

[DOI: 10.20472/IAC.2018.040.063](https://doi.org/10.20472/IAC.2018.040.063)

**REBECCA PEARL TUMWEBAZE**

Ministry of Agriculture, Animal Industry and Fisheries, Uganda

**HENK SOL**

University of Groningen, Netherlands

**DORIS KAKURU**

Uganda Technology and Management University, Uganda

## **REQUIREMENTS FOR DECISION ENHANCEMENT FOR POULTRY FARMERS: A CASE OF EAST AFRICA**

### **Abstract:**

Because of agriculture's direct link to global food security, it is strategically important. This research recognizes the importance of a paradigm shift from subsistence to commercial agriculture for East Africa to advance this strategic importance. This shift has particularly had significant impact on the poultry industry. In East Africa, commercial poultry farming has steadily taken root over the last decade albeit the challenge of inadequate farm management competences among farmers which has been aggravated by lack of systems and approaches to enhance effective and efficient decision making among poultry farmers in the region. The focus of this study therefore is how decision processes of poultry farmers can be enhanced so that they are able to efficiently monitor and manage their operations as they seek to take advantage of the trend of commercialisation of the poultry industry. This paper explores the decision making practices of poultry farmers with an aim of enhancing these decisions for improved productivity of poultry farms in the region. The key research question this study seeks to address is: How can decision making among poultry farmers in East Africa be enhanced?

### **Keywords:**

Decision making, Decision Enhancement, Studio, Design Science

## 1. Introduction

The poultry industry across the world has undergone both scientific and technological advances to meet its high commercialization growth rate. In many first world countries across Europe and America, farms using high scale technologies are already enjoying the benefits of industrial poultry production. In some Asian countries such as China and India, the poultry industry is one of the fastest growing segments of the agricultural sectors. The poultry industry in Africa has also been growing steadily as well though it still lags behind compared to the other continents. Though poultry production is widely practiced in Africa, it is mainly in small holder/backyard systems, which are characterized by low input and low output (FAO, 2011). The continent continues to import not only poultry but other agricultural products (Trostle & Seeley, 2013). Nonetheless, there is steady growth of the poultry industry across the continent. According to FAO, (2013), chicken meat production in Africa between 2006 and 2013 increased steadily by almost 5% per year. As global growth during this period averaged a little below 4% per year, Africa increased its contribution to the world total to 5.1% in 2013.

Like most of Africa, poultry production in the East African region has been largely subsistence with the indigenous chicken accounting for about 70% of the total flock in the region (FAO, 2013; FAO, 2011; Kyarisiima et al, 2004). However, in recent years, this trend has significantly changed with increasing poultry flock numbers and more commercial farms being registered (FAO, 2011). Over the last decade, poultry production has continued to be very dynamic and has been typified with unprecedented growth across the East African region which illustrates a steady shift from subsistence to commercial poultry farming.

Sonaiya & Swan, (2004) provide a clear distinction between commercial poultry farms and rural or subsistence poultry farms. According to them, subsistence poultry farms often have a flock of less than 100 indigenous birds, largely operate informally and in most cases do not employ salaried labour. They characterise commercial poultry farms as those rearing hybrid birds which are specially hatched for optimal meat or egg production. These hybrids are normally confined in either houses or cages and they require high balanced feed for optimal production; crucial veterinary hygiene and disease management; supplementary artificial light particularly for the egg laying birds; and artificial brooding. In this study, the above description of commercial poultry farms by Sonaiya and Swan (2004) defines the scope of this research. This study is further informed by FAO (2011) who emphasizes that commercial poultry farms involve high initial investment unlike backyard/subsistence poultry farms which are largely characterised by low input and low output. It is from this that the poultry farmer considered in this research is described as one who rears over 100 birds, is concerned with the financial investment involved and pays explicit attention to the management of his/her poultry farm as a profit venture. This kind of farmer therefore must be concerned

with aspects of housing, feeding, hygiene and disease management as raised by Sonaiya and Swan (2004).

With an increasing number of such commercial poultry farms, there is need to focus on how to come up with innovative ways of boosting and supporting poultry farms and other agricultural enterprises to grow in scale (FAO, 2011). It is no wonder that East African governments have up scaled their efforts towards supporting the growth of commercial agriculture enterprises including those engaging in poultry production through policy e.g. Uganda's Plan for Modernization of Agriculture (PMA), which seeks to convert subsistence farming into commercial farming (Ekou, 2013) and Rwanda's framework for livestock development which seeks to enhance commercial livestock enterprises. In spite of these efforts as well as prospects and opportunities of the poultry industry in the East African region, poultry farmers are faced with challenges which threaten further growth and sustainability of the industry e.g. unstable input prices and quality (Katongole et al., 2013; 2011); wide gap between local demand and supply of grandparent stocks (FAO, 2009), Lack of sufficient regulation (Msoffe and Ngulube, 2015; FAO, 2009), inadequate information availability (FAO, 2009) and limited use of technologies (World Bank, 2008) among others. Msoffe and Ngulube (2015) and Karanja (2014) also observed that these challenges are further aggravated by the problem of inadequate management competences among farmers which is mainly caused by a lack of adequate systems and approaches to guide farmers in decision making. Begum et al (2010) classify a poultry farm as a decision making unit, in which farmers must make decisions concerning management of the farm and its flocks. It is against this background that this study focussed on understanding the decision making practices of poultry farmers in East Africa with an aim to seeking innovative ways of enhancing the decision processes in order to boost poultry farmer's management competences.

## **2. Decision Making among Farmers: Theoretical Perspectives**

Decision making involves searching for information on the problem to be solved, identifying possible alternative solutions, evaluating the different alternatives and choosing among these alternatives and finally controlling the implemented decision (Simon, 1960). Mintzberg et al. (1976) defined a decision process as a set of actions and dynamic factors that begin with the identification of an incentive for action and ends with a specific commitment to action. To characterize decision making styles, both rationalistic and bounded rationality models (March, 2010) are of importance. Rational decision making implies that the decision maker operates under certainty, knows the alternatives as well as the related outcomes, is conversant with the decision criteria and has the ability to make an optimum choice and implement it (Towler, 2010; Simon, 1997, 2009). In reality, this is not the case among actors operating in uncertain and complex business environments (Keen & Sol, 2008), such as the agricultural domain (Aregu, 2014; Parker, 2001).

The decision mechanism of a typical farmer is not that of the rational man who consciously considers all alternative options (Osinga, 2015). The decision making strategies farmers pursue do not only depend upon the actual effects, but also on how they perceive and cognitively process their experiences (Aregu, 2014). Simon (2009) uses the term bounded rationality to describe a decision maker who would like to make the best decision but instead (due to unavoidable constraints) settles for a less than optimal decision. Nair (2006) and FAO (2006) both noted that farmers' decisions are greatly influenced by time constraints, cost and inability to process needed information. It is from this that one can assert that poultry farmers' decisions in East Africa will most likely be influenced/bound by challenges in their business environments.

Osinga (2015) noted that farmers take on a satisficing rather than an optimizing approach in decision making. The satisficing approach implies that not only cognitive abilities, but time, resources or personal circumstances constrain decision making (Keen & Scott Morton, 1978). And because of this, they will most likely apply heuristic rules since heuristics mainly stem from the decision maker's observations, perceptions and past experiences (Marsh, 2002; Antonides, 1996). Heuristic practices are cognitive short cuts that enable the decision makers (poultry farmers in this case) to make evaluations based on one or a few simple rules thereby avoiding the processing and time costs related to exploring an exhaustive set of possibilities (Marsh, 2002).

Several researchers (Gocsik et al., 2014; Knowler and Bradshaw, 2007; Edwards-Jones, 2006 etc.) have mentioned farmers' intrinsic motivation as another influence to farmer decision making. In fact Greiner and Gregg (2011) suggest that intrinsic motivation can sometimes outweigh financial motives when it comes to farmer decision making. In their study, Sadler-Smith and Sparrow (2008) found out that often decision making relied a lot on the decision maker's tacit knowledge than on formal data. This is supported by the social psychological theories, which explain why some members of a given population exhibit a given behaviour while others in the same population do not (Fishbein et al., 2001). This is also well explained by the emotional theory which states that everyone is influenced by their past experiences, expectations, emotional state and emotional memory when making a decision. Looking at poultry farmers in East Africa and the complex nature of their business environment characterised by various challenges, farmer experiences and emotions can't be ruled out of their decision making processes.

Osinga (2015) also observes that farmers are social creatures who will most likely make their decisions with in the context of other decision-makers. This is influenced by the multi-stakeholder setting in which they operate. Farmers are most likely to make decisions based on the views of others in their social networks. Sociology literature (Commandeur, 2006; Van der Ploeg, 2010) asserts that farmers are not rational, conscious, individual decision makers, and their decisions are influenced by interactions with other farmers, farm advisors, farm suppliers, veterinaries, and others (Bock and Van Huik, 2007; Jansen and Vellema, 2011). Poultry farms are highly multi-stakeholder

considering that the farmers must continuously work with poultry breeders, input suppliers, veterinarians, farm workers, etc throughout their management processes.

From this discussion, it is apparent that an individual farmer's goals, values, experiences, networks, expertise, personal norms and attitudes are highly reflected in the decisions they make. In East Africa, poultry farming is still evolving from previous subsistence/backyard systems to commercial systems (FAO, 2011), this too may have an influence on farmer attitudes and experiences, hence decisions. The challenges faced by the industry in the region as discussed in section 1 also have a direct influence on the kind of decisions poultry farmers make. These challenges cause farmers to make decisions under conditions of uncertainty. For example a poultry farmer making a decision in an inadequately regulated business environment is bound during the decision making process. Jager and Janssen (2012) proposed Consumat, a set of four decision strategies based on their consumer studies: repetition (do as you always do), imitation (do as your close peers do), inquiring (study what all peers do and do as the majority do), and optimizing (calculate all alternatives and choose the best). It is plausible to assume that poultry farmers use similar kinds of heuristics when faced with their complex decisions. By applying Consumat to decisions in the context of poultry farm management, two key issues are apparent: 1) the focus of poultry farmers' decision making practices should be more on the decision making processes and not the final decision; and 2) the views and experiences of stakeholders in the poultry farmers' decision making arena are important to the farmers' decision making process. These two issues can be key requirements for enhancing decision making processes among poultry farmers.

### **3. Methodology**

In order to gain a broader and practical understanding of poultry farm management and the decision making practices and processes involved, an exploratory study among selected poultry farmers and key stakeholders of the poultry industry was conducted. Both case studies and focus group discussions were used to gain practical understanding. While case study based inquiry facilitated a detailed description of the context in which poultry farmers performed their tasks and made decisions, focus group discussions further advanced broader and deeper insights into respondents' views, attitudes, beliefs and motivations.

#### **3.1 Case Studies**

To collect data from the cases, a structured interview guide which was formulated based on information gathered from literature was used. The questions in the interview guide focussed on four key areas as presented in four sections i.e. participating farm characteristics, poultry farm management processes and the decisions therein, current use of ICT at farms, considering the role ICTs have been known to play in supporting decision making in business and finally, an open section for farmers to express themselves on their preferred requirements for enhancing their decision processes. The researcher visited all case study farms between October and December 2014 and spent

time at each of the farms observing the practices of farmers as well as carrying out the interviews using the guide.

Purposive sampling was used to select 13 poultry farms as cases for this research. This enabled a deliberate choice of farms based on two qualities:

- 1) Farms had to conform to the descriptions of commercial poultry farms of this study which was guided by Sonaiya and Swan (2004) and FAO (2011) as discussed in Section 1. Farms rearing over 500 hybrid birds which are specially hatched for optimal meat or egg production were considered.
- 2) Farm managers and/or farm owners had to have an interest to participate and share their views in the study.

Analysis of qualitative data followed the procedures of grounded theory (Strauss & Corbin, 1998). Having begun with information from literature and pilot studies, the use of grounded theory guided the study to use emergent strategies and rely on comparative inquiry during analysis (Charmaz & McMullen, 2011). The three coding processes of grounded theory (open coding, axial coding and selective coding) were employed because of their ability to ground theory in data (Strauss & Corbin, 1998). As Holton (2007) puts it, it is through coding that the conceptual abstraction of data and its re-integration as theory takes place.

### 3.1.1 Findings and Discussion

The 13 selected cases were a diverse organizational mix in terms of size which is mainly represented by flock numbers. The combination of farms managed by farm owners and those managed by farm managers gave a wealth of practices and experiences as far as farm management is concerned. From the first section of the questionnaire, characteristics of the farms such as location, types of birds reared, flock size and the person at the helm of managing the farm were gathered. Farm characteristics can be insightful in understanding individual farmers' decision making practices (Poppenborg & Koellner, 2013).

**Table 1: A description of farms which participated in the case study interviews.**

	<b>Farm</b>	<b>Location</b>	<b>Type of birds</b>	<b>No. of birds reared</b>	<b>Person in charge (Business owner/ Farm Manager)</b>
1	Mazima Farm Ltd	Kampala, Uganda	Layers	550	Business Owner
2	FarmFair Ltd	Entebbe, Uganda	Layers & Broilers	1,000	Business Owner
3	Nami Farm	Mukono, Uganda	Layers	1,000	Business Owner

	<b>Farm</b>	<b>Location</b>	<b>Type of birds</b>	<b>No. of birds reared</b>	<b>Person in charge (Business owner/ Farm Manager)</b>
4	Impressed Company Ltd	Mukono, Uganda	Layers & Broilers	1,300	Farm Manager
5	Mugabane's farm	Mukono, Uganda	Layers & Broilers	2,000	Business Owner
6	Kwagarakwe farm Ltd	Mukono, Uganda	Broilers	2,400	Farm manager
7	Kirangira Poultry farm	Wakiso, Uganda	Layers & Broilers	3,370	Farm Manager
8	Kari Chicken (K) Ltd	Naivasha, Kenya	Layers & Broilers	5,800	Farm Manager
9	Delo farm Ltd	Mukono, Uganda	Layers & Broilers	8,000	Business Owner
10	Kigata Farm Ltd	Mukono, Uganda	Layers & Broilers	10,000	Farm Manager
11	Maito Farm	Mwanza, Tanzania	Broilers	10,000	Farm Manager
12	Dem Commercial farmers Ltd	Mityana, Uganda	Layers & Broilers	15,000	Farm Manager
13	Musiyani Farm Ltd	Nakuru, Kenya	Layers & Broilers	30,000	Farm Manager

Out of 13 farms, only 5 (38.5%) were managed by the business owners while 8 (61.5%) were managed by employed farm managers. It was observed that farms with small flock numbers were more likely to be managed by business owners compared to farms with bigger flock numbers. This finding rhymes well with McElwee (2008) who observed that small farms were more likely to be family businesses and run by the owners and the family. McElwee (2008) also described an emerging group of farmers who are highly opportunity-aware and often using a variety of business strategies to ensure business success. This group of farmers may obtain secondary income from alternative businesses or even formal employment to supplement farm income and possibly invest further in the farm (McElwee, A taxonomy of entrepreneurial farmers, 2008). It was also noted that only 4 out of 13 farms (30.8%) specialized in a particular type of bird reared (i.e. layers or broiler birds). The other 9 out of 13 farms (69.2%) were of a diversified nature and reared both layers and broilers. This is in line with Kaba (2016) who observed a growing trend of diversification in farms as a process accompanying economic growth and an indicator of increasing commercialization and structural transformation of agricultural economies. Effective diversification in farms promotes farm competitiveness

(Kaba, 2016) and helps farmers to counter shocks arising from seasonal factors (Francesco, 1999). Diversification is also key in broadening income sources of farms.

To understand poultry farmers in their own terms and make meaning of their operations and decisions, each respondent was tasked to list at least six activities they perceived as important to their farm businesses and in which they made critical decisions. The responses have been summarized in the table below.

**Table 2: Important poultry farm activities where critical decisions are made**

Poultry Farm Activity	Frequency	%age (of total respondents)
Input purchasing	13	100
Vaccination	13	100
Brooding	11	84.6
Feed mixing	9	69.2
Flock replacement	9	69.2
Financial management activities	8	61.5
Marketing and sale	6	46.1
Biosecurity and disease control	4	30.8
Slaughter	2	15.4
Storage	1	7.7
Selective hiring of staff	1	7.7

These responses point to several issues:

- 1) Poultry farm management activities as per above responses and consequently decisions are not any different from those already mentioned in literature (FAO, 2013; FAO, 2011; Segal, 2011; Richards et al., 2010; etc.).
- 2) All respondents acknowledged input purchasing as an important activity in which they made decisions that matter. This is in agreement with FAO (2011) who noted that farmers in the East African region make their own decisions to purchase farm inputs and are highly involved in all aspects of purchasing from placing their orders till delivery of inputs to the farm (FAO, 2011).
- 3) All respondents noted vaccination as another important activity in which they make critical decisions. This may be due to the challenge of high rate of disease prevalence that has affected the poultry industry as reported by Natukunda et al. (2011) and Adei and Asante (2012). From these responses, we note that farmers are highly aware of this challenge and consider decisions concerning vaccination and disease control as critical decisions.
- 4) With over 50% of the respondents agreeing to the same activities as per table 2, we note that activities of poultry farmers in East Africa and consequently their decisions are largely similar.



To understand the farmers' decisions further, we asked respondents about what mainly triggered them to make decisions in their operations. Responses were recapped into five triggers: routine, information, observation, trends in the farm records and market forces. All 13 respondents (100%) were prompted to make decisions based on observation of their flocks, routines and information received. 9 respondents (69.2) further added trends in the farm records while 6 respondents (46.2%) mentioned that market forces trigger their decisions as well. Focusing on observation as a trigger of decision making, it is important to note that decision making among poultry farmers is a continuous process because birds, like other living beings, are always growing and can change their behavior and physiology to adapt to changes in their environments (Crespi & Denver, 2005). Equally these environments are constantly changing both naturally and artificially (Cheng, 2010). Therefore, this requires that the decision maker in a poultry farm is always actively participating in the farm processes to be able to make informed decisions amidst the continuous changes. It is thus important that any initiatives to guide or enhance farmers' decision processes make consideration of farmers' observations and salient knowledge which can mainly be attained if farmers are empowered to actively remain in the 'loop' of their processes to enable them to make the necessary observations.

To better understand the decision objects involved, farmers were asked about the performance indicators which they use as a guide to decision making during their operations. Multiple indicators were raised as shown in table 3:

**Table 3: Responses on performance indicators used for decision making**

Performance indicator	Frequency (out of 13)	%age (of total respondents)
Healthy chicken (free of disease)	13	100
Mortality rates	13	100
Growth rates	13	100
Production rate	13	100
Sales rates	11	84.6
Egg damage rates	11	84.6
Age of birds	11	84.6
Bird weight growth rates	10	76.9
Financial performance / Profit	10	76.9
Hygiene in the chicken house	8	61.5
Feeding rates and patterns	6	46.1
Morbidity rates	5	38.5
Rates of failures/abnormalities (e.g egg damages, cannibalism)	5	38.5

From these responses, it was noted that:

- 1) Farmers are largely in agreement on the kind of indicators that guide decision making in farm and flock management.
- 2) Poultry farmers rely on multiple farm/flock performance indicators to make decision which makes the decision making processes rather complex. A performance indicator is a concrete management decision that has to be practiced on a continuous basis to reach the main objective (Goodger, 1984).
- 3) The above findings underscore the importance of continuous flow of information on such indicators to ease farmers' decision making processes particularly because many poultry farm management factors are related to performance indicators at different stages. These indicators also give insight on the kind of information poultry farmers would require during decision making.

In the structured interview guide, respondents were asked about their sources of information during decision making. This was mainly to understand what and who influences farmers at their points of decision making. Seven options were given and respondents were allowed to make multiple selections. The options given were a) Veterinary doctors; b) Government extension workers; c) Fellow farmers; d) Experience; e) Main stream media; f) Others (specify). Their responses are reflected in the table below:

**Table 4: Information sources during decision making**

	Source of information during decision making	Frequency (out of 13)	%age (of total respondents)
a)	Veterinary doctor	13	100
b)	Government extension workers	9	69.2
c)	Fellow farmers	13	100
d)	My previous experience	13	100
e)	Internet	10	76.9
f)	Main stream media (newspapers, radios, TV)	13	100
g)	Others	10	76.9

In the option of 'others', the specifications given were suppliers, family, market sources, farmer association, farm workers and farm owners.

From the responses above, the following was noted:

- 1) Poultry farmers largely operate in multi-stakeholder settings and often seek opinions from others. In this study, all 13 respondents sought information from veterinary doctors. This shows the significant role poultry farmers attach to veterinary doctors. All 13 respondents also sought information from their fellow farmers. This confirms the strong social network of farming communities in Africa already observed in literature (Maertens and Barrett, 2013; Brock and Durlauf, 2000; Manski, 1993).

- 2) There is reduced influence of government extension workers who have previously been considered to occupy a strategic position of information dissemination to farmers as observed by Aina (2012).
- 3) Documentation of experience throughout rearing is important as farmers can then be able to use the records of previous experience as a support for decision making. This emphasizes the fact that good quality records should be kept, analysed and interpreted to enhance better poultry farm management decisions.
- 4) With 10 of the 13 respondents (76.9%) using the internet as a source of information for decision making, it is important to acknowledge a growing interest in technology among poultry farmers in East Africa especially since previous studies (Spielman et al., 2010) observe low technology adoption among farmers in Africa.

Respondents were specifically asked to write down the challenges they face during poultry farm management. The information about poultry farm management challenges helps us to further understand the decision making context of poultry farmers as decisions must be made to counter such challenges. Several challenges were listed and have been summarized as: poor quality of farm supplies and inputs e.g. day old chicks and feeds; capital/financing challenges; unpredictable weather patterns which affects availability of feed inputs; fluctuations of costs of farm inputs and supplies, challenge of getting skilled workers; counterfeit drugs on the market and high flock mortality rates. Others were cannibalism, egg damages, market challenges, fluctuation of product prices, thefts in farms by workers, short shelf life of poultry products, lack of information about the industry e.g. about disease outbreaks, lack of regulation and high disease prevalence. From the responses, it is clear that that poultry farmers are faced with numerous challenges and are highly aware of them. Decisions made in the context of such challenges must aim at addressing them. The long list of challenges given by respondents also confirms that poultry farms in East Africa are indeed faced with various challenges as already noted by Kurukulasuriya and Mendelsohn (2008). In the same study, they noted that these challenges have held back the growth of the poultry industry in the region. Innovations towards addressing these challenges therefore would enhance growth of the industry.

Farmers were queried on how they used ICTs in their farm processes with an aim of improving their decisions. Of the 13 case studies, only 3 (23.1%) had a computer on site. These three farms were all using Microsoft Excel and Microsoft Word to store farm records and make performance reports. Of the 10 who had no computers on site, 6 (60%) said they didn't find any value added by the presence of computers at their farms, 4 (40%) gave no reason for not having a computer on site. All the 10 respondents (90%) with no computer agreed that they would purchase a computer only if it added value to their businesses. While all respondents were computer literate, none of the respondents was using any ICT service/application for management and decision making. It was however observed that all the 13 farms had at least more than one mobile phone on site. After a further inquiry on the use of mobile phones at farms, respondents mentioned

that they used mobile phones for making and receiving calls, sending messages, searching the internet for information and using social media.

While these findings agree with the low technology usage widely reported among farmers in East Africa (Spielman et al., 2010), it also shows that farmers would utilise technologies if they perceived them to be of added business value to their farms. The finding that no farmer was currently using any decision support ICT service or application may be an indication that current decision support services have not been widely promoted among farmers in East Africa or have not been designed with the needs of the typical East African farmer in mind.

From literature (e.g. FAO, 2011; Solano et al., 2003), the importance of information was highly acknowledged for facilitating enhanced decisions of farmers. Therefore, respondents in this study were asked to express themselves on their preferred information requirements for enhancing improved decisions making. Responses were summarized as: rearing requirements, information on different suppliers of poultry farm inputs and credibility, rearing guidelines for different poultry types and strains, feed ratios and formulations, poultry strains and their unique requirements, information on vaccination of birds and use of drugs, market information like price changes and buyers, rearing guidelines, information on relevant policies for the poultry industry, information on business opportunities for farmers, inputs and prices and information on disease outbreaks. These responses show that farmers have a lot of information needs and any innovations towards making this information readily available would add value and improve the management and subsequently decision making processes of poultry farmers.

### **3.2 Focus Group Discussions**

Following the findings from the case studies, two FGDs were held in Kampala, Uganda on 3<sup>rd</sup> June 2015 and 9<sup>th</sup> June 2015. The guidelines of Freitas et al. (1998) for using FGDs in research were followed. The key objective of the FGDs was to get deeper insights on the general findings from the case study interviews and observations made. The FGDs also provided a natural environment where participants could influence and be influenced by others – just as they are in real life (Krueger & Casey, 2000). The spontaneity that arose from the strong social context of poultry farm management was well brought into practice at these meetings because participants were able to articulate themselves even more. Other than taking the role of setting the pace for discussion, the researcher took a much less dominating role and instead focused on getting deeper and broader insights by maximizing interaction between the participants as recommended by Freitas et al. (1998).

A maximum number of 12 participants were selected for each of the two focus groups as recommended by Freitas et al. (1998). The participants were selected basing on their availability, involvement and experience (Veser, 2004). A combination of homogeneous and snowball sampling methods were used to select the 24 participants for the two sessions. Ten participants of the case study interviews were contacted by phone and

invited to participate. These already shared characteristics of commercial poultry farmers as defined in this study and they had all participated in the case study interviews whose findings set the agenda for the FGDs.

To get a good blend of participation, the researcher sought to have other key stakeholders of the poultry industry in the focus group discussions. In particular, stakeholders who influenced farmers' decision making practices were of keen interest. The researcher zeroed on veterinary doctors, extension workers, representatives of key suppliers and representatives of farmer associations because these had been mentioned in the case studies as sources of decision support for the farmers. Snowball sampling method was then employed by asking the 10 participants to endorse these key people as recommended by Patton (2002). The snowball method was useful in taking advantage of the social network of the poultry farmers and provided the researcher with a reasonable number of potential participants (Thomson, 1997). With over 30 names endorsed by the farmers, the researcher segmented the group into categories of the different disciplines that they represented to ensure a multi-disciplinary mix of participants for variety of views for each meeting. They were then contacted on phone and only those who could be available on selected meeting days and were willing to participate and openly share their views were selected. Each of the two groups had 5 poultry farmers, 2 veterinary doctors, 2 hatchery representatives and 3 feed suppliers making 12 participants. Each of the meetings lasted 1.5 hours. The meetings began with self-introduction of the participants. This was followed with a ten minute presentation by the researcher about the purpose of the study, the general findings from the case studies and reason for the FGDs. The presentation was concluded with two questions to the participants.

- 1) What makes the decision making in poultry farm management complex?
- 2) How can decision processes of poultry farmers be enhanced?

According to Freitas et al. (1998), introductory questions can give participants an opportunity to contemplate previous experiences thereby creating a platform for discussion. The discussions were mainly driven by the participants' interaction with minimal intervention from the researcher, who on a few occasions interrupted with a transition question to move the conversations back to the key questions. During the meetings, it was observed that FGDs were instrumental not only in collecting a wide range of opinions from a cross section of stakeholders of the poultry industry but also to validate the information.

### **3.2.1 Findings and Discussion**

From these meetings, it was noted that poultry farm management comprises of comprehensive processes characterized by multiple decisions. Participants observed that decisions made during poultry farm management were highly consequential. The decisions made in one stage of the process had impact on output in all other stages as well as other process e.g. decisions made at the brooding stage affect growth of birds which leads to effects on their production rates and body weight throughout rearing and

would lead to birds attracting a low price in the market. This may explain why decision support systems which only support a small part of the rearing process are not highly adoptable among farmers in East Africa.

One of the key challenges to decision making in poultry farm management was identified as inadequate regulation in the sector. As participants discussed, it was a general consensus that this made purchasing decisions complex. Participants noted that there were a lot of poultry inputs on the market which were substandard and it was difficult to identify the genuine ones. Equally, the sector has a lot of 'quack practitioners' who misguided farmers. It was noted from the discussion that poultry farmers are engaged in repeated purchases of farm inputs such as day old chicks, feeds and vaccines. They also purchase services of veterinary practitioners and consultants to guide them in management and decision making. The importance of activities of input purchasing, which had already been highlighted by respondents in the case study interviews was further emphasized. Because of the challenges with purchasing, it was also noted from the FGDs that farmers preferred to mix their own feeds because only then could they ascertain quality besides saving some costs. This gave further insight on why 69.2% of the case study respondents mentioned feed mixing as an important activity in poultry farm management. Farmers were also concerned about an increased number of hatcheries which were substandard and selling out poor quality chicks. This resonated with the findings of Msoffe and Ngulube (2015) who asserted that East African countries lack comprehensive veterinary laws and policies and where these are in existence, they are hardly implemented.

The fact that farmers operate without budgets came out clearly in the meetings as well. In the discussions, it was noted that often farmers started rearing flock without concrete plans which affected them during rearing. Rearing flocks involves dedication of resources such as finances, time, commitment and labour. It is therefore important that farmers are able to plan so they can only rear flocks that fit into their plans. In the meetings, participants agreed that planning should involve information seeking, budgeting and dedicating resources.

Participants also expressed concern about there being no formal way of identifying markets and interacting with others in the industry. Participants acknowledged the importance of collaboration of stakeholders in the industry through which they could access mentorship, information and decision making support from one another. This further emphasized the importance of social networks in farm management as already noted by Osinga (2015), FAO (2011), Nosheen et al. (2010) and Edeoghon et al. (2008) as well as confirmed during the case study interviews

Participants in the focus group discussions had general consensus about the high disease prevalence affecting farm decision making. Participants mentioned New Castle, Gumboro and Coccidiosis as the major diseases affecting their farms. Both New Castle Disease and Gumboro are preventable through vaccination while coccidiosis is preventable through bio-security management at the farms. During the case studies,

respondents all noted that they treated vaccination activities as important. It was therefore surprising that participants still had an issue of disease outbreaks particularly for diseases that can be preventable by vaccination. On a further inquiry about this, it was noted that while some farmers may have previously skipped a vaccination activity hence attracting disease, there were possible cases of vaccine failure arising from the sources or suppliers of vaccines. The poultry doctors at the FGDs particularly mentioned the importance of purchasing vaccines from reliable and certified sources as there were a lot of counterfeit drugs and vaccines on the market.

On a whole, the focus group discussions zeroed on the importance collaboration, information and transparency of players as important issues for eliminating the decision making hindrances and enhancing the decision processes of poultry farmers. It was also noted from the discussions and case studies that poultry farmers in East Africa may not always follow logical decision making processes like other decision makers, and yet they must make timely and effective decisions numerous times. Because of this, there is likely to be a discrepancy between the desired effect of a decision and its actual effect. It is also possible that typical poultry farmers in East Africa will most likely apply heuristic rules since heuristics mainly stem from the decision maker's observations, perceptions and past experiences (March, 2002).

#### **4 Conclusion**

Poultry farm operations involve numerous activities and consequential decisions. Considering the findings from exploration, we group the different activities under four main processes of planning, purchasing, rearing and marketing. Planning entails information gathering market exploration and budgeting; purchasing involves sourcing for farm inputs, purchase and inventory management; rearing involves the day to day activities of flock handling such as health monitoring, nutrition management, flock welfare and record keeping; while marketing involves advertising and sale of farm inputs. These four processes are inter-related because of the consequential nature of the decisions involved in the processes. Henceforth, we note that poultry farm management involves a complex interaction of four inter-related processes of planning, purchasing, rearing and marketing, in which farmers continuously make decisions. Nonetheless, these four processes remain ineffective as long as the poultry farmer is unable to collaborate with stakeholders of his/her value chain because of the influence of these stakeholders on the poultry farmers' decision making processes and general management. This makes collaboration another important aspect of poultry farm management which is inter-related with the initial four processes. From the discussion so far, it is also apparent that decisions made across these inter-related processes are decisions that matter (DTM) as defined by Keen and Sol (2008). Keen and Sol (2008) define decisions that matter as decisions that are complex, consequential, uncertain, non-reversible, non-avoidable and multi-actor. It is therefore imperative to conclude that poultry farmers' decisions fit the above description of Keen and Sol (2008).

Keen and Sol (2008) also coined the term Decision Enhancement as a “management lens or way to look out at the dynamic and volatile domains of complex private and public sector decision-making and, increasingly, their interdependencies and necessary collaborations”. Decision Enhancement aims at enhancing decision making processes through professional practices that fuse human skills and technology; bringing together the best of executive judgment and experience with the best computer modelling, information management and analytic methods while facilitating scenario building and evaluation, collaboration and simulation to rehearse the future. Keen and Sol (2008) instituted decision enhancement following a studio-based approach as an improvement in the decision support systems research field focusing on ill-structured and complex decisions termed as decisions that matter. The concept of a studio is defined as a facilitative, interactive environment or shared space or forum designed around a process or processes, that contain a set of integrated tools/technologies that enable stakeholders (people) to interactively collaborate to generate and analyse possible solutions to a given problem (Keen and Sol, 2008). Studios facilitate decision making processes by providing a collaborative and interactive work space using suites (i.e. integrated sets of technology) and sets of guideline The concept of DE is not new to solving complex problems in East Africa. Several researchers (Katumba, 2016; Mirembe, 2015; Aregu, 2014; Ejiri, 2012; Amiyo, 2012; etc) addressing decision making challenges in various domains have applied decision enhancement successfully. These studies substantiate Decision Enhancement as a credible approach for increasing decision process agility in volatile and complex environments.

It is against this background that the notion of decision enhancement of Keen and Sol (2008) is highlighted as an appropriate mechanism for enhancing decisions made by poultry farmers throughout their processes. Decision enhancement (Keen and Sol, 2008) is grounded in the theory of decision support systems. The use of a decision enhancement studio, which starts from the lens that focuses on stakeholders in decision arenas and their decisions that matter (Keen & Sol, 2008), can enhance poultry farmers to appropriately collaborate with other actors in the poultry industry in a streamlined process where stakeholders can be identified and their skills, qualifications and experiences used as a basis for collaboration. Whereas much of the focus of the application of information technology aims at taking people out of the loop, the approach of decision enhancement is to use technology not to replace or support decision making but to enhance and extend decision makers’ capabilities (Keen & Sol, 2008), which in essence takes care of poultry farmers’ local salient knowledge and experience. This study therefore proposes a Poultry Decision Enhancement Studio (PDES) to enhance poultry farmers’ decision making.

The following requirements for the PDES can be adopted.

- 1) The PDES should facilitate collaboration and networking among stakeholders of the poultry industry because their views enhance poultry farmers’ decision making processes.



- 2) The PDES should enable interdependence of decisions across the processes of poultry farm management i.e. planning, purchasing, rearing, marketing and collaboration. This is because of the inter-related nature of these processes and consequently their corresponding decisions.
- 3) The PDES should encompass the three major perspectives of a decision enhancement studio (people, process, technology).
- 4) The PDES should facilitate a transparent and regulated environment through which farmers can operate and make decisions.
- 5) The PDES should support documentation of farmers' experiences and farm information because these can be a good basis for decisions making.
- 6) The PDES should enable information interpretation and analysis. Poultry farmers' decisions are highly influenced by the information they have. Interpretation and analysis of this information further enhances timely decision making.
- 7) The PDES should provide guidelines to poultry farmers on flock handling and decision making on key performance indicators of flock and farm management.

These requirements can be a good guide for designing a useful and usable studio for poultry farmers in East Africa.

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