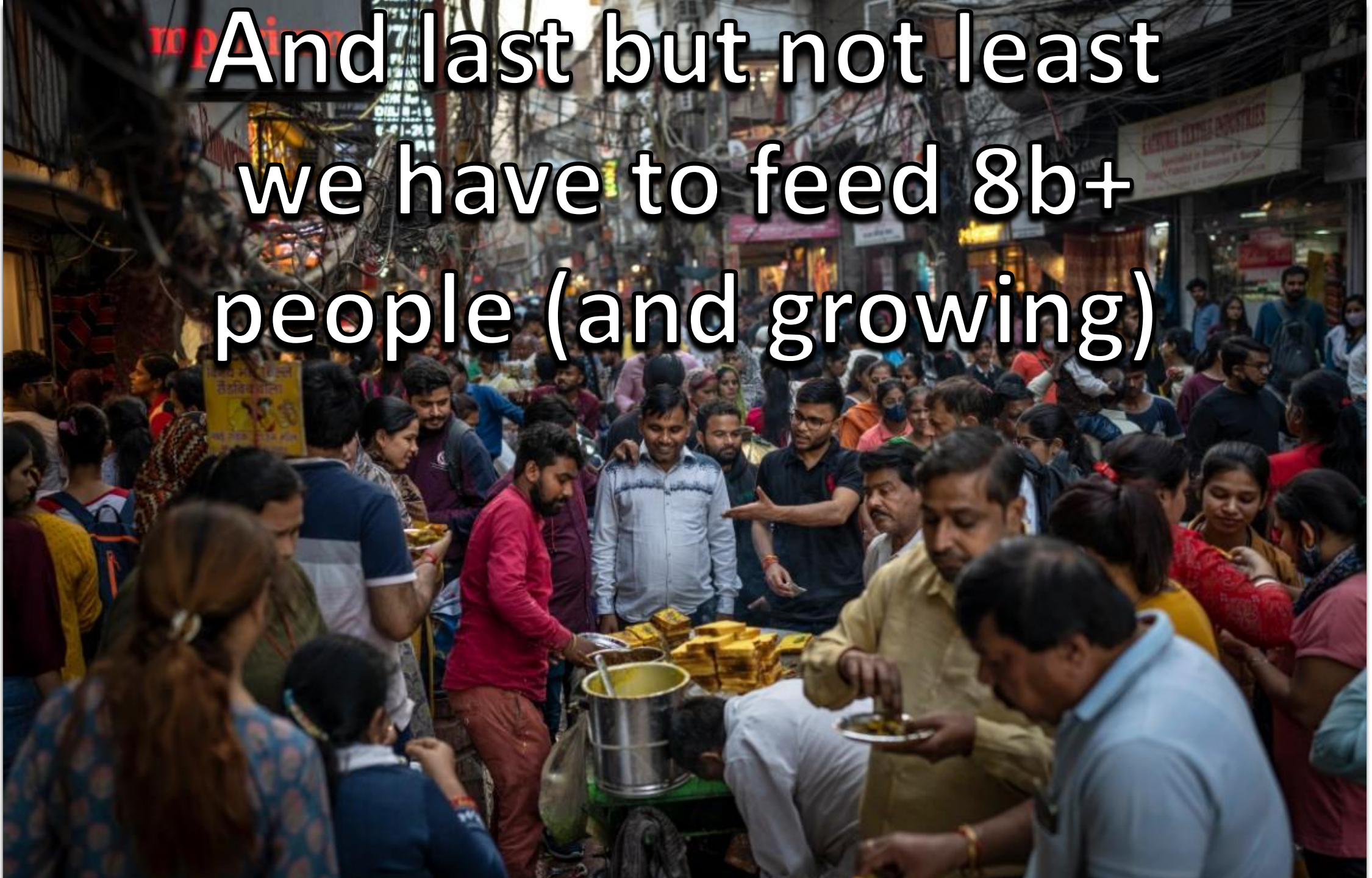
Glyphosate residues: 70% paddocks with detectable levels; range 0.05 to 3.6 mg.kg⁻¹
AMPA residues: 93% paddocks with detectable levels; range 0.05 to 2.3 mg.kg⁻¹

Much more work needs to be done i.e. how long does it stay in the soil; impact on soil micro-organisms; crop damage; human and animal health?

The future is NOW

- **Pesticide residues** (soil and grain): work with farmers with long-term records of farm chemical use. Test residues in soil and grain (develop correlations between long term chemical use and residue levels) on different soil types/climatic zones
- **Glyphosate long term trials:** (i) desiccation and RR crops: grain and soil residues; (ii) glyphosate soil residues impact on seedlings; (iii) efficacy of 'organic' R-up replacements
- **Regen-ag:** cover crops on weed suppression, inclusive of soil water and soil nitrogen dynamics (especially in dry environments). Can cover crops be managed without glyphosate?

And last but not least
we have to feed 8b+
people (and growing)





plants

Review

Farming without Glyphosate?

Hugh J. Beckie *, Ken C. Flower and Michael B. Ashworth

In 2020, Hugh Beckie, then from WAHRI, and co-authors published an excellent paper on 'Farming without glyphosate'

Acknowledgements

Foremost: ! **the GRDC for the Travel Award in 2020 !**

The many farmers we met for your hospitality and in-depth discussions of your farming systems, your willingness to share information and what your farm will look like if glyphosate is banned

The many agronomists for sharing your expertise and knowledge of farming systems and weed control methods in your regions

The researchers for your enthusiasm and dedication in collecting good data and interpretation of the data for sustainable and profitable outcomes