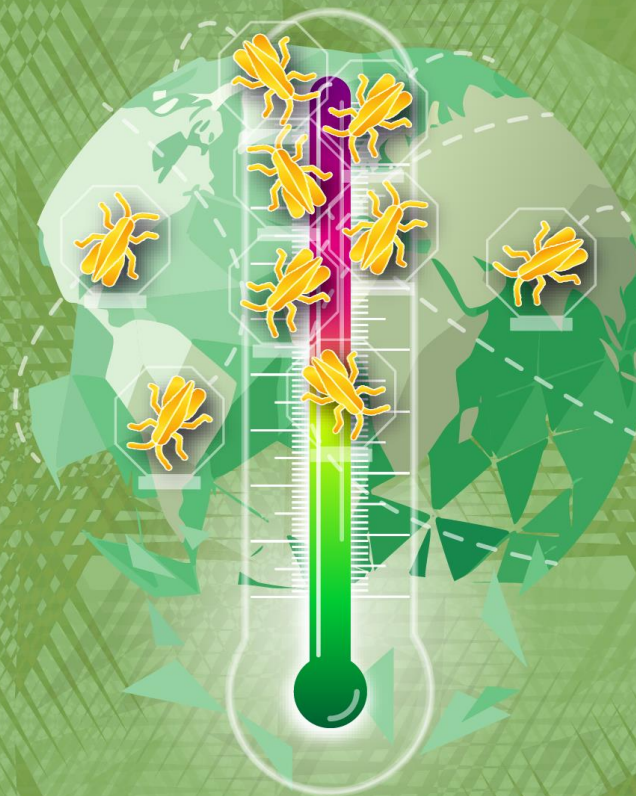


IPPC Webinar Series

Climate Change and Phytosanitary Issues

1–2 October 2025 | 14:00–16:00 CET



Biocontrol use and regulation across regions in the Context of Climate Change

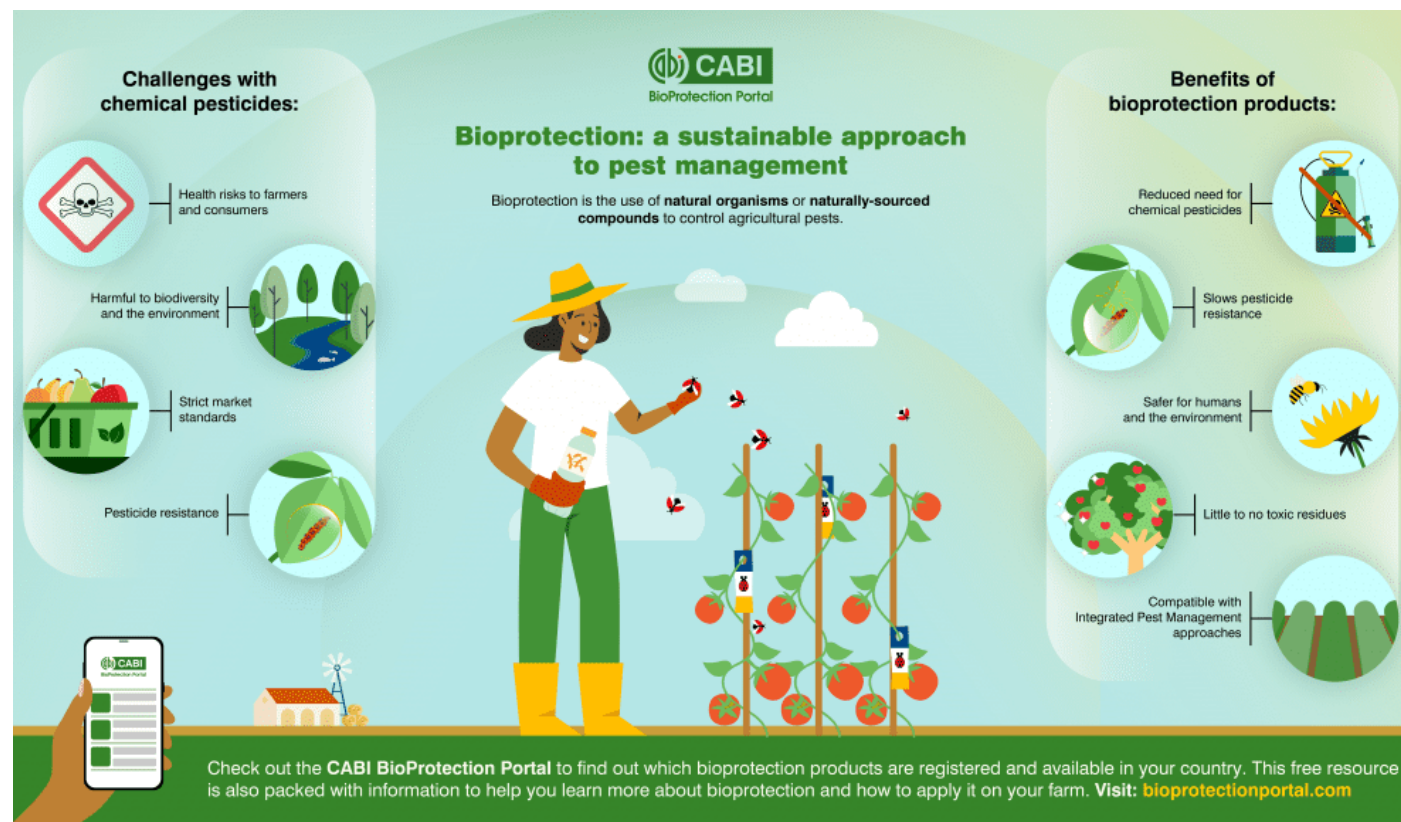
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Context

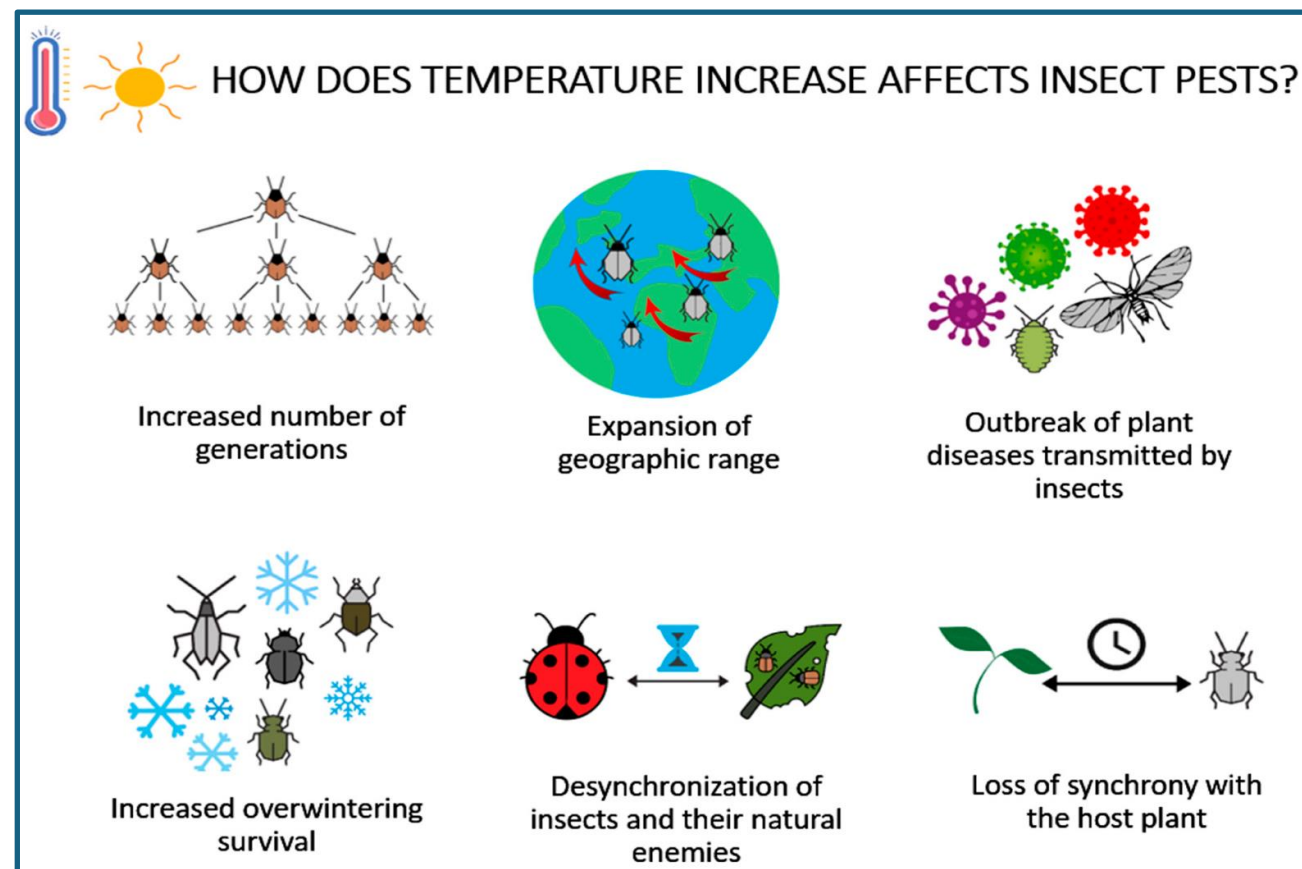
- Global food security is hampered by crop yields losses (up 40% of crop yields are lost to pests and diseases attacks)
- **Chemical control** of pests mainly adopted by farmers/industries with limited results and many adverse effects on human health and environment
- **Biocontrol** (as NBS, eco-friendly method, cost-effective, Food Safety, **effective over large areas**)
- **Challenges:** The development of **biocontrol products**, their **regulation**, their **adoption** and effects of **climate change on their effectiveness**





Context

- Pests pressure in agriculture worsened by **climate change** due to:
- ❖ **Unpredictable seasons and increase of temperature** leading to proliferation of pests and expansion of their native range
- ❖ **Impact on biocontrol agents developmental rates, survival, etc.**
- ❖ **Temporal mismatch** between natural enemies and target pests can reduce their effectiveness
- Successful biocontrol agents often have high target specificity and synchronized phenology with their targets



Effects of temperature rise on agricultural insect pests
(Skendžić et al. (2021))



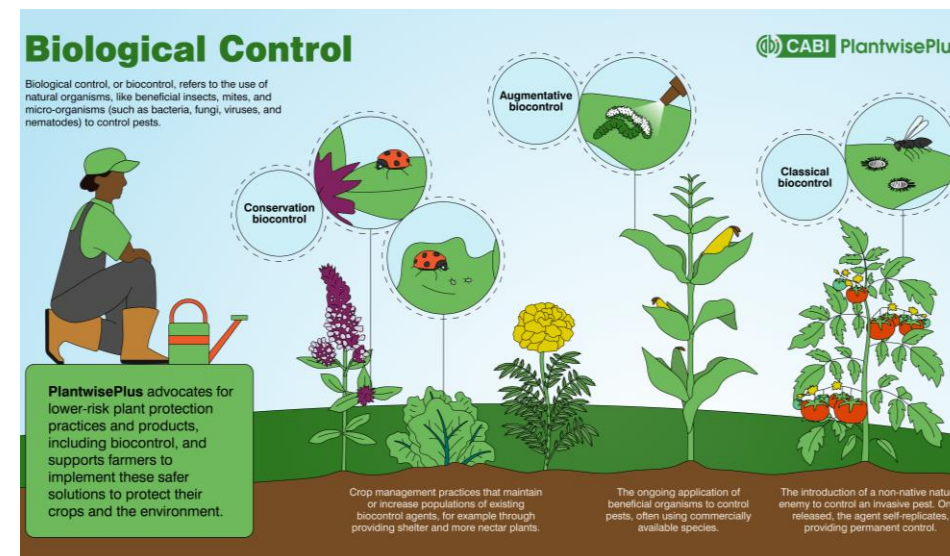
Biocontrol: definition, mechanism and approaches

- **Biocontrol or Biological control:** method to control pests such as insects, mites, weeds and plant pathogens using other living organisms or substances derived from them, including microorganisms, semiochemicals.

❑ **Mechanisms:** predation, parasitism and herbivory

❑ Biocontrol Approaches

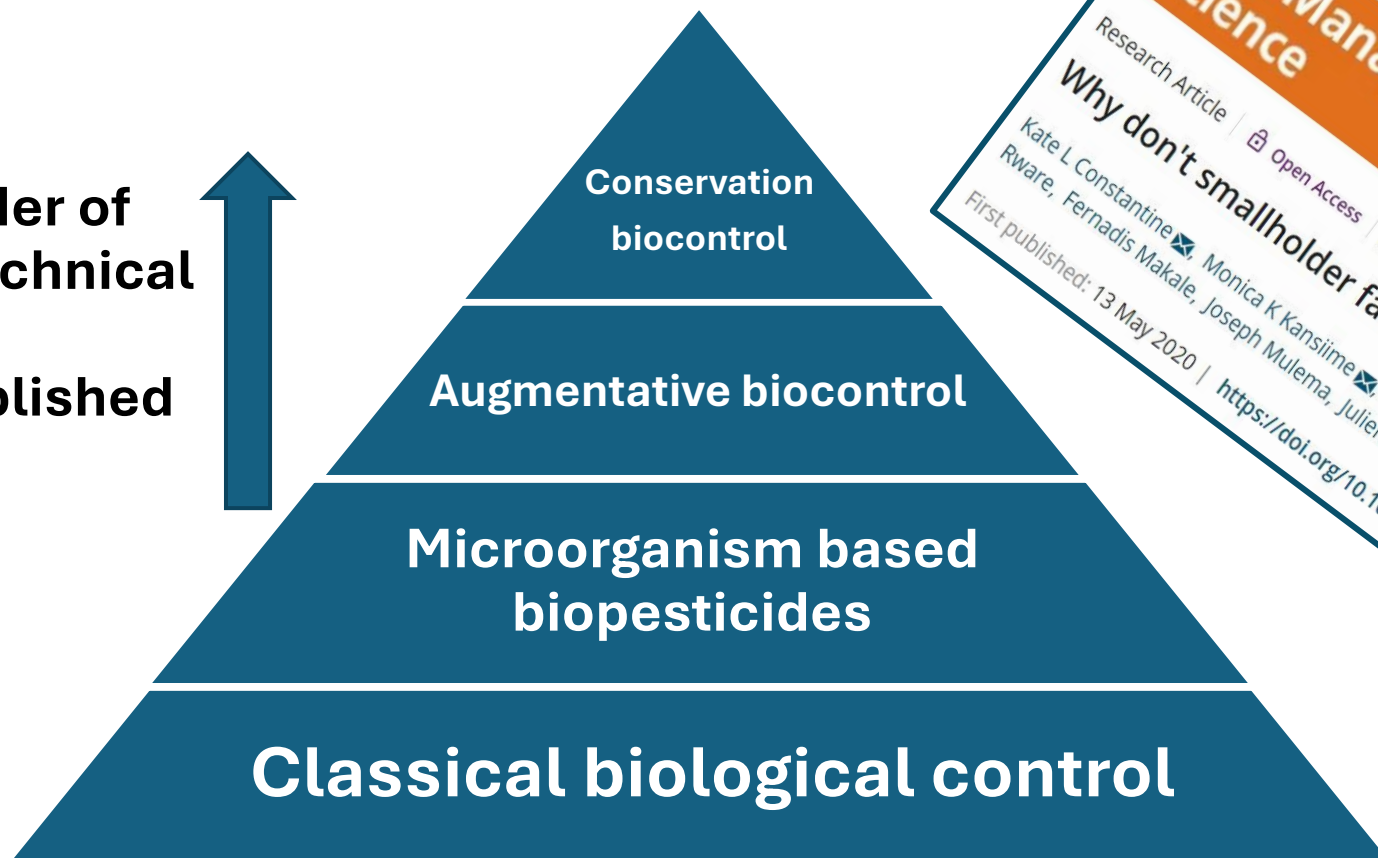
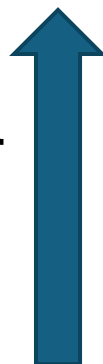
- **Conservation:** suitable habitat and food for natural enemies
- **Augmentative:** release of natural enemies already present in the area
- **Classical:** introduction of non-native natural enemies (mainly used for Invasive Species' control)
- **Microorganisms based biopesticides:** e.g. entomopathogens *Metarhizium anisopliae*, *Beauveria bassiana* etc.





Biocontrol research and use

Decreasing order of
results from technical
research on
biocontrol published





Biocontrol research and use

- **Steps to develop a cost-effective biocontrol product (microorganisms and macrobials based products)**

Discovery: Finding a natural enemy that kills the pest

The easiest bit

Strain selection: Especially for microbials

Lab & field trials to confirm efficacy, practicality: Pest mortality, Reduced yield loss, etc.

Public research often ends here

Develop commercial production methods: Can be a stumbling block, especially for macrobials

Formulation: Especially for microbials

Product registration: Can be a disincentive if slow/expensive; not always needed for macrobials

Packaging, distribution, marketing: Getting the product in good condition to the farmer – and profitable for everyone



Biocontrol research and use

Macrobiols released for **classical biocontrol** and target pests

Countries in Europe, North Africa, and the Middle East and their respective number of introductions of biological control agents, agents established (Seehausen et al. 2021)

Africa

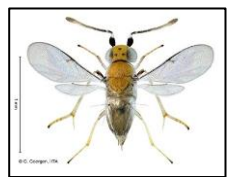


Anagyrus lopezi

1981



Phenacoccus manihoti



Gyranusoidea tebygi

1986



Rastrococcus invadens

©Georg Goergen/IITA

Africa
and
Asia



Teretrius nigrescens

1990



Prostephanus truncatus

©Georg Goergen/IITA

Country	Number of introductions	Agents established Number (%)
Israel	127	43 (33.9)
Italy	109	48 (44.0)
Former USSR	79	20 (25.3)
France	57	24 (42.1)
Greece	55	20 (36.4)
Spain	47	30 (63.8)
Egypt	41	14 (34.1)
Cyprus	34	22 (64.7)



Biocontrol research and use

Some of the key natural enemies promoted as biocontrol products are:

Type of organism	Some key products (Biocontrol agents)	Pest targeted
Bacteria	<i>Bacillus thuringiensis</i>	Lepidopteran insects
Fungus	<i>Beauveria bassiana</i>	Lepidopteran pests, Mealybugs, Thrips, etc.
	<i>Metharizium</i> spp	Locusts, Grasshoppers
Virus	Pieris rapae granulovirus (PrGV)	Lepidopteran pests, Whiteflies
Predatory mites	<i>Amblyseius swirskii</i>	Whiteflies, Thrips
	<i>Transeius montdorensis</i>	Whiteflies, Thrips
	<i>Phytoseiulus persimilis</i>	Red spider mite
	<i>Amblyseius cucumeris</i>	Mite pest and thrips



Overview of biocontrol products regulation/registration

- **Purpose of biocontrol products regulation:** control the potential spread and impact of living organisms used to suppress pests, ensuring their safety and efficacy.
- **ISPM 3** addresses regulation of biological control agents capable of self-replication (IPPC/FAO, 2005)
- **NPPOs have the legal mandate** to facilitate the registration and documentation necessary for the import, export, transport, release and mass-production of biological control agents and other beneficial organisms (IPPC/FAO, 2005)



ISPM 3

INTERNATIONAL STANDARDS FOR
PHYTOSANITARY MEASURES

ISPM 3

**GUIDELINES FOR THE EXPORT, SHIPMENT,
IMPORT AND RELEASE OF BIOLOGICAL CONTROL
AGENTS AND OTHER BENEFICIAL ORGANISMS**

(2005)

Produced by the Secretariat of the International Plant Protection Convention



Overview of biocontrol products regulation/registration

- Lack of specific national regulation for biocontrol products in many countries
- Application of chemical pesticides legislation to biocontrol products has led to unnecessary and inappropriate regulatory burden
- Biological risk undervalued
- Lack of formal or reliable records/register for macrobial (parasitoids, predators, herbivorous insects/phytophages species) imported and released in many countries (especially in Africa)
- Insufficient communication on biocontrol products registration process



ISPM 3

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Regional harmonization of biopesticides registration: Case of Africa

Between 2018-2019, with the support of USDA-FAS, CABI conducted continental wide study to better understand the current context and regional harmonization of the regulation of plant protection products (PPPs) including biopesticides

Methods

- An overview of pest control products regulatory frameworks across the African Continent
- Key informant survey and information on all initiatives supporting harmonizing the registration and management of plant protection products in Africa (CILSS, WAPRC, UEMOA, CEMAC, ICGEB).
- Initiatives led by the AUC and each of the RECs officially recognized by the AUC: UMA, COMESA, CEN-SAD, EAC, ECCAS, ECOWAS, IGAD, and SADC.
- Two stakeholder consultative workshops with Member States and RECs in 2022 and 2024

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Plant Health Strategy for Africa implementation support project

Areas of overlap, divergence and opportunities for alignment in the guidelines and laws governing the registration of biopesticides in Africa

February 2023





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Climate Change and
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Results and the Outcomes & Benefits of regional harmonization



Current situation of Plant Protection Products (PPPs) harmonization in Africa



Map illustrating country participation in regional harmonization initiatives (IAPSC and CABl, 2024)

- **WAPRC (17 member countries)** of 3 West African intergovernmental organizations) is a body established to harmonize and facilitate pesticides registration
- **16 Member States of SADC** have established the Southern African Pesticide Regulators' Forum (SAPReF).
- **EAC 8 countries** have established a harmonization initiative
- **6 countries in CEMAC** (a subset of ECCAS) have also joined together for to form “Comité des Pesticides d'Afrique Centrale (CPAC)”.
- **Harmonization effort, focusing on bioprotectants, is led by COMESA and will cover 21 countries**, becoming the largest grouping to date.



Prerequisites for incorporating a system for the registration of biopesticides into law

Legal instruments relating to the PPP registration identified for 49 African countries

Legal instruments relating to the PPP registration	Proportion of countries
Primary legal instrument governing pesticide or agrochemical control, including common regulations for pesticide registration	92%
Requirement for business dealing with pesticides and biopesticides to formally register products	92%
Provision for a registration committee	82%
Provisions for a register of plant protection products	Most
A definition of "pesticide" (or equivalent term) that encompasses biopesticides	84%
Data requirements for registration of plant protection products in general	~66%
Data requirements for product packaging and labelling	~70%
Provisions distinguishing public from confidential data	Some
Dossier evaluation	~50%
Provisions on advertising	~66%
Post registration controls	Most



Specific elements of a biopesticides regulatory framework addressed by national regulations

Organization	Number of countries with provisions (over 49 countries)
Standalone definitions of biopesticides	21
Biopesticide registration different from that of conventional pesticides	8
Provisions for the registration of biopesticides in general	7
Specific provisions for microbials	5
Specific provisions for botanicals	4
Specific provisions for semiochemicals	3
Specific provisions for macrobials	6
Provisions for other biopesticide categories	6
Distinct data requirements for registration of biopesticides	7



Specific elements of a biopesticides regulatory framework addressed by subregional (REC) guidelines and regulations in Africa

Organization	CEMAC	CILSS	EAC	COMESA	ECOWAS	SADC
Standalone definitions of biopesticides	Y	Y	Y		Y	Y
Biopesticide registration different from that of conventional pesticides	N	Y	Y	Coming soon – will be aligned with SADC and EAC	N	N
Provisions for the registration of biopesticides in general	N	N	Y		N	N
Specific provisions for microbials	N	Y	Y		N	N
Specific provisions for botanicals	N	N	Y		N	N
Specific provisions for semiochemicals	N	N	Y		N	N
Specific provisions for macrobials	N	N	Y		N	N
Provisions for other biopesticide categories	N	N	N		N	N
Data requirements for registration of biopesticides	Y	Y	Y		N	N

Coming soon – will be aligned with EAC



Outcomes & benefits of regional harmonization

- Can **improve regulatory harmonization** by:
 - streamlining procedures (**speed up product registration** across countries)
 - pooling limited governmental resources and saving costs
 - reducing trade barriers and Increase biocontrol products availability
 - diminishing incentives for smuggling.
 - Supports embedding good practice, for risk assessment
- Regions can **promote the registration of safer PPPs, including biopesticides** with shared data requirements.
- Can **reduce the potential impacts on human health and the environment**, ensure agricultural sustainability, and optimize resources between national governments and regional bodies.

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An African Perspective for Harmonized Policies Framework on Plant Protection Products (PPPs)

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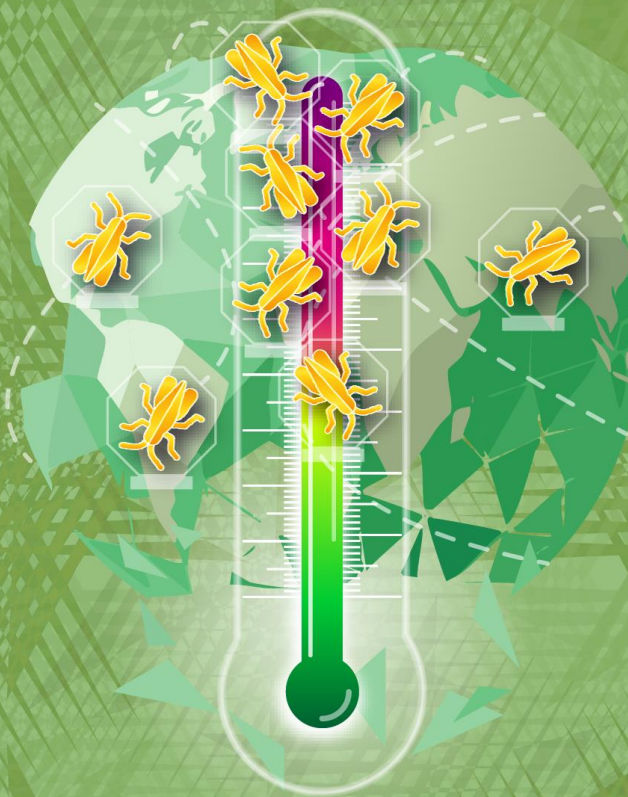
Conclusion

- Biocontrol is a sustainable alternative pests control method to promote, despite climate change can have direct and indirect adverse impact on biocontrol agents
- Registration of biocontrol products is still be a challenge, with lack of specific regulation process established in many countries
- Regional approaches to harmonize regulation of biocontrol products registration is getting interest and should be encouraged to increase products availability
- Promote quarantine facilities setup at national/regional level for effectiveness and risk assessment tests
- Improve communication between NPPOs at regional level about biocontrol products, especially macrobials importation
- Inform stakeholders of the importance of complying with the regulation for biocontrol products

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Thank you