InCIP NEWSLETTER

Smallholder Indigenous Chicken Improvement Programme

April 2013 - September 2013 *ISSUE no. 03*

Principal investigator's desk

This edition of the InCIP newsletter puts emphasis on the milestone the programme has made. We note with pride and confidence that the strides made are not in any way small. The technologies, innovations and research findings so far can account for most of what we anticipated to achieve and more. Of the achievements, Greenhouse production of chicken and Artificial Insemination (AI) of indigenous chicken (IC)stand out. Such out of the box thinking in research is welcome at a time when we no longer look at reinventing the wheel but identifying innovations using the existing technologies. These two innovations among many others serve to show the kind of drive the programme has. It also goes to show that we have stuck our focus on our goals and objectives. Our next challenge will be that of transfer of the technologies. I believe that our work has elicited enough excitement among our targets: the IC farmers. Indeed we have increased our visibility both on-line and physically both in Kenya and Malawi. Our achievements have also been presented in other countries in Africa and Europe.

Principal investigator with guests during the open day at Egerton University

Our presence in trade fairs, agricultural showcases, conferences and workshops has ensured that our IC outputs reach our targets far and wide. I am keen to point out that InCIP-Malawi went an extra mile together with the support of the Government of Malawi, and Agricultural Sector Wide Approach Programme (ASWAP) supported two undergraduate students to attend this year's Conference on Sustainable Animal Agriculture for Developing Countries (SAADC) in China. This shows how far we have gone to ensure visibility. Apart from visibility this is a great step towards capacity building. However we are not stopping at exciting the farmers but to ensuring that they actually take up the technologies for the purposes of alleviating their economic and food security status. Our efforts should be seen as the epicenter from which solutions emanate from and spread outward to our targets. The effects of our efforts should be sustainable as well as offer inspiration to future projects and science. I am certain after achieving our objectives we shall have made an indelible mark in science, in the society and in global food security scene. Before completion of our study and programme, we should also be able to forecast the probable emerging issues which should form basis not only for future research but also give birth to a similar or bigger partnership. I encourage us and our partners to maintain the tempo as we take each step at a time and ensure that we cut the tape at the finish line with gusto.

InCIP patronises the Sustainable Animal Agriculture for Developing Countries (SAADC) conference

The Indigenous Chicken Improvement Programme (InCIP), with support from the Government of Malawi, Agricultural Sector Wide Approach Programme (ASWAP) together with the conference organisers, facilitated Judith C. Kanyama and Yvonne S. Kamanga, both final year students pursuing Bachelor of Science (BSc) in Animal Science at Lilongwe University of Agriculture and Natural Resources (LUANAR), to attend a conference on Sustainable Animal Agriculture for Developing Countries (SAADC) in China from 27 – 31 July, 2013 that was patronised by participants from 26 countries.

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

The students were accompanied by a member of staff Mr. D. Chiumia, a Dairy Science and Technology Lecturer from the Department of Animal Science who was in addition, supported by LUANAR within a Dairy Diploma Project funded by Scottish Government International Development Fund. The SAADC is a biannual conference which started in 2007. This series of conferences are designed to provide a platform for the exchange of experience and knowledge among academicians, researchers, graduate students and producers for development of sustainable animal husbandry in developing countries. The students presented the results from their respective research projects conducted in partial fulfilment of the requirement for the BSc degree. Judith made an oral presentation on the effect of

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Benefits of breeding for disease resistance in indigenous chicken

Breeding for disease resistance in IC is important given the environment under which they are produced. Malnutrition, poverty, ill health with high mortality, unemployment and illiteracy with other poor social services are the features common among the Kenyan rural. Thus chicken rearing is one of the most suitable activities to improve the livelihood of the poor due to small investments and relative ease of improving productivity in the rural setting. The IC constitute the majority of chicken reared, they are kept by over 90% of households in rural areas for economic, nutritional, socio- cultural and spiritual purposes. Productivity of this chicken is varied due to genetic diversity and variation in production environment. The predominant production system in most rural areas is extensive management system characterized by scavenging, little or absence of immunization programmes, increased disease and predators' exposure to birds, uncontrolled natural mating and hatching of eggs by broody hens. The extensive management system has the unfortunate consequences including heavy infestation with coccidian and other helminthes, frequent Gumboro and Newcastle diseases outbreak that inflict the major economic loss and compromise production.

The strategy to control these diseases has been majorly vaccination which is rarely practiced by the resource poor rural farmers. And for the few IC keepers who vaccinate, the effectiveness of vaccination is limiting due to a plethora of different pathogens and continual shift of pathogen epitopes. Use of drugs by farmers for prophylaxis purposes

Vaccination of indigenous chicken

especially upon diseases outbreaks has raised concern to consumers due to risk of antibiotic resistance and allergies caused by carry-overs effects. This calls for breeding for enhanced immunity of IC that can resist infection and meet

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

age, introducing different breeds of chickens to scavenging for growth and survival while Yvonne presented a poster on the effects of parity on IC egg size, number of eggs and hatchability. Despite the huge number of presentations at the conference, LUANAR students managed to shine. This was reviewed when Yvonne was recognised among the top ten young scientist participants. "I'm very excited that I have won this award, this has given me the reason to dream even bigger", Yvonne Said. Judith who also works at Chitedze

Yvonne S. Kamanga during SAADC Conference

Research Station in Lilongwe as a livestock scientist had this to say, "I have been impressed with the technologies in use by smallholder farmers which can be replicated in Malawi such as biogas production from sheep and surface irrigation under soil covering film, of-course some may need validation". In her words Dr. F. Chigwa, the Head of Department of Animal Science expressed gratitude to the students for putting LUANAR on the map. According to Prof. J.P. Mtimuni, the Research and Seminar coordinator in the Department, "this is the first of its kind in the history of LUANAR as a higher learning institution to send undergraduate students to international conferences, this should be emulated and surely it will contribute to quality research among students". "InCIP is achieving some of its peripheral targets in capacity building and publication and as a programme, it is grateful to Malawi Government, ASWAP with support from World Bank for complementing LUANAR efforts in promoting IC", Dr. T. N. Gondwe, InCIP coordinator commented.

My experience working at InCIP

Mr.Brian Oketch, a third year Bachelor of Arts (Economics and Mathematics)student at Egerton University has been working at InCIP as an office assistant for quite a period of time. It is no doubt that InCIP has inculcated good values and morals such as discipline, in students more specifically those in the Faculty of Agriculture. It has empowered most of the students to be more of job creators than job seekers in this world of gross unemployment.

"Being my first job, it is a memorable thing in my life. I started working at InCIP in February, 2013. During this

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8 months period, I have learnt life lessons of sacrifice and responsibility. At the beginning of my job, I was really excited to learn and know about my duties and responsibilities in the project. Though, at the beginning I had so many challenges, thanks to my colleagues who helped me whenever I encountered difficulty. With their help I am now able to meet my daily activities with ease. I was taught how to handle office equipments and documents more efficiently and to communicate with people in an official way. I am grateful that working at InCIP has given me the opportunity to develop my communication skills and self confidence. At InCIP, I met the Project Director Prof A.K Kahi, who has been a mentor, trainer and a friend. He is friendly, kind with passion for young people's talent and will always offer assistance whenever needed. Working for this project has made me appreciate and develop an interest in agriculture. I consider this a great advancement and achievement".

Mr. Brian at work

The Government of Malawi and NGOs have offered to support breeding of indigenous chicken in Malawi

INCIP Malawi has started hatching IC eggs of different phenotypes with the aim of breeding for improvement and conservation of animal genetic resources. To benefit the rural community, INCIP Malawi will work with stakeholders to facilitate dissemination of the improved genotypes to communities on sustainable basis.

Upon receiving the news, the Deputy Director of Research and Investigation in the Department of Animal Health and Livestock Development, Dr. P Chikungwa said that the work is commendable worth of support. Other stakeholders' representatives echoed likewise, "I hope we will soon begin to access breeding stock for multiplication; you have our support" Victor Mhango, Deputy Country Director of Heifer International Malawi said. According to Small Scale Livestock Livelihood Programme (SSLLP), it is an opening for improved livestock productivity in Malawi; "Indeed this is the way to go if we are to improve livestock productivity in Malawi. This is a great step towards development and SSLLP will give all the support to the programme", said Bernet F.K. Lwara, the Head of Programmes, SSLLP Malawi. Through the research, LUANAR is exploring alternative options of improving village chickens for enhanced household food and income security. Already, the two incubators in use, one is from the Government of Malawi and the other is from Malawi Industrial Research and Technology Development Centre (MIRTDC).

Value chain mapping of the indigenous chicken

The level of knowledge on poultry management in Kenya is refined. Production of IC is deemed to be a business by the flock keepers rather than a routine with sales happening either on a daily, weekly or monthly basis. However, the IC market has remained unreliable and unpredictable due to price fluctuations of chicken. It is obvious that the producers of IC are and have been so reluctant to take the step of learning how to improve their poultry management practices for better economies of scale and improved household income. IC management as practiced by many farmers is based on low input strategies where the IC are left to scavenge for food. Feeding these chickens is and has always been a matter of choice by the producers especially where rearing is done in small scale.

Indigenous chicken ownership cannot be regarded as straight as cattle ownership. In small scale rearing of IC, ownership is left wholly to the male gender with women and children taking the roles of ensuring that they free range. A very small percentage of the households have built coops for their poultry otherwise a very large number of those keeping IC opt to share their houses with the chicken. This is so most especially in instances where the rearing is in small scale. Most of these farmers tend to assume the needs of their poultry. The chickens are released in the morning to fend for themselves as they scavenge for food the whole day and return home in the evening. Housing takes the cheapest means available and ranges from chicken sleeping in the kitchen (most comfortable) to being kraaled on the verandah (least comfortable).

Veterinary services in IC systems are virtually absent with farmers resorting to ethno-veterinary practices where red pepper and Neem leaves are used. Ethno-veterinary practices has been as a result of partly the generally high resistance of the IC to diseases hence the farmers' reluctance to use modern drugs and partly due to the lack of knowledge amongst the poultry farmers on the availability of modern chicken drugs and disease management.

Breeding in IC systems is not organised. Most households exchange cocks that are superior for certain desired characteristics, from relatives and neighbours with the sole aim of improving their flock. This practice defeats any organized disease control initiatives and contributes to the problem of inbreeding in the flock. Consequently, the practice of selective breeding in IC has been futile with exceptional instances where the services of informal breeders are sought by the farmer in question.There is a great need for proper breed improvement programmes. This will enhance effective utilization of the huge genetic diversity of the IC population; therefore the implementation of community based breed improvement programmes to both small scale and large scale poultry farmers is timely.

A shift from subsistence poultry production to market oriented production system is necessary. *Cont. on p. 4*

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farmers' and consumer's expectation. InCIP is therefore in forefront of achieving this through the PhD research of Mr. J. Khobondo who is registered at Egerton University.

InCIP has realized that the possibility of genetically improving chicken resistance constitutes an attractive alternative for both the industry and consumers. The positive attributes for such endeavours include improved food security nationally, economical empowerment of women and the village poor as envisaged in the Kenyan Vision 2030 policy paper. Besides, genetic selection for enhanced immunity has been suggested as a safe and logical tool to reduce infectious diseases' problems in animals worldwide. This method could be an effective way to improve the innate and correlated acquired ability to respond to antigenic challenges and aid in generation of more disease resistant IC against a wide pathogens base under different environmental conditions.

The sustainability of this method is robust; the gain in efficient immune response and disease resistance may be transferred to subsequent and future generation until fixation point. Breeding for disease resistance will reduce the inputs required by commercial and small scale holder farmers to maintain IC since the flocks will be more efficient and disease resistant. This will culminate in high profit margins. InCIP has therefore initiated a noble scheme to breed for hardy chicken that will at least survive the disease outbreaks and maintain high production. The science has just started.

An SMS based marketing and information system

Mobile phones have become a basic necessity in all households both in the urban and the rural areas. Although these vary from high end computing devices to a more basic one, SMS communication is accessible and affordable to all.In Kenya for example, 13 billion SMS are sent annually. SMS based communication being cheap and widely spread in most areas in Africa, can be used to bridge the gap in agricultural information especially in the Indigenous Chicken Production Value Chains (ICPVC).

Information between the different actors in the ICPVC is very limited thus leading to issues such as exploitation of farmers by middle men and the lack of essential information about the production of IC, which would have otherwise increase productivity and in turn improve livelihoods.

Due to this, INCIP, as part of its activities is developing an SMS based marketing and information system. This system will give farmers access to information with regards to the production of the IC breed as well as market information at a fairly affordable cost. Farmers will be able to get the different market prices that will cushion them from the exploitation frequently suffered under the middlemen.

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Addressing the major constraints on production technologies, input supply and product marketing systems in the IC value chain is also very critical. Both farmers and extension officers should be trained on, disease control, feeding, improved housing and entrepreneurship. This will play a very big role in improving the productivity of the IC. Participation of the female gender in the trainings should be emphasised due to the big role they play in household management of the IC.

Feed efficiency evaluation in indigenous chicken

Indigenous chicken are a valuable asset and form an integral part of the rural households in Kenya in terms of food security, economic and social roles. Various genotypes have been identified within the farmer flock and ranked based on preference. The normal feathered is the most dominant genotype reared by farmers, followed by the naked neck chicken that carries the tropical relevant major gene due to its productive adaptability in the tropics.

Majority of genetic improvement programmes have emphasized selection to improve growth-related traits and reproductive traits, which influence revenues. However, besides increasing revenues, it is important to consider avenues to reduce costs of production in order to improve production efficiency. Feed costs account for about 60-70% of the total production costs; making feed efficiency a trait of economic importance due to its direct influence on production costs. Feed efficiency measures how much saleable product is produced for each unit of feed consumed.

Indigenous chicken under intensive management

The main aim of activity 2 tasks 2 of InCIP is to carry out an analysis of feed efficiency on IC, in order to identify the most efficient genotype. The study is being carried out by Ms.Sophie Miyumo, an MSc student at Egerton University and currently the already existing population of IC is being used to produce the experimental flock on which the required data will be collected. The results of the study will provide information required for breeding programmes aimed at improving feed efficiency in IC.

Training on artificial insemination in chicken

In Kenya, InCIP facilitated the training on artificial insemination (AI) in chicken, to alleviate mating incompatibility between the Red Island Red (RIR) cocks and IC hens. The training took place at EGU. The incompatibility was due to the difference in the rate of growth in RIR that is faster than IC thus rendering them too big for the small IC within a very short period of time. This problem has been solved in many parts of the world through AI however, this is not the case with Kenya simply because of lack of and/ or poor knowledge in artificial

Wondmeneh Esatu demonstrating procedures on cocks

insemination techniques and facilities. The training was conducted by Mr. Wondmemeh Esatu, alongside Mr. Kiplangat Ng'eno who coordinated as well as participated in the training. The training was also supported by Wageningen University, The Netherlands.

The aim of training was to;

- To train the participants on the procedures on males which included, massaging, milking and semen handling.
- To train the participants on the procedures on females i.e. evertion of the cloaca and deposition of semen.
- To train the participants on how to differentiate fertile and infertile egg by breaking the eggs and examining the structures on the yolks.

Practical lessons were given to the participants with regards to the procedures involved on both males (massaging, milking and semen handling) and females (evertion of cloaca and deposition of semen)

All the participants were able to differentiate fertile from infertile eggs. The training is the first ever artificial insemination on chickens in Kenya.The demonstration on AI was put in the Egerton University website for faster access by the public and poultry farmers.

How to improve the production of indigenous chicken

Indigenous chicken are more resistant to high temperatures and are better adapted to more difficult circumstances. Currently, the production of this breed of chicken is very low despite the fact that, most of the households in the country do produce this chicken. The minds of many have been left tossing around wondering what or rather where the problem is or could be with regards to IC production.

Why are the yields of IC so low yet a large number of poultry farmers have engaged themselves in the production of IC? Most of these chickens lay very little eggs forcing quite a large number of the small scale farmers to use most of the eggs laid in maintaining their chicken population.

This therefore calls for a great need of improving the production of IC by and large as a process of fighting poverty and low household income. The process of improving the productivity of this breed of chicken can be done through selective breeding (selection and culling) and improved management practices.

Selection involves choosing which birds, based on a certain criteria become parent for the next generation. Culling involves removal of unproductive, infected and or sick chickens from the rest of the population during the production period. By so doing farmers increase the production efficiency of the flock. Selection and culling should be continuous practices that farmers exercise right from the hatching of the birds.

Improved management such as better feeding, housing and healthcare for birds in low input will go a long way in improving IC productivity and a reduce mortality. Mortality can be significantly reduced through an increase in farmer awareness of health needs by providing them with vaccines and through an improvement in the nutrition of the growing stock. Technical sensitization to farmers about supplementary feeding and watering would substantially improve the productivity of this breed of chicken.

The indigenous chicken under intensive production system

The indigenous naked neck chicken

The indigenous naked neck chicken is among the genotypes at InCIP. This chickenis characterised by a completely featherless neck area and thus the name. They are very good layers with ability to produce double the standard number of eggs under improved nutrition and management. The complete absence of feathers around their neck area makes them more heat tolerant than most chickens hence very ideal for hot climates. These chickens have a dermis which has a unique ability of swelling, hence an excellent heat dissipation mechanism that makes them less susceptible to heat stress. They are highly resistant to diseases and are superior to the indigenous

The indigenous naked nake chicken

normal-feathered, the exotic naked neck breed for growth performance, meat characteristics, egg production and the egg quality among others.

The naked neck chicken thrives under adverse environmental conditions such as, poor feeding, poor management and variable temperature among. All these characteristics coupled with its adaptability, the indigenous naked neck chicken is the breed for future breeding strategies and hence the breed to keep!!

Feeding strategies

Activity 2 tasks 5 of InCIP is on evaluation of IC feeding strategies for selected ecotypes. This has been effectively attained to a great level with only a few steps left for its completion. Mr.Jesse Gakige an MSc student at Egerton University has facilitated the attainment of this task. His work is majorly on the effects of targeted phase supplementary feeding on performance of scavenging ecotypes of IC in Kenya. The main objectives of the study being to determine the effect of supplementary feeding at exponential growth phase on mature weight, evaluate effect of feed intake, feed conversion efficiency and ecotypes on weight and gain. The morphological characteristics of the gut of the ecotypes at different growth phases will be examined.

All the data collection has been done and he has embarked on writing a thesis on the same. At the end of the study period, organoleptic tests will be conducted to examine the effects of treatments on meat quality. The end result of this study will be to provide a scientific basis for feeding strategies that will exploit the physiological adaptations induced by the requirements for improved growth rate.

The indigenous chicken under semi intensive production system

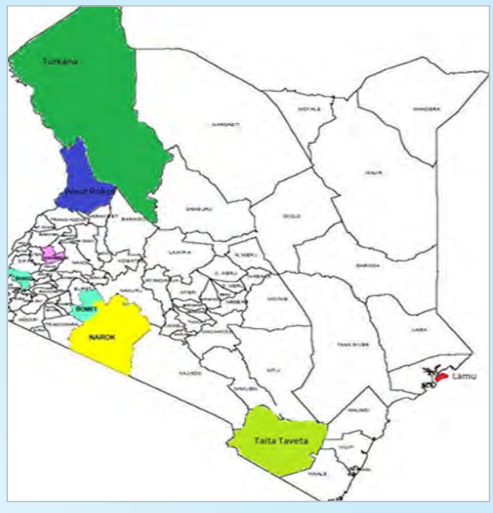
"...Feeding strategies is key to profitability for farmers who want to venture into IC farming as a business. Supplementation being the biggest challenge for these farmers, these strategies will help them supplement their chicken at the phase with the highest feed conversion efficiency. This will help to attain market weight faster at a lower cost of production."

A study on the different ecotypes of indigenous chicken

This study was carried out by Mr. Kiplagat Ng'eno, a PhD student at Wageningen University. A high performing ecotype was identified amongst many other characteristics. This included studies on:

A. Genetic diversity and major histocompatibility complex region variability in indigenous chicken

A study was conducted to investigate genetic diversity and major histocompatibility complex (MHC) region in IC ecotypes in Kenya. Blood samples were collected from eight counties of Kenya, namely; Kakamega and Siaya in the Western region, West Pokot and Turkana in North Rift, Bomet and Narok in South Rift, Lamu and Taita-Taveta in coastal region. Blood samples were genotyped with twelve microsatellite markers. In total, 140 alleles were detected. All markers were polymorphic with 11.58 (range: 6 to 46) mean number of alleles per markers. Inbreeding coefficients for over-all population (Fit) was 0.056. Pair-wise coefficient of inbreeding between populations (Fst) estimates varied between 0.001 and 0.1 with an average of 0.03. AMOVA revealed a high within ecotype variation (97%). The chicken MHC marker LEI0258 revealed 46 alleles and this indicates that IC host many and highly diverse alleles which are associated with disease and parasite tolerance. Therefore their conservation needs to be prioritized to maintain such a diverse MHC gene pool for the current and future development of chicken. Clustering analysis indicated a clear ecotype subdivision into three genetically distinct groups. Two main population clusters indicated by ad hoc statistic ΔK, posterior probability (Ln P (D)) of the data and PCoA are Lamu (one cluster), Taita-Taveta (second cluster) and populations from Kakamega, West Pokot, Turkana, Bomet, Narok and Siaya a third cluster. Quantification of genetic diversity is useful to policy makers and other stakeholders in determining priorities for conservation, utilization, management and genetic improvement.



Map of Kenya showing the sources of IC ecotypes

"Kuchi" an ecotype from Lamu

B. Consumers' preference and behaviour towards indigenous chicken meat and eggs

A study was conducted to determine consumers' preferences and behaviour towards IC meat and eggs. Survey data obtained from consumers from three regions of Kenya were analysed to identify consumers' preferences towards IC meat and eggs. A principal component analysis technique was used to extract principal components that explained the maximum variance within the data. Consumer clusters were defined in accordance with their preferences and behaviour using cluster analysis. Results indicated that sex of the chicken, bodyweight, tenderness, flavour, juiciness, salt content, meat colour, smell, fat and price were the most important sources of variation influencing the preferences and behaviour of IC meat consumers. Based on magnitude and sign, five meat preference clusters were non-specific, fat, weight, sex-tenderness and meat-quality sensitive consumers. For eggs, two clusters were egg size and egg yolk colour sensitive consumers. Through identification of the IC meat and egg preferences, producers and breeders can understand and respond to consumer preferences more efficiently and allow segmentation of market as well as increasing competitiveness.

C. Morphological features and attributes of indigenous chicken ecotype population of Kenya

A study was carried out which characterized IC ecotypes morphologically and described attributes of their different body plumage colours towards disease resistance, mothering ability, camouflaging, broodiness and meat, and egg production. Five IC ecotypes were studied; Kakamega, Siaya, West Pokot, Narok and Bomet. Data on morphological features and attributes of different body plumage colours were collected from 1580 chickens. Results revealed that, proportion of black, black-white striped, brown and red body plumage colours were significantly different ($P<0.05$) between the ecotypes. Normal feathered chickens were dominant (>90%) over frizzled. However, statistical analysis revealed that feather morphology between the ecotypes is not significantly different. Distribution of body feathers were significantly different ($P<0.05$) between ecotypes. Results showed that majority of IC population have different shank and skin colours. Comb types across ecotypes varied significantly ($P<0.001$) and dominated by single comb (>83%). Eye colours varied significantly ($P<0.001$) within ecotypes unlike between the populations.

The widely distributed eye colour was orange (>62%). Zoometric measurements were significantly different between ecotypes ($P<0.05$). Body plumage colours were attributed to disease resistance, mothering ability, camouflaging and broodiness, meat and egg production difference, depending on the region. In conclusion, IC ecotypes studied are heterogeneous population with huge variability in morphological features without standard phenotypic characteristics.

The delegation from Uganda

It is indeed with no doubt that our popularity has gone far way beyond our borders. Our activities in the Indigenous Chicken Improvement Programme has seen visitors coming from far and wide with the sole intention of wanting to learn more about the activities carried out and how these activities can be brought close to their reach, within their vicinities; with the most recent visitors coming all the way from our good neighbouring country Uganda; which included a good number of their members of parliament, scientists, breeders,

Guests from Uganda being addressed at the InCIP office

geneticists, lecturers and farmers.

The most interesting feature that fascinated the delegation was artificial insemination in chickens. The artificial insemination conducted at the research unit is the first ever in the wider African fraternity with Ethiopia being the only exception.

This is a clear indication of the achievements that InCIP has achieved within a very short span of its existence. It will be imperative to say that the programme has indeed gained momentum. We still have much more to give and the public should be expecting much more from us.

Technologies will be disseminated to farmers within our reach, as we look forward to expand our linkages with farmers and institutions from other parts of our country as well as those in other African countries.

Chicken Greenhouse

Through networking with the industry, InCIP has managed to convince the Amiran Company Ltd to donate a chicken greenhouse. This is a Solarig™ Poultry Kit. InCIP is testing its utility in chicken production. It was such a tremendous joy for the InCIP's staff seeing the installation

Green house

of the greenhouse. The installation was done by the Amiran Company Ltd, who did it diligently and professionally. The greenhouse is proving to be very useful especially for cold environment. With this rate of success; we may be talking of a chicken greenhouse! Many will be perplexed wondering how can chicken be put in a greenhouse because, most of the farmers are used to tomato and horticulture greenhouses. Well this is one different purposed greenhouse and we are pretty sure that it comes in handy with a large number of merits for the intended purpose.

A poultry greenhouse is a one advantageous thing that most of the poultry farmers should actually think to own one, either individually or as a community. This is because the chicken greenhouse can primarily save on space, water and manpower. It can effectively raise the labour productivity, reduce pollution from the manure and also reduce the infection of diseases on the chickens. It cannot go without saying that the greenhouse provides a high rearing efficiency with convenient management of the poultry. Some of the features of the Poultry Kit include:-

- Galvanized steel structure
- Based on the construction of the Solarig™ Tunnel Kit (8m width, 15m length).
- Special isolated covers to protect from heat and cold temperatures.
- Roll-up curtains for ventilation on sides
- Ventilation window at front & back
- Door entrance
- Supporting cables to connect the feeding devices
- Water tower made of galvanized steel

InCIP

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The programme is funded by the European Union through the African Union

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