

## Principal investigator's desk

It is with great joy and feeling of accomplishment as we look at what we have achieved so far. This newsletter is a manifestation of what we have accomplished, what we are doing and what we are yet but certain to accomplish. InCIP solutions which target four main development areas ensure that we not only link with all stakeholders in the indigenous chicken value chain, but also bring them on board to share their knowledge, experiences, challenges and opportunities.

We pride ourselves in having made huge steps in empowering indigenous chicken farmers, developing capacity and supporting policy. It is indeed great to know that InCIP has joined hands with Nyama World and Farmers Union of Malawi to promote formal marketing of indigenous chicken. InCIP has also been integrated by Innovations for The Livestock Industry (iLINOVA) programme with the purpose of promoting the

## Lead implementing scientist excels in research

Prof. Dr. sc. agr. A. K. Kahi is currently the leading scientist with the highest number of publications in Egerton University and other universities offering agricultural courses in Kenya. He has over 50 papers published in premier internationally refereed journals above the second ranking scientist. This is according to Scopus®, the largest abstract and citation database of peer-reviewed literature that delivers a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities ([www.scopus.com](http://www.scopus.com)). In 2001, Prof. Kahi scooped two awards; the prestigious Peter Doherty Award and Consultative Group on International Agricultural Research (CGIAR)'s Excellence in Science Award in the most Promising Young Scientist Category. This clearly reflects that even in his early years in research he was already a determined fellow and has lived up to the awards' expectation by showing his focus on contributing knowledge to the science community. He has further demonstrated this by retaining the lead position for the Award of Researcher of the Year in two categories – Publications and Funds attracted at Egerton University, since 2005.

Prof. Kahi is an accomplished Professor of Animal Breeding and Genomics at Egerton University's Department of Animal Sciences and a member of the Permanent International Committee of the World Congress on Genetics Applied to Livestock Production. Given his strong networking skills, he has successfully attracted funds for institutional development and advancement from various donor agencies including the European Union (EU), Netherlands Organisation for International Cooperation in Higher Education, US Agency for International Development (USAID), African Union (AU), US Department of Agriculture (USDA), World Bank, International Foundation of Sciences (IFS), UK government's Department for International Development (DFID), British Council, among others.

creation, updating and utilization of technologies along the IC value chain. In addition, InCIP is playing a major role in disseminating IC technologies to farmers. What remains in our mind is the fact that we are not limited by our challenges but inspired by what we can achieve.

I applaud us for our efforts as we continue to accomplish our tasks. Please take some time to read this issue of the newsletter to get a grasp of what we have achieved up to this quarter. We hope our newsletter gets a wider readership to enhance adoption of our outputs. You can also get a copy of the newsletter online and help us circulate it widely.



PI with Mr. & Miss Agriculture during the Egerton University open day-2014

## InCIP activities presented at stakeholder workshop organized by Farmers Union of Malawi

Farmers Union of Malawi (FUM) organized a rural poultry stakeholder workshop that was held on 15th May 2014 at Crossroads Hotel, Lilongwe. The workshop aimed at briefing its stakeholders on the initiatives taken by FUM on improving the rural poultry value chain. FUM through funding from Flemish Government (FICA) initiated rural poultry in selected areas of Mzimba district, Northern Malawi. The *Cont. on p 3*



Participants at the FUM organized rural poultry workshop at Crossroads, Lilongwe

# Methods that can be employed to improve genetic resistance of indigenous chicken to common diseases

One of the constraints limiting increased chicken production is poor health. Newcastle disease (ND) is regarded as the principal factor limiting rural chicken production in Africa and can typically kill up to 80% of household poultry. Birds that survive ND have high antibody levels and are resistant for a while. However, the level of antibodies decline with time resulting in reduced protection as antibodies wane and eventually become susceptible again. This cycle is repetitive in the life of the birds. In intensive small scale chicken flocks, Gumboro or Infectious Bursal Disease (IBD) is very important. This disease results in up to 50% mortality in a susceptible flock. IBD also has an immuno-suppressive effect, resulting in poor response to vaccination and increased susceptibility towards other pathogens.

Intestinal and ecto-parasites are also of importance in traditional chicken production and can cause high mortality and as well as compromised production. Other pathogens that have been observed to cause major losses in chicken

the next generation. This is how indigenous chickens have been naturally selected for adaptation to locally present pathogens. Another approach available to commercial breeding companies is to make an offspring test. An offspring test involves producing a number of offspring from each breeding candidate and placing them in an infected environment. The rate of mortality due to infectious diseases in the offspring groups is a direct measure of breeding value for disease resistance in the parents, and can be used to inform the selection of birds for breeding. For example, there has been use of an offspring test to obtain lines resistant to Marek's disease after four generations. There has been use of Sheep Red Cell as a noble antigen to select divergently for low and high responders after 30 generations. This method is not practiced due to animal welfare concerns. The second method is selection of parents based on offspring upon measuring immune proteins. For example, the most extensive breeding experiments for immune traits have been performed in cattle and chicken where genetic parameters have been estimated. The

third method is using molecular methods to choose breeding animals with genes or markers for genes that are known to give a better protection against infection. This involves detecting direct markers or genes responsible for the expression of the trait of interest or using genome wide association studies to identify QTL conferring resistance.

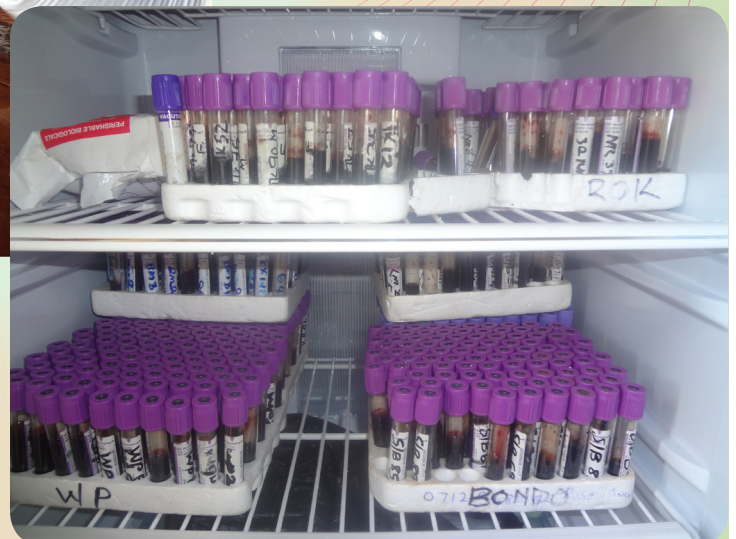
In light of this, InCIP has started an elaborate on-station experiment in Kenya to gather genetic variation of certain immune traits. This study being conducted by Mr. Joel Khobondo; a PhD student of Animal Breeding and Genomics



**Blood collection from birds for DNA extraction to study genes that influence disease resistance**

include Salmonella, Mycoplasma, infectious laryngotracheitis, E. coli and fowl pox virus. These myriad pathogenic challenges prevalent in tropics overwhelm the immunity of chicken resulting in reduced efficiency of the memory cells as some of these diseases infect birds later in life. This leads to delayed and inefficient response hence making the birds more susceptible.

Chicken exhibit variation in resistance and tolerance. This variation can be exploited and technology transferred to resource poor farmers. Three different ways or strategies can be used to genetically improve disease resistance: First, selecting and breeding the birds that have shown ability to survive infections; for example the simple or empirical method is to ensure that all candidates for becoming parents are exposed to pathogens. Those that survive have proven resistance, the genetic element of which will be transmitted to



**Some of the blood samples for DNA extraction**

at Egerton University, Department of Animal Sciences intends to quantify genetic variation in birds and identify genes that influence disease resistance. The information will then be used in selection and breeding for disease resistance in indigenous chicken to meet the low input management systems. The study proposal for this work has been accepted and approved by the graduate school of Egerton University and sampling of animals for DNA extraction is underway.

Cont. from p 1

activities included distribution of Black Australorp (BA) to organized farmers in order to enhance their livelihood. BA is a dual purpose exotic breed recommended by the Government of Malawi to improve productivity of indigenous chicken through crossbreeding. At the workshop, InCIP Country Leader, Dr. Timothy Gondwe, presented to the stakeholders the initiatives of the project to promote indigenous chicken (IC) through selective breeding and value chain development. Dr. Gondwe, who also represented the National Rural Poultry Center and the Department of Animal Science at Lilongwe University of Agriculture and Natural Resources (LUANAR), presented the InCIP establishment at LUANAR that included breeding, evaluation and hatching units and a framework for distribution of IC to rural communities around Bunda and the linkages with private and public institutions. Dr. Gondwe emphasized that the project is program based and expressed a desire for greater engagement of all actors in the IC value chain.

## Livestock feeds production at Egerton University

Njoro women's group in Nakuru County has been rearing poultry for commercial purposes for the past five years. Currently, on farm, they have about 1000 hybrid layers which were obtained as day old chicks from a hatchery and reared to sexual maturity for egg production. The group has been sourcing feeds from different feed companies due to issues concerned with consistency in feed quality and costs. As a result, they have been experiencing fluctuations in egg production and this has greatly affected their returns. An important point that must be understood by poultry farmers is that, lack of consistency in quality of feeds can adversely affect egg production. Therefore, when sourcing for feeds, it is advisable to maintain a single source unless otherwise. This is because of the variation in quality that exists between different feed companies which is likely to affect livestock productivity.

Egerton University has incorporated animal feed production into its programmes, branded as Egerton Feeds, to help farmers deal with the problem of inconsistency and unreliability in feed quality and supply, as well as cost; Thanks to InCIP. The feed processing unit has teamed up with researchers in animal nutrition, from the Department of Animal Sciences in order to formulate feed rations using appropriate ingredients and in required proportions. In addition, extensive proximate analysis is carried out on raw materials and final processed feeds in the highly equipped animal nutrition laboratory at Egerton University. The purpose of this is to ensure that they produce feeds of high quality and maintain these standards that will guarantee optimum returns to the farmer.

Egerton Feeds produces feeds for various categories of livestock;

1. Dairy cattle and goats
2. Poultry
  - Layer chicken (Chick mash, Growers mash, Layers mash)

*Improving Indigenous Chicken Productivity for Enhanced Livelihood and Food Security in Sub-Saharan Africa*

FUM implements its activities in Mzimba where InCIP sourced the initial breeding stock. The workshop provided an opportunity for interaction with farmers that were willing to sell the birds to InCIP and response to enquiries on expected time for the breed stock would take to reach the communities. Distribution of the birds on trial basis is currently ongoing. This is however limited to communities that surround Bunda Campus. It was pleasing to note that farmers in Mzimba who are supported by FUM are well organized through self-initiatives and innovation and promote BA distribution to fellow farmers through live birds and fertile eggs.

During the workshop, the CEO of Nyama World Ltd noted that there is increasing and unmet demand for IC meat and eggs that requires communities to be organized. Nyama World recognized activities of InCIP and arranged for a visit to InCIP facilities in LUANAR.

- Broiler chicken (Broiler starter and Broiler finisher)
  - Kienyeji chicken (Kienyeji mash – to be used as supplement if kienyeji chicken are raised on free-range)
  - Quails – egg production (Quail chick mash, growers mash and layers mash)
  - Quails – meat production (Quail starter mash and finisher mash)
3. Pigs (Sow-weaner meal)
  4. Rabbits (Pellets)
  5. Fish (Pellets)

Each of these livestock produce different products which require different nutrients at specific proportions, therefore, Egerton Feeds has focused on using tested raw materials to produce their feeds so as to ensure high productivity from the animals. The feeds are packaged in 50kg, 20kg, 10kg and 5kg bag to suit different levels of farmers. Farmers also have the privilege to acquire animal feeds at a cheaper price and still be assured of good quality at the end of the day. An additional benefit of Egerton Feeds is that it has a technical farm advisor who provides extension services to farmers on animal nutrition, feeds and feeding aspects. Our esteemed customers include small-scale farmers, large-scale farms



Samples of Egerton Feeds

and companies who are generally satisfied and keep on returning for more.

# Experiences of indigenous chicken over exotic breeds of livestock under smallholder farming system in Malawi

Comparison of survival of indigenous and exotic livestock under smallholder free range production system was done at Chitedze Research Station using chicken and cattle. The objective was to come up with a breed that would assist resource poor farmer. Body weight, adaptability, disease resistance and

experiences have been observed by farmers in villages around Bunda Campus of LUANAR where InCIP also distributed BA and IC cocks and eggs.

The importance of indigenous livestock has also been explored in cattle where the Holstein cattle breed are highly affected by lumpy skin disease compared with Malawi zebu under the same environment at Malimbwe Village in Malawi. These observations indicate the value of indigenous livestock which is masked by the artificial value of the exotic livestock which are not suitable for the local farming conditions in Malawi. Thanks to the collaboration between InCIP and Innovations for The Livestock Industry (iLINOVA) programme in working towards shedding light on the importance of indigenous livestock hence, showing the need to improve management and promote their efficient utilization for successful life of a smallholder farmer.



**IC vs. BA under same environment at Chikhawo Village (swelling heads commonly observed in BA chicks)**

survival were the traits used to evaluate performance. Results indicated that, free-range indigenous livestock are suitable for a smallholder farmer in Malawi because of their broad feeding habits and adaptation to unfavourable environment.

Low cost of production also puts them at an advantage over exotic livestock. In addition, hatchability of 100% was observed when eggs from Black Australop (BA), indigenous chicken (IC) and their crosses were naturally incubated by IC at Chikhawo Village in Malawi. However, chick survival rates between the local, exotic and crosses varied greatly with Black Australop chicks being the least at 1%. Similar



**High mortality rates of the BA under the free range system**

## Evaluation of growth performance of the “Kuchi” ecotype

Kuchi is one of the Kenyan IC ecotypes mainly found in Lamu County and the neighboring coastal regions where it has been kept for a long time. It is believed to have been introduced by merchants from Asia particularly Japan who inhabited the region some years back. This ecotype is common in Tanzania where studies have shown its superiority in growth traits compared to other ecotypes. It could therefore be a good starting material for genetic improvement in body weight. Unlike other IC ecotypes, very few studies have been done on Kuchi in Kenya. Molecular studies carried out within the InCIP project have characterized the various ecotypes in Kenya into clusters and Kuchi was found to uniquely belong to its own cluster, indicating its genetic distinctiveness from the rest of the chicken population in Kenya. This further shows the need to study the Kuchi bird. Due to the findings in Tanzania, many farmers are now starting to utilize Kuchi for meat production in Kenya ignorant of its genetic attributes. The ecotype has recently been introduced in Elgeyo Marakwet County from Lamu and preliminary performance indicates its superiority in meat production. It is important to understand the Kuchi growth patterns and its growth genetics in order to design breeding

program for its genetic improvement for increased productivity, Mr. George Lihare a Masters student in Animal Breeding and Genetics at Egerton University, Department of Animal Sciences has undertaken a study to contribute to improved production efficiency of Kenyan IC through genetic analysis of growth patterns of the Kuchi ecotype.



**“Kuchi” an ecotype from Lamu**

## InCIP join hands with Nyama World and Farmers Union of Malawi to promote formal marketing of IC

Mr. Hussein Jakhura, the Chief Executive Officer of Nyama World Ltd, one of the leading retail meat processors

The CEO was so impressed that he brought in a proposal to partner with LUANAR to rehabilitate the butchery and use it as a slaughter point for IC and local goats for its retail shops. The proposal also included organizing farmers to bring their IC to the butchery for slaughter. The concept, that constitutes a Public Private Partnership (PPP) approach, was welcomed by InCIP who developed a concept note and presented to Management of LUANAR for top level policy decision. The Deputy Vice Chancellor, Professor Emmanuel Kaunda, welcomed the concept and promised to table the same at University Management. Meanwhile, InCIP went on organizing farmers to bring their IC for slaughter and sell to Nyama World from the butchery. Nyama World buys broiler chickens dressed at MK1000.00 per kg but promised a 10 – 20 % top up on IC. Nyama World buying birds directly from the farmers would help them bypass the middle men who are often exploitative.

This venture has had its fair share of challenges. Despite various calls for farmers to sell their IC, less than 10 tried the system. This raised questions as to why farmers do not respond to the demand. Some of the reasons included less need for farmers to sell their birds during the dry season when harvest is still plenty; farmers have small flock sizes and would mean depleting the IC. Some farmers, given the location of the butchery unit, suspected they would be taxed or charged some fees. InCIP responded by increasing interventions to the farming communities through distributing fertile eggs from genetically evaluated birds at its breeding unit. These eggs were set on hens that were laying and about to sit on its eggs. Half of the eggs were removed and replaced by eggs from the breeding unit. Households were advised to consume the eggs taken from the hen; an intervention that enhanced household nutrition. In addition, communities surrounding Bunda were encouraged to vaccinate their IC flocks against Newcastle disease (NCD). InCIP facilitated access to the vaccine which was provided to farmers in communities on a cost-recovery system. This, plus the initial intervention of distributing cocks to communities, would promote flock sizes and hence have surplus for sale to Nyama World.

Despite the above effort, farmers did not prefer formal marketing of IC since selling birds on dressed weight basis did not give farmers more money than that offered by middle men. This revelation brought another dimension to InCIP who, together with its Agribusiness Expert, Dr. Joseph Dzanja, entered into a rapid evaluation of IC marketing in commodity markets. This quick assessment revealed that farmers sell a live hen between MK1500.00 and MK2000.00 and a cock between MK2500 and MK2800.00 to middlemen. Middlemen then sold the chicken to consumers in institutions and city commodity markets at a mark-up of between MK3000.00 and MK5000.00 per live bird. Further studies by students at LUANAR found that carcasses of IC weigh about 700 g in hens; 1000 g *Cont. on p. 6*



**InCIP breeding unit at LUANAR**

and traders in Malawi visited InCIP research facilities at Bunda Campus of LUANAR on 23rd May 2014 after networking during the stakeholder workshop at Crossroads Hotel, Lilongwe. During the visit the teams discussed strategies to formalize indigenous chicken marketing. Mr. Jakhura reiterated the high demand for IC products. He noted that of every 10 customers demanding poultry meat and eggs they offered, 7 demanded IC products. Mr. Jakhura expressed concern that Nyama World faces problems of regular supply of both meat and eggs from IC, and expressed the need for InCIP and other related projects to organize farmers to be supplying 1000 kg of IC meat every day. Following the presentation from Nyama World CEO, InCIP took up the initiative to organize farmers from around Bunda and disseminated messages to Extension Officers at Mkwinda and Mitundu Extension Planning Areas of the demand.



**Nyama World CEO holds discussion with InCIP team from Malawi**

During the meeting, the CEO of Nyama World toured InCIP facilities including the breeding, multiplication and hatching units. The CEO also visited the butchery at Bunda Campus that has facilities for slaughtering chicken.

cocks. This indeed invalidated the selling of IC based on dressed weight and hence the problems for the IC to enter the formal market. A feedback was presented to Nyama World through emails and during the visit made by the CEO to LUANAR on 9th September 2014.



Some of the improved IC at the InCIP research unit in LUANAR

Forward thinking, the demand for IC keeps growing but supply to the formal market is still challenged. Interviews with a few middlemen also confirmed the huge demand for IC compared to broilers at commodity markets and restaurants. Formalizing the IC market requires further effort, and InCIP would like to embark on genetically improving the frame of IC to attain dressed weights of over 1 kg in hens and close to 2 kg in cocks at earlier ages of 4 to 5 months. This will enable communities to profitably sell the birds to formal meat retail shops. Nyama World has proposed to set up an IC breeding and research centre at LUANAR through farmer, researcher and private sector approach as part of the partnership. Currently the proposal is still to be tabled to the university management for informed decision. InCIP has also identified phenotypes of high growth performances that will be used for selective breeding



Dr. Dzanja chats with middlemen on IC marketing

and multiplication. The Agribusiness team is evaluating the feasibility of IC marketing in both formal and informal channels. In addition, Farmers Union of Malawi has joined hands to use the unmet demand as potential to enhance resource poor households through enhanced IC initiatives.

## What poultry farmers need to understand before obtaining the 'improved indigenous chicken'

The current rise in demand for indigenous chicken products has driven majority of poultry farmers in the indigenous chicken business creating a demand for these birds. Most of these poultry farmers have gone to the extent of crossing indigenous chicken with commercial hybrid birds (broilers and layers) in attempt to improve indigenous chicken to produce the so called 'improved indigenous chicken'. This desperation has resulted to various poultry farms going into the breeding business to produce improved indigenous chicken (sometime referred to as improved kienyeji chicken) with faster growth rates, high egg production rates and resistance to diseases without adhering to the breeding principles. It is therefore important that poultry farmers understand how the indigenous chicken industry is structured, their purpose in the industry and obtain flocks from reputable institutions.

A typical structure for the modern indigenous chicken industry should be characterized by a hierarchy with distinct tiers, where each tier constitutes actors (primary breeders, multipliers and producers) with distinct functions. The primary breeders are found at the top most of the tier. These are the people who carry out intensive selection and breeding of indigenous chicken in order to produce offspring of high performance. This is usually an exceedingly specialized and complex process involving effective and accurate selection for numerous traits in the cocks and hens to ensure that the final improved indigenous chicken possess all the required attributes. The process requires huge amount of data on every single bird and its extended family to be collected and analyzed, and as such it is very costly hence, primary breeders are commonly found within research institutions or universities since these stations have the necessary facilities and human resources in place to enable them carry out these activities.

The primary breeders don't have the capacity to produce and supply the number of breeding stock required by farmers and this is where the multipliers become appropriate. Multiplication centres can be run either by farmers' organizations and cooperatives or private hatcheries. The multipliers obtain the improved indigenous chicken from the primary breeders either as fertilized eggs or day-old chicks. Their main function is to multiply the improved birds to meet producers' demand. It is worth noting that multipliers are not tasked with any improvement functions since this has already been carried out by the primary breeders. At this point, producers are able to gain access to improved indigenous chicken from the multipliers, mostly as day-old chicks. These birds are usually a cross between different lines which have undergone intensive selection for particular production traits hence enable poultry producers to benefit from extra vitality and extra production. Which particular lines and breeds are developed and crossed is the 'recipe' of the individual breeding company. The producers involve market-oriented farmers or financially

Cont. on p. 7

Cont. from p. 6

well-off households who are responsible for production of the improved indigenous chicken for consumption of their products.

Quite often farmers make a common mistake of obtaining the already improved birds and use them for breeding with an agenda of further improving the birds. In some cases, they use the commercial hybrid birds (broiler and layers) to achieve this goal. However, one must understand that these birds being disseminated to producers have undergone intensive selective breeding to ensure optimum performance thus no further improvement can be achieved. This is similar to the case of hybrid maize seed varieties obtained from seed companies where farmers are advised not to plant seeds from cobs of these hybrids as this would result to crops which are about 20% poorer in performance. Therefore, poultry farmers should realize that the hybrid commercial birds are purposely meant for production. The good attribute with a pure indigenous chicken is that it will be managed as a purebreed and is able to reproduce itself and maintain the same level or even higher production.

It is also important that poultry producers obtain flocks that are of proven performance from reputable institutions like Egerton University. This makes pedigree information a valuable tool in indigenous chicken breeding because the ancestral records provide knowledge necessary for predicting the performance of progenies. Institutions should therefore be able to provide credible information used in the production of pedigrees and records, bringing to surface the importance of breeder integrity. Quite often some institutions try to meet the ever-increasing demand for improved indigenous chicken by simply obtaining/importing the parent stock of exotic birds and crossing them with indigenous chicken with no proper information on their performance. The main disadvantage likely to be faced with this strategy is the unpredictability in performance of the crossbreds disseminated to farmers and that is why in some cases farmers have complained on the deterioration in performance in the improved indigenous chicken obtained from some institutions. Since these are products of crossbreeding exotic birds and indigenous chicken, what do we call them? Improved indigenous chicken or simply crossbred chicken. I think they are crossbred chicken since they possess 50% gene proportion from the exotic and indigenous chicken. Therefore, farmers should consider obtaining progeny of proof to avoid disappointments in their production flocks. Next time you buy an improved indigenous chicken request for the pedigree and some estimates of performance, as you would do when purchasing a pedigreed dairy cattle. If not, then that is not an improved indigenous chicken but rather a crossbred chicken normally with unknown gene composition.

Through intensive performance evaluation, InCIP has successfully managed to estimate breeding values for different traits of economic importance which has guided the on-going selection and breeding of indigenous chicken with a purpose of genetically improving their production. A sample of sires (cocks) of high genetic merit is shown below with their breeding values for average daily gain, a trait considered important by poultry farmers. The purpose of these breeding values is to ensure that individuals are selected to be parents based on genetic merit such that their offspring perform on average better than the previous generations.

Take an example, the cock named “Richard-White” who has a breeding value of +3.60 for average daily gain, this simply means that, since Richard-White only gets to transmit half of its genes to its offspring and the remaining half comes from the other parent (mother), Richard-White’s offspring will get half of +3.60 value for average daily gain and will on average perform better than its parents generation by +1.80 (g/d).



Sample of pedigreed cocks intensively bred for improved production

by InCIP

## Evaluation of IC meat and egg composition quality

Indigenous Chicken products are generally perceived to be more preferred by the consumers due to several desirable characteristics. However, continuous supply of good quality IC meat to a wider market remains a challenge. There is limited scientific information on processing system that would guarantee farmers supply of safe and high quality IC meat to consumers.

InCIP has initiated a study to evaluate meat and egg composition quality from indigenous chicken. The study by Mr Bernard Oloo, a PhD student of Food Science and Technology at Egerton University, Department of Dairy, Food Science and Technology aims to develop a Hazard Analysis and Critical Control Point (HACCP) system for processing Kenyan IC meat to ensure a reliable supply of safe IC meat that satisfies a wider market both locally and internationally.

The system will be able to guarantee IC product safety. The study will then evaluate the quality and safety of the IC meat processed under HACCP with the view to gaining

## InCIP disseminates IC technologies to farmers

Part of InCIP activities is to disseminate information and technologies to target beneficiaries (farmers) through trainings to enable them

improve their flock production. Mid this year, InCIP conducted an on-farm training on poultry and hatchery operations at the Yegen Enterprise. The activity involved a two-day training of the farm staff members on artificial insemination in chicken



InCIP team and Yegen Enterprise staff members during the training on reproduction technologies

and sexing of day-old chick. Both are reproductive technologies that are applicable to hatchery enterprise.



Demonstration of the abdominal massage technique for semen extraction

The enterprise has over 5000 female birds kept under a battery cage system in which feeding and watering systems are automated to enable efficiency in management.

It also maintains a flock of 500 male birds under deep

a deeper understanding of how these characteristics contribute to the perceived consumer preference of the IC's meat from the different clusters. The study will also look at the effect of IC rearing method on the safety and quality of the IC meat processed under the HACCP plan. This will lead to a better understanding of their attributes and how to exploit such attributes to improve market access and fair pricing for these IC. The proposal for this study has been accepted by the graduate school and the preliminary data collection is expected to kick off from the month of January the Year 2015.



Conditions in one of the Local markets in Nakuru County

litter system. These males are insufficient to mate the 5000 female population. Therefore, to ensure high fertility rates, artificial insemination (AI) was deemed necessary thus the AI training.

Day one of the AI training focused on semen extraction and deposition procedures. InCIP staff demonstrated procedures on how cocks are stimulated using the abdominal massage for semen extraction, and procedures of semen extraction. This was followed by cloaca eversion and semen deposition in females. The trainees were able to perform the AI procedures right from semen collection from cocks to deposition into the hens. The trainees managed to extract semen from 200 cocks and inseminated 500 hens. The second day of training was on sexing of chicks. The day started with a brief introduction on reproductive morphology of both male and female birds. This was later followed by a practical session which involved identification of the main differentiating sex organ between males and females. During this time, the trainees were engaged in the session to allow each of them to get a technical feel of the procedure. The staff managed to sex 500 day old chicks during the training.

Both trainings were a success as the trainees were satisfied with the new technical knowledge gained and are already applying both technologies in their poultry and hatchery operations.



Demonstration of semen deposition in females

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*...working to improve livelihoods and food security among the resource poor households in Sub-Saharan Africa*

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