

AgbioInvestor



Crop Protection Market Development and Future Outlook

CAC

March 2024

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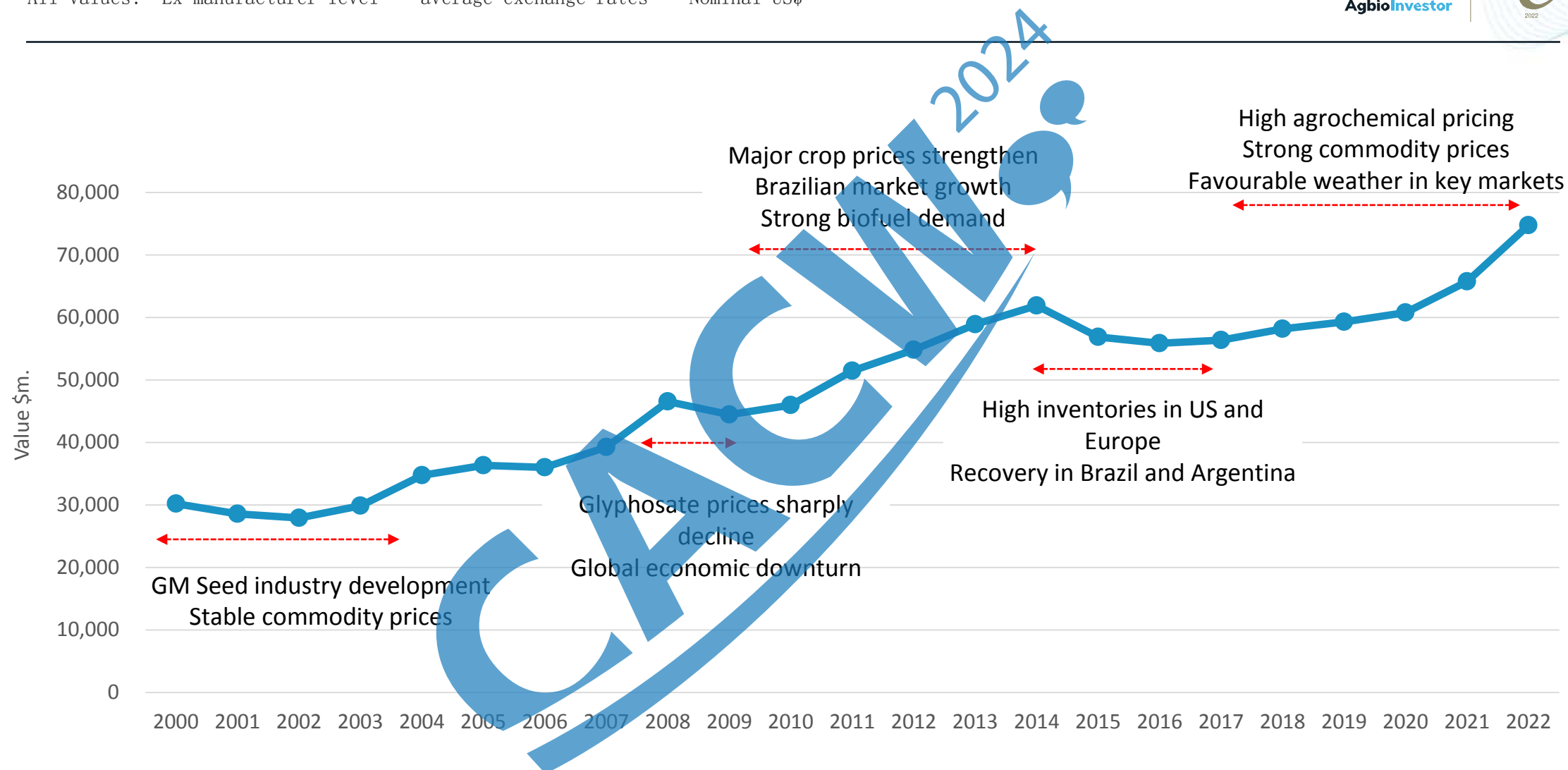
Current Market Drivers

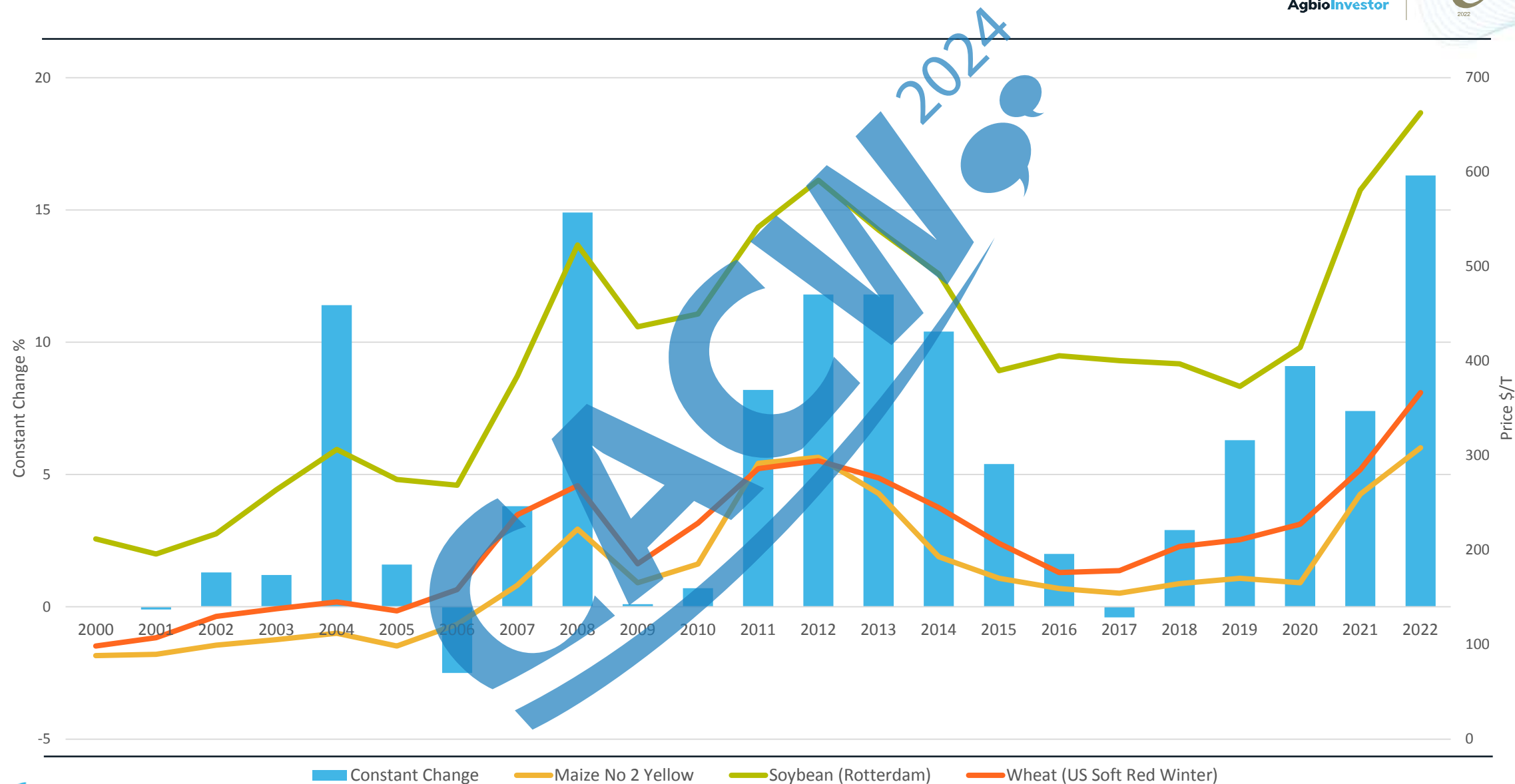
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Historic Crop Protection Market Development

All values: Ex-manufacturer level - average exchange rates - Nominal US\$

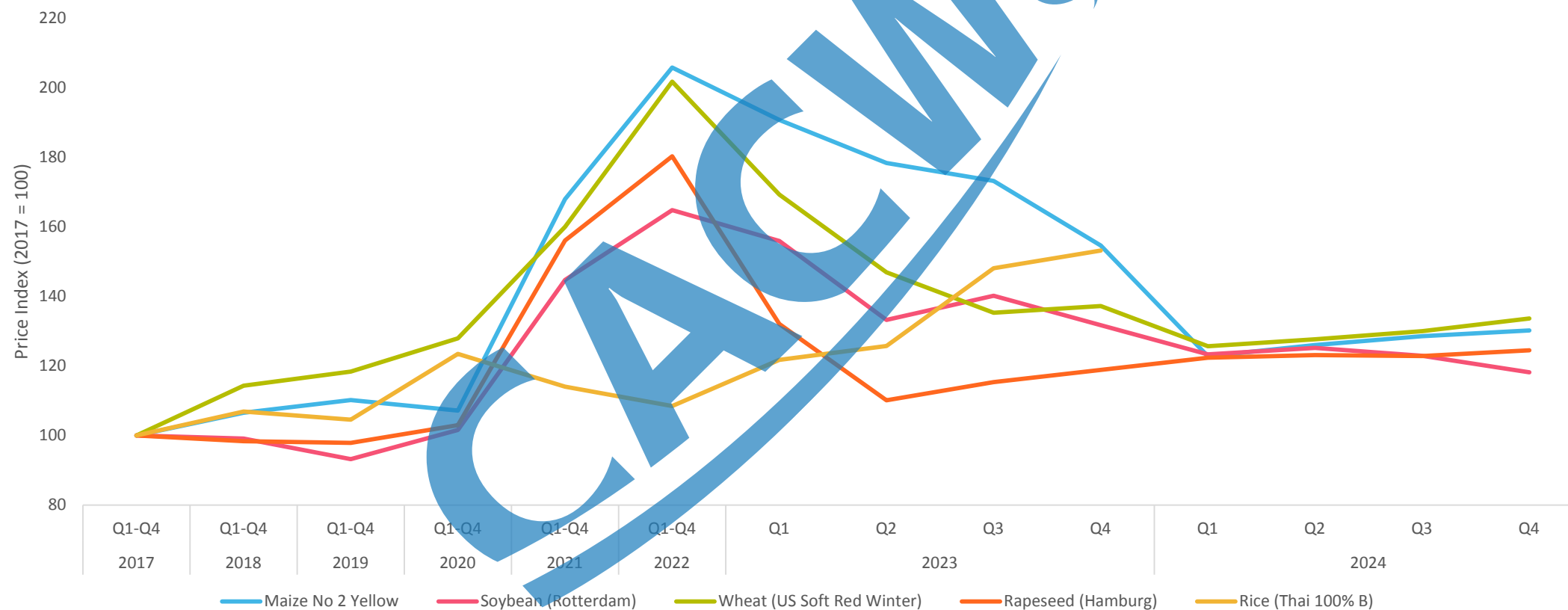




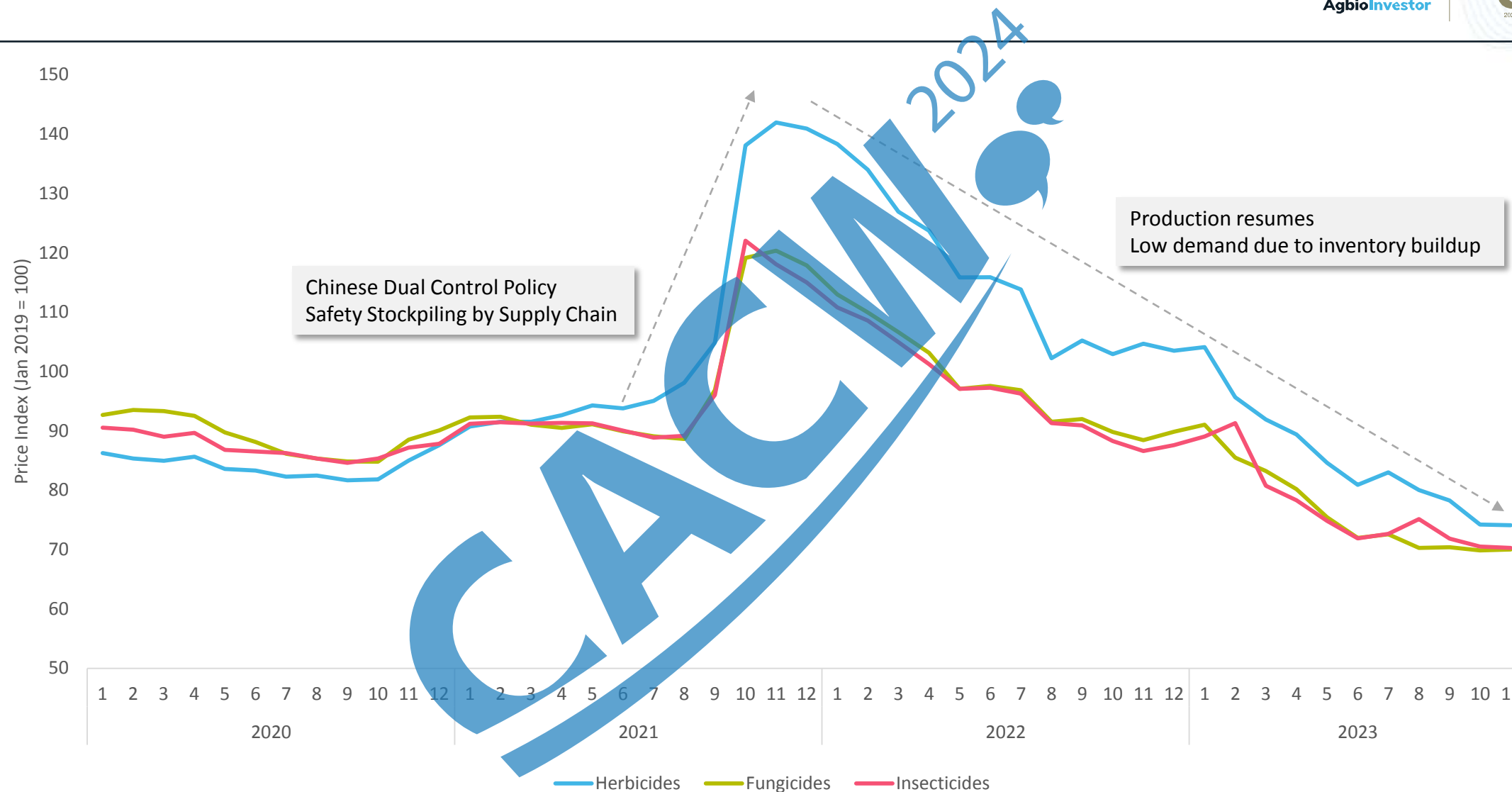


Current Market Drivers: Commodity Prices

- Crop commodity prices peaked during mid-2022
- Prices remain high by historical standards
- Covid, Ukraine and poor weather conditions initially drove strong gains
- Prices have softened as concerns over global grain supply have eased
- Winter wheat futures trading up, future Australian production a concern
- High corn pricing and low stocks stimulated a switch to increased planted areas in N. America



Current Market Drivers: China Agrochemical Prices



Crop Protection Market: Regional Markets 2023 Preliminary

All values: Ex-manufacturer level - average exchange rates - Nominal US\$



- **North America:** increased maize area but lower soybean; improved weather conditions in west / California; relatively high commodity prices; falling agrochemical prices; inflation and high input costs; dry weather in Corn Belt
- **Central & South America:** higher maize and soybean areas in Brazil; high pest pressure; agrochemical prices declining but remained robust during product purchasing window; very dry conditions in Argentina, parts of southern Brazil.
- **Asia Pacific:** positive early season in many regions, although onset of El Niño has led to dryness impacting Australia, southeast Asia; less favourable conditions in India, inventory build-up; weather conditions highly variable, extreme heat an issue in many countries; high pest pressure in several key markets, notably China; rapid decline in agrochemical prices.
- **Europe:** Cereal area up slightly; maize area down, but yields recovering from very poor 2022, product usage increased; high disease pressure (including Septoria) in several countries; weather generally more positive compared to 2022, although some southern countries impacted by extreme weather events; agrochemical pricing sustained at high levels compared to other regions; growth continues to be hampered by Russia / Ukraine conflict.

Region	2021 (\$ m.)	2022 (\$ m.)	Change 22/21 (%)	2023 Nominal (\$ m.)	Nominal Change 23/22 (%)	2023 Constant (\$ m.)	Constant Change 23/22 (%)
North America	10,333	12,684	22.8	12,450	-1.8	12,548	-1.1
Central & South America	18,735	22,979	22.7	25,045	9.0	24,721	7.6
Asia Pacific	20,330	22,609	11.2	20,288	-10.3	21,859	-3.3
Europe	13,736	13,713	-0.2	14,451	5.4	14,822	8.1
MEA	2,641	2,770	4.9	2,626	-5.2	2,854	3.0
Total	65,775	74,755	13.7	74,860	0.1	76,804	2.7



2024

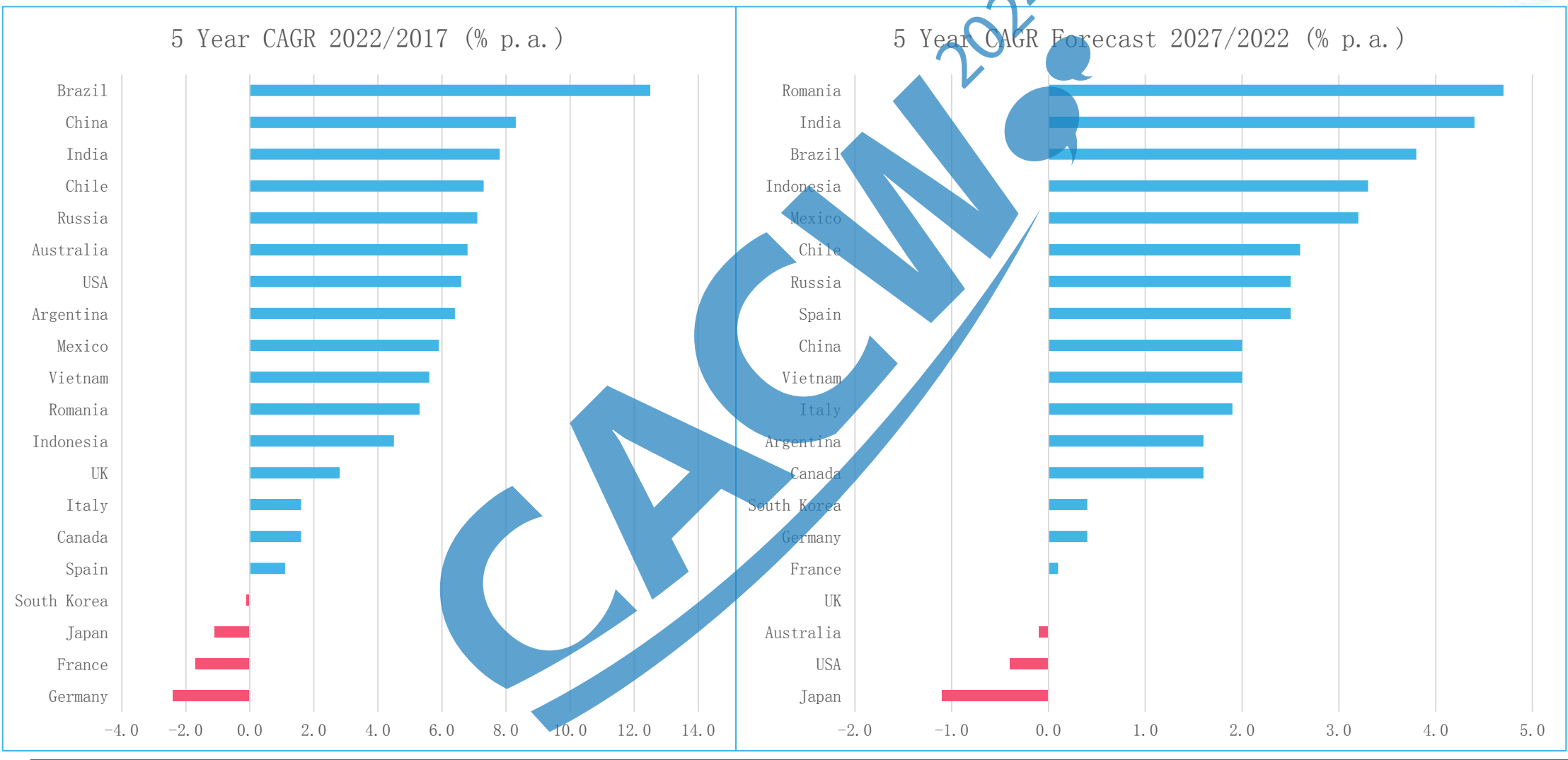


Key Future Market Drivers

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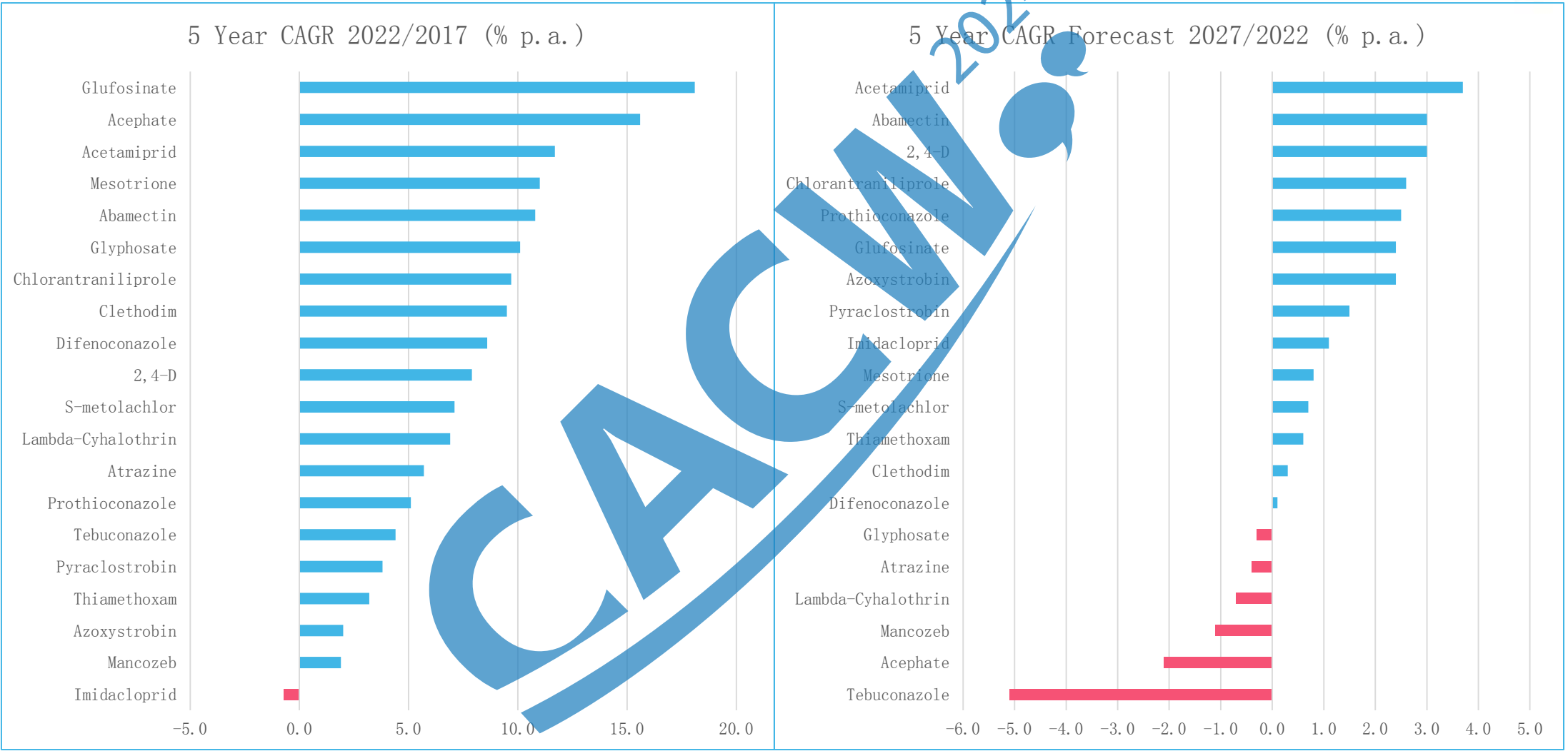
Crop Protection Market: Leading Country Markets

Top 20 country markets in terms of US\$ value 2022 situation



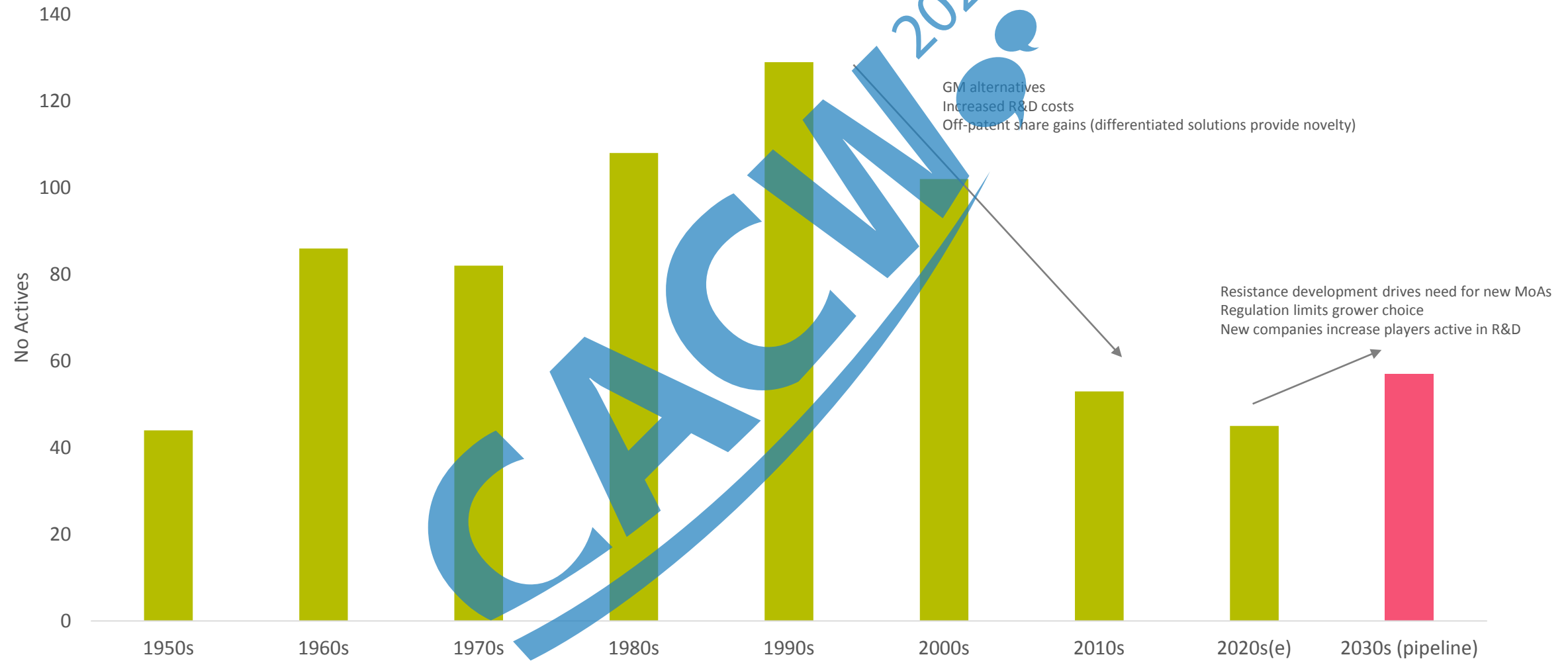
Crop Protection Market: Leading Active Ingredients

Top 20 active ingredients in terms of US\$ value 2022 situation



Future Market Drivers: Active Ingredient Introductions

*2030s based on ISO common named AIs currently in pipeline of industry majors, Japanese and Chinese industries



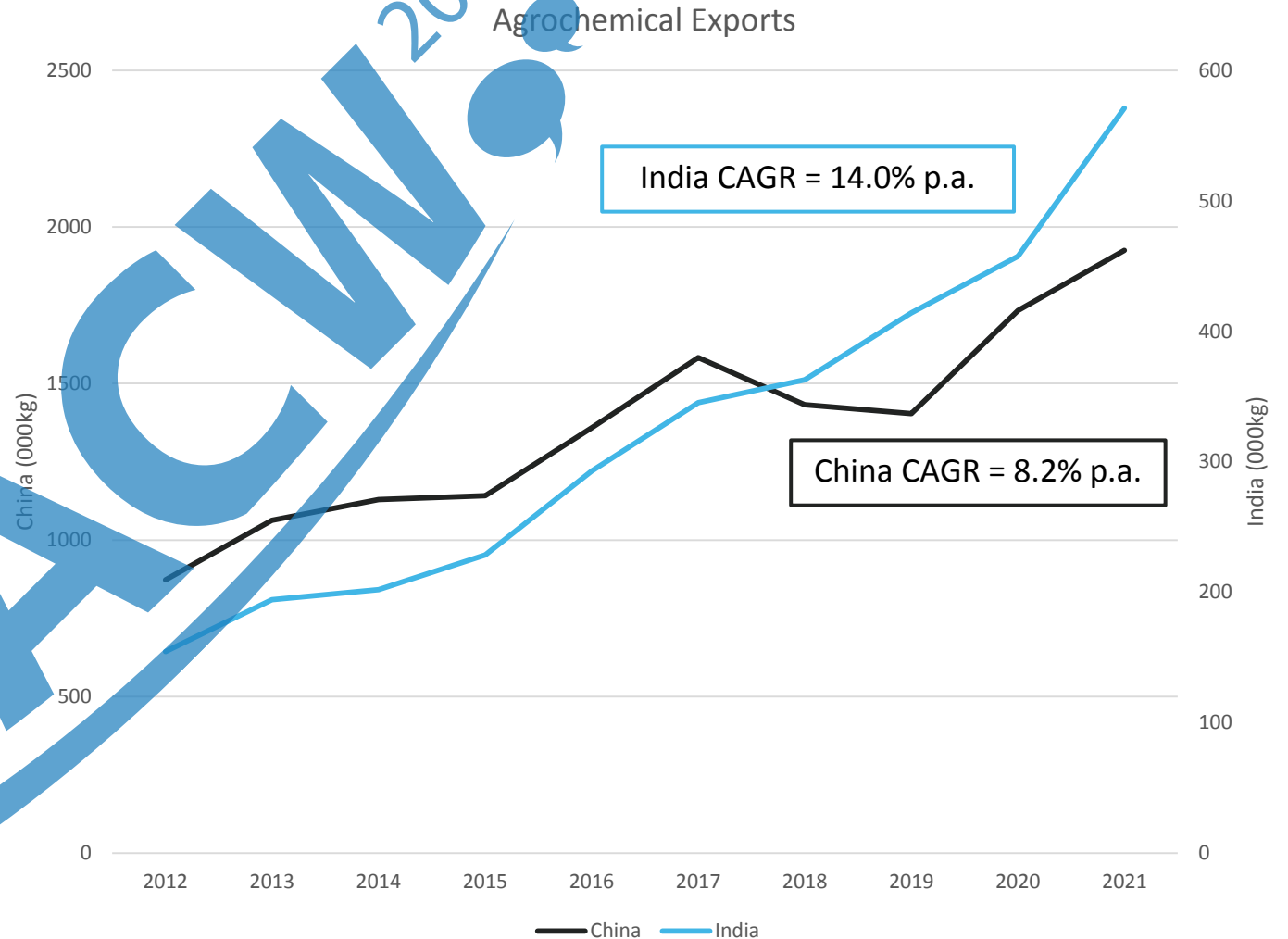
- Resistance development and regulatory pressure increasing need for new technology
- Increased interest in R&D of novel and low tox/environmentally sound CP actives e.g. :
 - Cyclopyrimorate (Mitsui Chemical Agro) first new MoA herbicide for several decades
 - Fenpicoxamid (Corteva) a naturally derived novel MoA fungicide
- New small R&D companies filling gap of industry majors
 - Develop new AIs faster at lower cost
 - Often based on novel approach/tech
- Potential to be collaborative and/or competitive

Select New CP AI Discovery Companies/Tech Providers

Company	Founded	Technology
AgPlenus	2018	In silico, Computational
Agrematch	2017	In silico, AI based discovery
Deargen	2016	In silico, Computational (tech provider)
Enko Chem	2017	DNA Encoded Libraries
GreenLight	2008	Topical RNAi pesticides
HitGen	2012	DNA Encoded Libraries (tech provider)
MicroMGx	2015	Metabologenomics (tech provider)
MoA	2018	<i>in vivo</i> plant model
Oerth Bio	2019	PROTAC protein degradation

India Key Beneficiary of 'China Plus One' strategy to diversify product supply. Benefits from:

- Relative low costs, inc. labour
- Large pool of qualified personnel
- Adherence to global manufacturing standards
- Increasing focus on IP protection

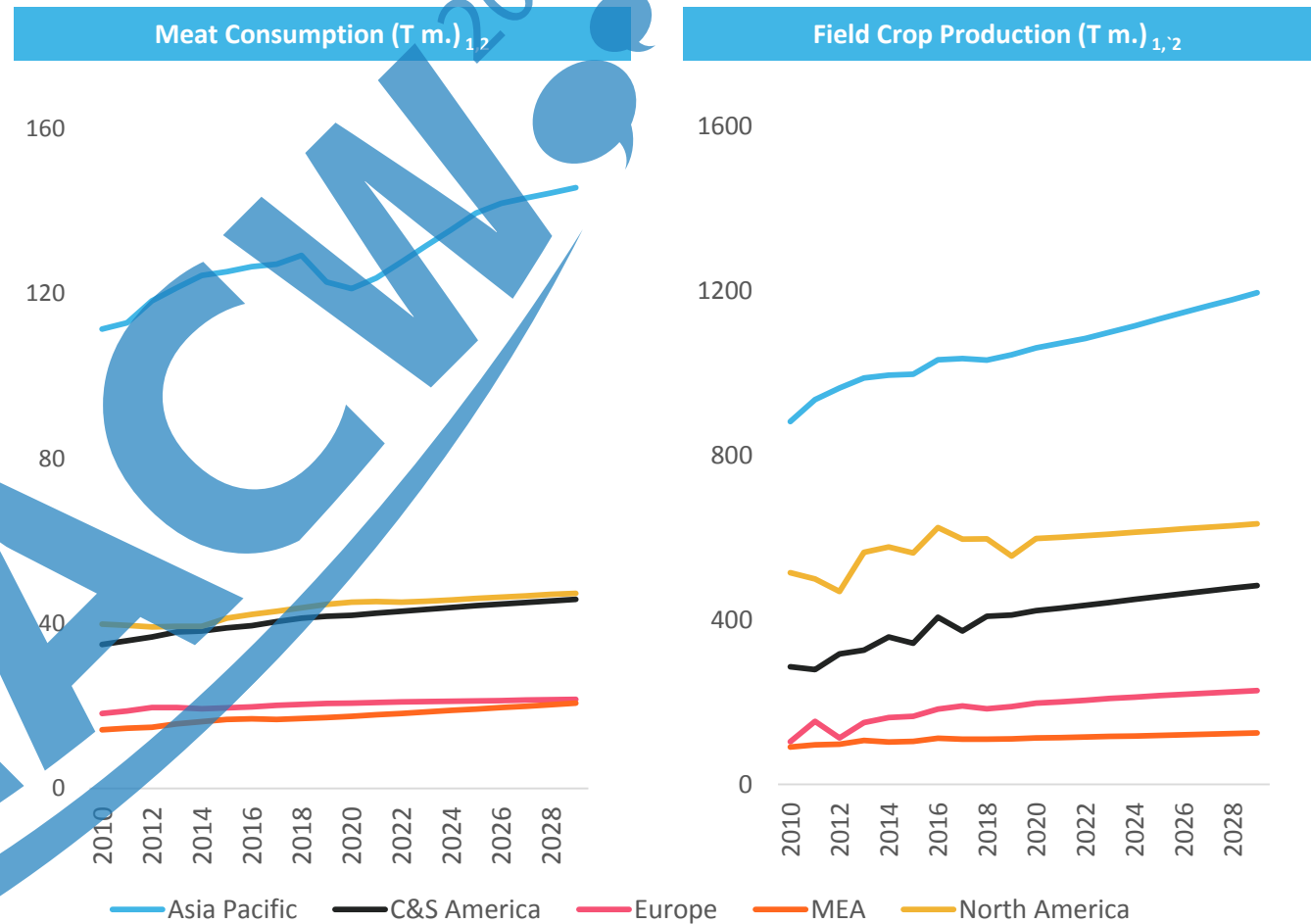


Changing dietary habits have potential to alter crop protection demand

- Vegetarian, veganism drives demand for feed crops and shifts demand to pulses and vegetables
 - Focus on Europe & North America
- Meat consumption forecast to rise primarily in APAC region:
 - Expanding middle classes in markets such as China and India
 - Demand for crop exports from C&S America and North America

¹ Beef, pig, poultry, sheep in key countries

² Maize, rice, soybean, wheat in key countries



Political Control Now Centres on Environmental Controls

Targets range between 2030 - 2050

Generally, the key themes behind
legislation focus on:

- Substantially increasing agricultural production
- Reduce pesticide volume use
- Reduce nutrient losses
- Reduce fertiliser use
- Substantially increasing organic farming areas.

Recent Political Initiatives

The European Green Deal

- Farm to Fork
- EU Biodiversity Strategy

United Kingdom

- Brexit
- National Action Plan for the Sustainable Use of Pesticides (NAP)

Japan's Green Food System Strategy

USA's Agriculture Innovation Agenda (AIA)

China's 14th Five-Year Plan

- National Agriculture Green Development Plan (2021 - 2025)
- National Pesticide Industry Development Plan (2021 - 2025)

Canada's Healthy Environment and Healthy Economy Plan

Australia's National Agriculture Innovation Agenda

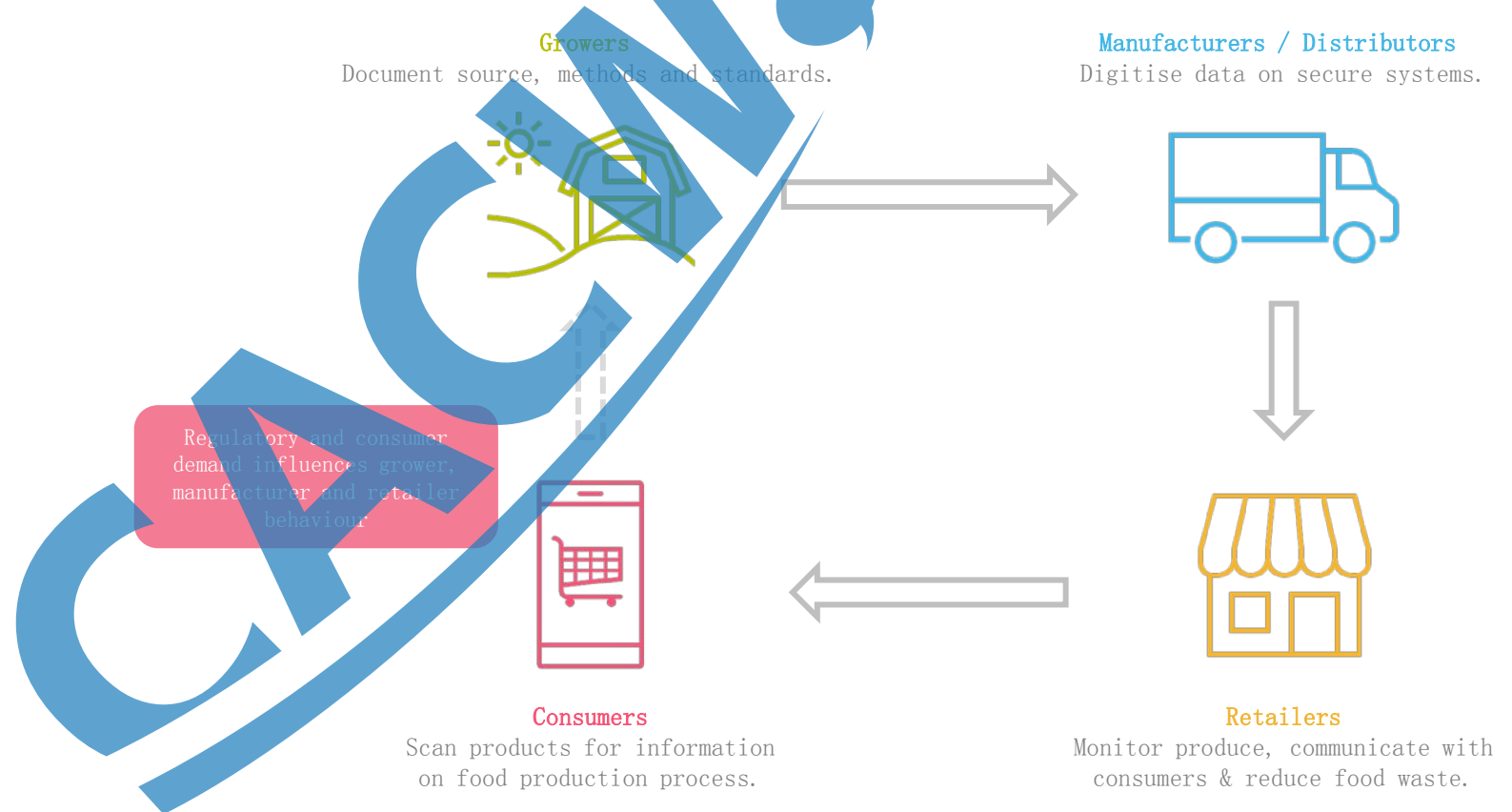
Brazil's ABC+ Plan

Digital Agriculture Uptake Driven by Consumer Demand

- Demand for low residue produce driven by consumers and food groups
 - E.g. PAN-UK surveys supermarkets and ranks related to their action on pesticides.
- Expected to aid increase demand for biopesticides
 - Particularly large farms with direct links to retail.
- Traceability may be a key issue for regulators to enforce standards:
 - Enabled by Digital Agriculture

Digital Systems for Food Traceability

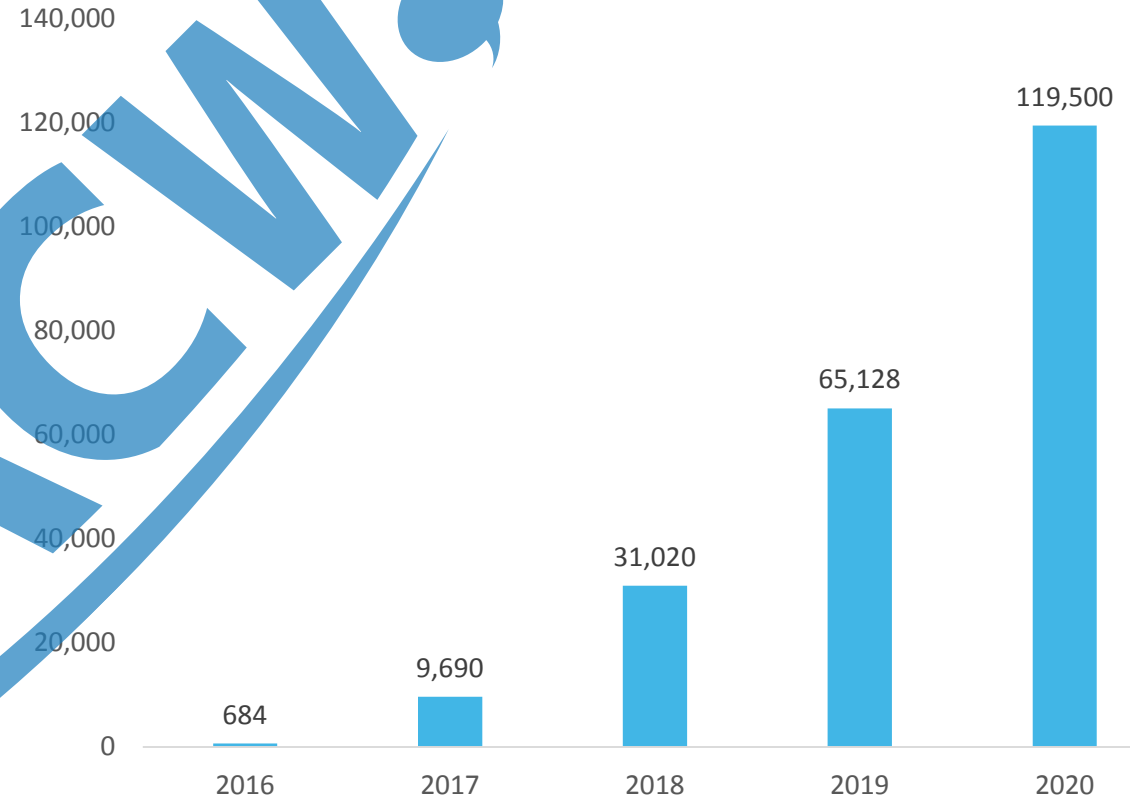
Enable tracking of history, distribution, location and application of food products. Helps ensure reliability of sustainability claims and enhances transparency.



Increasing Use of Digital Technologies

- Key factors driving uptake
 - Profit / Efficiencies
 - Regulatory
 - Consumer demand
 - Labour availability a key issue in some markets
- Key barriers to use
 - Cost
 - Complexity / ease of use
 - Cross-platform compatibility
- Service-based model seems most likely to have success
 - Lack of tech knowledge/skills can be a barrier to grower usage
- Creates opportunities particularly for high dose formulations for use with low quantities of water

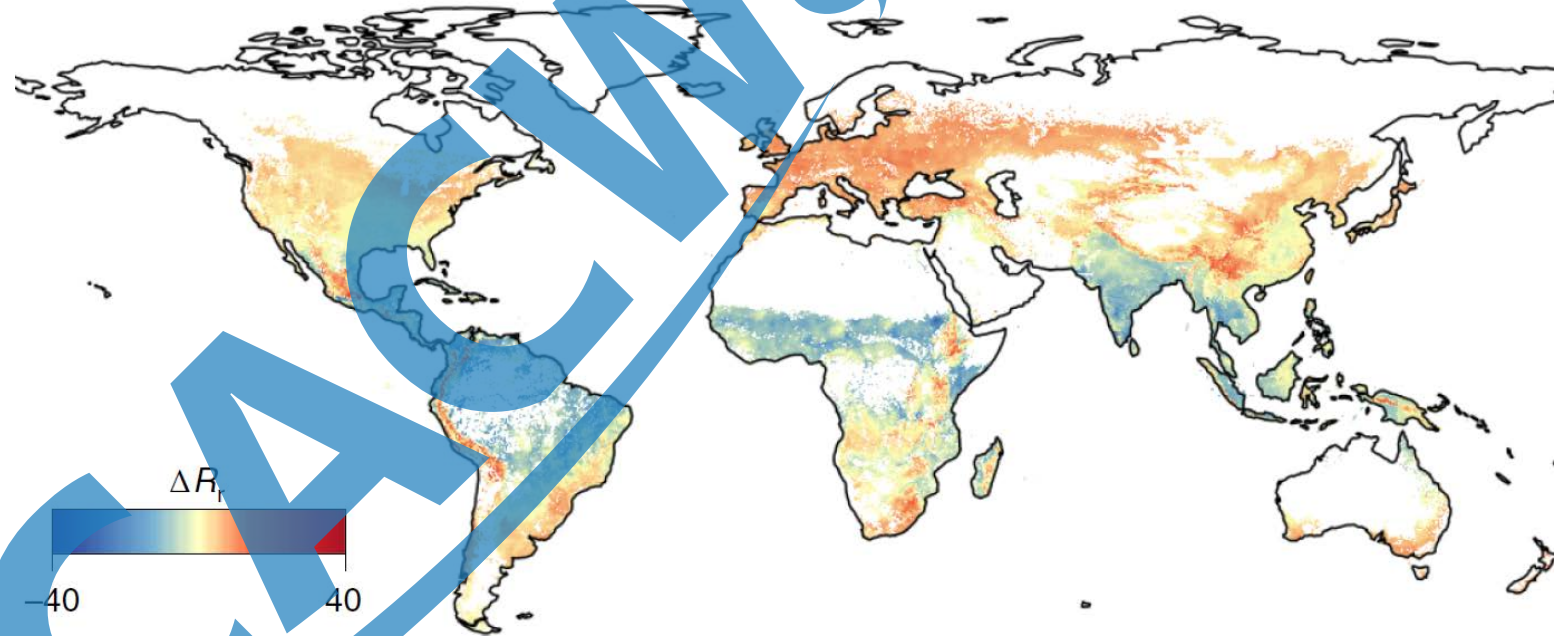
Japan Area Treated by Drone (Hectares)



Climatic change expected to alter pest distribution

- Impacts are crop, pest and microclimate dependant:
 - More species at higher latitudes
 - Fewer species closer to equator
- Potential to increase pressure in USA and Canada, Europe, China, Andean S America, Southern Africa
- Potential for fewer species of concern in Brazil & Northern S America, Sub-Saharan Africa, India and SE Asia
- Number of species not necessarily indicative of pressure on crop plants.

Average change in number of crop disease species (ΔR_T) at end of 21st century under high emissions scenario (RCP 6.0).



Source: Adapted from: Chaloner, T.M., Gurr, S.J. & Bebber, D.P. Plant pathogen infection risk tracking global crop yields under climate change. Nat. Clim. Chang. 11, 710–715 (2021).



Future Market Drivers: Biopesticides

Value at ex-manufacturer level

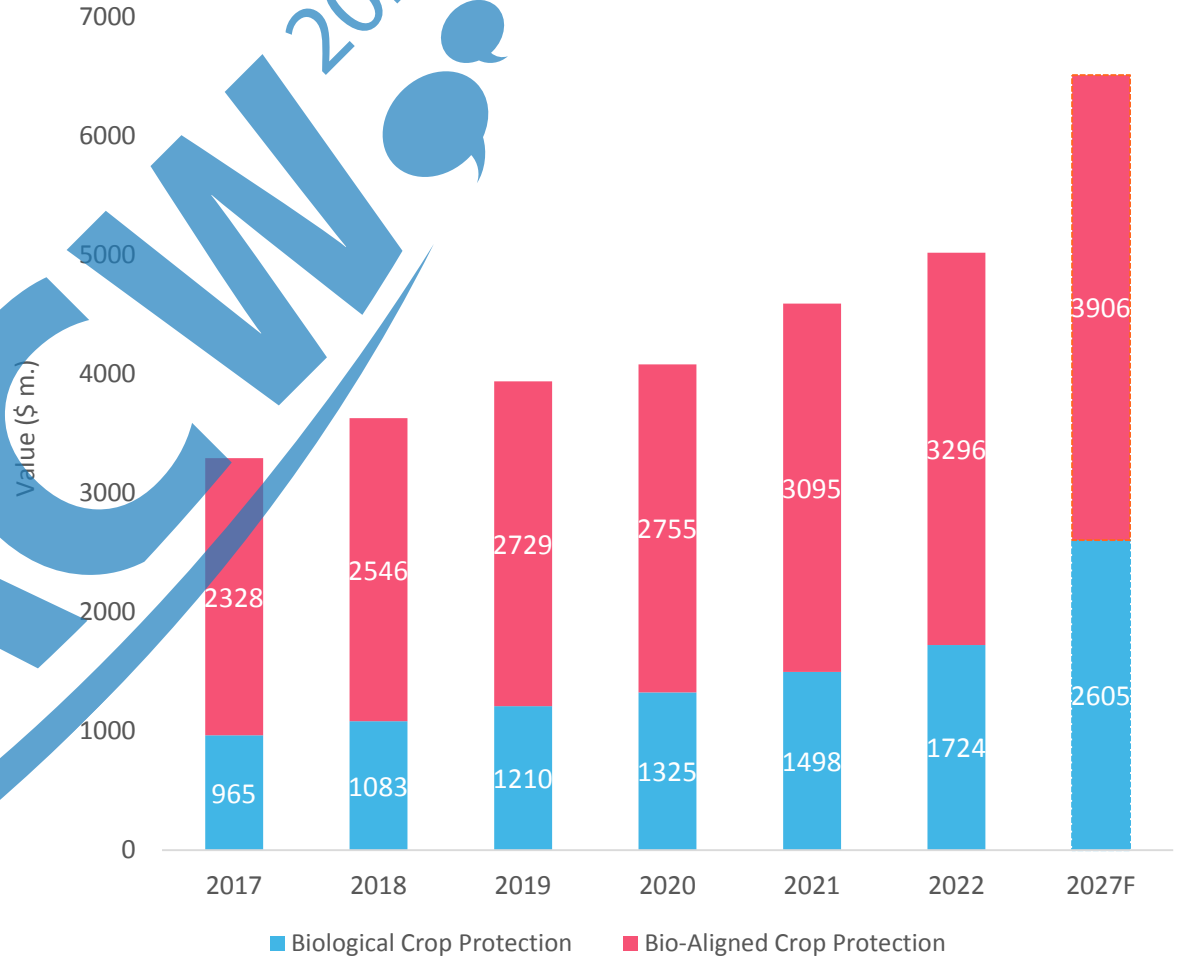


The Biopesticide Market Remains a Small Proportion of the Overall CP Market

- Market remains dominated by Bio-aligned products
 - (e.g. copper, sulphur, spinosad)
- Biopesticide (e.g. plant extracts, microbials) market +15% in 2022
- Biopesticide Market expected to continue to out-grow conventional CP

Key Drivers

- Organic production
- ‘Green’ legislation
- Efficacious new technology
- Increased market reach
- Novel mode of action
- ‘Bridge’ hybrid products
- Regulation

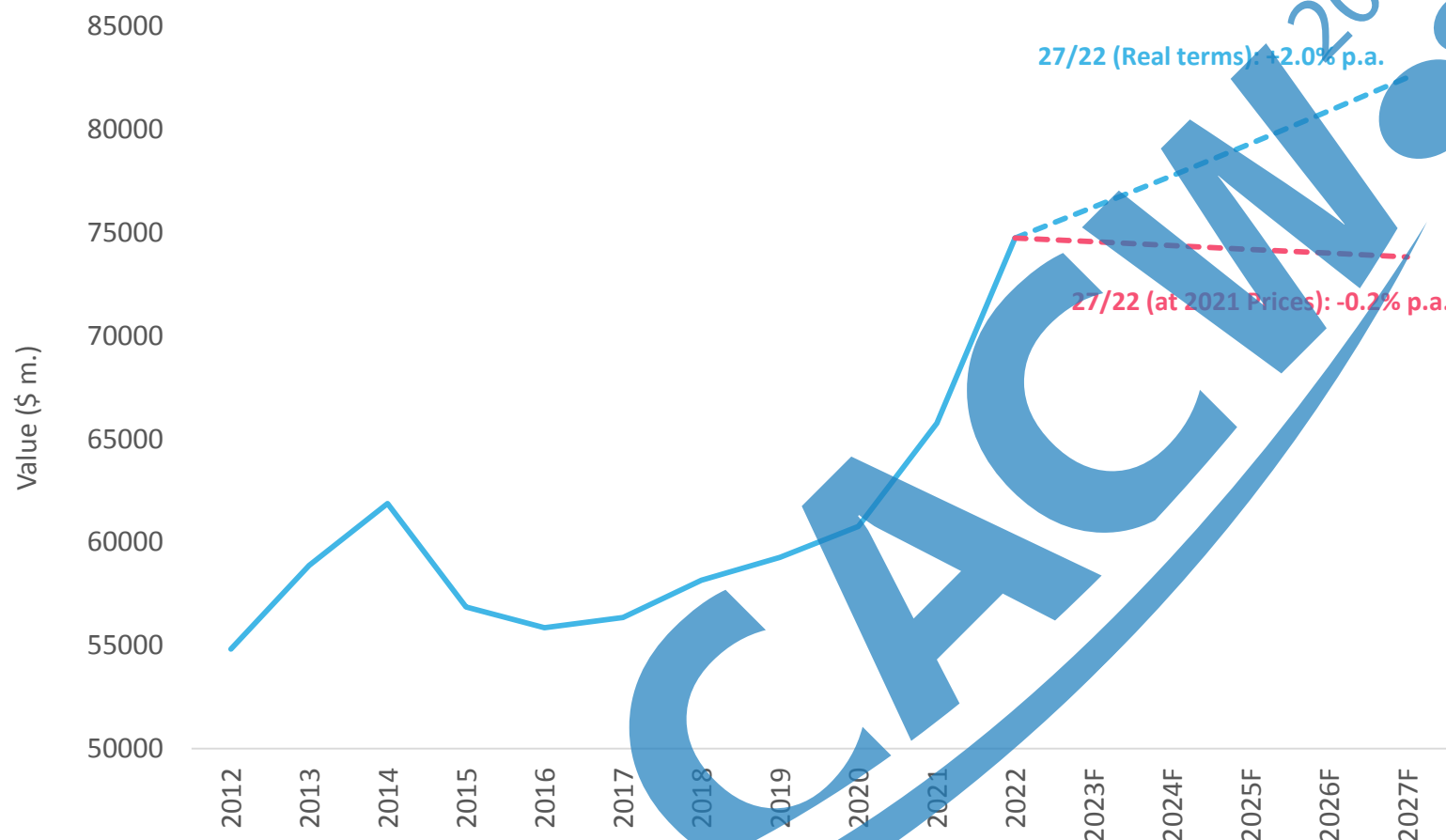


2024



Market Forecast

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2022

Significant gain from high pricing environment

Volumes relatively stable

Strong commodity prices

2027F

Positive Drivers

Pest resistance development aids value

Developing markets (e.g. SE Asia, MEA) drive volumes

Further uptake on seed treatments and biologicals

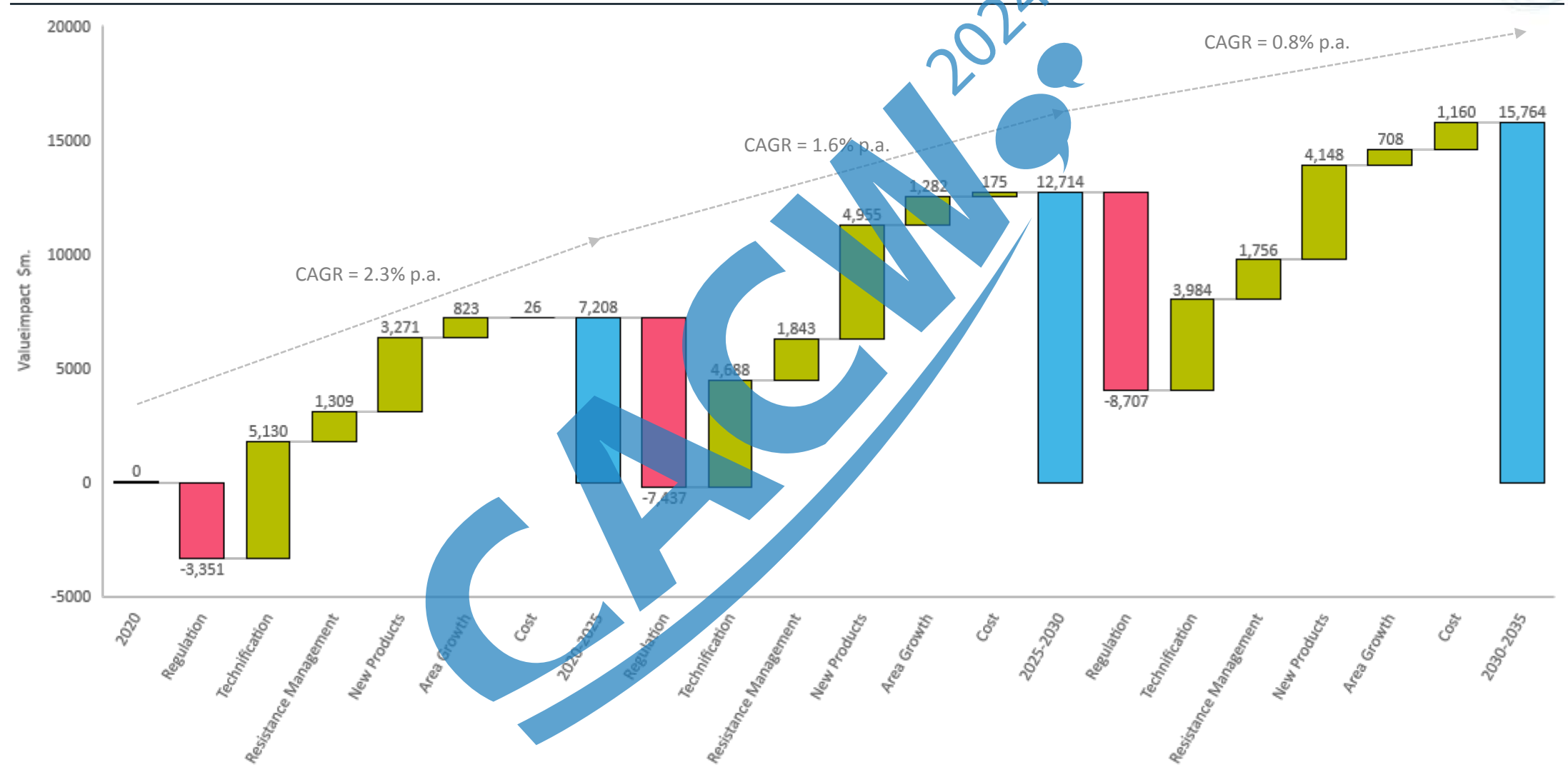
Negative Drivers

New GM areas and traits detract from value and volume

Accelerating impacts of variable rate applicators on volumes

Commodity and Input price normalisation

Crop Protection Market Forecast 2025-2030-2035



Note: 2020 baseline predates recent significant price increases
Forecasts in Real terms (i.e. constant price + currency)

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