



# Push Pull in Africa

Modern science meets  
traditional farming

# Prof Thomas Odhiambo 1931-2003

- PhD in reproductive physiology of the desert locust, Cambridge University 1965
- Lecturer in Zoology at Nairobi University
- Founder with Carl Djerassi of ICIPE (International Centre for Insect Physiology and Ecology)





**International Centre for Insect Physiology and Ecology** aims to...

“Alleviate poverty, ensure food security and improve the overall health status of peoples of the tropics, by developing and extending management tools and strategies for harmful and useful arthropods, while preserving the natural resource base...”

4H: Health of humans, animals, plant and environmental

- Staff >400, works in 40 countries,

# Rothamsted, 1843



ROTHAMSTED  
RESEARCH

In partnership with ICIPE from 1993

“We view science as a continuum, from blue skies to green fields, and strategic research as the tool to confront complex problems. We combine both, supported by unique capabilities and interdisciplinary teams, strengthened by partnerships. Such a systems approach is the only way to achieve highly productive but environmentally-benign farming and food innovations”

<https://www.rothamsted.ac.uk/our-values>

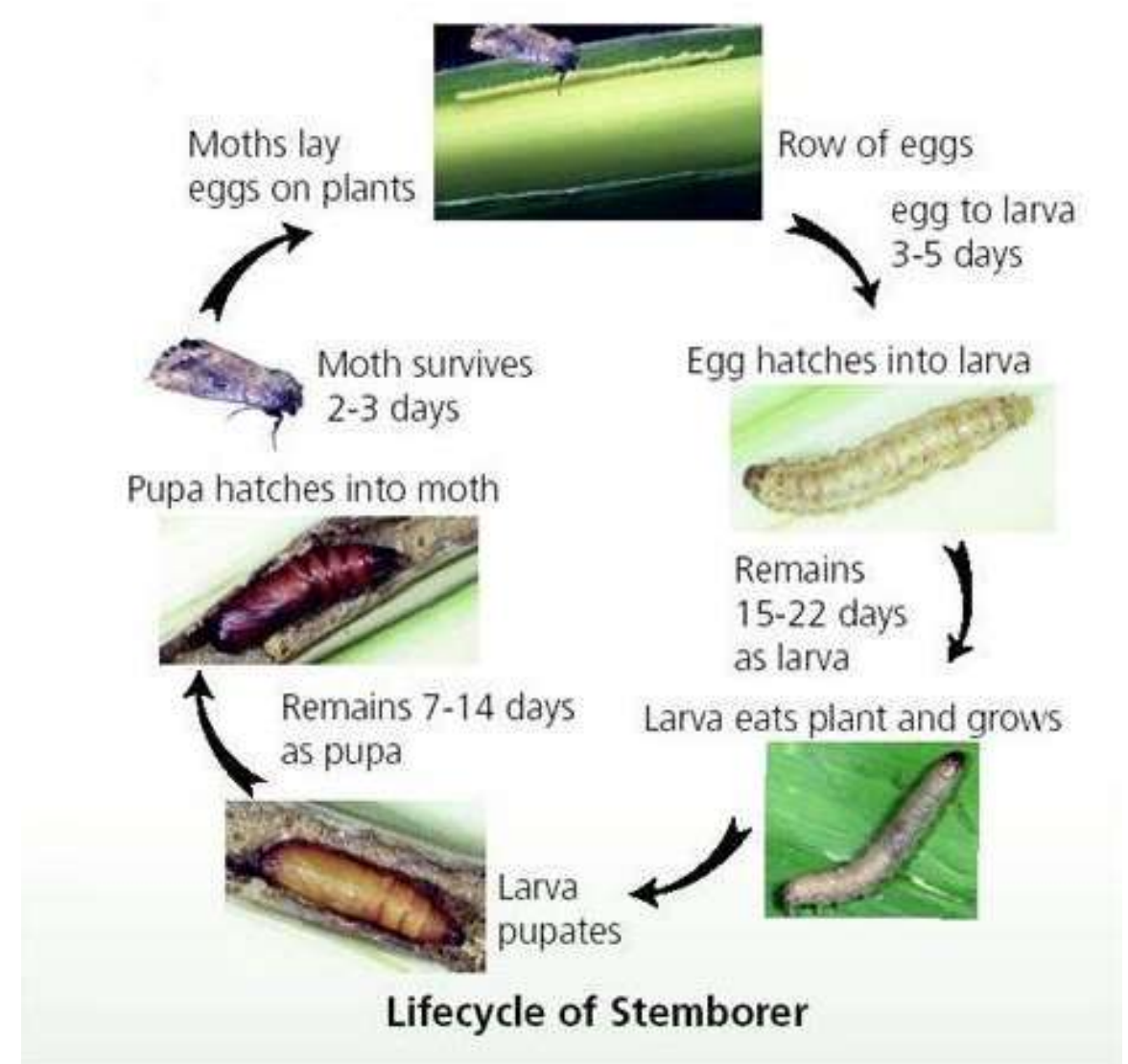
# Smallholder farmer challenges

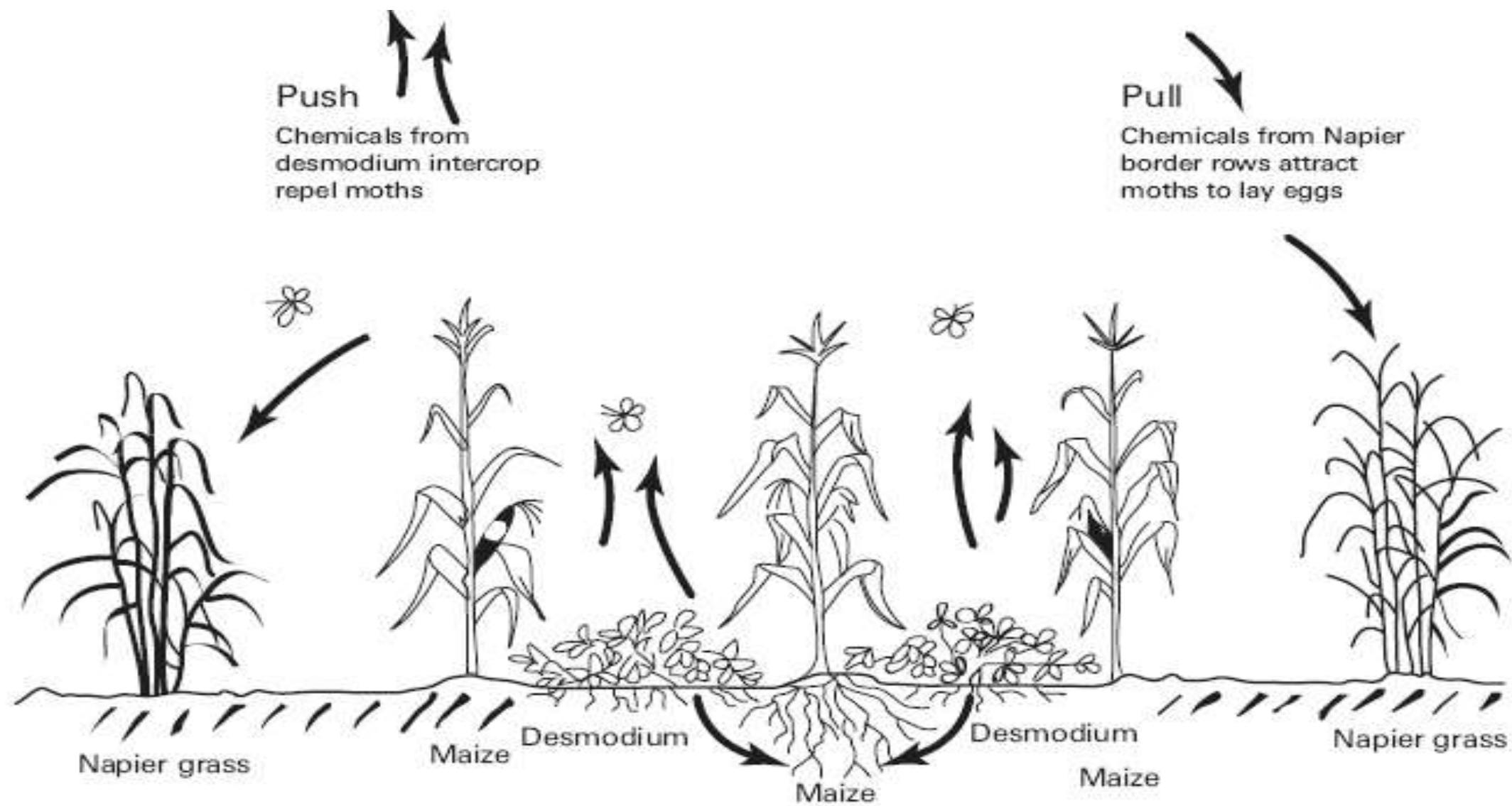
- Maize pests: stem-borer, fall armyworm
- Parasitic weed *Striga*
- Declining soil fertility
- Heavy workload for women
- Shortage of fodder for animals
- Poor food security



# Start with the stem-borers

- *Chilo partellus* and *Busseola fusca*
- Caterpillar eats leaves, bore into stems and can kill growing point
- also present in wild grasses, and have natural enemies





Chemicals from *Desmodium* suppress *Striga* weed

# Benefits to the farm

- Maize yields doubled
- Fodder for animals
- Soil fertility improved
- More food for less work
- Improved diet for household





# Economic benefits

Study in of 642 farmers in 56 villages in Western Kenya in 2016 found significant yield and economic benefits for PP in maize:

	<b>PP</b>	<b>non-PP</b>	<b>Difference</b>
Yield (kg/acre)	1572.99	929.51	643.48***
Prodn costs (KSh/acre)	29,486.63	19,902.27	9,584.36 ***
Net income (KSh/acre)	40,139.46	25,739.31	14,400.14 ***

Plus fodder benefits

# Benefits to society

- Women's workload reduced
- New businesses bring cash income
- Farmer expertise: "Before I was just a farmer, but I have gained much. I am trained, computer-literate, a facilitator; and I am a push-pull expert."
- Community self-reliance



# Lessons for the UK - technical

- Study pest life cycles and make minimal interventions using chemical ecology - pheromone traps, lavender oil spray
- Make more use of companion planting e.g. swede rape as trap crop for oilseed rape pollen beetle
- Make more use of perennial crops inc agroforestry
- Investigate potential of combining cropping and livestock



# Lessons for UK - principles

- Protect the integrity of science with open-ended funding
- Do what you're good at
- Work with what farmers actually want
- Observe what's happening in the field, e.g. insect life cycles
- Involve farmers as researchers and mentors, e.g. farmer field labs

