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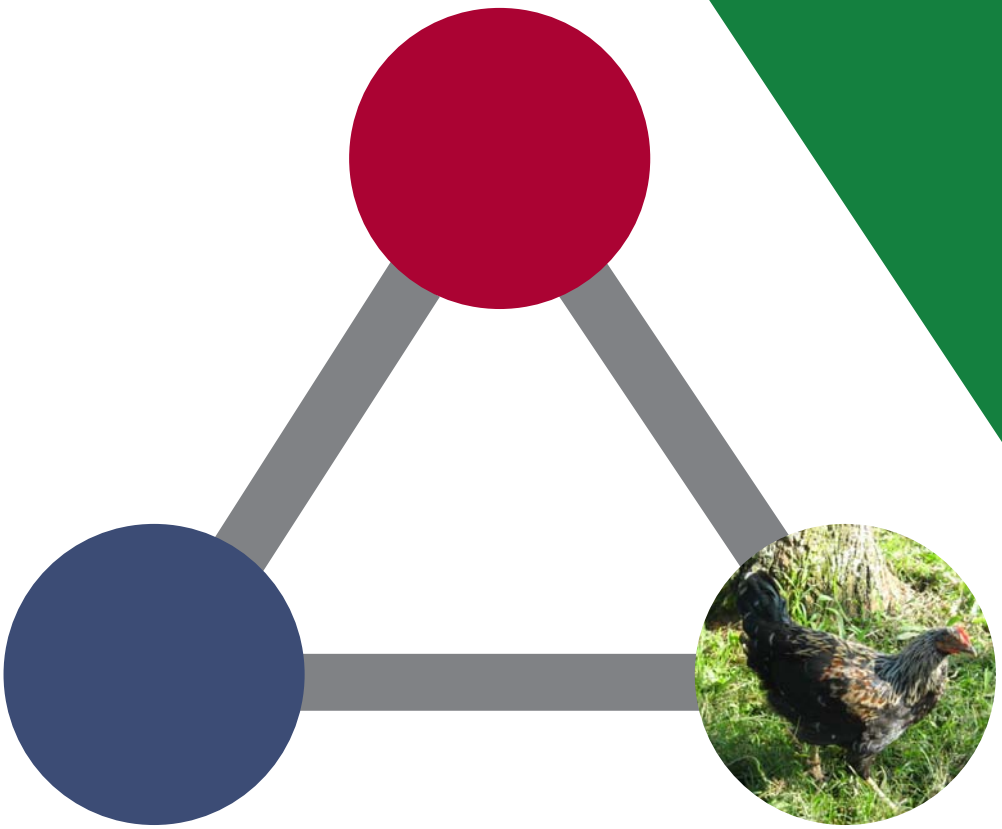

Poultry Genetic Resources and Small Poultry Production Systems in Uganda

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List of Abbreviations

AnGr	Animal Genetic Resources
CIDI	Community Integrated Development Initiative
ECUIFA	East and Central Uganda Integrated Farmers Association
INCORET	Indigenous Consultants, Researchers and Trainers
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDG	Millennium Development Goals
MOH	Ministry of Health
MP	Member of Parliament
NAADS	National Agricultural Advisory Services
NAGRC&DB	National Animal Genetics Resources Centre and Data Bank
NARO	National Agricultural Research Organisation
OIE	World Animal Health Organisation
PMA	Plan for Modernisation of Agriculture
PEAP	Poverty Eradication Action Plan
SAARI	Serere Agricultural and Animal Research Institute
SFR	Scavenging Feed Resource
SoW	State of World Animal Genetic Resources Uganda
UN	United Nations
UGS	Uganda Shilling
USAID	United States Agency for International
WHO	World Health Organisation

Executive Summary

This is a literature review of the local poultry genetic resources used in the small poultry production systems in Uganda. The purpose of this review was to identify existing documented information on local poultry genetic resources and to identify information gaps that need to be filled up in order to achieve veterinary policies/strategies against highly pathogenic avian influenza (HPAI) that are responsive to the needs of smallholder producers and biodiversity conservation.

Macro-economic and specific livestock policies and legislations exist. They are vital for creating an enabling environment to invest in the livestock sector. Although these policies provide for the institutional and regulatory framework, they do not, however, provide for some of the challenges that have emerged over time. For example there is no compensation for the smallholder producers whose poultry could be exterminated during the control of HPAI. Other policies are shared among government ministries and departments rendering them difficult to implement.

Uganda has a big reservoir of local poultry genetics, whereby out of the estimated 23.5 million chickens 84.2% is free-range indigenous type of breeds. Several scholars have cited the importance and uses of local poultry genetics that include nutrition, cultural and socio-economic benefits. There are suggestions advanced to use local poultry as an entry point to rural household development. Some studies have been done in disease control and characterisation of local chicken but more work needs to be done to generate information for planning in disease control, production and marketing. Source of breeding stock for commercial farmers are the hatcheries, but local poultry keepers still use the traditional system of local hens hatching eggs.

Efforts to improve the performance of local chicken have been attempted through crossbreeding between local hens and exotic commercial cocks both for eggs and meat. Comparative studies done between crossbreds and local chicken found that crossbreds produce 3-4 times more eggs than the local birds per laying period. They also weighed twice as heavy (2.5-3 kg) as the local birds at the age of 22 weeks. More studies have to be done to cover the various agro-ecological zones and the different commercial breeds to offer poultry keepers the choice of appropriate crossbreds. The negative correlation between increased egg production in F3 and brooding has been observed which has led farmers to stop at F2 when backcrossing with exotic genetics.

Small-scale poultry production systems consist of free-range where local chicken scavenge, backyard and semi-intensive. All small-scale poultry productions systems are vulnerable to poultry diseases. Whereas in the free-range and backyard management system keepers have little or no disease control measures, in the semi-intensive system farmers practice disease control strategies by having regular vaccinations and other interventions. Indeed, in the semi-intensive system, farmers mostly keep commercial layers and broilers bought from commercial hatcheries. However, there is an emerging trend where rural farmers keep local chicken and crossbreds on semi-intensive scale with improved management. Marketing of local poultry is mostly in the informal sector with several types of market that include primary, secondary and urban markets. There are several factors that affect supply and demand, including seasonal availability of poultry, transportation, retailer output, disease outbreaks, and lack of information on prices. The cost-benefit analysis of local chicken production needs studying.

Critical information that will enable policy makers to make appropriate policies is still missing. This includes: identification of constraints and stakeholders with their roles in the supply chain; national data base on local poultry populations, management and health by

regions; comprehensive characterization of local poultry populations, population sizes by region and farming/production system; assessment of the role of gender in small poultry production systems; market information and trends by region and for the country at large. It is the availability of such information that will empower policy makers to draw sustainable poultry development programmes for the country.

Introduction

Livestock production constitutes an important sub-sector of Uganda's agriculture, contributing about 9% of Gross Domestic Product and 17% of Agricultural Gross Domestic Product. It is an integral part of the agricultural system in many parts of the country. Livestock contribute significantly to the welfare of the population at both household and national levels by: being the source of food such as meat, milk and eggs, which are sources of essential nutrients; providing income to farmers through sale of animals and their products; serving as mobile banks from which the funds can be liquidated for other uses; using the dung as fertiliser for sustainable agriculture; providing draught power for ploughing and transport and; contributing to socio-cultural values of society in the form of dowry, gifts and pride.

In Uganda, local poultry is an important animal resource in most rural areas. They are easy to acquire and, under improved management, their reproduction and production is high enough to realise faster income generation due to the minimal initial investment. In rural communities, free range chickens contribute significantly to the livelihoods of farmers (Kirunda *et al.,* 2003). However, rural poultry does not rate highly in the mainstream national economies because of the lack of measurable indicators of its contribution to macroeconomic indices as Gross Domestic Product (GDP). Economic evaluation of livestock at household and national levels is complicated by the multiple functions of livestock in the economy. Moreover, estimating the value of rural poultry is even more difficult than for other livestock because of the lack of reliable data (Kitalyi, 1998). Indeed, Ssewanyana *et al.,* (2003*b*) remarked that scientific reports or investigations on local poultry in Uganda are scarce. The high illiteracy rate among local poultry keepers complicates record keeping that would have served to evaluate the sector.

Government Policies and Legislations

Macro economic policies hinge on the Poverty Eradication Action Plan (PEAP), which is the national economic development framework interfacing the UN Millennium Development Goals. The contribution of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) to PEAP is contained in the Plan for Modernisation of Agriculture (PMA). It is the framework for eradicating poverty in the farming households through multi-sector interventions. It aims to lift rural incomes through improved productivity. It should be noted that macro-economic policies have an impact on livestock related policies since they affect operations and delivery of services to local poultry farmers. Specific livestock sub-sector policies and legislations exist in the animal health focusing on disease control and animal handling. Others are geared towards improvement of animal production and productivity. However farmers in small poultry production systems have not benefited from these policies due to several constraints and challenges in implementation hence the need to formulate policies that will stimulate development of the local poultry in smallholder production systems.

Poultry Genetic Resources

The terminology used to describe poultry and chickens in particular is sometimes confusing, as they are referred to as "indigenous", "native", "local" or "traditional". However, according to Mogesse (2007), these terms are defined as: Indigenous - living naturally in an area, not introduced; Native - belonging by birth to a specific area, country; Local - native inhabitant and; Traditional – customary. For the purpose of this Literature Review, I will use the word "local" to imply all those above. Uganda has a big resource of poultry, including chickens,

turkeys, ducks and geese. Local poultry is estimated to constitute the majority of poultry in the small scale production systems, however, in spite of their large populations, contribution to egg and meat consumption in Uganda is low. Most of the chickens are called Nganda, Nsoga, Nkedi, Nyoro *etc*., depending on the locality or region where the chickens happen to exist (Ssewanyana *et al.,* 2004). According to the Fact Sheet on the Animal Genetic Resources of Uganda (2002), local chicken is described based on their physical appearance. The cocks include the Ugandan short legged, Ugandan brown, Ugandan red and Ugandan white. The hens include Ugandan short legged, Ugandan brown, Nsesere (naked-neck), and the Teso chicken. There is no information to show whether these various types are of different genetic formation. There are also introduced chicken hybrids in the country for both meat and egg production. They include Rhode Island Red, Hubbard, Arbor Acres, Hybro, Bovans Brown, Bovans Goldline, Australops and Naira. These were for commercial production and sometimes crossbreeding purposes. It is the commercial layers and broilers that supply most of the eggs and meat to formal urban markets. Turkeys were introduced in the country during the colonial period and are found in some parts of the rural areas in Uganda although their populations are mainly concentrated in the Eastern districts of Uganda. They are raised as scavengers in the backyards of the homesteads. Ducks are present throughout the whole country, especially in urban and peri-urban areas, being raised on household waste and brewer residues in the backyards. However, duck meat is generally not popular as only a few households keep them.

Importance and use of local chickens

Free-range poultry is widespread in the rural areas in Uganda, just like the rest of Africa. In the rural areas, local poultry is an important source of meat and eggs. They are valued mainly for their ability to scavenge, disease tolerance, meat quality and general hardiness (Ssewanyana *et al*., 2003*b*). In rural communities, free-range chickens contribute significantly to the livelihoods of the households. They are easily disposed of when need arises by any of the family members. Ssewanyana *et al.,* (2003*c*) observed that in Apac and Kumi districts, husband and wife jointly take the decisions on sales and cash. Village chickens also fulfil a range of other functions for which it is difficult to assign a monetary value. They provide manure, are required for special festivals to meet social obligations, and they are essential for many traditional ceremonies and treatment of illness (Ssentumbwe, 2006).

Population size and regional distribution

Population sizes and their distribution are not well documented. Different institutions provide different estimated figures, and it is missing an authoritative figure that can be used for planning and other uses. Some of the information may include only chicken, leaving out turkeys and ducks. However, UBOS and MAAIF have just carried out a livestock census, in August 2007, and this is expected to provide reliable figures for the much needed poultry census. However, MAAIF (2006) estimated the national chicken flock at 23.5 million. It was composed of 3.7 million (15.8%) exotic/crossbred chicken and 19.8 million (84.2%) local ones. The Eastern Region had the highest share of nearly 7.4 million birds (37.3%). The Central and Northern regions followed closely with 4.3 million (21.7%) and 4.2 million (21.3%) respectively. The Western Region, with 3.9 million, had the least number of local chickens among the four regions. Out of the 3.7 million exotic/crossbred chicken national wide, the Central Region had the biggest number with 2.4 million (64.5%) and the Northern Region had the least with 0.05 million (1.3%). The current population size statistics do not indicate census for each breed population or ecotype found in different regions of the country. The poultry census is always combined with other livestock census.

Characterization of Local chicken

Ssewanyana *et al.* (2003b) characterized local chicken found in the districts of Soroti, Mbale, Jinja, Masaka, Sembabule and Mbarara. The study considered the environment they live in, the way they are managed, flock structures, uses, performance and phenotypic characteristics. The study revealed that chicken flocks ranged from 2-113 and most families kept 1-4 cocks. The growers (3-7 months) formed the biggest part of the flocks followed by chicks. Eggs are mainly used for hatching chicks though some are eaten in the household. The chickens exhibited a wide phenotypic variability in all the characters studied which included: plumage, shank, eye, earlobe, comb, skin, feathers, feather distribution, body size, comb type, spur size, eggs, shell colour, yolk colour, tail, wattle size, and earlobe size. However, the study did not address adaptations, prevalent breeding systems, population trends and description of the environment in which the local poultry is predominantly found. Local chickens are genetically poor producers of meat and eggs. They take long to reach sexual maturity (7months), have a small mature carcass weight and produce few eggs per year. The hens produce about 2-4 clutches a year, each of about 10 – 12 eggs (Byarugaba *et al.*, 2002, Ssewanyana *et al.*, 2003*b*). They have a hatchability of 87% and wean 6.3 chicks on average after 2.8 months. However, they hatch their own eggs and brood the chicks hence ensuring that the farmer has a continuous supply of replacement stock compared to commercial layer and broiler keepers. Adult cocks weigh more than adult hens (2.1kg *vs* 1.4kg). These findings are a bit different from those by Kyaligonza (2004). Details are shown in Table 1 below. Characterisations of other species of poultry like turkeys and ducks have not been done.

Table 1 Production coefficients of the local chicken in Uganda as reported by scholars

Reference	Clutch per year	Eggs per clutch	Egg weight (g)	Inter clutch average (months)	Hatchability %	Mature weight (kg)	
						Cock	Hen
Ssewanyana *et al.* (2003c)	2.0-2.4	13-15		2.7	82.3-90.9	1.7 – 2.4	1.2-1.6
Kyarisiima (2004)	2.5-3.0	6-20	40-50		40-100	1.5 – 2.5	1.0–1.5

Source of breeding stock

According to Mukiibi-Muka (2003), barter trade, gifts and markets are the main sources of local poultry breeding stock. However the quantity and quality of the various sources have not been evaluated. In Hoima, it was reported that farmers' groups incubate and hatch local and crossbred chicks which they sell at UGS 1000/- per chick. In Kampala and Mukono private companies like the Uganda Local Chicken Rearers Association, based at Kamwokya, hatch and sell local day-old chicks.

Farmers that keep commercial layers and broilers get their supplies from companies that source parent stock from abroad. In this arrangement local hatcheries keep on buying parent stock from developed countries and farmers get day old chicks from them to replace ageing stocks. Such an arrangement renders commercial poultry farmers vulnerable to any changes, which may happen in the day-old chicks supply chain. The brooding trait in local chicken is being exploited through synchronised hatching when several hens are made to hatch on the same day to have a reasonable number of day-old chicks. It is a useful technology and self-sustaining for replacement stock and also for supply of day-old chicks to local poultry farmers. It has been reported that in Rakai, due to the widespread adoption of synchronised hatching and improved poultry husbandry practices, both egg and chicken sales significantly improved. However, as demand of day old-chicks increases, farmers groups have bought incubators to hatch more chicks from locally produced eggs, as reported in Hoima.

Genetic improvement

According to Byarugaba (2007), local chickens are valuable reservoirs of genes for adaptive and economic traits providing diversified genetic pool, which can help widen genetic diversity linked to different communities, meeting future challenges resulting from changes in production sources and market requirements. Traits of local breeds include hardiness to inclement weather conditions, resistance to some local poultry diseases, and multi-purpose use under the free-range production system. However there is little or no information on the genetic make up of local poultry.

Local chicken keepers lack a proper breeding programme. They hardly practice structured selection to improve traits of economic importance like egg and meat production. Ssewanyana *et al.* (2003*c*) reported that farmers in Kumi and Apac selected cocks based on colour and live weight but never select hens. Inbreeding was also high since farmers kept cocks for more than 2 years allowing them to mate with their daughters and grand daughters. Genetic improvement programmes have been done by crossbreeding between local chicken and exotic/commercial cocks. The aim is to combine the adaptive attributes of the indigenous chickens with the high producing abilities of the exotic chicken. It also targets to improve the meat and egg productivity of indigenous chickens (Ssewanyana *et al.,* 2003c, Ssebina, 2003). Cocks from the commercial breeds (Rhode Island Red, Bovans Brown, Hybro, *etc*.) both for meat and egg production have been used. Performance of crossbreds (meat and egg type) compared to local chickens has been evaluated, with crossbreds performing better than the locals. Ssewanyana *et al*. (2003*a*) reported that crossbred chickens produce 3-4 times more eggs than the local birds per laying period and weighed twice as heavy (2.5-3.kg) as the local bird at the age of 18-22 weeks. They also laid bigger eggs than those of local hens. Nevertheless the upgrading should not be done beyond F2 because it is negatively correlated with hatchability. Crossbreeding efforts are combined with improvement in the general husbandry, disease control and nutrition by the participating farmers. Based on these findings, various stakeholders are encouraging local poultry keepers to embark on crossbreeding. The approach must involve the participation of these chicken keepers in the determination of priorities and in the formulation of strategies, as well as in the planning and implementation of breeding programmes (Ssewanyana *et al.*, 2004). Community-level selection programmes, combined with nucleus elite or flocks managed by associations of local chicken producers, offer interesting opportunities. Local governments like Hoima district and some NGOs (INCORET, CIDI, and Farm Africa) have started to support farmers to select phenotypically and breed to improve indigenous local chicken production. It should be noted that selection of local poultry breeds take longer to achieve the desirable results than crossbreeding.

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Small Poultry Production Systems

Bamusonighe (1998) reported that in Uganda 80% of the chicken population is free range predominantly kept in rural areas. Indeed, smallholder poultry production is primarily from free-ranging birds, where there are few or no inputs. The system holds majority of local poultry and most of the keepers. It has high potential for genetic and management improvement to increase production. It is only in the semi-intensive system where commercial layers and broilers are kept. Description of the production, management and feeding systems has been done by various scholars (Mukiibi-Muka, 2000; Byarugaba et al., 2002; Kyarisiima et al., 2004).

The Free Range (scavenger) system

This is the main management system for the majority of local poultry in Uganda (Byarugaba, 2002; Ssewanyana *et al.,* 2003c; Kyarisiima 2004). The free-range chicken production system is an integrated part of the farming system with low input-output. Local poultry rearing serves as a means to convert low-quality feed (household waste) into high protein. The birds range freely during the day and are usually gathered at night into a basic shelter for protection against predators. Local poultry houses meet some of the basic requirements like protection against inclement weather but rarely provide adequate space and ventilation. The hygiene and provision of a clean environment in the house is also inadequate. Studies done reveal that housing of local chicken is not a priority for farmers. For example, Ssewanyana *et al*. (2003*c*) observed that in Lira, only 37% of the farmers housed the chicken at night. The scavenger (extensive) system has little management interventions from the owner, and there is no national data on the number of households that keep and own local poultry.

The free-range poultry production may sometimes include mixed type of species, especially chickens and turkeys. But this is not widespread and it is mostly in the eastern parts of the country. All species and ages run together and interaction with wild birds is common. In this system rearing losses are very severe due to disease, poor nutrition and predators. Kirunda *et al.* (2003) estimated that mortality of indigenous poultry under scavenging conditions is 70% and above in chicks up to 8 weeks of age, which greatly inhibit increase in the number of local poultry populations. Presence of predators exacerbates the losses but local poultry keepers have improvised by applying dye on chicks. This may help to increase the flock sizes albeit on a small scale.

Local poultry usually scavenge for most of their feed requirements and the feed resource in this system is limited to the available nutrients in the area that include insects, seeds, discarded grain and kitchen wastes. There is no provision of water by the farmer allowing flocks to get water from any available source. Most times such water is found in mud-water pools.

The Backyard system

This is a system in which the birds are partly confined within a fenced yard or merely within an overnight shelter, fed and watered. It is mainly practiced in peri-urban areas. It is also common in the Banana-Coffee farming system during planting season. It is not very common compared to scavenging system. In this system, disease control is done depending on the location of the farm. In the urban setting, the farmer seeks for veterinary intervention from qualified personnel, but in the rural setting, disease control is not taken seriously. Farmers are challenged to source adequate quality feeds for the birds. Sanitation may not be adequate to prevent disease incidences.

The semi-intensive system

Most farmers in this system keep commercial layers and broilers supplied by companies that keep parent stock to supply day-old chicks. This system is common in urban and peri-urban areas due to the higher demand for eggs and poultry meat. The farmer is committed to commercial production and practices veterinary and other management interventions. These may include disease control, feed and water supply and housing. Farm inputs suppliers like drugs, feeds *etc*., play an important role in this system. Routine work by the farmer is scheduled and most times such farmers access extension. Local and crossbreds chicken keepers have also adopted this system, where they keep 400-800 with the aim to produce eggs and meat for the market. NGOs (CIDI, CORET) have reported improved management whereby indigenous poultry is housed using locally available materials built out of mud wattle and thatch. In Hoima district, farmers near the urban area buy commercially compounded

feeds in small amounts but the quality of these feeds is still poor and there is no quality assurance. There is relatively medium capital investment to construct buildings and purchase of other inputs. In case of urban areas, farmers may hire buildings to rear layers and broilers so as to benefit from the urban markets. Poultry keepers in this system supply most of the eggs and meat to the local market.

Poultry health and health control systems

One of the major constraints to village poultry production in Uganda and developing countries in general is undoubtedly the existence of various diseases (Ojok, 1993). Among the diseases most commonly recognized is Newcastle disease, which has been ranked the most important (Mukiibi-Muka, 1992; Byarugaba, 2007). It is important to vaccinate against Newcastle disease regularly starting with chicks. However, in the small scale poultry production system, vaccination is not done because farmers have a problem to purchase the vaccines as they are usually packed in big doses. In Hoima district, hatchery management and vaccination of day old chicks is backstopped by extension staff (Kajura, 2007). The management system where birds of all ages stay together heightens chances to loose all birds whenever epidemics occur. This is the case for the village poultry production system because of the inherent mixing and movement of the birds (Kirunda et al, 2003). Other poultry diseases like Fowl typhoid, Gumboro, Fowl pox etc., are still endemic and also become prominent where vaccinations against NCD have been done. There are also parasites both external and internal, which are well recognised by the farmers (Kiddu-Makubuya, 1998; Lubwama, 2002). Some of the parasites such as stick tight fleas are known to cause serious losses especially in the chicks. In these villages, local remedies are usually used to treat many of these diseases such as use of paraffin to clean off external parasites and many herbs for internal parasites (Kirunda *et al*. 2003). There are no scientific studies done to establish resistance of local poultry to common poultry diseases like Newcastle disease or Fowl Typhoid.

Research, Extension services and Record Keeping

The National Research Organisation (NARO) is responsible for research in the agricultural sector, including local breeds' improvement, development and generation of technologies to enhance production and productivity. NARO provides the institutional framework to conduct research, as provided for in the Research act. Universities also carry out scientific research. The research-extension linkages are still weak and need strengthening. However, dissemination and transfer of generated technologies and information is the responsibility of the National Agricultural Advisory Services (NAADS).

According to the National Agricultural Advisory Services Act (2001), NAADS is in charge of delivering extension services to farmers through:

- support the provision of advice and information services to farmers,
- support technology development and linkages with markets,
- monitor and ensure the quality, appropriateness and affordability of advisory services,
- support private sector and farmer institutional development,
- provide programme management and monitoring, and
- ensure that the research and extension needs of farmers are identified and answered by service providers.

NAADS has started to support local poultry genetic improvement, management and production. The programme started in a few districts but is gradually expanding to cover all districts of Uganda. Farmers in some districts like Hoima chose local chicken keeping as a commercial enterprise and access extension services through NAADS support.

Record keeping is a management tool for efficiency, decision making and planning. In the scavenging system, record keeping is non-existent yet all local breeds are kept under this system. This makes improvement very difficult, especially genetic improvement. However, in the emerging intensification of local chicken, record keeping is being promoted by NGOs and farmers' groups. Individual farmers and farmers' groups keep records for economic reasons and management decisions. For example, local chicken farmers in Rakai keep egg production records, census, feeding records, hatching records, financial records, *etc*. Also supporting organisations like NAADS demand records from farmers and extension staff to track and evaluate various interventions. Record keeping may be one of the limiting factors to improve on production and productivity of local chicken.

The Socio-Economics of Local Poultry

The socio-economic importance of free-range poultry to rural communities in Africa, including Uganda, has been exhaustively discussed in various articles (Mukiibi-Muka, 1992; Kwapil, *et al.*, 1992; Kitalyi, 1998; Mukiibi-Muka, *et al*. 2000; Nyange, 2000; Bagnol, 2001, Mukiibi-Muka *et al.* 2003). In rural communities, free range chickens is commonly used in many social and cultural functions and contribute significantly to the livelihoods of farmers. Studies have found that free-range poultry is probably the only livestock kept by every household in the rural setting. Therefore, its improved productivity is likely to contribute to poverty alleviation in the rural villages (Mukiibi-Muka *et al.*, 2003). The potential of local poultry to serve as an entry point and development engine for rural areas through crossbreeding has been suggested (Ssewanyana *et al.* 2003*a*). The ability to raise them in small land areas interfacing with rapid increasing population, places it as an enterprise of choice for women, youths and rural-resource poor (Kyarisiima, 2004). Improving the village chicken production systems in Uganda would result in increased opportunities and more equitable distribution of food and income within and among households especially in villages (Byarugaba, 2007). However, the economic contribution of the indigenous free-range poultry at the national level has not been evaluated.

Social-culture and local poultry

Traditionally, local poultry keeping is a preserve of women and children (Mukiibi–Muka, 1991; Kyarisiima *et al*. 2004). However, in Hoima district, Kajura (2006) reported that with the local poultry becoming a major source of income in some of the households, men have taken over roles previously held by women and children in the indigenous chicken management. Men are directly getting involved in decision making on management and have taken over to control sales and expenditure of the proceeds from indigenous chicken. This raises the issue of family-power relationships involving gender roles. In Uganda, local poultry are often used on ceremonies, rituals, sacrifices and gifts. For example, it has been noted that chickens are given to convey value to a relationship or to offer thanks to a favour. Indeed, for most social-cultural and religious purposes, the required sex and colours of fowls are also prescribed. For example, in Buganda, a cock with spotless white plumage is used as an offer to *Mukasa - god of waters*. Other gods are offered birds of various colours depending on the case and god/goddess involved. Eggs of local chicken play a major role in the Luo tradition and culture where they can be used to cleanse or to complete a ritual, like eggs being used in the last funeral rites ceremonies. In traditional set ups, until of late, women and girls were not allowed to eat poultry products in Buganda. Modernisation, through education and cultural evolution, has encouraged women to eat eggs.

Networking

The poultry supply chain has several actors that include producers, suppliers of various inputs, traders of live and processed chicken, researchers, policy makers and regulators, importers and exporters (Byarugaba, 2007). Unfortunately, there is neither bond nor fora that bring together these various stakeholders to work together to develop the poultry sector. For example, there is a weak link between researchers and farmers, and between extensionists and policy makers. The link between policy makers and farmers is not strong enough to enable farmers' demand for policies that would enhance production and productivity in the local poultry sector.

The absence of networking across sectors and stakeholders to promote local poultry development has disadvantaged local poultry keepers. Indeed, there are no defined roles of the various stakeholders in the local poultry sector. There is another group that can be branded 'Catalysts/Facilitators' that may include NGOs like Action Aid, Farm Africa, Religious bodies and others that improve livelihoods of resource-poor farmers in rural areas through poultry keeping. The table below shows the list of stakeholders that can play a big role in poultry production improvement.

Table 2 List of Local Poultry Stakeholders

Public Sector	Private Sector	International
MAAIF,	NGOs (local and international)	FAO, OIE
NAGRC&DB, NAADS	Local Poultry Farmers Associations	USAID, WHO
Research Institutions: NARO, Universities	Local Poultry Farmers	
Ministry of Health, Local Governments,	Local Poultry Traders (live birds, products and by-products) Transporters	

SOURCE: SSENTUMBWE (2006)

Marketing

Marketing of local poultry is not well defined. In many parts of Africa, including Uganda, chicken are sold to meet unforeseen expenses. The birds usually sold from the village flock are surplus males (cockerels and cocks); pullets and non-productive hens; large sized birds; old hens and sick birds. Growing chicken are sold just before the on set of the high risk Newcastle Disease (Byarugaba, 2007). There are no studies done to cover the various agro-ecological zones nor do they show consumer behaviour and market trends. However, there is an aura of optimism expressed in local chicken studies of a market demand which suppliers have not satisfied. The market price for free range birds is usually stable due to traditional taste values placed on their meat. Local chicken meat is considered tastier and stronger flavoured than commercial broiler meat; the meat (muscle tissue) is tougher and retains its texture when prepared in traditional dishes and the birds are not fed with compounded feed which may contain antibodies, anti moulds compounds, enzymes, sulpha drugs and other medicines or synthetic chemicals.

The supply chain management consists of various players, right from production, wholesaling and retail. Local poultry farmers sell to the middlemen who exploit their ignorance of market prices to pay them less.

According to MAAIF (2004), echoed by Byarugaba (2007), the existing types of markets include:

- Informal Markets: These are within the villages, possibly selling from farmer to farmer or to retailers. Often chickens are bartered for larger animals such as goats.
- Primary markets: Are generally formed by several villages within a parish. Often, they are unfenced areas with few or no facilities (perimeter fence, loading ramp, holdings and toilets). They are held on gazetted days of the week. Traders also purchase chicken from adjacent several primary markets, during the course of a week and truck them to destinations within or outside Uganda.
- Secondary markets: They normally have a larger throughput than that of primary markets but also lack proper weighing, loading and hygienic facilities. Traders often come with trucks to buy local chicken for immediate transportation to larger centres such as Kampala.
- Urban markets are found in larger towns and cities. Often there are designated areas where mobile chicken stalls are erected. Local governments tax operators of such units. Consumers from such urban markets are hotels, restaurants and some affluent city dwellers. Prices in these markets range from UGS 3500/- to 7000/- in 2005 with an average price layer difference of 2000/- (Mukiibi-Muka *et al.* 2005).

Factors that affect marketing of local poultry include: seasonal availability of birds; transportation; retailer output; outbreaks of diseases; lack of information on prices; lack of streamlined marketing structures. Others may be socio-religious factors, which are due to plumage and sex.

Poultry Meat Consumption

In Uganda, most of the poultry end up consumed, even the commercial egg type chicken. Indigenous chicken products (eggs and meat) are often the only source of animal protein for the resource-poor households. They are a source of high quality protein for the sick and malnourished in rural areas (Kyarisiima *et al.* 2004). Local chickens are occasionally consumed by rural households and are appreciated for their taste, their relatively tough meat being well adapted to the traditional cooking practices. A study on uses of local chicken showed that 36% are consumed at home, 33% are sold for cash; 16% are used for ceremonies, 13% are given as gifts and 2% are used for other purposes. (Ssewanyana *et al.* 2003b).

Economic-Benefit Analysis

There are no studies that have been done to examine the gross margin analysis and determination of who benefits in the marketing chain of chickens and price competitiveness of the different poultry species and types with other available alternative sources of protein in the country. It is important that such information is gathered for planning and policy formulation. In urban areas, local chickens are consumed by those who can afford to pay high prices since they are more expensive than the commercial broiler chicken.

Identified Information Gaps

Constraints in Local Poultry Development

Constraints to increased production and productivity of local poultry have been mentioned by various studies (Aruo, 1976; Mukiibi-Muka, 1992, Butungi, 2002; Kirunda *et al.*, 2003; Otim *et al.* 2003; Kyarisiima *et al.* 2004; Byarugaba, 2007). These include, but not limited to, low genetic potential of local poultry, lack of knowledge in animal husbandry, poor feeds in quality

and quantity; poor housing, poor health, predators and thefts; lack of planned breeding and poor marketing structures. Strategic interventions have to be formulated to improve on production and productivity of local poultry, and to enhance farmers and other stakeholders' capacity to fully embrace local poultry farming as a business. The following information will be useful, if collected:

- Identification of constraints and stakeholders to formulate a comprehensive, or improve, policy for the development of local poultry industry
- Data base on local poultry populations by regions and the country at large
- Characterization of local poultry (chicken, ducks, turkeys) including the population sizes by regions and farming/production systems
- Role of Gender in local poultry production
- Market information and trends by region and the country at large
- Poultry diseases incidence (endemic and epidemic) in the different regions, including proposed control interventions, especially for scavenging birds
- Establish a listing of the different stakeholders in the local poultry sector, and the role each one plays
- Contribution of local poultry in the livestock sector and its role to rural resource poor families (quantification)
- Scavenging feed resource (quantity and quality) evaluation based on agro-ecological zones and farming systems, including peri-urban areas, to determine supplementary feeding requirements
- Identify on-going research and development efforts into the local poultry, and where cooperation can be tapped for synergy
- Networking nationally and internationally for information exchange and experiential learning
- Hatcheries producing local poultry day old chicks (numbers, sanitation and bio safety measures)
- Determine types and quality of local day old chicks
- Mapping of the local poultry sector, i.e. breeders, day-old chick producers, egg and meat producers, marketers, transporters, *etc.*

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Appendix: Summaries of unpublished Literature

Authors: Ssewannyana, E., James Oluka & Joseph Masaba
Title: On-Farm Evaluation and Multiplication of SAARI Crossbred Chickens for increased Meat and Egg Production, 1998*:* Paper presented at the Inception Workshop of the Livestock Research Systems Research Programme (LSRP) Mukono DFI October 1998.
Abstract
A large proportion of Ugandan community keeps chickens for meat, eggs, income and socio-cultural purposes. Of the estimated 23 million chickens in Uganda 90% are indigenous. One of the production constraints of these indigenous chickens is their genetically low production potential for meat and eggs. They have slow growth rate and lay about 2-3 clutches of eggs per year of 10-12 eggs per clutch. On the other hand, the exotic chickens have high meat and egg producing abilities. From to date, SAARI has crossbred indigenous hens with exotic cocks of Arbor Acres, Hybro and Bovans Brown breeds in order to combine the positive adaptive attributes of the indigenous chickens with the high meat and egg producing abilities of the exotic chicken breeds. The on-station results indicated that crossbreeding increased meat production by 2.0-3.0 times among the crossbred progeny within a growth period of 20 weeks. Egg size also doubled among the F2 progeny. The above results encouraged researchers to adapt and transfer the technology to farmers' premises and assess whether the productivity would still be enhanced under on-farm conditions. This paper presents materials, methods and results of a baseline survey, training course and the way forward for the on-farm activities.

Authors: Ssewanyana, E., Ssali, A., Kasadha, T., Dhikusooka, M., Kasoma, P., Kalema, J., Kwatotyo, B. A. & Aziku, L.
Title: Characterization of Indigenous Chickens in Uganda 2003. Proceedings of the Livestock Systems Research Programme (LSRP) Annual Scientific Workshop, 2003.
Abstract
Scientific Reports or investigations on indigenous chickens in Uganda are scarce. A study was undertaken to characterize indigenous chickens in terms of the environment they live in, the way they are managed, their flock structures, uses, performance and phenotypic characteristics. Data on the above parameters were captured through the use of a structural questionnaire administered to 240 respondents and involving 960 indigenous chickens. Data were analyzed by descriptive statistical methods, having collated as absolute figures or percentages. The study revealed that chicken flocks ranged from 2 to 113 and most people kept 1-4 cocks and 2-19 hens. The growers (3-7 months) formed the biggest (38%) part of the flocks followed by closely by the chicks (37%). Indigenous eggs are mainly used for hatching chicks (45%), some are eaten at home (33%), others are sold for cash (20%) while a few are used for other purposes (2%). The chickens are kept mainly for home consumption (36%), cash (33%), ceremonies 916%) and gifts (13%). A few are used for other purposes. The chickens are valued mainly for their ability to scavenge (32%), followed by disease tolerance (29%), meat quality (22%) and general hardiness (17%). Adult cocks weigh more than adult hens (2.1kg vs 1.4kg), most pullets reach sexual maturity at 7 months and most hens lay 14 eggs per hen and clutch, have a hatchability of 87% and wean 6.3 chicks on average after 2.8 months. On average, the chickens have two clutches of eggs per year and the interval between the two clutches is 2.8 months. Throughout the country, the chickens exhibited a wide phenotypic variability in all the characters studied except egg yolk colour, which was exclusively 100% yellow in all districts. The wide variation may help create improved strains of chickens selected from the indigenous populations or crosses generated for specific purposes.

Authors: P. Sorensen & Ssewanyana, E.

Title: Progress in SAARI Chicken Breeding Project – Analyses of Growth Capacity 2003: Proceedings of the Livestock Systems Research Programme (LSRP) Annual Scientific Workshop, 2003.

Abstract

In the SAARI chicken breeding project the growth capacity of local chicks was compared with chicks from crosses of the local bird with the Bovans Brown and raised at the farms from day-old chicks by using ordinary feeding practices at the farm. The percentage of Bovans Brown genes varied in the crosses from 25% to 75%. Later, the reproductive capacity was studied on the various combinations of Local x Bovans Brown crosses.

Data on body weight of growing chickens were the subject of statistical analyses from the crossbreeding experiment initiated under LSRP in 2000. Gradually, 30 households in the Kidetok village were selected as hosts for an experiment in which the household received a cock from SAARI to father all of the hatched chicks during the following six months. The cocks were either 100% Brown Bovans or an F1 cross having 50% genes from Bovans Brown and 50% genes from the local chicks. The resulting offspring had then either 50% of the Bovans gene or 25% of the Bovans gene. In addition, some batches of chickens with the pure local gene were included.

Once monthly, technicians from SAARI visited each household and weighed each clutch of chickens, counting the numbers of chicks in the clutch and recording the day of hatch of new clutches of chicks. The dataset consisted of 174 clutches of chicks that were weighed 3.2 times. Few of these clutches of chickens consisted of pure local chicks. Variance and covariance analyses were conducted to investigate the effects of percentage of the Bovans gene as a factor (0, 25, 50%) and the age as a 2nd degree polynomial regression. The regression of age was looked at within the three levels of Bovans gene in a nested manner (Within model) as well as across the three levels (Global model) and finally including both principles (Full model). A log transforming of the data before the analyses explained 90% of the variation for all three models. Based on regression parameters from the *Within model*, curves were drawn and showed that 50% of the Bovans gene had higher body weights compared with local chicks and chicks with 25% Bovans gene. Furthermore, at 120 days of age, the difference was at maximum when expressed as a proportion of body weight of local chicks (792 versus 614 or 29%). At seven to eight months of age the difference was smaller. Body weights of 25% Bovans were similar to those of the local breed. Therefore, it is argued that the proportion of the Bovans gene is not linear with respect to growth capacity. The information from these analyses could be used to argue that chickens from a program in which a considerable part of the genes is coming from Bovans should be marketed one to two months before local breeds to take full advantage of the growth capacity. If the Bovans chicks were marketed at the same time as the local breeds, the feed costs will be too high. Before more clear conclusions can be drawn, studies on the reproductive capacities should be done. Also, meat quality and market acceptance of two months younger chicks should be investigated and finally an optimal breeding plan for introducing the Bovan's gene through a new SAARI breed has to be elaborated.

Authors: Kirunda Halid & G. Mukiibi-Muka

Title: Causes of Chick Mortality in Free-range Poultry in Busede sub-county, Jinja District, 2003. Proceedings of the Livestock Systems Research Programme (LSRP) Annual Scientific Workshop, 2003.

Abstract

In rural communities free-range chickens contribute significantly to the livelihoods of farmers. The productivity of these chickens is, however, very low due massive losses as a result of disease, predation and poor nutrition and management. Although a disease, such as Newcastle is known to cause death in free-range poultry, there are still other causes of death among the chicks. A study was constituted to establish the causes of chick morbidity and mortality. Farmer groups interviews, cross-sectional and longitudinal studies were used. Preliminary results both from farmers groups and cross-sectional studies agreed that diseases were the highest cause of death in chicks followed by predation. Approximately 87% of the respondents never sheltered chicks all day and left them with mother hens. Although 56% of the farmers

indicated that they supplemented chicks with feeds, the quality and. quantity of supplementation was inadequate. Approximately 61 % of the farmers attempted to administer treatment to their sick chicks, but very often they used human drugs and herbs whose effect was doubtful. Out of the 112 post-mortems, causes of death were G.!T nematodes (83%), proventricular wall nematodes (76.8%) and un-feathered parts of the head (39.9%). The morbidity rate among monitored chicks was 47.1%

Authors: G. Mukiibi-Muka, F. Nahamya & T.Kasadha
***Title: Impact of Participatory Free-range Poultry Health on Resource poor households in Jinja district 2003*:** Proceedings of the Livestock Systems Research Programme (LSRP) Annual Scientific Workshop, 2003

Abstract

The socio-economic importance of free-range poultry to rural communities in Africa has been exhaustively discussed in various articles (Kitalyi, 1998; Kwapil, et al., Mukiibi-Muka, 1992; Mukiibi-Muka et al., 2000; Nyange, 2000; Bagnol, 2001). In summary, free-range poultry is widespread in the rural areas of Africa. The chickens are important providers of meat and eggs, and they are easily disposed of: when the need arises, by any .of the family members. In fact, it is the only livestock where women can make a decision to sell, slaughter or exchange, unlike cattle or goats. Furthermore, free-range poultry is commonly used in many social and cultural functions in Africa. Uganda has approximately 23 million chickens, (Bamusonighe 1998) and 80% of the population is free-range poultry predominantly kept in rural areas. Free-range poultry is probably the only livestock kept by every household in the rural setting. Therefore, its improved productivity is likely to contribute to poverty alleviation in the rural villages. Jinja district is located in Eastern Uganda. It borders with the districts of Mayuge in the east, Mukono in the southwest, Kamuli in the north and Lake Victoria in the south. It covers a total area of 734 km2 of which 536 km2 are arable land and 490 km2 are under cultivation. Jinja is an agro-industrial district comprising agricultural activities, such as livestock and crop cultivation, mainly maize and large sugar estates. The agro-industrial activities and factories have a substantial influence on labour demand and land availability for livestock activities (Nanyenya 1999). The district has a human population of 284,900 and 80% is rural-based with considerable land fragmentation due to population pressure. This means extensive livestock production is constrained and the only feasible livestock enterprises are free-range chickens, commercial poultry, and intensive dairy production. Dairy farming and intensive poultry production arc not feasible for many of the rural farmers due to the expensive capital requirements and expensive inputs.
Out of the seven rural sub-counties of Jinja district, Busede was selected for the introduction of the participatory health management project. The reason was that the farmers ranked free-range poultry as their number one livestock enterprise during the participatory rural appraisal (PRA) (LSRP Diagnostic survey, 1999). Busede is located on the eastern side of Jinja district and is comprised of five villages or parishes, namely Nabitambala, Kisasi, Bugobya, Itakaibolu and Nalinaibi. All five parishes generally have a homogeneous setting in agricultural production. This is heavily influenced by constraints, such as land fragmentation and the high human population due to a large labour force being required by the sugar plantations located close by.
The productivity of free-range poultry in Busedde is low, with an average of twelve chickens per household (Baseline study, 1999), due to death as a result of diseases, predators, poor nutrition and poor management.

Authors: M. O. Otim, Magne Bisgaard, Henrick Christensen, Poul Jorgensen, Kurt Handberg
***Title: Molecular Characterization and Phylogenetic study of NDV Isolate from recent Outbreaks in Eastern Uganda 2003*:** Proceedings of the Livestock Systems Research Programme (LSRP) Annual Scientific Workshop, 2003.

Abstract

A molecular technique was used to characterize 16 Newcastle Disease (ND) Virus (NDV) isolates from ND outbreaks in chickens in eastern Uganda in 200I and evaluate ND epidemiology with emphasis on the molecular aspect. The F and HN gene were the major determinants of virulence studied. Strain pathogenicity was derived from genetic analysis of

the F gene sequence and intracerebral pathogenicity index (ICPI). Comparative genetic and phylogenetic tree analyses were performed on the HN genes of the isolates and 17 NDV strains selected From the GenBank. ClustalX 1.81 and phylip were used for gene alignment and the final phylogeny was produced by neighbour-joining method. Results showed that all the Ugandan NDV isolates were closely related. The F gene cleavage site sequence analysis and biological characterization showed that the strains were very virulent. All the Ugandan NDV isolates formed separate cladestrom the currently known eight genotypes suggesting that they are a novel genotype, unrelated to those that have caused previous outbreaks.

Authors: A. V. Mobeti, and the Chicken Diversity Consortium (Africa). G. Bjemstad, W. Bulimo, H. Jianlin, G. ; Kierstein, L. Mazhani, B. Podisi, J. Hirbo, K. Agyemang, C. Wollny, T. Gondwe, V. Zeuh, D. Tadelle, G. Abebe, P. Abdoulaye S. Paco, L. Serunjogi, M. Abrerrahman, R. Sow, S. Weigend, R. Sanfo, F. Gaye, E. Ssewanyana, M. D. Coulibaly, B. Teme, VSF(Sudan) and O. Hanotte).

Title: Mitochondrial DNA D-Loop Sequences Reveal the Genetic Diversity of African Chicken

Abstract

Mitochondrial DNA (mtDNA) displacement (D)-loop sequences were used to study the genetic diversity and relationship of African domestic chicken. A total of 398 individuals belonging to 28 populations were sampled from 12 African countries. The hyper variable 1 (HV1) segment of the D-loop was PCR amplified and subsequently sequenced. The sequences of the first 397 nucleotides were used for analysis. Fifty-two haplotypes were identified from 50 polymorphic sites with polymorphism between nucleotides 167 and 397 contributing to 96% of the variation. Phylogenetic analysis indicates that African domestic chicken mtDNA can be grouped into six distinct clades with one to four clades observed in populations. AMOV A analysis indicates that 64.8% of the total sequence variation between haplotypes was present within population and 35.2% between populations. Our results suggest multiple maternal origins for the African domestic chicken.

Authors: Ssewannyana, E., Sorenson, P., Masaba, J. & Olupot, G. W.

Title: On - Farm Performance Evaluation of Crossbred Chickens in Soroti District, Uganda

Abstract

Ninety percent of rural households in Uganda possess indigenous chickens. These birds comprise 80% of the total poultry population of 23 million birds in Uganda (MAAIF, 2000). The indigenous chickens are kept for income generation through the sale of live birds and eggs and for socio-cultural functions such as marriages, funerals and baptismal parties. They are preferred to exotic chickens because of their meat's aroma and taste, their tolerance to local diseases and ability to scavenge for themselves. In spite of all the above attributes indigenous chickens possess, they have low meat and egg productivity due to their inherent low genetic potential for those traits. Research at SAARI indicated that mature body weight at 20 weeks increased by 1.5 - 2.0 times and egg number per clutch doubled when indigenous hens were crossbred with exotic Bovans Brown cocks. These results encouraged us to transfer the technology to on-farm conditions to assess whether the performance would still be enhanced on-farm. When the technology was transferred to on-farm conditions, mean body weight of F 1 chickens (50% BBxLH) increased by 34%, egg number per clutch by 94%, egg weight by 29%, egg circumference by 10% and egg length by 2% over that of the local chickens. The average income per household from the sale of crossbred cocks every 6 months increased by 140%. These results indicated that the technology of improving indigenous chickens through crossbreeding with exotic cocks was technically and economically viable even under on - farm conditions.

Authors: ***Ssewannyana, E. & Rees, D.***

Title: Developing a methodology for sustainable production of improved animal breeds

Abstract

For the last 44 years, Uganda has been carrying out livestock improvement programmes involving cattle, buffaloes, goats, sheep, pigs, donkeys, rabbits, poultry and crocodiles. These improvement programmes mainly involved importations of animals of European temperate breeds for use in either pure breeding or crossbreeding programmes. These efforts were mainly undertaken by government, using government departmental farms, government vehicles, personnel and animals. The idea was that government produces good quality stocks for sale to fanners. Although some improvement was realized, especially in dairy cattle, because the major custodians of the animals, the fanners, were not fully participating in the improvement programmes, those programmes achieved very little impact on the ground. This is the very reason why exotic and crossbred animals in Uganda are less than 5% across the various species. This paper presents a new approach/ method based on the three livestock improvement projects funded by COARD project where fanners were fully involved in 011 activities and played central roles in the improvement programmes. Doing things differently is highlighted, formation and consolidation of farmer breeder associations for sustainability is emphasized and networking between researchers and farmer breeder associations is given for both marketing and quality assurance purposes.

Authors: Illango, J., Etoori, A., Olupot, H. & Mabonga, J.,

Title: Rural Poultry Production in Two Agro-Ecological Zones Of Uganda

Abstract

A baseline study on rural poultry production, management and health was conducted in six selected villages in an agro-pastoral and mountain zone of Uganda during the wet and dry season. In the 114 rural households visited, the farmers were interviewed by using a questionnaire. Poultry flocks were examined and samples were collected for laboratory investigations. A free-range management system with mixed poultry species was practiced by farmers in both zones. The major poultry flock parameters in the agro-pastoral and mountain zone were, respectively, mean flock size of 22 (with a range of 3-65) and 17.5 (with a range of 6-60); mean hen: cock ratio of 2.6 to 1 and 4.8 to 1; mean egg production per hen per year of 8.8 and 11.5; mean hatchability of 70.8% and 85.7%; mean chick mortality of 39.6% and 28.6%. The flock ownership was single, mixed or shared among family households. Women were more involved in most of the activities regarding poultry management, although in both zones a division of labour existed within the household. Men predominantly made the decisions on sale, consumption and treatment of poultry. The most important health problems in the flocks in both zones in the two seasons were coughing, diarrhoea, fowl pox and internal parasites. It was concluded that the major constraints affecting rural poultry production in the two zones were diseases especially Newcastle disease and parasites, inadequate housing and poor feed supplementation especially in the dry season. Women had important responsibilities in rural poultry production in the two zones. The findings form the basis for an assessment of the effects of interventions on rural poultry production in the two zones.

Author: Ssebina Benon Ssalongo

Title: Integrated Programmed Hatching of Day Old Chicks on one Particular Day per Week. A basis for improving the social and economic status of Rural Communities, 2003

Summary

The paper explains how programmed hatching using a number of chickens can be done. It gives uses and advantages of programmed hatching. It is presented as a solution to farmers who would like to have a number of local chicken day old chicks but have been getting few from hatching one local bird. It is also given as an alternative to hatching day old chicks using machines which need electricity that is rare in rural areas. Sanitary conditions required are also expressed in details of what farmers should do. Topics covered include management requirements and processes that have to be done in programmed hatching. Performance and other maintenance requirements necessary to ensure continuity are expressed.

Authors: Dr.Connie Kyarisiima, John James Okiror & Benon Sebina: 2005
Title: Evaluation of the Indigenous Chicken Project in Rakai District: Improving Welfare in Rakai by Improving Indigenous Chicken Production through Programmed Hatching and Cockerel Exchange Programme, 2003-5.
Implemented by: Community Integrated Development Initiatives (CIDI)
Funded by: Farm Africa (Maendeleo Agricultural Technology Transfer Fund.

Summary

Impact established in this evaluation included an increase in egg sales and price of an egg. An average household could sell UGS 6000/= eggs per year. The cost of an egg from local scavenging chickens cost was UGS 100 but the fertilized F1 and F2 egg cost was at UGS 200 due to the high demand. It was also established that the chicken sales increased whereby a household could sell 200 day-old chicks and 30 adult birds in a year at UGS 8000/= to 10,000/=. The chicks were priced basing on its filial generation whereby F1 chicks cost UGS2 500 at two months and that of F2 cost UGS1700/= at one month of age. There was high demand of the chicks reported at the time. Improvement in crop yields after application of chicken manure and household nutrition was also cited. It was concluded that programmed hatching lead to increased local chicken productivity and rapid multiplication of local chicken flocks.

Author: Ssebina Benon Ssalongo
Title: Commercial Chicken Production Manual for Uganda, 1996

Summary

The manual is written in English and guides poultry keepers on husbandry, disease control and feeding. It is especially important for beginners who need a hands-on approach to feeding poultry.
Topics covered in this manual include: Systems of poultry keeping; Brooding chicks; Broiler chicken production; Rearing cocks; Management of layers; Feeding green feeds; Poultry vices; An introduction to poultry health diseases and parasites and Poultry feeding in general. Local poultry farmers who can read English use it to improve local poultry production and management. However since majority of local poultry keepers cannot read and write English they are not aware of it hence cannot utilize the manual.

Authors: Drs Bwali Schola; Kajura. 2006,
Title: Hoima District NAADS Annual Progress Report July-June 2005/2006

Summary

Hoima district is one of the areas where NAADS is promoting farmers' prioritized/selected income generating enterprise. Local chicken is one of the enterprises identified by farmers to generate income for economic advancement. These farmers have formed associations in the different sub-counties of the district to benefit from NAADS services. In turn, NAADS supports these groups in: farmers institutions development; enterprise development and linkages with the market, service provider institution and capacity development, planning, monitoring/quality assurance and evaluation and; programme management and coordination. All these are done with cooperation from local government.
Sub-counties that have farmers groups include Buhanika, Bugambe, Buhanika, Kyabigambire. Services are delivered through 11 NGOs/firms to about 28 farmers groups.

Author: Drs. Bwali Schola, Kajura; 2007
Title: Hoima District Annual Progress Report. July 2006 – June 2007
NAADS Hoima District Local Government

Summary

There was an increase of farmers groups (from those of 2005/06) that keep local chicken. Indeed, support to farmers groups included purchase of a locally made incubator to hatch local chicken day old chicks. Financial support from local government to farmers groups also increased. Search of markets was also strengthened. Farmers crossbred local chicken with exotic commercial cocks.