



## An Overview of the Newcastle Disease Avian Influenza Control Research Project

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*In 2007, the Newcastle Disease Avian Flu Control Research Project, a sub-project under the Global Livestock CRSP Avian Flu School, was initiated in Tanzania. Because the symptoms of Newcastle disease are very similar to those of avian flu, it is difficult to institute an effective avian flu control program without a Newcastle disease control strategy. The project is thus aimed at: 1) designing a model for a sustainable Newcastle disease vaccination program in rural villages, 2) assessing the prevalence of poultry diseases, and 3) designing methods and strategies for improving poultry health at the village level. Village chicken vaccinations were organized, supervised and conducted by trained village vaccinators in selected villages in three wards, one ward each in Mtwara, Morogoro and Iringa regions. The briefing and training of local policy makers and of local agricultural leaders is very important to the success and sustainability of village-level Newcastle disease vaccination programs and poultry development efforts throughout Tanzania and other African countries.*

### Background

A Highly Pathogenic Avian Influenza (HPAI) train-the-trainer pilot workshop was conducted in Morogoro, Tanzania in August of 2006, as part of the Avian Flu School (AFS) assessment. During this interactive workshop, participants were asked to design a plan for improving biosecurity and preventing an outbreak of HPAI at the village level. Participants from the Mwanza and Mtwara regional Veterinary Investigations Centers described how diseases, particularly Newcastle disease, caused 60-75% mortality in the free-ranging chickens in villages.

Newcastle disease is a contagious viral disease of poultry, and its most deadly form is common in many developing countries. In Africa, it is the chief impediment limiting village chicken productivity. The symptoms of Newcastle disease are very similar to those of HPAI, and the two diseases cannot be differentiated without laboratory-based diagnostic testing. It is therefore difficult to institute an effective HPAI control program without a Newcastle disease control strategy.

The Tanzania workshop participants discussed the successful Newcastle disease vaccination pilot programs in the Mwanza and Mtwara regions, where the thermostable Newcastle vaccine (I<sub>2</sub> strain) was used. The I<sub>2</sub> vaccine, which is generally distributed through district veterinarians, is produced by the Tanzanian government and is very inexpensive, costing about one U.S. dollar for a vial containing doses for 400 birds. In Tanzania, the national Newcastle disease vaccination schedule calls for vaccinating three times per year during the months of January, May, and September. The vaccine is applied

by eye-dropper, whereby a single drop is applied to the eye of each chicken.

The workshop participants proposed a plan that involved coupling Newcastle disease vaccinations with a participatory process to develop methods and strategies for improving biosecurity and disease prevention at the village level. The design of the plan was based on the concern that due to the high mortality of village chickens, very little value is attributed to chickens at the village level, and thus, there is little interest in investing time and resources in improving biosecurity to prevent HPAI, Newcastle, and other diseases. However, if poultry productivity improves as a result of the Newcastle vaccination, the added resource value would lead to increased interest in investing in chickens. An important benefit of the Newcastle Disease Avian Flu Control Project is that project villages that vaccinate chickens against Newcastle disease become sentinel villages for early detection of HPAI. In other words, if there is massive mortality of chickens, HPAI should be suspected immediately in the Newcastle-vaccinated flocks.

### Methods

The project involves five major steps:

**Step One.** A strategic component of this project is that the support of local leaders is key for the long-term sustainability of district- and village-level efforts to improve poultry health and productivity. If local leaders are not informed regarding the project purpose

and methods, they are not likely to offer support or to authorize local resources for expanding the program. And, worse, if they do not understand the potential of the project, they may see it as a diversion from other local priority projects. Thus, the first activity of the project was conducting one-day briefing and training workshops on avian health and production for district and ward leaders, emphasizing the importance of disease control, especially for Newcastle disease and avian influenza. Two hundred and twenty-four local leaders were trained and briefed on the project in seven one-day training workshops. Following the local leaders' training, at least one region adopted the program district-wide, and later across the entire zone of the southern highlands of Tanzania. The local leadership in Iringa adopted the Newcastle vaccination program as part of the rural development agenda for the district. The program was planned for the entire zone and was launched May 5, 2008, in a kick-off week called 'Kuku Week' (translated as "Chicken Week").

**Step Two.** Training village chicken vaccinators and record-keepers to implement the vaccination program and to provide adequate documentation of chicken disease, productivity, and the impact of the Newcastle disease vaccinations were included in this step. For this, 25 data collectors and 60 chicken vaccinators were trained. Good record-keeping is a very important component of poultry stewardship. Poultry health and productivity records are critical tools used to recognize increases in sick or dead birds or to evaluate changes in productivity.

**Step Three.** Consistent with the national Newcastle disease vaccination schedule, village chickens were vaccinated by the village vaccinators in selected villages in three wards, one ward each in Mtwara, Morogoro and Iringa regions. To date, the project has organized, supervised and conducted Newcastle disease vaccinations twice in all three wards and three times in Iringa and Mtwara. Table 1 indicates the total number of chickens vaccinated for the first and second vaccinations.

**Step Four.** Conducting socioeconomic surveys in a sample of households participating in the project to assess the knowledge of chicken diseases among villagers and to assess the importance of chicken production to their livelihoods are components of this next step.

**Step Five.** The last project activity will be collecting and evaluating diagnostic samples of poultry diseases in the project villages. The key element to this activity is to evaluate the antibody titers against Newcastle disease, as measured by the hemagglutination inhibition test, at different times in a year and to establish the patterns for other diseases following an increase in the numbers of chickens and their age stratification.

### Preliminary Findings

The briefing and training of local policy makers and of local agricultural leaders is very important to the success and sustainability of village-level Newcastle disease vaccination programs and poultry development efforts. Local officials that have participated in poultry health briefing-trainings have shown strong interest in adopting local policies and providing funds to support poultry vaccination and development programs. It is encouraging that local leaders are now spreading the message on vaccination and the need to improve poultry management. In Iringa, they have already set by-laws on compulsory Newcastle disease vaccination with penalties to defaulters. Newcastle disease vaccination yields dramatic and rapid increases in the productivity of village chickens. Village chicken numbers in the Iringa study area increased 50 percent between the first and second rounds of vaccination.

University-based poultry veterinary scientists may serve as key extension agents for the improvement of poultry health and productivity at the village level. Working in collaboration with regional veterinary staff and field staff of non-governmental organizations, a core group of university poultry specialists and a cooperative extension specialist

Table 1. The number of chickens that have been vaccinated in the three project wards.

Ward	First vaccination	Second vaccination	Third vaccination
Mlowa	17,320	25,820	N/A
Mzumbe	27,307	30,073*	N/A
Ufukoni	850	1700	N/A
Total	45,477	57,593	

\*The number of vaccinated chickens excludes chickens from 80 households, which were not vaccinated because the owners refused to comply. The refusal was mainly based on the farmers erroneously believing that one vaccination would provide sufficient protection for their chickens.



*While speaking with village poultry farmers in Morogoro, Tanzania, AFS team members, including Project Manager David Bunn, assess the effectiveness of the Newcastle disease vaccinations and learn of poultry health problems. Photo by Danielle Kneuppel.*

have effectively extended their poultry health knowledge to village communities.

### **Practical Implications**

Improving poultry health and productivity at the village level can be an important component of programs to reduce malnutrition in poor rural communities, since poultry is one of the few animal food sources available to poor families. In Tanzania, as in many developing countries, 80% of poultry production is village-based. Unfortunately, the productivity of village poultry has been severely limited by devastating poultry diseases. The development of effective strategies and practical methods for households and villages to improve poultry disease control is critical for attaining the benefits that poultry offer for providing income and food for rural poor families.

Avian influenza and Newcastle disease are two such diseases requiring control and management. The symptoms of Newcastle disease are very similar to avian flu, and the two diseases cannot be distinguished from one another without laboratory testing, which is often cost-prohibitive and requires resources not always available in rural communities of developing countries. Therefore, instituting an effective avian flu control program must include a Newcastle disease control strategy.

Furthermore, the practice of university-based veterinary scientists engaging local policy makers and agricultural leaders may be a model for animal health extension across Africa. Improvements in poultry health and productivity resulting from this study make the case for investment in a much larger poultry health extension program throughout Tanzania and other African countries.

## Further Reading

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Avian Flu School (AFS) was created to address the need for a train-the-trainer program to disseminate the knowledge necessary to minimize the health and economic impacts of H5N1 HPAI by improving the ability of a country, district or community to prevent, respond to, and recover from an outbreak. The project is led by Dr. Carol J. Cardona, University of California, Davis. Email: cjcardona@ucdavis.edu.



The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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