

An innovative chili dispenser to establish memory fence dynamics at crop-wildlife interfaces for effective long term human-elephant conflict mitigation





Prepared for the 8th International Congress for Wildlife and Livelihood on Private and Communal Lands


Sébastien Le Bel (Cirad) & Mike La Grange (AWMC)

On the menu....




- Human Elephant Conflict: a challenge for conservation.
- Problem elephant control & the chili pepper fashion.
- Chili-oil extract and table tennis balls.
- Teasing the elephant memory: a new mitigation approach?
- PAC: Preventing - Alerting - Controlling.



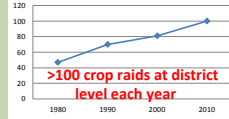
Problem elephants




2040
1997 million

Elephant Population Growth in Zimbabwe (x 1000)














>100 crop raids at district level each year



HEC mitigation

9 awareness
11 preventing access
9 chasing away
2 removing

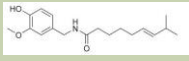
9 solutions for human threat			1/2/8/9	1/2/4/5	8	
25 solutions for crop raiding			1/2/5/6 9/10	1/2/3/4/5 9/10/12/13	1/2/3/4/5 6/7/8/12	8
17 solutions for infrastructure destruction			1/2/5/8	2/3/5/6/9 10/12/13	3/4/5/8	
15 solution for water conflict			1/2/1/8	3/6/10/12	4/5/6/8	18
11 solutions for livestock threat			4/5/9/12	4/9/12	4/5/8/12	



The deterrent effect of chilli pepper



Capsaicin
C₁₈H₂₇NO₃



- A labour-intensive cash crop (1-3,000 kg/acre).
- A maximum of 100 g of dry chilli/m² with an average planting density of 3.5 plants per m².



cirad

Exposing to chilli pepper: gas dispenser

- Locally made gas-dispenser, made with two pieces of PVC.
- Standard table tennis ball of 40 mm in diameter (32 cc) filled with chilli pepper oil extract.
- Field tests were carried out in Hwange National Park, Zimbabwe (2007).
- Combining deterrent effects:
 - Noise (110db),
 - Hit (16J),
 - Chilli (250.000 SHU).

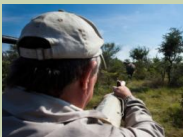


Le Bel, S., Taylor, R., La Grange, M., Ndoro, O., Barra, M. and Madzikanda, H. (2010). An easy-to-use capsicum delivery system for crop-raiding elephants in Zimbabwe: preliminary results of a field test in Hwange National Park. *Pachyderm* 47: 80-89.

cirad

Fields tests 2009-2013

- 378 attempts at deterring elephants.
- Only the release of chilli pepper has the strongest deterrent effect.
- Improvement needed: to eliminate the need to fire immediately after loading, to aim at the common distances elephants are encountered, to repeat firing during the night.



Le Bel S., La Grange M., Drouet-Hoguet M. 2014 Repelling elephants with a chilli pepper gas dispenser: field tests and practical use in Mozambique, Zambia and Zimbabwe from 2009 to 2013. *Pachyderm* (55)

cirad

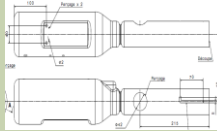
Improving the chilli pepper gas dispenser



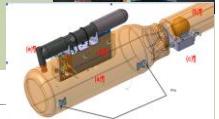
Floating barrel to cycle pepper ball

Ball feed system

Fuel injection system



Powerful 'zapper' igniter unit on charge



Testing the chili-pepper dispenser



 **Reminding boundaries**

- Problem animal control and veterinary fence protection (1987): training elephants to “respect” boundary fences.
- Remembering conflict areas: elephants can be taught to stay clear of crops.
- Improving traditional fences from observations during capture operations or from tracking elephant movements.



La Grange M., Le Bel S., Czudek R., Stansfield F. 2012. Managing Human Wildlife Conflict in Zimbabwe: A Boundary perspective rather than a Problematic species issue. IVth International Wildlife Management Congress 2012. Durban, South Africa, 9-12 July 2012.

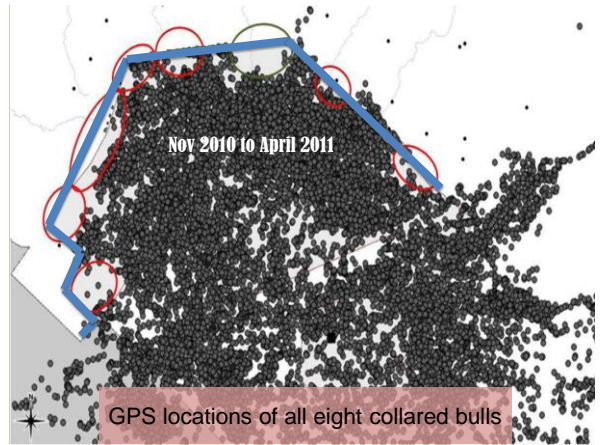
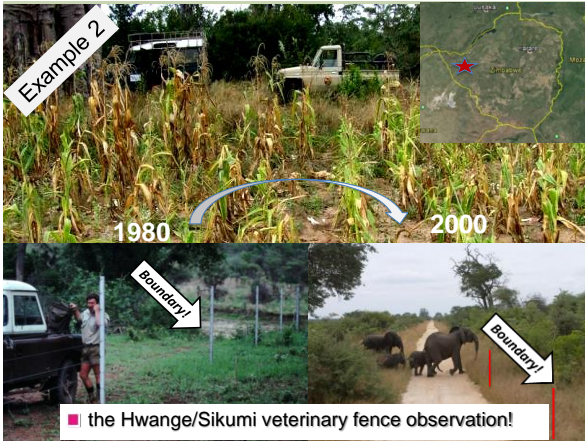


Example 1



- Trying to drive 19 elephant bulls from a small private game farm into the adjacent National Park (Hwange NP), Zimbabwe.



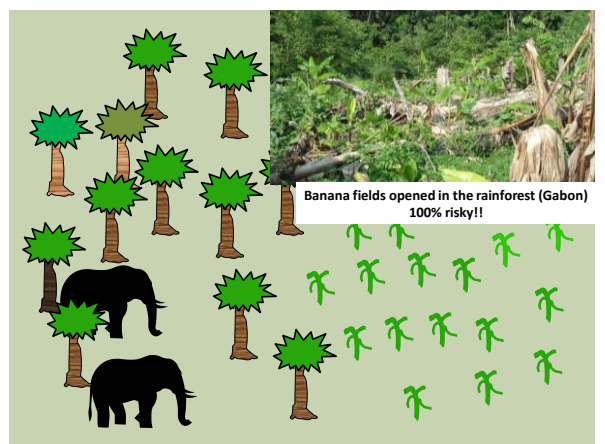


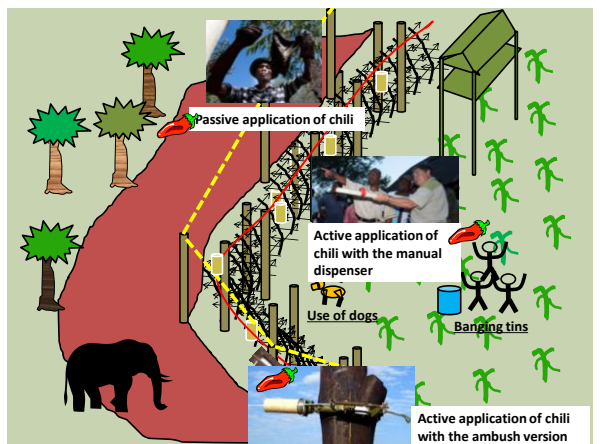
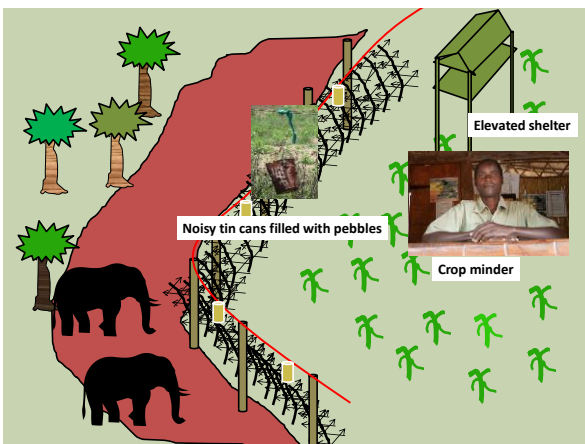
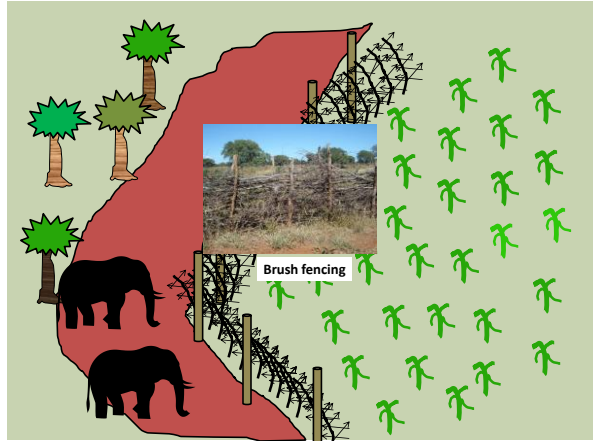
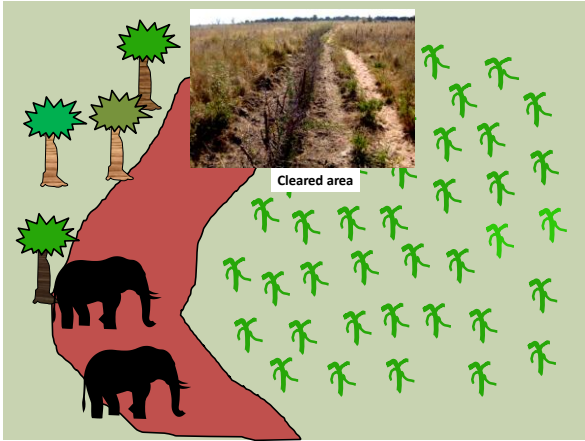
Integrating the chilli pepper gas dispenser in a boundary strategy

Training crop raiders to stay away from farming ventures.

- Proper Zoning to reduce the current haphazard approach.
- Providing a barrier (traditional or modern) to demarcate the boundary – a defined position for both the animal and people where to concentrate mitigation effort.
- Applying an array of tools to fortify this position.
- Only targeting problem elephants and this has to be done along the boundary they depredate.
- Not tracking and peppering elephants elsewhere (adjacent wildlife area).
- Diligence + patience + persistence to repel detractors.

cirad







As a recap for PAC Preventing – Alerting - Controlling



- HWC mitigation: increasing human tolerance towards wildlife species and decrease negative interactions with them.
- Enabling communities to protect themselves and to adopt less risky attitudes.
- HEC mitigation: building on existing traditional approaches with a range of applicable solutions (Tool Box).
- Using an active chilli pepper dispenser will help crop-raiding elephants to avoid human settlements through a discipline learning curve "Memory Fence".
- In addition to crop protection this approach will improve the functioning of elephant corridors.
- Improving of wildlife-based revenue ventures is essential for ensuring long-term human-wildlife coexistence.

cirad

