Cavies – animal protein for the future

Harnessing husbandry of domestic cavy for alternative and rapid access to food and income in Cameroon and the eastern Democratic Republic of the Congo

By Felix Meutchieye & Wanjiku Chiuri *et al*.
Naivasha, Kenya – 5 June 2013

Outline

- Roles of cavies
- Current achievements
- Lessons learned, challenges and the way forward

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ROLES OF CAVIES

- Food (animal protein)
- Economic empowerment of women and youth
- Cavies and education
- Cavies and natural resource management
- Cultural aspects of cavies
- The future with cavies

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Food (animal protein)

Cameroon

- Alternative meat source

Eastern DRC

- Basic for nutrition security

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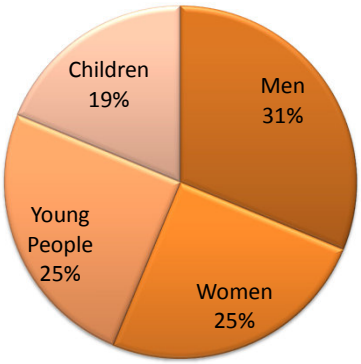
Photo by TK Metre

Restaurants in CMR

Distribution of major customers of cavy dishes in restaurants in Cameroon



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Economic empowerment of women and youth

Cameroon

- Large scale production by female farmers
- Sizeable business around cavy production, trade and restaurants

Eastern DRC

- Subsistence production and small scale trade
- Convertible rapidly – "petty cash" or a "currency" for paying teachers' salaries or for barter trade

Cavy sales at Mugogo market

Trade in CMR

Cavy trade and export

- Losing his job triggered the start with cavy culture 'for survival'
- He has been a cavy salesman for the last 23 years
- He sells more than 300 animals/week
  - Mostly in Yaoundé
  - Currently exports to Gabon and Equatorial Guinea


Photo by F Meutchieye

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Cavies and education

Cameroon

- Animals for secondary education (biology practicals)

Eastern DRC

- Animals for paying school fees, uniforms and supplies

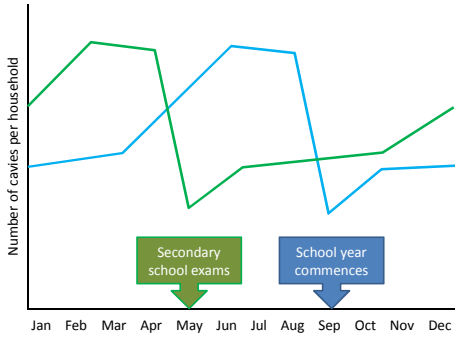


Photo by BLMaass

Cavies and natural resource management

Cameroon & eastern DRC

- Soil fertility management
- Manure
- Vegetables/Arrow root

- Alternatives to poaching (bushmeat) – preserving natural ecosystems and their biodiversity

Cultural aspects of cavies

Cameroon

- Tradition, ceremonial and ritual in the rural area of the Forest Zone
- New delicacy in towns
- Specialized cavy restaurants for the rich and the famous
- Generally no cultural inhibitions

Eastern DRC

- Part of the gifts in marriage negotiations in Nord-Kivu
- Consumed like a snack with beer in the bars
- Generally no cultural inhibitions

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CURRENT ACHIEVEMENTS

- Science from the lab – genetics
- Science from the field – feeds & feeding
- Socio-economic aspects
- Capacity building
- Communication and profile lifting

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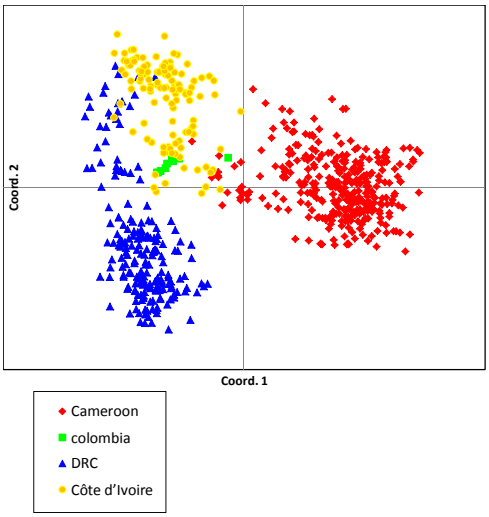
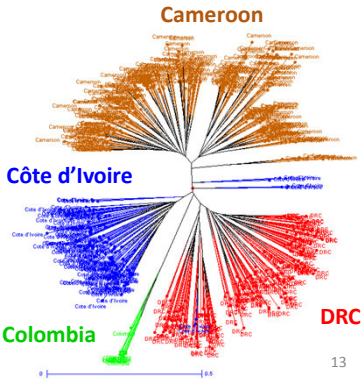
Science from the lab – genetics

Cavy population clusters based on molecular data (SSR markers)



- Country populations cluster distinctly
- Clear genetic distinctiveness of the populations within countries



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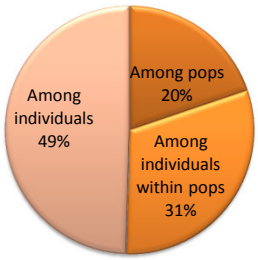
Levels of within and between population variations

Percentages of Molecular Variance



- Adequate intra and inter populations variation available to enable effective selective breeding
- Between population variations adequate for inter-country breeding program design and implementation

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FEAST in DRC

Challenges identified and ranked by farmers in eastern DRC

Problems	Muhon-goza ranking	Cirunga ranking	Tubimbi ranking	Kaman-yola ranking	Overall frequency (no.)	Mean overall ranking
Little knowledge on husbandry techniques	2	1	2	1	4	1.5
Animal health and veterinary services	4	4	3	5	4	4.0
Lack of good quality forage throughout the year	5		5	4	3	4.7
No access to market	1			2	2	1.5
Lack of money/poverty		2	1		2	1.5
No access to credit	3			3	2	3.0
Insecurity		5	4		2	4.5
Lack of improved breeds		3			1	3.0

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Breeding feedback from field observations

- Improved breeds were requested by participants in IP meetings
- No empirical data yet to inform breeding
- Farmers use social networks to source breeding stock
- Inference
  - Genetic potential and breeding related constraints identified in all the countries and sites
  - Traits of importance
    - Growth
    - Adaptability (survival)
    - Fecundity
  - Planned breeding program needed

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Conclusions from the genetic study

- The populations in the different countries are significantly separated
- Substantial within-country population differences
- Levels of inbreeding are relatively high, but can be easily addressed

➢ The potential for improvement is huge, but health and nutrition have to improve to fully harness this

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Science from the field – feeds & feeding

Cameroon

- Feed inventory
- Draft manual on forages
- Feeding trials to optimize the use of locally available feed resources and mineral supplementation/vitamins
- Feed assessment training using the FEAST tool

Eastern DRC

- Feed inventory
- Feed assessment using the FEAST tool
- Forage demonstration plots in 4 sites
- Forage planting materials distributed to 34 farmers in 4 sites for participatory assessment

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From demonstration plots to farmer-managed participatory forage trials in eastern DRC

Photos by W Chiuri

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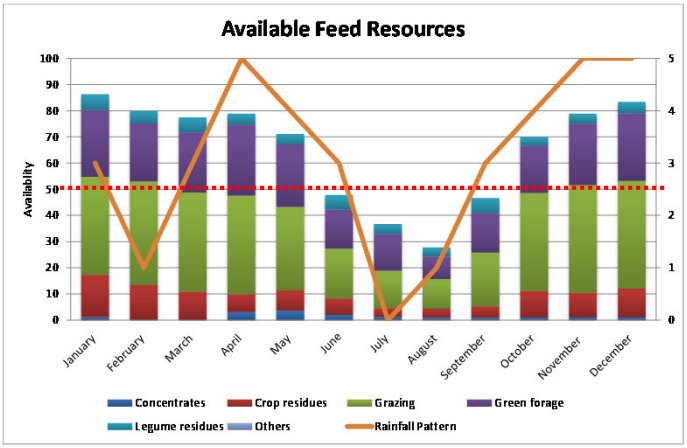
FEAST in DRC

Feed availability in Muhongoza, eastern DRC



Sufficient feed available

Feed availability strongly follows rainfall availability; apparently there is surplus in the high rainfall periods, but neither forage preservation nor forage cultivation are practiced.

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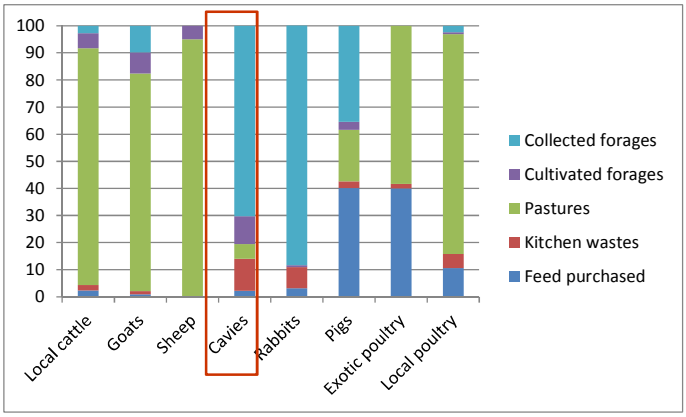
FEAST in DRC

Contribution (%) of feeds from several sources in the diets of different livestock



Ruminants mostly graze, predominantly tethered; cavies and rabbits receive mainly collected forages, kitchen wastes are fed mostly to cavies and rabbits or poultry; feed is purchased for pigs and exotic poultry.

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Main conclusions from feeds & feeding

Cameroon

- Feed is not a primary constraint
  - However, cavy keepers have limited knowledge about feed requirements and potential feed stuffs
- There is a need for formulating optimal ratios

Eastern Congo

- Feed is not perceived as a primary constraint due to very low overall livestock holdings
  - However, underfeeding could show its effects in disease susceptibility and high mortality rates
- ➢ To move from mere livestock 'keeping' to livestock production, improved and differential feeding according to physiological state, age and sex is crucial

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Socio-economic aspects

- Cavy culture is common across the humid tropic belt with high potential of poverty alleviation or wealth creation
- Women have high access and control of cavy production and disposal as compared to other livestock species
- Young people, especially teenage-boys participate in cavy production and sales

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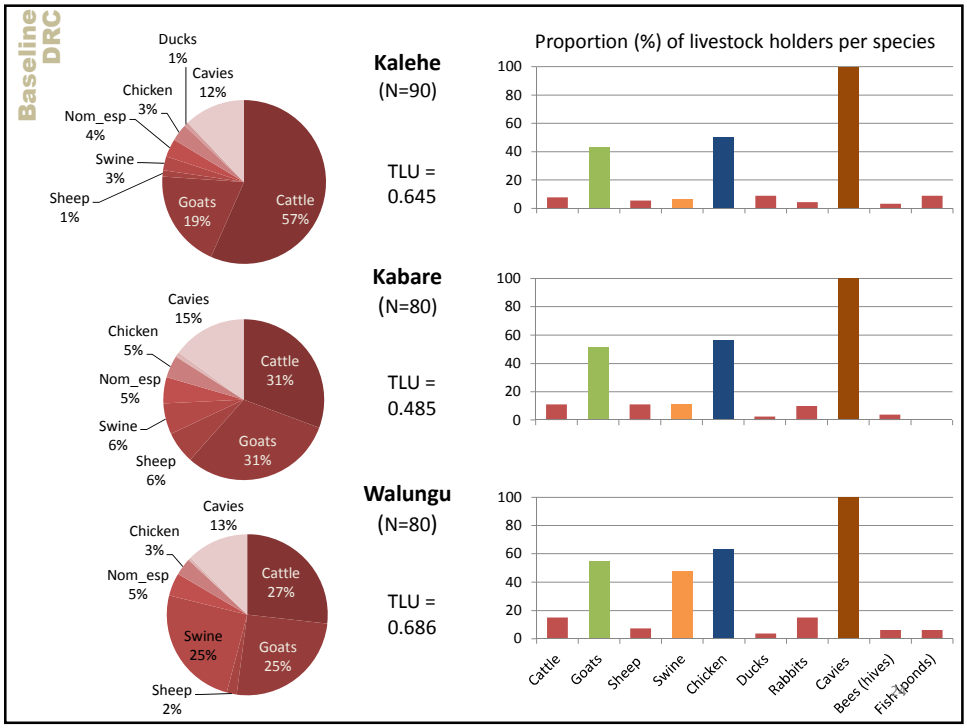
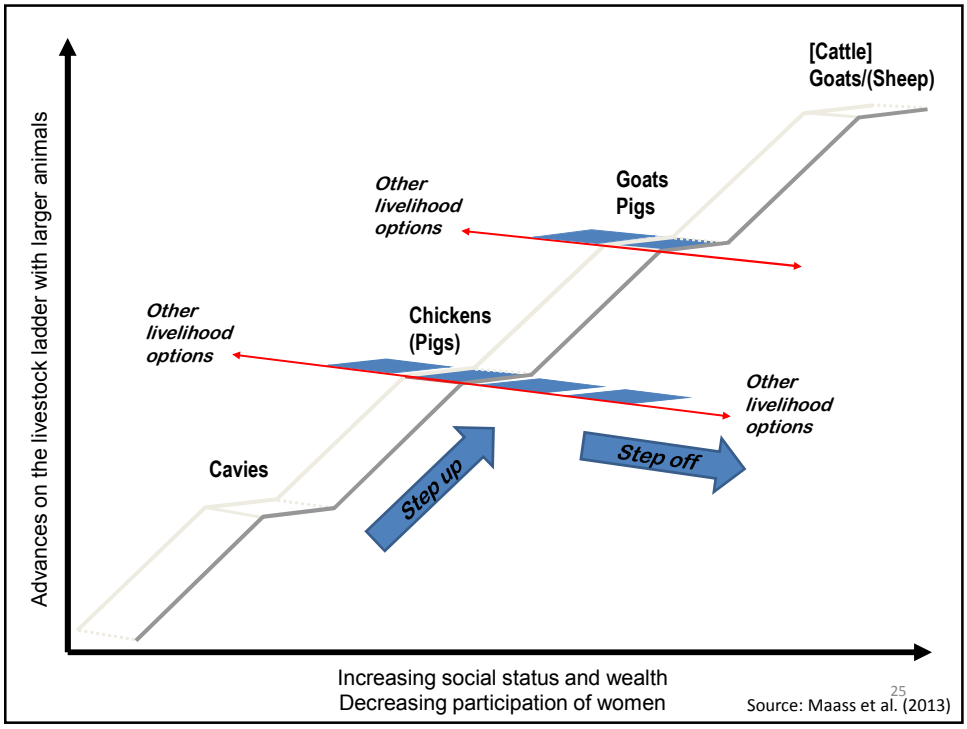
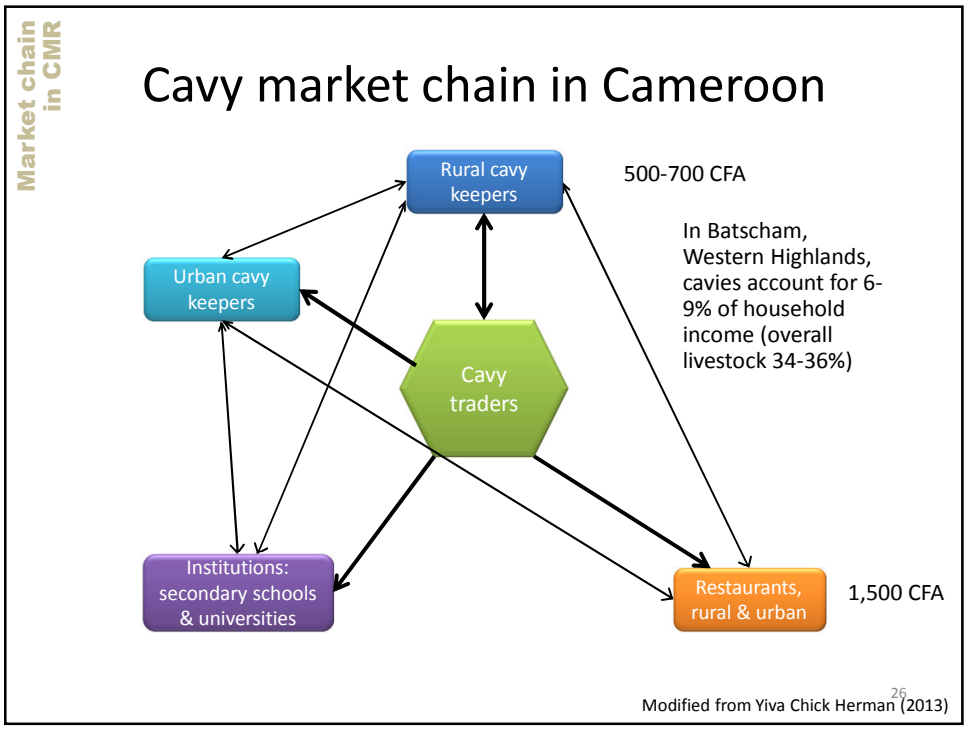


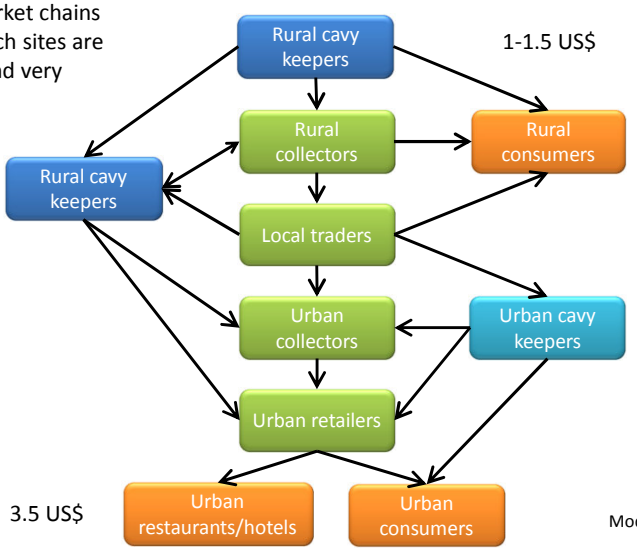

[Cattle]
Goats/(Sheep)
Other livelihood options
Goats
Pigs
Other livelihood options
Chickens
(Pigs)
Other livelihood options
Cavies
Step up
Step off
Advances on the livestock ladder with larger animals
Increasing social status and wealth
Decreasing participation of women
25
Source: Maass et al. (2013)


Market chain in CMR
Cavy market chain in Cameroon
Rural cavy keepers
500-700 CFA
In Batscham, Western Highlands, cavies account for 6-9% of household income (overall livestock 34-36%)
Urban cavy keepers
Cavy traders
Institutions: secondary schools & universities
Restaurants, rural & urban
1,500 CFA
26
Modified from Yiva Chick Herman (2013)

Market chain in DRC

Cavy market chain in eastern DRC: Nyacibimba – Mudaka – Bukavu

Most market chains at research sites are simple and very short



Modified from Wimba Benjamin (2013)

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Market chain in DRC

Cavy trade in eastern DRC

Example from Tubimbi of number of people involved in the cavy market chain

Category of actor	Male youth (no.)	Female youth (no.)	Male adult (no.)	Female adult (no.)	Total (no.)
Cavy keepers	5	7	6	18	**36**
Rural collectors	2	1	12	26	**41**
Middle-men	5	6	11	15	**37**
Whole seller	3	3	5	9	**20**
Urban collectors	1	2	1	4	**8**
Total	**16**	**19**	**35**	**72**	**142**

Photo by W Chiuri

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Market linkages and trade

Cameroon

- Western Highlands region
  - 10 bi-weekly markets function
  - Some being suppliers to others
- Bangang and Batcham in West region
  - Provide over 50% of live animals sold in Douala, Yaoundé and others
  - About 5 traders link producers to distant restaurants with transport as main issue
  - Cavies are collected weekly in markets
    - Except Bafoussam with daily cavy sales
- North West region
  - Producers sell cavies are directly to consumers
  - Middlemen are key in supplying secondary schools

➢ There is good potential to organize a market system around cavies

Eastern DRC

- In the four sites in Sud-Kivu (Muhongoza, Nyacibimba, Kamanyola, Tubimbi)
  - 11 market centers for cavies function, usually active twice a week
  - Typically about 110 cavies are sold as ready food; 1240 as life animals
- Within the cavy trade, neither producers nor traders are organized
  - Except in Mudaka
- Cavies are sourced from 11 villages, mostly different from the market centers
- Individual sellers substantially outnumber traders

➢ This indicates good potential to organize a market system around cavies

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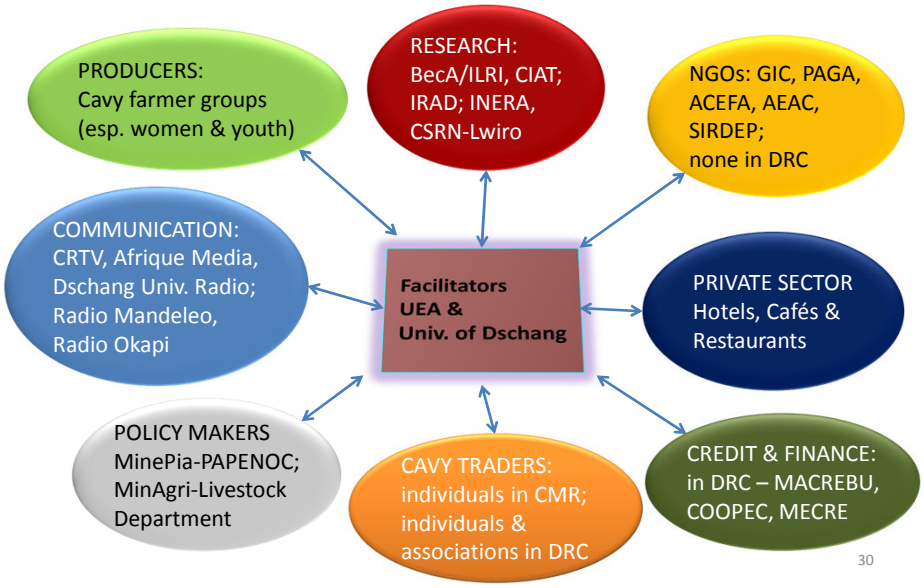
Structure of Cavy Innovation Platforms



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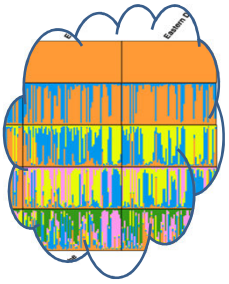
From genetic structure to community advice

Kuzalisha wanyama wa familia moja (baba na mtoto wake, ama mama na kijana wake, au dada na ndugu wake), ndio sababu moja ya magonjwa; kwa hivyo, ni vizuri kutafuta ndume kutoka kijiji ya bali kama Walungu!

Inbreeding can cause your cavies fall sick more often; you need to get a male from the group of Walungu!



Bertin Bisimwa, former ABCF fellow at BecA, shares his scientific results with cavy keepers in the IP meeting in Kalehe, eastern DRC

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Cavy Innovation Platforms

Cameroon – existing structures

- National Confederation of Cavy Farmers
  - Meetings every 3 months
- Four regional cavy farmer federations
  - Meetings dependent on their programs
- Cavy farmer associations
  - Monthly meetings
- IP manager plays a crucial role

Eastern DRC – creating new structures

- Regional Cavy Innovation Platform
  - Meetings every 3-4 months
- Sub-IPs in four sites
  - Monthly meetings
  - Discuss results achieved, challenges, plans
  - Draw work plans and budgets
- Active IP facilitator is key

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Stakeholders meeting at national level in Bertoua, Cameroon

Farmer group meeting in Batcham, West Highlands of Cameroon

Female farmer registering for the meeting

IPs in DRC

Membership of sub-IPs in eastern DRC

S-IP & Traders Associations	Monthly meeting day	Members (no.)			Account no.	Banking institution	S-IP Name	Action site
		Female	Male	Total				
Kalehe	Last Wednesday/ month	73	33	106	#3300252	COOPEC Ihusi-Kalehe	BULONZA*-Muhongoza	Muhongoza-Kalehe
Kabare	2nd Sunday/ month	44	11	55	#2966	MECRE-Bagira	AECO*-Nyacibimba	Cirunga-Nyacibimba
Kamanyola	Last Sunday/ month	35	27	62	#33-449	COOPEC Kawa	UECO*-Kanyola	Kamanyola-Walungu
Tubimbi	Last Friday/ month	37	17	54	-	-	S-PF* Umoja	Tubimbi-Walungu
	Total keepers	**189**	**88**	**277**				
Mudaka T-A	1st Thursday/ month	2	4	6	-	-	UCCM*-Mudaka	Mudaka-Kabare
Mugogo T-A	Last Saturday/ month	15	13	28	-	-	UCCM*-Walungu	Mugogo-Walungu
	Total traders	**17**	**17**	**34**				

* Abbreviation of local name

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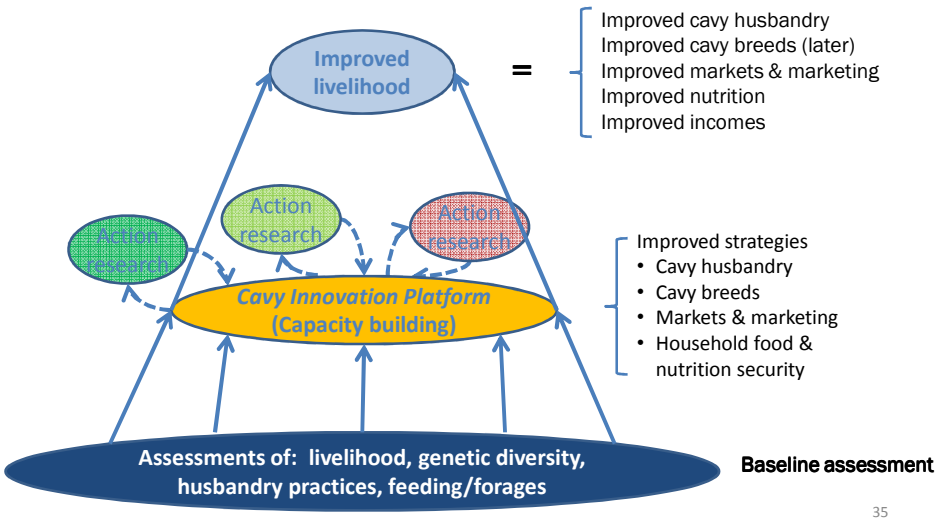
Pathway to impact



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Capacity building

Academic level

- Planned 9 MSc students at Univ. of Dschang and Sokoine University of Agriculture – exchange between countries
- Associated 8 undergraduate students from different universities
- Associated 5 PhD students at Univ. of Dschang

Community level

- Farmer organizations

➢ We have taken the university to the community – results in empowerment at various levels

Institutional level

- NGOs

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"I have never imagined that I could go to secondary, but thanks to the Cavy Project, I am the one now advising and challenging university lecturers!"
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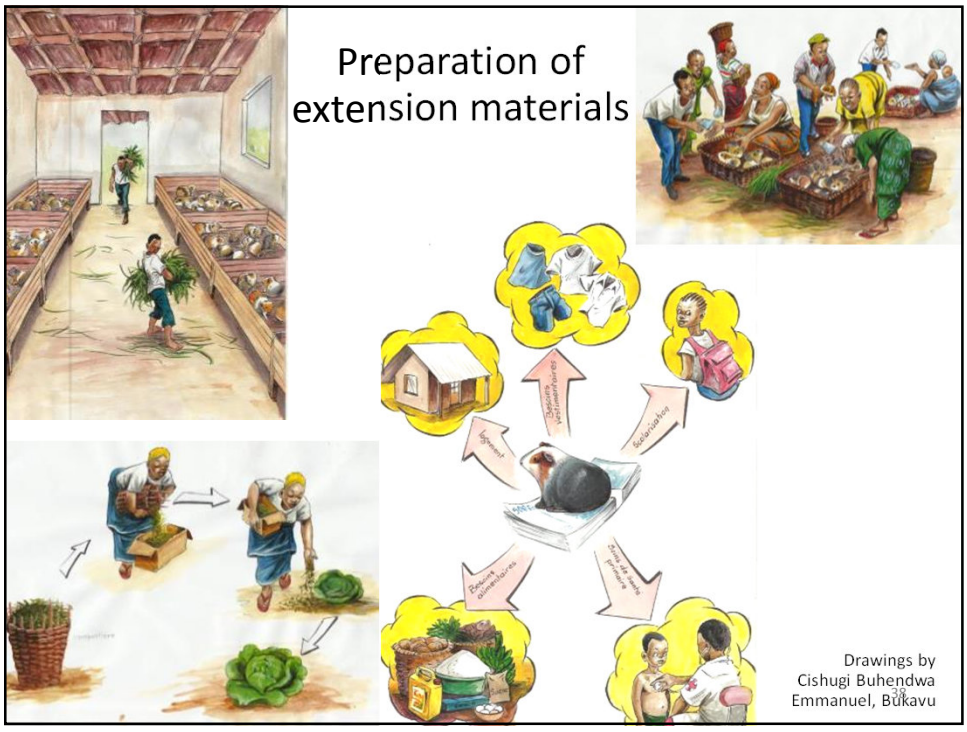
Preparation of extension materials
Drawings by Cishugi Buhendwa Emmanuel, Bukavu
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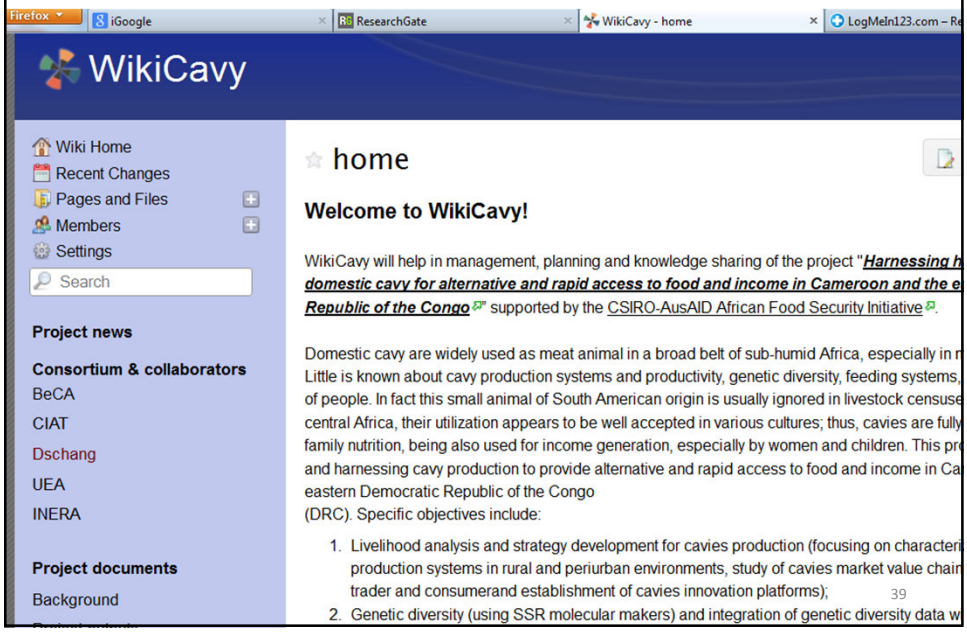
Communication & profile lifting



Creating awareness & lifting profile by radio and TV

Cameroon

- CRTV – National network:
  - CRTV Magazine (Fr): 30 min
  - Morning Safari (Eng): 90 min
  - Protéines Animales (Fr): 20 min
  - Documentary (Fr/Eng): 26 min (to come)
  - National news (Eng): 2 min
  - General announcement of IP meetings
- Afrique Media (private TV):
  - Reportage (2 min)
- Dschang University Radio:
  - Magazine (Eng): 45 min x 3

Topics covered:

- Project objectives and activities
- Research preliminary results
- Cavy husbandry techniques and production systems
- Innovation platform concepts and functionning

Eastern DRC

- Radio Mandeleo is one of the Innovation Platform members
- Several 40-min. radio emissions with presentations plus call-ins by the listeners
- Radio Okapi – covering IP meeting

Topics covered:

- Improved forages – establishment, management, feeding
- Cavy husbandry
- Cavy trade and consumption

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International public goods

- Niba, A.T., Meutchieye, F., Fon, D., Laisin, A.G., Taboh, H., Njakoi, H., Bela Tomo, A., Maass, B.L., Djikeng, A. and Manjeli, Y. 2012. Current situation of cavy production in Cameroon: Challenges and opportunities. Livestock Research for Rural Development, Vol. 24, Article # 194, available from: http://www.lrrd.org/lrrd24/11/niba24194.htm. Downloaded 56 times from ResearchGate

- Meutchieye, F., Bacigale, S., Wimba, B., Chiuri, W., Niba, A.T., Amzati, G., Mwai, A.O., Fon, D.E., Maass, B.L., Djikeng, A. and Manjeli, Y. (2013). Domestic cavies in Cameroon and eastern DR Congo for nutrition security and income diversification. 'Integrated approaches promoting diversity, robustness and multifunctionality of production systems'. A North South Dialogue – SAPT 2 (Sustainable Animal Production in the Tropics) to take place in the framework of the 64th annual meeting of the EAAP to be held 26-30 August 2013 in Nantes, France. (accepted). (http://www.eaap2013.org/)

- Bacigale, S., Paul, B.K., Muhimuzi, F.L., Mapenzi, N., Peters, M. and Maass, B.L. (2013). Characterizing feeds and feed availability in Sud-Kivu province, DR Congo. 'Revitalising grasslands to sustain our communities'. 22nd International Grasslands Congress to be held in Sydney, Australia, 15-19 Sep 2013. (accepted). (http://www.igc2013.com/pages/home.php)

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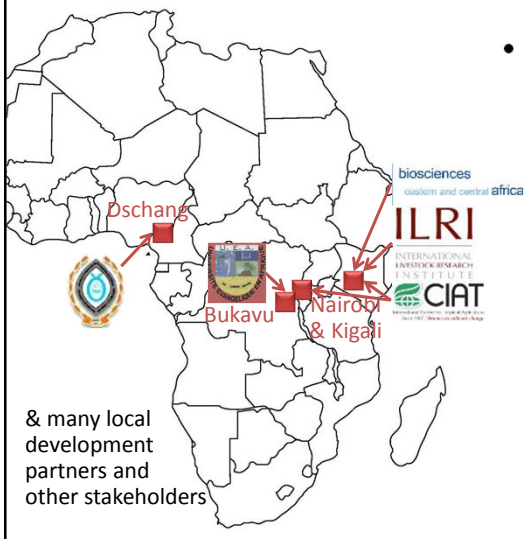
LESSONS LEARNED, CHALLENGES AND WAY FORWARD



& many local development partners and other stakeholders

- How "we" started
  - Inception meeting in Nov. 2011
  - Institutional agreements signed in Feb./Mar. 2012
  - Engagement meeting and funds available in Apr. 2012
  - It's only May 2013 now

Lessons learnt

- Improved cavy production and marketing can contribute to poverty alleviation in resource-poor communities
- Government support is important, but it must be backed up by political will (effective strategies and budgets)
- Effective leadership is important at all levels
- Capacity building is necessary especially at the initial stages

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Challenges

- Cavies are not in the mainstream livestock agenda
- Cavy production and marketing is mainly considered as part time business by smallholder farmers
- Slow attitude/behaviour change among stakeholders, especially NGOs
- Perpetuated dependency syndrome in post-conflict areas
- Shortage of forage seeds & propagation materials
- Occurrence of animal health challenges not understood
- Several internal leadership changes
- Weak administrative system(s) – also need for institutional capacity building, e.g., in DRC
- Communication among the team, incl. students

SILENCE IS NOT AN OPTION!

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Gaps

- Knowledge gaps for research
  - Good estimate of cavy populations and keepers per country
  - Comprehensive economic data of cavy impact at HH level
  - Effect of cavies for human nutrition, especially for poor children under five
  - Socio-cultural and anthro-pological aspects
  - Misconceptions (e.g. feeding with the right feed stuffs)
  - Comprehensive phenotype information
  - Genetic diversity only incipiently known from Sud-Kivu
- Institutional/policy gaps
  - Breeding strategy/ programs
  - Lack of policies/curricula that include cavies as livestock at different levels
  - Inter-institutional cooperation at national level in Africa needs to be established (incipient between Cameroon and DRC)

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The way forward

- Address gaps and challenges identified
- Broaden the knowledge on cavy genetics within sub-Saharan Africa through ABCF and other opportunities
- Engage the scientific capacity built by the project
- Network for outreach – identify potential future projects
  - Expansion to Tanzania, e.g., application by a Tanzanian to the Australian PhD scholarship
  - Potential collaboration with VSF, FAO, IFAD, and others
  - Expansion of cavy support as an alternative to poaching
- Selective breeding
  - Dispersed nucleus breeding (both station and community based)
  - Smart/graduated germplasm exchange between countries would benefits farmers
- Streamline markets
- Support IPs to maturity

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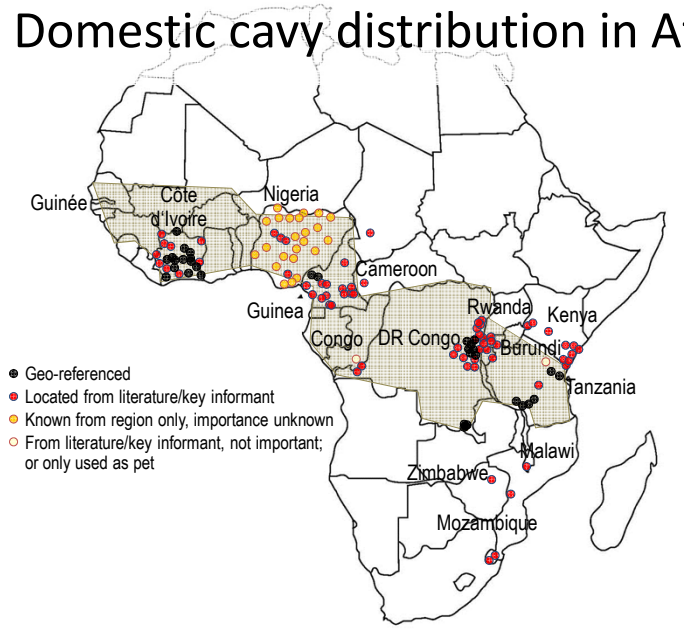
Domestic cavy distribution in Africa



Shaded area of distribution after map by Ngoupayou et al. (1995)

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Toolbox for improved cavy production

Improved cavy production

Market

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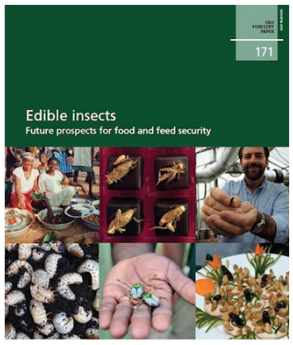
Food for the future!

- UN Habitat: more than 60% of population in developing countries in urban centers in 2020



- Cavies are “urban-nice”
- One of the coping strategies for climate change
- Addresses increasing urbanization in terms of animal protein
  - Healthy meat with low fat and low cholesterol levels
- Addresses dwindling land sizes for the poor
- Low carbon foot print

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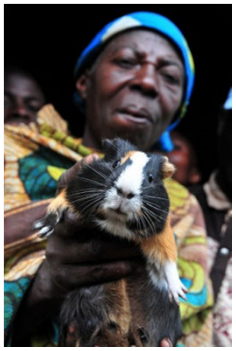

OUR GOAL!

Acknowledgements

- Our teams:
  - Dschang, Cameroon
  - Bukavu, Eastern DRC
  - BecA ILRI Hub & CIAT, Nairobi
- The cavy farmers and our partners in the Innovation Platforms
- The ABCF fellows from Côte d'Ivoire and DRC
- The BecA/ILRI-CSIRO partnership
- AusAID for funding our research

biosciences eastern and central africa | CSIRO | Australian AID | ILRI
Improving food and nutritional security across eastern and central Africa
A research and development partnership between Africa and Australia
CIAT Centro Internacional de Agricultura Tropical International Center for Tropical Agriculture
U. E. A. Université Evangélique en Afrique
IRAD

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Phenotypic variability in Sud-Kivu, eastern DRC

Cavy names in Africa

Country	Region/ [language]	Local name [some explanation]
Nigeria	[Nupe]	Etsu nasara [the white man's rat]
Nigeria	[Hausa]	Beran Masar [rat of Egypt]
Cameroon	Western highlands [Engl.]	Guinea pig
Cameroon	Forest zone [French]	Le cobaye
Rwanda	Gisenyi, Ruhengeri and Byumba Provinces	Le cobaye
Congo	[Kikongo-Baskongo]	Mpuku mputu [rat d'Europe]
Congo	[Kikóngo ya Létá]	Kikweyi
DR Congo	Nord-Kivu Province [French]	Le cobaye
DR Congo	Sud-Kivu Province [French]	Le cobaye, Dende [le cochon d'Inde] La souris colorée
East Africa	[Swahili]	Kavi kwa nyama Nungubandia, Simbilisi
Kenya	Central Province [Gikuyu]	Tunyuri
Kenya	Sabatia division, Western Province	Kangaru
Kenya	Eldoret [Gikuyu]	Kanyoru
Kenya	Coastal Province	Pan'ga
Tanzania	Moshi/Kilimanjaro Region; Muheza/Tanga Region	Sili [from panyasili, originally rat]
Tanzania	Morogoro Region	Pimbi, Malele
Tanzania	Iringa Region [Kikinga]	Simbilisi, Bukula
Mozambique	Sofala and Maputu Provinces [Portuguese]	Cobaia

Lessons learnt: IP formation is a process

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