

*Activities of the Research Platform Production and Conservation in Partnership (RP-PCP) on wildlife-livestock interface in Zimbabwe:  
outputs after 3 years*



M. de Garine-Wichatitsky, Murwira A., Caron A., Pfukenyi D.,  
Mundy P., Fritz H., Mukamuri B., Manjengwa J., Mwenje E.



## ■ Overview RP-PCP, 2007-2010

- Background:

Research Platform based in Zimbabwe with a regional perspective (SADC/TFCAs)

Created in 2007 (MoU Dec 2007)

External evaluation in October 2010; renewed MoU Dec 2010, bureau Jan 2011

More than 40 senior researchers and post-graduate students involved



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- Partnership:

4 main scientific partners: UZ, NUST, CNRS et CIRAD

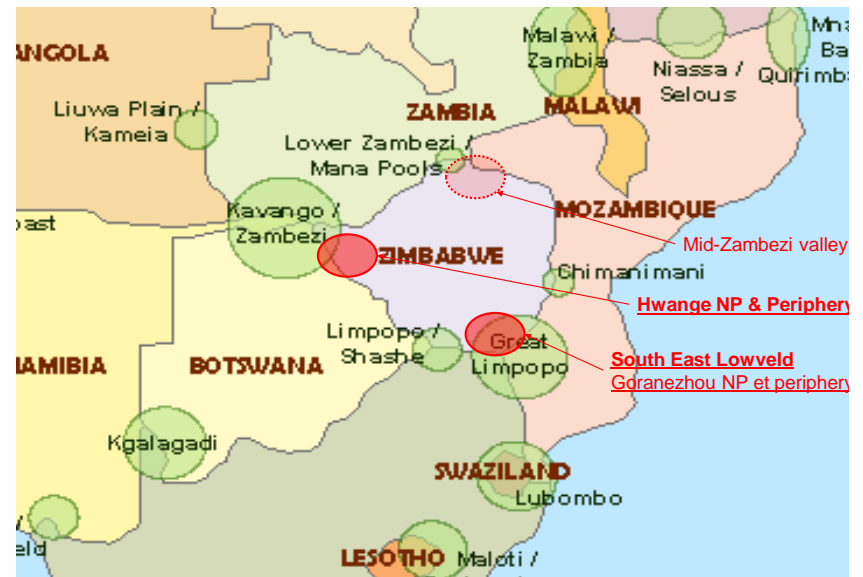
UZ (6 Dept/Faculties), NUST (1 Dept), CIRAD (3 research units), CNRS (2 RU)

Other scientific partners: Universities in S.Africa (UP/MRI&OP) and Europe (UL1, UM2, WUR)

Regional scientific networks: AHEAD, GDRI, TFCAs, Competing Claims

Operational partners: Veterinary, agricultural, forestry services, National parks, NGOs

Donors: MAEE France, EU, FAO, ANR, FFEM



## One Health approach

*AHEAD-GLTFCA Draft Thematic Concept Note for the proposed March 2011 meeting*

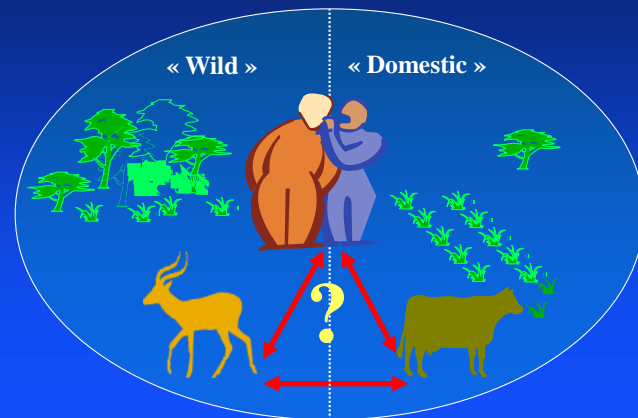
Fig 1. One Health approach based on three pillars

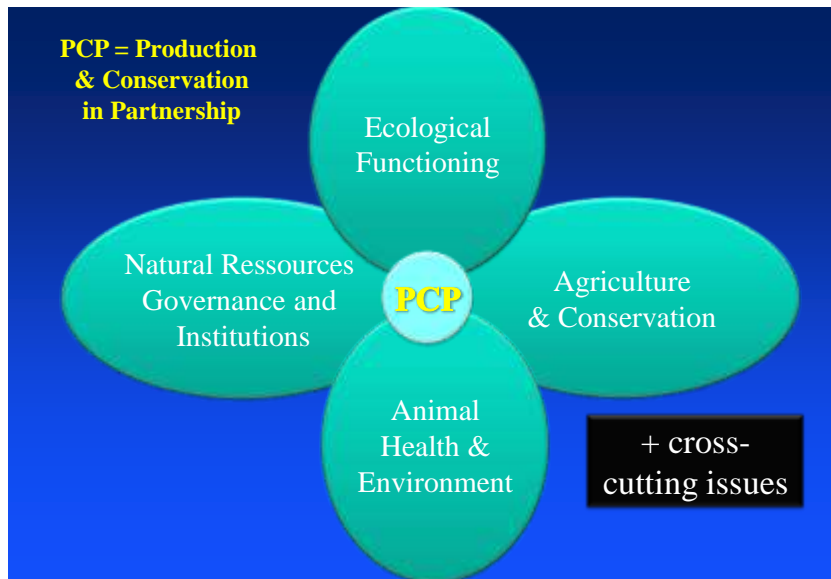


## RP-PCP: “Wild-Domestic interfaces”

**Object of research:** « Socio-ecological systems at the wild/domestic interface »

**Main research question:** « sustainability », role of « heterogeneity and resilience »





## RP-PCP productions 2007-2010

### -Examples of RP-PCP projects in which RP-PCP has been involved since 2007

\* *Research projects*: e.g. GLTFCA Buffalo-Cattle interactions , ANR-FEAR (Landscape of fear and the use of landscape resource heterogeneity by ungulates of different body size)

\* *Development projects*: EU-PARSEL (Public-Private-Community partnerships to improve food security in the South-East Lowveld of Zimbabwe) and EU-LIFIN (with NGO Action contre la Faim)

\* *Competitive fund to support students (SCAC)*

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→ *Proposal AHE # 1 (accepted 2007, funded by SCAC; ongoing)*:

“Tick diversity and abundance and tick-borne infections in domestic and wild animals at the livestock/wildlife interface in marginalised communities of the SEL of Zimbabwe”, UZ-Vet Fac & CIRAD, 1 MPhil UZ/Vet Fac, Student name L. Jomane

→ *Proposal NRG1 # 2 (accepted 2008, funded by SCAC, completed 2009)*

“Scenario Planning and Iterative Assessment in selected communities in Beitbridge” UZ/CASS, 2 MSc students, Student names F. Marimira and L. Mugabe

→ *PhD proposal Eco # C (started mid-2009, funded by CNRS and ERAMET, ongoing)*:

Title Integrated and sustainable management of African wildlife through protected areas. Developing modelling tools for exploring scenarii and decision making. Student name C. Guerbois, PhD, U. Lyon 1

## -28 Students supervised/supported by RP-PCP

Surname	Name	Gender	Programme	Nationality	Institution
Baudron	Frédéric	M	PhD	French	WU
Caron	Alexandre	M	PhD	French	UP/MRI
Cholet	Nathalie	F	MSc	French	SUPAGRO
Crosmary	William	M	PhD	French	UL1
Dube	Timothy	M	Mphil	Zimbabwean	UZ/GoeES
Gomo	Calvin	M	Mphil	Zimbabwean	UZ/Vet Fac
Guerbois	Chloé	F	PhD	French	UL1/MNHN
Jomane	Lenin	M	Mphil	Zimbabwean	UZ/Vet Fac
Madumbo	Decide	M	MSc	Zimbabwean	UZ/CASS
Marimira	Florence	F	MSc	Zimbabwean	UZ/CASS
Matema	Collen	M	PhD	Zimbabwean	UZ/CASS
Miguel	Eve	F	PhD	French	UM2/SIBAGHEE
Mugabe	Lovemore	M	MSc	Zimbabwean	UZ/CASS
Mundava	Josphine	F	PhD	Zimbabwean	NUST
Mutema	Maredeh	M	Mphil	Zimbabwean	UZ/SSAE
Mutsamba	Eleanor	F	Mphil	Zimbabwean	UZ/SSAE
Muvengwi	Justice	M	MSc	Zimbabwean	UZ/TREP
Ncube	Hengisizwe	M	Mphil	Zimbabwean	NUST
Ndaima	Henry	M	Mphil	Zimbabwean	UZ/GoeES
Nyenda	Tatenda	M	MSc	Zimbabwean	UZ/TREP
Nzuma	Tendai	M	Mphil	Zimbabwean	NUST
Pachavo	Godfrey	M	Mphil	Zimbabwean	UZ/GoeES
Périsquet	Stéphanie	F	PhD	French	UL1
Sibanda	Mbulisi	M	Mphil	Zimbabwean	UZ/GoeES
Tambara	Edwin	M	MPhil	Zimbabwean	UZ/TREP
Van der Meer	Esther	F	PhD	Netherlands	UL1
Zembo	Esther	F	PhD	Zimbabwean	UZ/GoeES

## - Students

- 28 postgraduate student have been/still are supervised under the RP-PCP since its inception in 2007:
- 20 Zimbabweans (4 female) and 8 European (5 female)
- 10 students were registered as PhD and 12 as Mphil and 6 as MSc
- Students were registered in 12 different faculties (UZ/CASS, UZ/Vet Faculty, UZ/GeoES, UZ/TREP, UZ/SSAE, NUST/DFRWM, UP/MRI, UL1, UM2, WU, MNHN, SUPagro)
- 9 thesis have been accepted/submitted/drafted

1. **Baudron, F.** *in prep.* Integrated evaluation of CA technology using MGL to improve productivity and sustainability of cotton-cereal system in the Mid Zambezi Valley. *PhD thesis, University of Wagenigen.* Submission anticipated in April 2010.
2. **Caron, A.** *in prep.* Describing and understanding host-pathogen community interactions at the wildlife-livestock interface. *DPhil thesis, University of Pretoria, Faculty of Zoology and Entomology.* Submission anticipated December 2010.
3. **Gomo, C.** *submitted.* A survey of Tuberculosis and Brucellosis in wild and domestic animals in the South-East Lowveld of Zimbabwe. *MPhil thesis, University of Zimbabwe, Faculty of Veterinary Sciences.* Submitted June 2010.
4. **Marimira, F.** 2010. Understanding livelihood futures from the perspective of women in the context of GLTFCA in Zimbabwe: a case study of Chikwarakwara and Tshipise villages in Beitbridge district. *MSc thesis, University of Zimbabwe, Faculty of Social Studies, Centre for Applied Social sciences.* March 2010. 99 pp.
5. **Mugabe, L.** 2009. Making sense of the Great Limpopo Trans-frontier Conservation Area in Zimbabwe: an attempt to use scenario planning tools to understand livelihood options in Beitbridge district. *MSc thesis, University of Zimbabwe, Faculty of Social Studies, Centre for Applied Social sciences.* October 2009. 108 pp.
6. **Mutema, M.** 2009. The effect of conservation agriculture on soil macrofauna diversity and selected soil physical properties in semi-arid areas of Zimbabwe. *MSc thesis, University of Zimbabwe, Faculty of Agriculture, Department of Soil science and Agricultural Engineering*
7. **Muvengwi, J.** 2007. A comparative study of the vegetation structure and visibility at wild dog (*Lycaon pictus*) kill sites in and outside Hwange National Park. *MSc thesis, University of Zimbabwe, Faculty of Science, Tropical Resource Ecology Program.* August 2007. 48 pp.
8. **Ncube, H.** *in prep.* Limitations of recruitment in medium sized herbivores: population dynamics of the plains zebra *Equus quagga chapmani* in Hwange National Park. *MPhil thesis, National University of science and Technology, Faculty of Sciences.* Submission anticipated October 2010.
9. **Nzuma, T.** *in prep.* A comparative study on the population status of hunted ungulates *Loxodonta africana* and *Tragelaphus strepsiceros* in a CAMPFIRE District. *MPhil thesis, National University of science and Technology, Faculty of Sciences.* Submission anticipated early 2011.

### - Scientific productions (September 2010)

Articles in peer-reviewed international journals included 9 papers published or in press (September 2010), 4 papers submitted or under revision, and 26 manuscripts in preparation (at least one draft version circulated to co-authors).

The large majority of these papers have one student as first author (33/39).

Books and book chapters:

- Special issue of *Biodiversity and Conservation* (Edited by Taylor & Torquebiau) following the Tapoa workshop co-organised with several members of RP-PCP (Niger in 2008), and several books/reports produced for IED and EU-PARSEL project.

- Book in prep "Living on the Edge: People and Transfrontier Conservation Areas". Eds. Andersson, J., de Garine-Wichatitsky, M., Dzingirai, V., Giller, K. and Cumming, D. 5 chapters with RP-PCP contributors

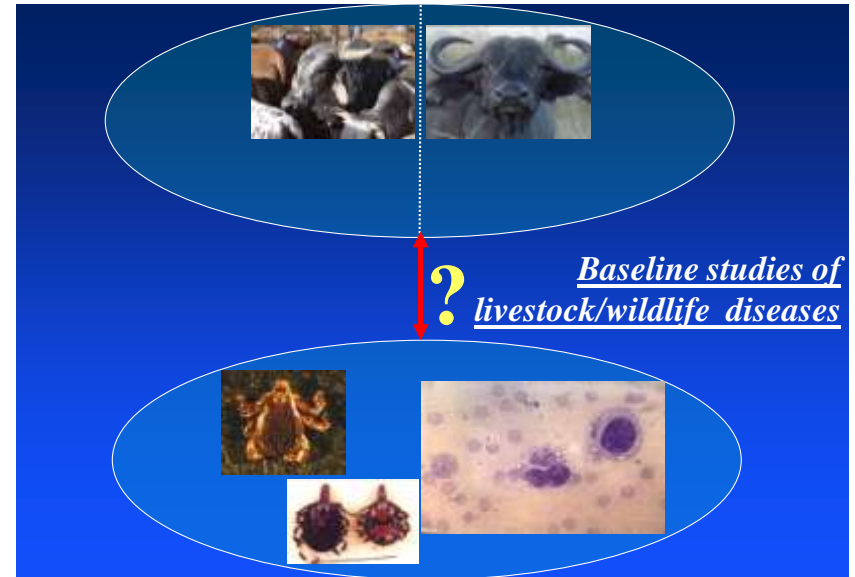
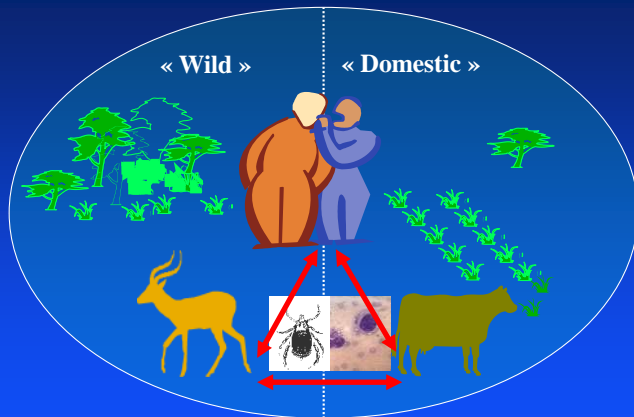
Communications in international conferences and workshops included 20 oral communications and 14 posters. Most of these communications were presented by students (12 students in total)

## Key themes that feed into the One Health Approach for the AHEAD-GLTFCA

Cumming D, Biggs H, Kock M, Shongwe N and Osofsky S, 2007, The AHEAD (Animal Health for Environment And Development) - Great Limpopo Transfrontier Conservation Area (GLTFCA) Programme: Key questions and conceptual framework revisited.

1. **Animal health and disease**
2. **Land use, ecosystem goods and services**
3. **Human Livelihoods, animal and ecosystem health**
4. **Policy support and capacity building at national and regional levels**
5. **Communication and outreach**

1. Animal health and disease





## -Projects since 2007

\* Proposal AHE # 1 (accepted 2007, funded by SCAC):

“**Tick diversity** and abundance and **tick-borne infections** in domestic and wild animals at the livestock/wildlife interface in marginalised communities of the SEL of Zimbabwe”, UZ-Vet Fac & CIRAD, 1 MPhil UZ/Vet Fac, Student name L. Jomane

\* Proposal AHE # 2 (accepted 2007, funded by SCAC):

“A survey of **tuberculosis and brucellosis** in wild and domestic animals in the SEL of Zimbabwe”, 1 MPhil UZ/Vet Fac, supervision UZ-Vet Fac & CIRAD . Student name C. Gomo

\* Proposal AHE # 3 (accepted 2009, funded by CORUS and SCAC):

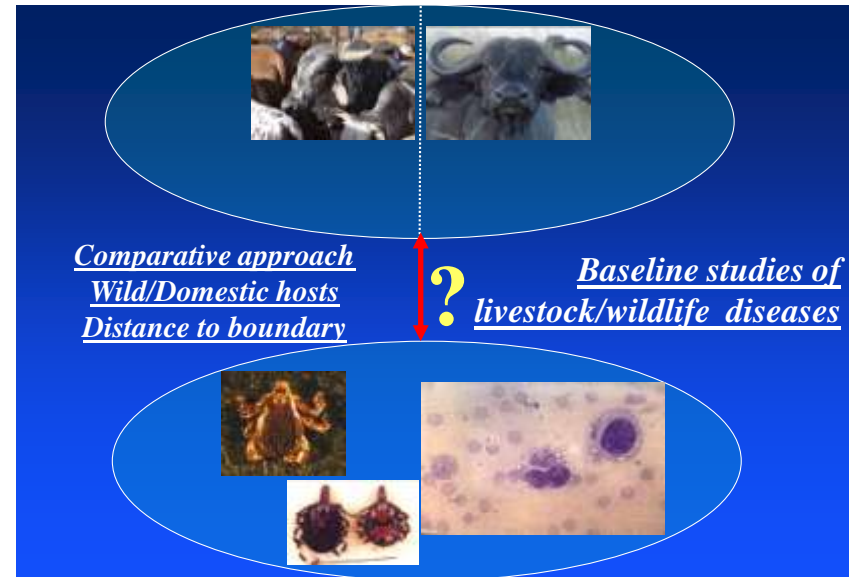
Title “Evaluation of **vaccination efficiency against FMD** in cattle populations at the wild life livestock interface within the lowveld region of Zimbabwe”

No student. Collaboration Univ. Pretoria/Vet Fac, UZ/Vet Fac & CIRAD

\* EU-PARSEL, livestock production component (reports in prep)

\* CORUS-FMD project, prevalence and vaccination efficiency

\* FSP-GRIPAVI, prevalence of AIV and NCD



## - Selected productions

\* Article 6. de Garine-Wichatitsky, M. Caron, A., Gomo, C., Pfukenyi, D., Foggin, C., Dutlow, K., Lane, E., Le Bel, S., Hofmeyr, M., Hlokw, T. and Michel, A. 2010. Bovine Tuberculosis in Buffaloes. Southern Africa. *Emerging Infectious Diseases*, 16 (5): 884-885.

Article 5. Caron, A., Abolnik, C., Mundava, J., Gaidet, N., Burger, C. E., Mochotloane, B., Bruinzeel, L., Chiweshe, N., de Garine-Wichatitsky, M., Cumming, G. 2010 *in press*. Persistence of Low Pathogenic Avian Influenza Viruses in Waterfowl in an African Ecosystem. *Accepted in EcoHealth*.

Article in prep 8. Gomo, C., de Garine-Wichatitsky, M., Caron, A., Pfukenyi, D. *Submitted*. A survey of brucellosis in cattle and wildlife at wildlife-livestock-human interface in Zimbabwe.

Oral 12. de Garine-Wichatitsky, M. Gomo, C., Jomane, L., Pfukenyi, D., Hove, T., Foggin, C., Caron, A. 2009. Prevalence of main diseases in wild and domestic ungulates at three contrasted wildlife/livestock interfaces in the South East Lowveld of Zimbabwe. Oral presentation. XIIth ISVEE conference. Durban, 10-15 August 2009

Poster 7. Jomane, L. Tick diversity and abundance and tick-borne infections in domestic and wild animals at the livestock/wildlife interface of the Southeast Lowveld. Poster. *9th AHEAD meeting, 4-6 March 2009, Namaacha, Mozambique*.

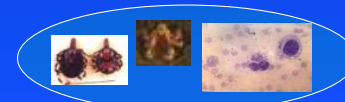
Poster 5. Caron, A., Heath, L., Pfukenyi, D., de Garine-Wichatitsky, M., Jori, F. FMD vaccination trial and viral circulation at the wildlife/livestock interface in the South-East Lowveld of Zimbabwe. Poster. *FMD International Symposium and Workshop, 12-14th of April, Melbourne, Australia, 2010*

## 1. Animal health and disease

## 2. Land use, ecosystem goods and services



Mobility and contacts  
wild/domestic hosts



### -Projects since 2007

\* *Proposal AHE # 4 (accepted 2009 funded by SCAC):*

Title “**Permeability of selected fences** to wildlife and livestock in the South East Lowveld of Zimbabwe”

Student name T. Dube, MPhil UZ/GeoES; supervision MPhil UZ/GeoES, UZ/Vet Fac & CIRAD.

\* *Proposal CC # 2 (accepted 2008, funded by SCAC and EU-PARSEL):*

Title “Understanding the distribution of cattle at the livestock-wildlife interface using real-time Global Positioning Systems (GPS) and satellite remotely sensed data”

Student name F. Zengeya, PhD/UZ Department of Geography and Environmental Science; supervision UZ/GeoES & CIRAD

\* *Proposal CC # 3 (accepted 2008 funded by SCAC and WATERNET):*

Title “**Waterhole use by wild and domestic ungulates: exploring temporal niche use and associated competition and pathogen transmission potentials**”,

Student name M. Zvidzai, MPhil/UZ Department of Geography and Environmental Science; supervision UZ/GeoES, CIRAD & CNRS

\* EU-PARSEL livestock component

\* « GLTFCA buffalo-cattle mobility and interactions »

### - Selected productions

**Article 9.** Zengeya, F., Murwira, A., de Garine-Wichatitsky, M. 2011 *in press*. An IKONOS based **evaluation of cattle home ranges** (HRs) and utilization distributions (UDs) estimated by the Kernel density estimator and the Local convex hull (LoCoH). *Int. J. Remote Sensing*.

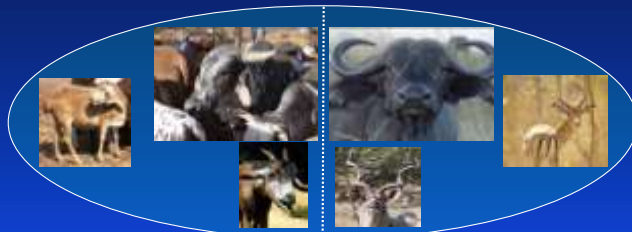
**Report chapter 4.** Dube, T., Murwira, A., Caron, a. & de Garine-Wichatitsky, M. 2010. Preliminary results on the **permeability of veterinary fences to buffalo (*Syncerus caffer*) and cattle in Gonarezhou National Park**, Zimbabwe. In: Ferguson, K. & Hanks, J. (Eds). *Fencing Impacts: A review of the environmental, social and economic impacts of game and veterinary fencing in Africa with particular reference to the Great Limpopo and Kavango-Zambezi Transfrontier Conservation Areas*. Pretoria: Mammal Research Institute. 228-232 pp.

**Poster 12.** Zengeya, F. Understanding the Distribution of Cattle at the Wildlife-Livestock Interface Using Real-Time Global Positioning System (GPS) and Satellite Remotely Sensed Data. Poster. *9th AHEAD meeting, 4-6 March 2009, Namaacha, Mozambique*.

**Poster 14.** Zvidzai, M., Murwira, A., de Garine-Wichatitsky, M. Waterhole use patterns by wild and domestic herbivores in and around Gonarezhou National Park. Poster. *10th AHEAD meeting, 24-27 February 2010, Hazyview, South Africa*.

1. Animal health and disease

2. Land use, ecosystem goods and services

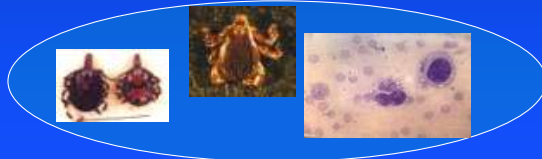


Ecological determinants of diseases at the  
wildlife-livestock interface



Communities of wild and domestic hosts

Communities of pathogens



### -Projects since 2007

\* *PhD proposal AHE # A (started Dec 2006; mainly funded by Gripavi/CIRAD project):*  
Title “Interaction of Host-Pathogen Community at the Wildlife/domestic Interface”  
Student name A. Caron. PhD Univ. Pretoria/MRI; supervision Univ. Pretoria/MRI, CIRAD, UZ/TREP, Univ. Montpellier II.

\* *PhD proposal AHE # B (started Dec 2008; mainly funded by Gripavi/CIRAD project):*  
Title “Avian influenza virus and Waterfowl: Virus introduction and maintenance into the Chivero-Manyame dams and Hwange pans”  
Student name J. Mundava. PhD NUST, supervision by NUST and CIRAD), mainly funded by Gripavi/CIRAD project.

\* *PhD proposal AHE # C (started Dec 2009; mainly funded by CIRAD, CNRS, FEAR and PARSEL projects, ongoing):*  
Title “Impacts of predation and parasitism on epidemiological risk for wild and domestic herbivores in Southern Africa”  
Student name E. Miguel. PhD Univ. Montpellier II, supervision by CIRAD and CNRS

\* EU-PARSEL  
\* FSP-GRIPAVI

## - Selected productions

**Article 3.** Caron, A. Gaidet, N., de Garine-Wichatitsky, M., Morand, S., Cameron, E. 2009. Evolutionary Biology, Community Ecology and Avian Influenza. *Infection, Genetics and Evolution*, 9 (2): 298-303

**Article 4.** Caron, A., de Garine-Wichatitsky, M., Gaidet, N., Chiweshe, N., Cumming, G. 2010 *in press*. Estimating dynamic risk factors for pathogen transmission using community-level bird census data at the wildlife-domestic interface. *Accepted in Ecology and Society*.

**Article in prep 17.** Mundava, J., Caron, A., de Garine-Wichatitsky, M., Gaidet, N., Mundy, P. *In prep*. Breeding seasonality of duck species in Zimbabwe: Implications for avian influenza epidemiology.

**Oral 12.** Caron, A., Fritz, H., Morand, S., de Garine-Wichatitsky, M. Network of Interaction, Geographic Mosaic of Coevolution and Community Ecology: Sanitary Risk at the Wildlife / Livestock Interface. Oral communication. *Meeting of the two GDRI on Biodiversity and Sustainable Use in the context of Global Change - Madagascar and Southern Africa at the Corum and CNRS, 3rd November 2008, Montpellier, France.*

**Poster 10.** Mundava J., Mundy P., Caron A., Gaidet N., de Garine-Wichatitsky M., Couto T., Couto F. An ecological approach to estimating the risks of introduction, maintenance and spread of avian influenza viruses in the Chivero and Manyame Ecosystem. Poster. *ISVEE Conference XII, 10-14 August 2009, Durban, South Africa.*



## Projects since 2007

\**Proposal AHE # 5 (accepted 2009 funded by AHEAD-Seed Grant and SCAC):* “**Pathogens, Parks and People:** Assessing the Role of Disease in Trans-Frontier Conservation Area Development: Zimbabwean Component” U.Pretoria/MRI. Zimbabwe component conducted by CIRAD/UZ-Vet Fac/UZ-CASS. C. Geoghan (UP) + L. Mugabe (UZ-CASS)

\* *Proposal AHE # 5 (accepted 2010 funded by SCAC, ongoing):*  
Title “A survey of brucellosis and bovine tuberculosis in humans at a **wildlife/domestic animal/human interface** in Zimbabwe”  
Student J. Burumu. MPhil UZ/Vet Fac, supervision UZ/Vet Fac-CIRAD-Min. Health.

•*Proposal NRG1 # 2 (accepted 2008, funded by SCAC, completed 2009)*  
“**Scenario Planning and Iterative Assessment** in selected communities in Beitbridge” UZ/CASS, 2 MSc students. Student names F. Marimira and L. Mugabe

\* *Proposal NRG1 # 5 (accepted 2010, funded by SCAC, ongoing )*  
Title “A Study Of **Competing Interests Over Agriculture, Wildlife And Other Natural Resources** In The South Eastern Lowveld, Mwenezi District (Zimbabwe)”  
Student Name D. Madumbo. MSc, UZ/CASS; supervision by UZ/CASS



## - Selected productions

**Thesis 4.** Mugabe, L. 2009. Making sense of the Great Limpopo Trans-frontier Conservation Area in Zimbabwe: an attempt to use scenario planning tools to understand livelihood options in Beitbridge district. *MSc thesis, University of Zimbabwe, Faculty of Social Studies, Centre for Applied Social sciences*. October 2009. 108 pp.

**Thesis 5.** Marimira, F. 2010. Understanding livelihood futures from the perspective of women in the context of GLTFCA in Zimbabwe: a case study of Chikwarakwara and Tshipise villages in Beitbridge district. *MSc thesis, University of Zimbabwe, Faculty of Social Studies, Centre for Applied Social sciences*. March 2010. 99 pp.

**Paper 12.** Baudron F., Corbeels M., Andersson J.A., Sibanda M., Giller K.E. 2011 in press. Delineating the drivers of waning wildlife habitat: the predominance of cotton farming on the fringe of protected areas in the Mid Zambezi Valley, Zimbabwe. Under revision in *Biological Conservation*.

**Oral 16.** Geoghegan, C., Lovemore, M., Caron, A., Cumming D., Getz, W., de Garine-Wichatitsky, M., Robertson, M., Cameron, E., 2010. Pathogens, Parks and People: Assessing the Role of Disease in Trans-Frontier Conservation Area Development. Oral communication. *10th AHEAD meeting, 24-27 February 2010, Hazyview, South Africa*.

**Book.** People and Transfrontier Conservation Areas: Living on the Edge. In prep. Andersson, J., de Garine-Wichatitsky, M., Cumming, D., Dzingirai, V., Giller, K. (Eds).

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1. **Animal health and disease**
2. *Land use, ecosystem goods and services*
3. **Human Livelihoods, animal and ecosystem health**
4. **Policy support and capacity building at national and regional levels**

### - Training and capacity building

\* "Paper writing workshop": 2 days in June 2010 (Hakamela)  
16 students presented a paper during plenary sessions with supervisors and external experts (statistician)

\* "Best poster competition": 1 day in November 2009 (Harare)  
20 students presented a poster. The best three poster received funds to present their poster during the AHEAD/GLTFCA workshop February 2010 (6 RP-PCP students at AHEAD)

\* Funding of the participation of 12 students to international conferences or workshop in South Africa (Pretoria, Bloemfontein, Durban) and France (Montpellier and Lyon)

\* Student presentations during SSC (on average 10 students invited to present during November SSC meeting)

\* Training in statistics (R software) in Harare in November 2010 (15 RP-PCP students and supervisors)

\* Capacity building : 3 RP-PCP post-graduate students are employed by DVS or NPWMA

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3. **Human Livelihoods**, animal and ecosystem health
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5. **Communication and outreach**

## Merci! Thank you



**Funding:**  
- French Min. Foreign Affairs  
- European Union



Zimbabwe, Mozambique, South Africa: Veterinary Services and Park and Wildlife Management Authority  
(Thank you Markus, Chris and Nazaré!)