Improving food security in Africa by enhancing resistance to Newcastle disease and heat stress in chickens

Major challenges for poultry production in Africa

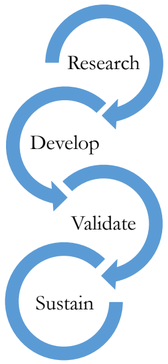
- Newcastle disease (ND) causes major flock die-offs in rural villages.
- ND vaccination programs have failed in Africa due to inadequate agricultural extension services, lack of cold chain to keep the vaccine viable, and unreliable production and distribution.
- Heat stress leads to decreased chicken feed intake, productivity, and even death.

Why genetic and genomic approaches?

- Advanced technology is available for use in Africa and other resource-constrained locations.
- Genetic improvement is a permanent solution, as compared with the need to continually vaccinate chickens against ND virus.
- Genetic improvement is also synergistic with protection from vaccines.

Building institutional capacity

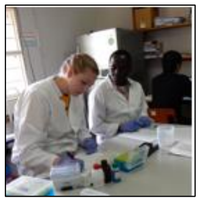
Improving infrastructure of poultry research facilities and long-term collaborative research with African Universities builds valuable institutional and research capacities.



- Use genomic technologies to <u>identify</u> genes and/or genetic markers associated with NDV resistance and heat stress in African indigenous chicken ecotypes.
- <u>Develop</u> an economical, low-density SNP panel for genetic selection.
- <u>Validate</u> genetic enhancement of resistance in African indigenous chicken ecotypes.
- Develop a <u>sustainable</u> chicken breeding and distribution plan.

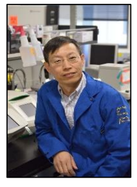
Developing human capacity

Training on poultry handling, sample collection, laboratory procedures, and advanced genetics is building the workforce and local capacity needed to sustainably improve poultry production systems in Africa.



Managed by UC Davis team

The Genomics to Improve Poultry Innovation Lab is managed by a team at UC Davis and is directed by Dr. Huaijun Zhou, Associate Professor, Chancellor's Fellow in the Department of Animal Science. The program is implemented through a partnership between UC Davis, Iowa State University, Sokoine University of Agriculture in Tanzania, the University of Ghana, and the University of Delaware. The program is funded by the U.S. Agency for International Development as part of Feed the Future, the U.S. government's global hunger and food security initiative.



Director/PI
Huaijun Zhou

Positive impacts

Poultry have contributed to improved human health and livelihoods for millennia. Poultry are integral to food security, income generation, and livelihoods in developing countries.

Innovation

- Contemporary genomics techniques, coupled with strong programs for training and for local and regional outreach, will ensure enhanced technology development and innovation.
- Reduce constraints limiting the ability of smallholder farmers to achieve maximum productivity.

Improving nutrition and food security

- Across rural Africa, women and children raise chickens for sustenance.
- Poultry has tremendous potential to alleviate the serious problem of malnutrition leading to stunting and reduced cognitive development.
- Protein-rich eggs and meat contribute to better nutritional status perfect source of critical micronutrients and protein.

Increasing incomes

- Improving village poultry production is considered to be a practical and effective first step in alleviating rural poverty.
- The income from poultry is often one of the few significant sources of income for people living under stressed conditions, especially for women.
- Production in excess of family needs can be marketed to generate profits for the household.
- In the women's hands, these funds are more likely to be used to support the needs of the children for healthcare, food and school fees.

Enhancing livelihoods

- In Africa, investing in local poultry production research and outreach will have a direct impact on the livelihoods of women poultry producers and their families.

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