

**TOWARDS THE MODELING OF INDIGENOUS POULTRY PRODUCTION IN THE EASTERN
CAPE PROVINCE, SOUTH AFRICA: CHARACTERIZATION AND EXTENSION
EVALUATION FOR POVERTY REDUCTION**

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DECLARATION

I, Shehu Folaranmi Gbolahan Yusuf , hereby declare that:

- (i) The research reported in this dissertation, except where otherwise indicated, and is my originalwork.
- (ii) The thesis has not been previously presented or submitted for any degree any where
- (ii) All the sources cited have been acknowledged accordingly.

.....

Shehu Folaranmi Gbolahan Yusuf

.....

Date

Dedication to

My wife and children, who gave me joy, love and smiles

My late mum, Hamdalat Anike who gave me light of education

Tata Madiba Rolihlahla Mandela who was an icon and inspiration

and

Those who were killed, maimed, exiled, imprisoned for demanding equal rights for all South
Africans

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Abstract

Poverty remains a critical issue mostly in the rural South Africa. Various initiatives, policies and programs have been enacted by the government with attempting to reduce poverty at the national and provincial levels; poverty is yet to be abated. The target of the Millennium Development Goal 1 (MDG1) of halving poverty by the year 2015 notwithstanding, poverty remains a threat to quality livelihoods. Agriculture has continued to be one of the pillars of government efforts to address poverty. However, in livestock production interventions, efforts of government had largely been on cattle, sheep, goats, pigs and exotic poultry with little attention being given to indigenous poultry production (IPP). This study explores the option of using IPP to address rural poverty by capitalizing on its minimal inputs while recognizing its prevalence in a variety of households. The study addresses the characterization of the IPP from the perspectives of housing, feeding, healthcare management, breeding and marketing options. Skill competencies of the indigenous poultry farmers (IPFs) and the Agricultural Development Technicians (ADTs) were examined. This study reviewed poultry models in different parts of the world with special attention to Africa. The human resource development program of the department of rural development and agrarian reform was discussed. The study employed the use of multi-methods approach, the quantitative and qualitative research methodologies. Descriptive statistical analysis, frequent count, percentage, means, standard deviation, chi-square, and principal component analysis was used in the quantitative data analysis while the “open social system” was used for the qualitative methodology. Findings revealed that IPFs face some challenges among which are, the poor housing that exposed the birds to inclement weather, predator attacks and stock theft, high mortality of chicks after hatching and expensive feed for the flock. The IPFs showed competencies in nine skill items that included ability to identify chicken predators ($x=3.92$) and high yielding chickens ($x=3.79$); control of predators ($x=3.77$); methods of using ethno veterinary drugs to treat chicken diseases and pests ($x=3.72$), and identify signs of diseases ($x=3.69$), among others. However, the ADTs did not show any competency in any of the 32 skills items. The principal component analysis with Varimax rotation was performed to ascertain the dimensionality of the measures. Six factors with eigen value of >1 , which accounted for 77.317% were extracted, with each factor loading ranging from 0.523 to 0.93. Factor loading after rotation that emerged on the same component was described; as brooding, shelter and care of the chicks; predators and healthcare; hygiene and litter management; feeds and feeding stuff; and record keeping and marketing. The findings on the human resource development revealed that staff meetings were the most common method

of capacity development. This was followed by in-service-training, formal study, workshop, and on the job training. The farmers' field school and study tours were sparingly used. However, respondents were in favor of on-site training, staff meetings, formal study and in-service-training. The findings on the appropriate model suggest a theoretical indigenous poultry production model (IPPM) for the Eastern Cape Province (ECP). The "open social system" was used to develop a framework for an indigenous poultry cooperative society (to be known as *Abafuyi Benkukhu Zemveli* [ABZ]). This was meant to create a binding force for capacity development, a strong economic foundation through equity contributions, creation of marketing channels, and the development of a concept of "our own" product in the market. Lastly, the study offers options for a training program that would accommodate the new initiatives, with a strong capacity development training approach. In this context, the study advocates for institutional support for the IPFs and the incorporation of indigenous poultry in the curriculum of the agricultural training programs at higher education institutions in South Africa.

Key words: Indigenous poultry, feeding, health care management, poultry model, skills, human resource development

Abbreviations and Acronyms

ABZ	<i>Abafuyi Benkukhu Zemveli</i>
ABZ Co-Op	<i>Abafuyi Benkukhu Zemveli Cooperative</i>
AgriBBBEE	Agricultural Broad Based Black Economic Empowerment
AgriSETA	Agricultural Sector Education Training Authority
ADTs	Agricultural Development Technicians
ARC	Agricultural Research Council
AVPATS	<i>Association Villageoise de Producteurs d'Aviculture Traditionelle</i>
B&MGF	Bill and Melinda Gate Foundation
BPM	Bangladesh Poultry Model
BRAC	Bangladesh Rural Advancement Committee
BRICS	Brazil, Russia Federation, India, China and South Africa
B-upDDES	Bottom-up Demand Driven Extension Strategy
CAADP	Comprehensive African Agricultural Development Program
CAQ	Capacity Assessment Questionnaire
CASP	Comprehensive Agricultural Support Program
CD	Capacity Development
CHH	Children Headed Household
CIDI	Community Integrated Development Initiatives
CIT	Composite Index Technique
CO	Competency Observed,
DAFF	Department of Forestry and Fishery
DARRD	Department of Agrarian Reform and Rural Development
DFID	Department for International Development
DLS	Department of Livestock Services
DoA	Department of Agriculture
DOCs	Day-Old-Chicks
ECDC	Eastern Cape Development Council
ECGDP	Eastern Cape Gross Domestic Product
ECP	Eastern Cape Province
ECPG	Eastern Cape Provincial Government
ECSECC	Eastern Cape Socio Economic Consultative Council
ERP	Extension Recovery Plan
EWTNs	Extension Workers Training Needs

CFA	Central African Franc
FA	Factor Analysis
FAO	Food and Agricultural Organization
FARA	Forum for Agricultural Research in Africa
FHH	Female Headed Household
FHISER	Fort Hare Institute of Social and Economic Research
FPS	Farmer Poultry Schools
GII	Gender Inequality Index
HDI	Human Development Index
HHPA	Household Poultry Advisor
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
HSRC	Human Sciences Research Council
HYCV	High Yielding Crop Varieties
IBSA	India, Brazil, and South Africa
IP	Indigenous Poultry
IPFs	Indigenous Poultry Farmers
IPFsCo-op	Indigenous Poultry Farmers Cooperative Society
IPH&BFs	Indigenous Poultry Hatcheries and Breeders' Farms
IPP	Indigenous Poultry Production
IPPM	Indigenous Poultry Production Model
ICT	Information and Communication
IDP	Integrated Development Plan
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
INCORET	Indigenous Consultants Researchers and Trainers
KMO	Kaiser-Meyer-Olkin
LCS	Living Condition Survey
LED	Local Economic Development Framework
MHH	Male Headed Household
NCD	Newcastle Disease
NCO	No Competency Observed
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organisation
NSAQ	Needs and Situation Analysis Questionnaire

OECD	Organisation for Economic Co-operation and Development
ORT	Oral Rehydration Therapy
PCA	Principal Component Analysis
PGDP	Provincial Growth and Development Plan
PPEA	Participatory Programmed Extension Approach
PRSPs	Poverty Reduction Strategy Papers
PSC	Public Service Commission
RIU	Research Into Use
SA	South Africa
SFRB	Scavenging Feed Resource Base
SMME	Small, Micro, and Medium Sized Enterprise
UNDP	United Nations Development Program
SPSS	Statistical Package for Social Science
VVV	Village Vaccinators
WARD	Women in Agriculture and Rural Development
ZAR	South Africa Rand

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CHAPTER 1

INTRODUCTION

1.1 Agriculture and poverty alleviation

Africa is a blessed continent, possessing a significant share of the world's natural resources. However, despite the continent's abundant natural resources, as well as its human resources, poverty, hunger and starvation are rife. Statistics show that 72.9% of the people in Sub-Saharan Africa live on a daily income of less than US\$2, while 50.9% struggle to survive on US\$1.5 or less a day. In addition, more than 556 million Africans are now suffering from malnutrition (World Bank, 2012). Agriculture is the main source of livelihood on the African continent and, in Sub-Saharan Africa (SSA) alone, it accounts for approximately 40% of GDP and 60 to 80% of the total employment (FAO, 2009). Nevertheless, SSA is the only region of the world where the food supply situation is continuing to worsen as the population increases. Diao, Hazell, Resnick & Thurlow (2007:6) describe the situation as dire and note that it is deteriorating. In an attempt to resolve this deplorable situation, in 2002 the African heads of state introduced a programme known as the Comprehensive African Agricultural Development Program (CAADP) (NEPAD, 2002; World Bank, 2007) with the aim of increasing agricultural output by 6% per annum for the next twenty years (NEPAD, 2002).

South Africa's agricultural landscape has changed significantly since the democratic elections in 1994, although it is still characterized by inequalities (Vink & Van Rooyen, 2009). According to Vink & Van Rooyen (2009), these inequalities are particularly evident among the white commercial farmers and the communal areas, and among the farmers in the communal areas. The most obvious inequalities are evident between the farmers in the commercial areas and the farmers in the communal areas. According to Vink & Van Rooyen (2009:13), the households involved in small-scale farming rely on multiple livelihood strategies, with farming production playing a significant role but making only a small contribution to their livelihoods. The majority of these small-scale farmers rely on social grants such as pensions and child support grants as their major sources of income. Vink & Van Rooyen (2009:26) report that the total contribution of subsistence farming to household incomes (in both cash and kind) ranges from 6 to 12% for dry land settlements and from 24 to 30% for irrigated land. Over the years, there has been a decline in production for small scale farming as compared to that of commercial farming. Various micro-level surveys of smallholder agriculture have established that the small-scale farmers in South Africa face a number of challenges which hinder their upward movement. These challenges include agronomic factors such as disease and adverse climatic conditions, together with a lack

of adequate information on how to manage these phenomena, institutional factors such as insecure land tenure and access to production credit in order to purchase inputs; and declining agricultural support services, including research and the provision of extension services (Vink & Van Rooyen, 2009:29). These factors all hinder the advancement of rural, resource-poor farmers who depend more on agriculture for their survival rather than on non-farming enterprises (Baiphethi & Jacobs, 2009).

South Africa, which is a signatory to the NEPAD initiative and which is regarded as being self-sufficient as regards food production, continues to have a high rate of malnutrition affecting children. For example, recent South African studies conducted by Ismail & Suffla (2013:2) indicate that child malnutrition rates have increased, thereby compromising the health of the child, while Liu, Johnson, Cousens, Perin, Scott, Lawn, Rudan, Campbell, Cibulskis, Li, Mathers & Black (2012:2158) reported that one out of every ten South African children is affected by underweight, a disorder common to poor nutrition. In addition, Shao, Konovalchuk, Clark & Bruening (2004) confirm the high levels of poverty, especially in the rural areas, where approximately 70% of South Africa's poor reside.

Poverty, which may be described as “multidimensional” in nature (Ravallion, 2011:13), is characterized by multiple deprivations. According to Ferraria (2011:11–13), these deprivations are evident in poor dietary patterns and inadequate living standards that often result in poor health, a shortened lifespan, limited access to education, knowledge and information and powerlessness in various domains. According to the 2013 Human Development Report (HDR), South Africa is listed with a value of 0.629 in 2012 on the Human Development Index (HDI), placing it in the medium human development category and positioning the country at 121 out of 187 countries and territories. This HDI of 0.629 is below the average of 0.655 for the BRICS countries (Brazil, China, India, Russian Federation and South Africa) but better than the average of 0.588 for the IBSA countries (India, Brazil and South Africa). As regards the Gender Inequality Index (GII), which reflects gender-based inequalities in three dimensions, namely, reproductive health, empowerment and economic activity, South Africa was accorded a GII value of 0.462, ranking it 90 out of 148 countries, in the 2012 index (HDR, 2013). Likewise, the Multidimensional Poverty Index (MPI), in the 2012 index, which identifies multiple deprivations in the same households in terms of education, health and standard of living, indicated that 13.4% of the South African population lived in multidimensional poverty (the MPI ‘head count’), while an additional 22.2% was vulnerable to multiple deprivations (HDR, 2013). In an attempt to overcome the challenge of under-nutrition, a significant percentage of household earnings is

spent on food and, unless the situation is redressed through a pragmatic, pro-poor program, this trend of poor dietary pattern will continue for a long time.

The democratic dispensation that was ushered in with the 1994 elections changed the face of rural poverty and inequality in South Africa. For example, in addition to the system of social grants, other safety net measures have been introduced to address the problem of rural poverty. Between 1994 and 2012, several anti-poverty initiatives, policies, programs and projects were implemented at the national, provincial and municipal levels.

Amongst these were programs initiated by the Department of Trade and Industry designed to offer support to the small, micro and medium sized enterprise (SMME) sector; the National Skills Fund that financed part of the Human Resource Development Strategy (HRDS); the Department of Land Affairs program on land reform in 1995–96; the Community-Based Public Works Program; the Working for Water Program; the Land Care Program; programs by the National Development Agency; the Integrated Rural Development Program; and the Urban Renewal Strategy in 2001 (Aliber, 2003). Other initiatives include the Comprehensive Agricultural Support Program (CASP), and the Agricultural Broad Based Black Economic Empowerment (AgriBBEE). At the provincial level, the government of the Eastern Cape province, through the Agrarian Transformation and Food Security pillars under the Provincial Growth and Development Plan (PGDP), has implemented the following programs: Massive Food Production; Siyazondla Homestead Production; the Comprehensive Nutrition Program; the Siyakhula Food Production Program; and the Integrated Agricultural Infrastructure Program (Eastern Cape Socio Economic Consultative Council [ECSECC], 2009). However, despite the implementation of these programs, poverty in South Africa remains a matter for concern.

The results of the Living Conditions Survey (LCS) (2008/2009), which uses the poverty indicators of poverty headcount, poverty gap and severity of poverty, indicated that Limpopo was the poorest province (48,5%) in South Africa, followed by the Eastern Cape (35,7%) and then KwaZulu-Natal (33%). The Western Cape and Gauteng had the lowest poverty headcounts, with 9% and 10,1% respectively, as compared to the other provinces. Despite the obvious contributions of the various initiatives of government at addressing poverty in South Africa, poverty is still prevalent, mostly in the rural areas. In an attempt to break the widespread cycle of poverty among in the rural dwellers in the Eastern Cape, a new approach was conceived using indigenous poultry production as an intervention. The initiative was to make use of the resource farmers' endowed knowledge of age-old traditional methods of chicken production developing from "within" the farmers' socio-cultural setting, capitalizing on the indigenous knowledge of the farmers, and requiring simple technology and modest funding, and

yet with the potential to impact positively on the livelihoods of the rural poor, where poverty is endemic. The notion of using indigenous poultry to address the issue of poverty emerged after the South African government had initiated a critical analysis of the various programs on poverty reduction. None of these programs had included indigenous poultry as an intervention initiative. However, overwhelming support for the use of indigenous poultry in such initiatives is evident in the literature and has proved to be successful in some Asian countries, as well as Uganda, Benin Republic, Ghana, Botswana, Burkina Faso and Tanzania in Africa.

1.2 Conclusion

This chapter described the issue of poverty in South Africa. The majority of people in the rural areas live in appalling conditions. Agriculture has proved to be the cornerstone of most of the critical intervention initiatives launched by the government with the introduction of various agricultural programs and projects at all levels of government. Livestock projects are one of the main areas of focus of the government. Unfortunately, however, the use of indigenous poultry production (IPP) has not been exploited as a means of poverty reduction among the rural, resource-poor farmers, although the success of IPP in poverty reduction has been widely reported. The way in which IPP may be used to reduce poverty in South Africa will be discussed next.

CHAPTER 2

BACKGROUND TO THE STUDY

2.1 Introduction

Poverty has remained a global, regional and national issue for a long time now. Global efforts towards poverty eradication got a fresh impetus in the year 2000 when 189 United Nations member states and 23 international organizations agreed to achieve the Millennium Development Goals (MDG) by the year 2015 (United Nations Development Program, UNDP, 2012). The priority among the MDGs is the eradication of extreme hunger and poverty. The goal has targets that include: reducing by half the number of people living on less than a dollar per day; achieving full and productive employment and decent work for all, including women and young people; and reducing by half the number of people who suffer from hunger (UNDP, 2012). However, the reduction in the proportion of the people living on less than \$1.25 a day between 1990 and 2010 in Sub Saharan Africa (SSA) remained marginal, from 56% down to 48% in 2010; whereas in South East Asia, poverty reduced from 45% (1990) to 14% (2010) (MDGs Report, 2013). In a nut shell, the poverty situation in South Africa still remains a critical challenge to the government. For example, Statistics South Africa released a report titled “The Poverty Profile of South Africa: Application of the poverty lines on the Living Conditions Survey (LCS) 2008/2009”. Among the key findings of the report was that between 2008 and 2009, 26.3% of South Africans were living below the food poverty line of R305 per person per month; 39% were living below the lower-bound poverty line of R416 and 52% were living below the upper-bound poverty line of R577 per person per month. When these figures are aligned with the international standard, they indicate that 10.7% of South Africans were living on less than \$1.25 per day and 36.4% were living below the \$2.50 per day poverty line. The report further indicates that between 2000 and 2006, there was a decrease in poverty levels, but the levels shot up between 2006 and 2009.

After 1994, the challenges of tackling the pervasive poverty in South Africa had been prioritized by the past and newly elected governments. This led to the enactment of various policies and initiatives, and pragmatic steps were taken. The efforts in several projects yielded some dividends, but, data released by the Eastern Cape Socio Economic Consultative Council (ECSECC) (2012), indicates that there were approximate 22 million (44%) people living in poverty in South Africa, and nearly 3.9 million (57%) lived in the Eastern Cape. Research findings indicate that most of these people were located in the rural areas (Anriquez & Stamoulis, 2007; Sodjinou, 2011).

Efforts at improving the livelihoods of the rural populace, whose primary means of livelihood, most often, revolve round farming activities remain unproductive. Agriculture which employs a large percentage of the people remains a point of focus of the government and international agencies with the aim of attaining poverty reduction. Good investment in agriculture has been recognized as a potential engine for economic growth (Byerlee, de Janvry & Sadoulet, 2009:17). The report of the World Bank (2007:3) indicates that agriculture is vital in developing poorer economies and its' growth is critical for poverty reduction and overall economic development.

The contribution of agriculture to poverty reduction was empirically evidenced in the findings of the Forum for Agricultural Research in Africa (FARA) (2007: 1) that "for each 1% increase in agricultural productivity in Africa, poverty is reduced by 0.6%". Moreover, there has been strong empirical evidence aligning poverty reduction with improvement in the agricultural sector more so than what is obtained in the manufacturing sector. This, according to Thirtle, Lin & Piesse (2003: 23), is evident in research-led technological change in agriculture that generates sufficient productivity growth with high rates of returns in Africa and Asia. The reduction in poverty has been statistically put at 27 million people per annum, whereas productivity growth in industry and services has no impact. Machethe (2004: 4) also indicates empirical evidence from other countries in the world that have used smallholder agriculture to make a significant impact on alleviating poverty through improved agricultural productivity and rural incomes. For instance, in India, Ravallion & Datt (1996: 6) reported that growth in agriculture took place with the diffusion of high yielding crop varieties (HYCV) to farmers. This benefitted both urban and rural dwellers, while growth in manufacturing had no such impact on poverty.

The strong case for agriculture in reducing poverty was evident from the various development programs of the South African Government that include, land reform, Comprehensive Agricultural Support Program (CASP) and the Women in Agriculture and Rural Development (WARD). The efforts of the government are geared towards implementing a holistic program that will contribute meaningfully to improving the quality of life of rural dwellers. The South Africa rural community, just like any other, is a heterogeneous complex with diverse economic activities inter-related to farming. The entire land space is 12.76 million hectares of cultivated land, of which nearly 10.45 million hectares (82%) is used for commercial purposes (AgriSETA, 2010: 3). Of the total land hectare, 80% is used for agriculture and subsistence farming, and only 12% is arable (GCIS, 2010). Strategically, South Africa is placed at an advantage in livestock farming with grazing land surface of 69% (Palmer & Ainslie, 2006). The main agricultural practices are cattle ranching and sheep farming, mixed farming, crop production, dairy farming, game ranching, aquaculture, beekeeping, and winemaking (GCIS, 2010). Invariably, any project aimed

at alleviating poverty from the grass roots level must capitalize on livestock production as an entry point. This perspective serves as important initial supporting motivation for investigating the use and introduction of indigenous poultry production as poverty alleviating initiative.

2.2 Indigenous Poultry Production and Poverty Reduction

Livestock farming has been identified as playing an important role in the socio-economic development of rural households that use it as a means of economic survival (Ali, 2007: 2). Small livestock, such as sheep, goats, pigs and poultry are largely kept by land scarce, resource poor households for commercial purposes because of their low initial investment and operational costs (Birthal, 2002: 7). Chickens, considered at the bottom of the “livestock ladder”, not only serve as income revenue to poor African women who are raising the chickens (Bill and Melinda Gate Foundation (B&MGF), 2011: 3), but also provide important nutritional security and reduce livelihood vulnerability, and promote gender equity (Ahuja, 2004:16; Dolberg, 2003: 5, and Ahuja & Sen, 2007: 3). Chickens serve as one of the physical assets owned by the resource poor in most rural areas. The poultry industry in South Africa is of two kinds. The commercial poultry industry, which is highly organised and uses very sophisticated technology, contributes more than 17% of the total gross value of agriculture with the broiler industry currently producing an average of 18.6 million broilers per week, and growing steadily since 1990, when only 7.6 million broilers per week were produced (South Africa Poultry and Products Report, 2011). The South Africa poultry industry is a fast developing enterprise that is characterized by intensive management, mechanization and specialization, dominated by a few large companies who are both breeders and producers (Pedersen, 2002: 603).

On the other hand, the smallholder sector is characterized by small-scale commercial (semi-intensive) and communal (extensive) farming. The semi-intensive production system is labor intensive, using specialized breeds and utilising moderate management styles (Mapiye, Mwale, Mupangwa, Chimonyo, Foti, & Mutenje, 2008:1685). Mostly, at the rural and poor scale level, the extensive system of poultry production is dominated by scavenging chickens, which are not classified into specific breeds and scavenge for feed (Muchadeyi, Sibanda, Kusina, Kusina & Makuza, 2004:3). This set of extensive systems of poultry keeping is dominant in rural South Africa where the majority of the vulnerable reside (Fort Hare Institute for Social and Economic Research (FHISER), 2010: 10). According to Tsibane (2000: 33) not much work has been done on village or backyard poultry in South Africa. As a result of this, there is no accurate data on the actual population of the village or backyard poultry and its contributions to the total poultry population of the country (Bwala, 2009: 26). Mtileni, Muchadeyi, Maiwashe, Phitsane, Halimani,

Chimonyo & Dzama (2009: 20) also confirmed the lack of information on the status of chicken production in most communal areas of South Africa.

For this reason, while agriculture is the focal point of rural development, availability of data and scientific information are precursors to sound planning of any intervention. Furthermore, Minten & Barrett (2008) argued that improved agricultural technology diffusion in developing countries is seemingly the most effective means of improving agricultural productivity thereby reducing poverty and food insecurity. However, one critical area of challenge is the skills and competence of extension staff.

2.3 Problem statement

The Eastern Cape plays host to substantial numbers of households relying on the informal sector and public grants for survival and this is as a result of the high level of poverty, unemployment and hunger that characterize the province (ECGDP, 2004). The report of FHISER (2010) on social development confirmed that two-thirds of households rely on social grants while more households located in the rural areas (74.4%) receive more than in the urban areas (57.1%). Du Toit & Neves (2006: 160) reported the fact that social grants occupy a pivotal place in the survival strategies of the poor. The Eastern Cape Province (ECP), regarded as the 'homeland' of livestock, has a comparative advantage over other provinces, having accounted for 54.3% of the total of South Africa's indigenous poultry production, followed by KwaZulu Natal (KZN) with 36.7% (AgriSETA, 2010:15). This comparative advantage is yet to be fully exploited to address the poverty affecting the province, especially among resource poor farmers. More so, when one considers the risky crop production in South Africa brought about by acute rainfall deficits, climate change and what Ortmann & Machethe (2003: 711) identified as the relative scarcity of water in most areas and the low potential of arable land available to the subsistence farmers, indigenous poultry production could offer a better option for poverty reduction. The challenge of fighting poverty and malnutrition, according to Sharma (2007: 35), could be effectively met, to a large extent, by strengthening the indigenous poultry production that is practiced in many developing countries. Todd (1998: 14) argued for the use of village chickens as an effective means of breaking the poverty cycle. The favorable factors accounting for this are:

- a. village chickens is a common trend amongst rural dwellers, especially women and children;
- b. it is regarded as the livestock of the resource poor;
- c. it involves low technologies that are readily available; and

d. the technology is inherited from parents down the lineage

Keeping indigenous poultry has been proven to make a substantial contribution to indigenous food security throughout the developing world, with its low input requirements, which conform to the socio-economic conditions of rural families (Abdelqader, Wollny & Gauly, 2007). Sonaiya & Swan, (2004: 34) also confirmed that, keeping rural poultry has helped diversify incomes and provide quality food, energy, fertilizer and a renewable asset in over 80 percent of rural households. Despite the various opportunities available towards using indigenous poultry production to alleviate poverty in the rural areas, little research has been conducted in this regard in South Africa (Mwale & Masika, 2009) and little empirical evidence has been provided to back up the use of indigenous poultry to alleviate poverty in Eastern Cape Province. The emphasis of poultry research (Aklilu 2007) has often been on modern (intensive) production systems, with little adaptive research on indigenous poultry production.

As a result of this poor approach to IPP, evidence from Jacobs & Hart (2012:6) indicate that a coherent status of the skills development in various sectors germane to rural development does not exist. The authors further opined that available fragmented evidence indicates that most rural areas have severe skills deficits that are largely inherited from the past. According to Mlozi, Kakengi, Minga, Mtambo & Olsen (2003: 2) most rural communities lack the required husbandry skills, training and opportunities to effectively improve their indigenous poultry production, perhaps because it is considered as a side-line activity (Burgos *et al.*, 2007). Knowledge of production is a fundamental basis of forming a foundation of improvement (Mwalusanya, Katule, Mutayoba, Mtambo, Olsen & Minga, 2001:405). Important to knowledge of production are the local contents, as emphasized by Fernandez-Baca (1994) and World Bank (1998), which have by tradition and culture, sustained the management of indigenous poultry production over the years. The success factors inherent in adoption of new projects were established by DeWalt (1994) and Pretty (2000), who indicated that research aimed at improving agriculture and natural resources management by rural people could be more effective under a participatory program approach. For the chosen approaches to have a positive impact, the process should involve the development of appropriate technologies, and the recognition and cultivation of good local practices through the integration of information on farmers' perceptions, priorities and indigenous goals (Ashby *et al.*, 1995, Sperling *et al.*, 1993; Thiele, van De Fliert & Campilan, 2001). The role of agricultural extension workers is therefore crucial. As emphasized by AgriSETA (2010) in the National Education and Training Strategy for Agriculture (AET Strategy), three crucial areas revolving round agricultural extension were identified as:-

- a. Agricultural production: This aimed for the research to be expanded that will address the needs of the small-scale farmers and subsistence farmers with emphasis on mixed farming and rural livelihoods sustainability skills.
- b. Agricultural economics: A critical need gap was identified in general agricultural economic skills (ranging spectrum of farm planning, farm management, enterprise management, marketing, finance) with the need to train both the farmers and the agricultural extension officers in such fields, and
- c. Agricultural development: A specific need that identified the development of agricultural extension officers in supporting especially emerging and small-scale farmers over the full spectrum. It requires new curriculum in the training of new extensionists and re-training and upgrading of existing officers.

As a result of these challenging factors, a more robust analysis of skills supply and demand on IPP is required. Assessments across the value chains are needed to establish the role to be played by the agricultural extension workers and the intended beneficiaries of the technologies. This entails not only upgrading poor skills, but aligning these skills with farmers' agricultural information needs and the agricultural market intelligence (Yusuf, Masika & Ighodaro, 2013). It is therefore important to identify the capacity gap of agricultural extension workers along with that of the farmers, with an attempt to create a capacity development program for the two actors in the IPP programs.

2.4 Evaluating the indigenous poultry production systems in the Eastern Cape Province

There is dearth of information on research conducted on the characterization and the understanding of the constraints and opportunities of developing indigenous poultry in the Eastern Cape Province. According to Muchadeyi *et al.* (2005: 333-4), the lack of adequate information usually leads to difficulties in designing and implementing programs that could benefit rural households. However, to establish an efficient and effective extension working system, there is a need for an in-depth understanding and analysis of the present state of the indigenous poultry production system. According to Mtileni, Muchadeyi, Maiwashe, Phitsane, Halimani, Chimonyo & Dzama, (2009); and Danda, Mwamachi, Lewa & Jefa (2010), characterization of production systems should be the first step towards undertaking a study that could identify the threats and opportunities for holistic improvements of the indigenous poultry production system. Okeno, Kahi & Peters (2011) supported the steps as they help in understanding the production and management practices of farmers and the associated factors

germane to developing improved strategies. In carrying out characterization studies, Abdelqader *et al.* (2007:157) suggest that it should be carried out under an on-farm situation through the baseline data collection rather than on-station experimental studies. The characterization will delve into 'what', 'who', 'how', and 'why' in tracking all stages involved from housing, feeding, health care and marketing towards developing a concrete baseline and the perception of the farmers as regards keeping indigenous poultry to support livelihoods.

2.5 IPP and poverty reduction

Economic growth is an antidote of poverty reduction. According to Riise, Permin & Kryger (2005:13) any program aiming at growth for the pro-poor must be anchored on achieving income gains for the poor, promote demand, and provide active market participation. For these to be achieved, the authors advocated for the stimulation of economic activities where the resource poor are mostly located in the rural communities, and capitalizing within the economic space where most of them pursue their livelihoods, which is agriculture. Within the rural low-income agrarian economies, IPP has been identified as playing a significant role in food security. IPP is an important livestock production system that is making immense contributions to poverty reduction in many parts of the world. Various models had been established to open economic advantages for the resource poor farmers using IPP. Recent experiences from Bangladesh, Benin, Burkina Faso, Senegal and Togo have shown that it is possible to improve poultry production at village level, taken into consideration the socio-economic, cultural and local economies (Riise *et al.* 2005:14). The introduction of model to IPP entails consideration for all the factors associated with the production. According to Riise *et al.* (2005:16), the major challenge for improving IPP at rural level lies in organizational aspects, not in the technical. The authors concluded that strategies at organizing the production, at the village level, that will benefit smallholder farmers with 5-50 chickens, remain a big challenge. However, experience from the Bangladesh model (Ahmed, 2000) has shown that resource-poor IP farmers could be supported to upscale into successful small-scale enterprises and earn a modest living. According to Aliber & Hart (2009:435), there are approximately 3 million small scale farmers who produce food primarily to meet household consumption needs. These farmers will require institutional support to increase food production, improve livelihoods and transform into commercial farming. The approaches therefore must be adapted to suit local situations (DoA) (Department of Agriculture), 2005). In an attempt to address these critical issues, it is necessary to consider that Cerdan-Infantes, Maffioli & Ubfal (2009) advised, namely that producer have different

characteristics, such as land, productivity and structure of production that make for different objectives and needs.

2.6 General objective

The general objective of this research study is to characterize the indigenous poultry production systems in the Eastern Cape Province, analyze the capacity of both agricultural extension workers and develop an IPP model through which effective extension service delivery could be achieved to the farmers. The ultimate aim is to suggest policy interventions which could better support indigenous poultry production at the rural level as a step toward poverty reduction.

2.6.1 Specific objectives are to:

- a. Characterize the indigenous poultry production systems in the study areas.
- b. Determine the indigenous technical skills of the farmers (that is, their skills with regard to feeding methods, poultry house building, and ethno-veterinary methods) and analyze the capacity of the Agricultural Development Technicians (ADTs) on IPP.
- c. Analyze the agricultural growth options that can support the formation of a more comprehensive rural development component using indigenous poultry production.
- d. Evaluate the professional development of agricultural extension personnel in the study area.

2.6.2 Research questions

- a. What are the characteristics of the indigenous poultry production and management systems available to rural farmers in the study area?
- b. What are the current levels of technical skills of the IPFs and the capacity of the ADTs with regard to feeding, housing and health care program for indigenous poultry production?
- c. What are the working modalities, strengths and weaknesses of BPM, RAKAI, RIU, The Benin Model and Projet pour le Développement d'Aviculture Villageois (PDAV) models towards IPP for poverty reduction in the various countries where the models have been used?
- d. How suitable are extension personnel qualified to offer extension services on indigenous poultry production?

- e. What in-service training support should be provided for extension personnel to offer the needed extension support for indigenous poultry production?

2.7 Significance of the study

This study aims to contribute to providing well verified and essential information, perspectives and recommendations that will support:-

- a. Sustainable management of indigenous poultry production in the Eastern Cape Province;
- b. Increased indigenous poultry production that will provide an avenue for resource-poor farmers to increase production, enhance food security, reduce malnutrition, improve livelihoods and thereby, contribute to the overall goal of poverty alleviation;
- c. The multiplier effects (service support enterprises) for commercializing indigenous poultry production, for example, local veterinary workers, poultry feed millers, vet drug shops etc, to allow the industry to serve as an increasingly important employment avenue for rural people

2.8 Expected outcomes

Upon completion the following intended outcomes are expected from this study:-

- a. The development and supply of a functionally useable data base of the current status of indigenous poultry production in the study area in terms of numbers and systems;
- b. It will provide some important guidelines for designing appropriate extension interventions for indigenous poultry production in the region;
- c. It will also provide some important guidelines and suggestions for further study and investigation to further improve the support and servicing of the indigenous poultry sector not only in the research area but in the whole country.

2.9 Conceptual Framework

The South African scavenging breeds of chickens have been identified by the Agricultural Research Council (ARC) (2009) Breeding Unit to be of seven different breeds. These sets of breeds are well adapted to survive under harsh, low input conditions, with very basic requirements of shelter, feed, water and hygiene. Amongst these are the Potchefstroom Koekoek, Venda, Ovambo and Naked neck breeds (Grobbelaar, Sutherland & Molalagotla,

2010). The technology of rearing these small, scavenging birds is well known among the farmers, and passed from one generation to the other to sustain their livelihoods. Often, these are the animals that poor people keep (Dolberg, 2003).

The development of indigenous poultry for poverty reduction can be traced to Bangladesh in the early 1980s. The poultry project had its starting point in very small units of 5-10 adult birds to start a development program for rural women. The positive impact recorded caught the attention of the development community (Dolberg, 2003), which involved people in production, supply and services. It was named the Bangladesh Poultry Model (BPM). The success of the BPM opened doors for several other models adapted to different socio-cultural environments in developing countries, with a significant impact on poverty reduction. Notable amongst these were models in Africa in Ghana, Tanzania, Mozambique, Benin Republic and Rakai in Uganda. However, the success factors of the models vary from one country to the other. For example, the success factors of the BPM according to Riise, Christensen, Kryger & Seeber (2005:1-10) are simple and low cost technologies that are suitable to the local conditions, interest of the farmers in poultry, basic husbandry knowledge and availability, timely and adequate delivery of vaccines. On the other hand, Rota, Brett, Nahar, Rahman, Ali, Sarwar & Fattah (2006:1-6) attributed the key success in rural poultry development projects to the availability of day-old chicks (DOCs) which are viable for production and at a low cost for sustainability and economic viability. Similarly, independent consultants on poultry, Akter & Farrington (2008: 1-13), in a paper "Sustainability of an innovation for poverty alleviation: the case of Bangladesh Poultry Model", identified factors of sustainability of the BPM as being associated with the availability of training, experience, family burden, space constraint, access to market, infrastructure and shocks.

In Tanzania, the activities of Research Into Use (RIU), a non-governmental organization (NGO) that anchored the indigenous poultry production revolution, attributed the success factors to the institutional changes enacted by the government. Some of the changes on a number of domains include: research practice; policy process; markets and marketing systems; policy relevance and responsiveness to poor people; access to technology; access to input and output markets; financing; new patterns of partnerships; and new and existing organizations that play new roles (RIU, 2011).

The term indigenous poultry will be adopted, considering the baseline of establishing what the farmers have on the ground. The analysis of the indigenous poultry production will be from the socio-economic and biophysical environment of production as well as the health status of the birds with critical considerations of the success factors of various models. Because the focus of this study was on the use of indigenous poultry for poverty reduction, factors affecting chicken

rearing were considered essential. Therefore, the Bariadi model (Rural Livelihood Development Company (RLDC, 2010) framework is applied (Figure 1) for a clearer understanding. The bases upon which these factors are developed have strong support from the following facts about the production system:-

- a. The risky nature of climatic conditions in the Eastern Cape Province coupled with the relative scarcity of water in most areas and the low potential of arable land availability (Ortmann & Machethe, 2003:710), creates better options for indigenous poultry production;
- b. The production of scavenging chickens is not associated with land resource, which is one of the main production challenges among resource poor members of the community (Kitalyi, 1998: 81);
- c. Village chickens can provide a start for the owner to climb the 'livestock ladder', leading to the acquisition of other livestock species such as goats, sheep, pigs and cattle (Dolberg 2003: 34); and it does not require large start-up capital (Sonaiya & Swan, 2004: 18);
- d. Village chickens survive where other poultry species would not easily do so (Copland & Alders, 2009);
- e. Village chicken production involves flexible management styles that can be easily combined with other farming or non-farming activities because of the proximity of the chickens to homesteads (Bradley, 1992: 694).

In summary, the project seeks to change the trajectory of programs aimed at reducing poverty by focusing on indigenous poultry production (IPP). Basically, IPP is an age-old practice of the rural farmers indicating the presence of local technical skills. However, the key success factors to be used as solid foundation of this project will be anchored on simple and low cost technologies, interest of the farmers in IPP, capacity development of all stakeholders through the value chains, timely and adequate availability of inputs, a strong market linkage network, modest funding through a new concept of farmers' cooperative system, a new partnership initiative system and institutional support.

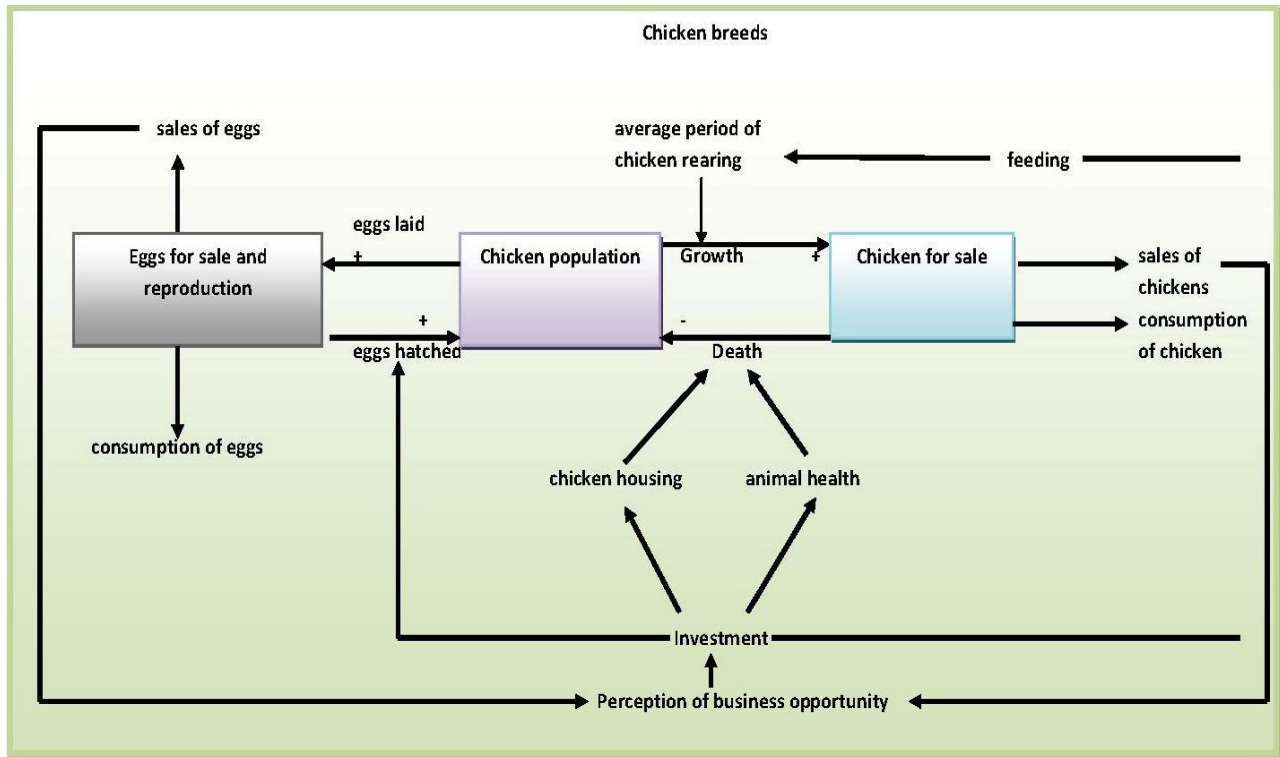


Figure 2.1: Factors affecting chicken rearing (Bariadi Model) Adapted from Rural Livelihood Development Company (2010)

2.10 Organization of the study

The motivation for the study is presented in Chapter 1. Chapter 2 provides relevant background information along with the problem statement, objectives, significance, thesis statement and conceptual framework. Chapter 3 examines the literature review of Indigenous Poultry Production (IPP). The origin of poultry models was traced to Bangladesh and the chapter explores how the model was modified and applied to the local contents in the adoptive countries. The critical success factors for IPP that include skills, knowledge and capacity development are also examined. Chapter 4 discusses the research design and methods employed in collecting data. It brings an explanation of the sampling procedure, the validity and reliability of the questionnaires and the procedure to ensure accurate data collection. The method of determining the sample size using power analysis is explained. An explanation of the survey design, brief socio-economic profile of the ECP, GPS-referenced map of the sample villages in Nkonkobe Local Municipality is also presented.

The four themes that formed the objectives of the study were presented using the technique of article writing format. The themes are described in chapters 5-8. The first theme examines the

characterization of the IPP systems, and is presented in Chapter 5. The demographic profile, economic and socio-cultural factors are also analyzed. The chapter further examines the housing types, feeding regime, health-care program, breeding program and the extents of commercialization of indigenous poultry systems.

Chapter 6 examines the indigenous technical skills of the indigenous poultry farmers and agricultural development technicians utilizing the 32 skill items developed from the review of literature. Skills development is a crucial issue in improving productivity. Skills items were grouped under the skills relating to housing, feeding, healthcare management, record keeping and market intelligence, and are discussed in the chapter.

Chapter 7 builds on the outcomes of the review of literature on poultry models in some part of Africa and Asia. An important aspect of project success is its' sustainability. The theoretical concept of the "open system theory" (OST) was therefore used to articulate the study. These two parameters formed the foundation upon which a production model is suggested for the ECP.

Chapter 8 examines the capacity development of the human resource of the Department of Rural Development and Agrarian Reform (DRDAR) of the Amathole district. The study examines the Amathole district in order to secure a representative sample size for the agricultural development technicians (ADTs). Capacity Development encompasses human resource development (HRD) as an essential part of development. Armed with this concept, education and training lie at the heart of development efforts and that without HRD most development interventions will be ineffective. The modalities and the capacity development programs of the department are examined and noted in the chapter. The core value of capacity development is to improve the knowledge, skills and understandings and develop the attitudes needed by the ADTs to bring about the desired developmental change in the IPP in ECP.

Chapter 9 presents the summary as well as conclusions and recommendations. Directions for future research based on this thesis are also proposed.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

Civilization of mankind started with the domestication of livestock (Sharma, 2007), which plays a pivotal role in the livelihoods of the rural masses in developing countries. Chickens have been domesticated for thousands of years. Archaeological evidence suggests that domesticated chickens existed in China 11,000 years ago (Alders 2004:11). Domesticated chickens appeared in Africa many centuries ago (Copland & Alders, 2009), making them an established part of African life. Chicken rearing is important to rural dwellers as scavenging birds in Asia (FAO, 2003; Islam & Jabbar, 2005) and Latin America (Mallia, 1999; Kyvsgaard, 2007). Approximately 800 million chickens (Dube, Zindi, Mbanga & Dube, 2010: 911) are found in Africa. However, the system of rearing is mostly free range, with chicks' mortality rate between 80-90% within the first year of hatching (Kelly, Chिताuro, Rohde, Rukwava, Majok & Davelaar, 1994; Permin, Riise, Kryger, Assoumane & Schou, 2004).

For many decades, the livelihoods of the resource poor households were more synonymous with indigenous poultry rearing than any of the other large livestock species, such as sheep, goats and cattle (Copland & Alders, 2005). According to Guèye (2000:130); Riise, Permin, Larsen & Idi (2004: 16), 85% of rural households in sub-Saharan Africa (SSA) keep chickens or other types of poultry. The production style common to scavenging village chickens include poor housing, feeding and poor health control programs (Awuni, 1989; RLDC, 2010). As a result of these, the local chickens are confronted with poor reproductive performance, poor growth rates, diseases, mortality and predation (Salum, Mtambuki & Mulangila, 2002; Conroy, Sparks, Chandrasekaran, Sharma, Shindey, Singh, Natarajan & Anitha, 2005). However, the traditional production of these scavenging chickens has been able to provide over 70% of the chicken products and 20% of animal protein intake of most African rural dwellers (Kitayi, 1998: 81). They are mostly owned by women and managed by women and children (Yakubu, 2010). Although the indigenous birds have low productivity, the birds are more adapted to unfavorable climatic conditions, particularly the extreme tropical heat (Yakubu, 2010). Economically, they provide animal protein in the form of meat and eggs and could be sold or bartered in exchange for other essential family needs and petty cash (Sonaiya & Swan, 2005; Dube *et al.* 2010). The purpose of rearing is mostly for home consumption, or as gifts and for religious purposes (Sonaiya, 2004: 525). Apart from being sources of food security, village chickens play an active role in pest control (Kelly *et al.* 1994: 626) and are readily available for traditional ceremonies and festivals (Muchadeyi *et al.* 2004). According to Dube *et al.* (2010: 913) village chickens also fulfill a

number of significant roles in the livelihood of resource poor farmers that are difficult to assign any monetary value to. The system of production is mostly free-range, characterized by a family ownership where birds are left to scavenge for feeds to meet their nutritional needs. Housing may not be provided (Huchzermeyer, 1973, Kuit *et al.* 1986, Atunbi & Sonaiya, 1994), and where this is done, it is usually made of local materials (Atunbi & Sonaiya, 1994:7). The scavenging chickens have no regular health control programs (Awuni, 1989) and, as a result, the local chickens are confronted with poor reproductive performance, poor growth rates, diseases, high mortality and predation (Salum *et al.* 2002; Conroy *et al.* 2005). In spite of the numerous challenges, Roberts & Gunaratne (1992); Sonaiya & Swan (2005) confirmed that small farming families, landless laborers and people with incomes below the poverty line were able to raise village birds with low inputs and harvested the benefits of eggs and meat via scavenging feed resources.

Rural chicken development programs started in the 1950s in Africa (Fermet-Quinet, 2005: 57), with an attempt to improve the genetic configuration for increased production, improved feeding, shelter and marketing. Poultry farming finds special favor with the rural people because of its potential to provide a supplementary income in the shortest possible time, its simplicity of operation and not too heavy demand on resources (Iqbaluddin, 1998). According to Riise *et al.* (2004:16) village-based poultry production systems is classified into three different categories comprising of traditional free-range, improved free-range and small-scale confined rearing systems (Table 3.1).

Village chickens provide a flexible livestock-production system that is widespread in most African and Asian countries (Alders 2004; Copland & Alders, 2005). When agro-ecological issues and the demographics of the human population are considered, village chickens often rank highly in terms of being an existing resource whose productivity can be increased with only a modest input (Copland & Alders, 2009). Village chicken systems do not require large investments to start or maintain (Alders & Spradbrow, 2001; Alders, 2004) unlike commercial poultry production, which requires large capital inputs, considerable technical skills and sophisticated markets (Copland & Alders, 2009). Village chickens can provide the start of the owner climbing the 'livestock ladder', leading to the ownership of other livestock species such as goats and cattle. This allows a progression of increasing economic activities for poorer people to improve their circumstances (Dolberg, 2003). However, rural poultry is not rated highly in the mainstream of national economies because of the lack of measurable indicators (Awuni, 1989). However, Mapiye *et al.* (2008: 1684) attributed the low returns on village chicken production in rural areas to insufficient rigorous and action research, the use of inappropriate economic

models to measure production and financial returns and failure to consider all uses. Moreover, the non capturing of the chickens' multiple non-cash outputs, such as manure, traditional purposes, home consumption, social obligations and status into livelihood models, has created the non recognition by the agricultural extension personnel and the policy makers.

Table 3.1: Village-based poultry production systems

	Traditional free-range (1-10 birds) Low input/low output	Improved free-range (5 – 50 birds) Low input/low output	Small- scale confined (50-200 birds) High input/ high output
Prevalence	Majority of rural families	Moderate number of rural families	Few rural families
Ownership	Owned mostly by women	Owned by women and family	Business men
Consumption	Home consumption	Home consumption and sale on local markets	Business income
Income focus	Small cash income	Family income	Credit based on assets
Social focus	Social and cultural importance (gifts, religious)	Social importance Micro-credit	Little social importance
Types of breeds	Indigenous breeds	Indigenous/ improved breeds	Hybrids (broilers or layers)
Mortality rate	High mortality	Moderate mortality	Low mortality
Feeding regime	No feeding (scavenging)	Local feeds (semi-scavenging)	Balanced feeds
Vaccination program	No vaccination	Newcastle Disease vaccination	Several vaccination schemes
Medication program	No medication	Little medication/local remedies	Full medication
Housing program	No housing	Simple housing	Houses with cages or deep litter
Production	Egg production: 30-50 eggs/year/hen	Egg production: 50-150 eggs/year/hen	Egg production:250-300 eggs/year/hen
Brooding characteristics	Long broody periods	Short broody periods	No broodiness
Growth rate	Growth rate = 5-10 g/day	Growth rate = 10-20 g/day	Growth rate =50-55 g/day

Adapted from Riise *et al.* (2004)

The authors concluded that because the indigenous poultry products are consumed mainly by the farming family without passing through the formal markets, researchers and policy makers do not appreciate the significant contribution of such products.

The production levels of rural poultry in many African countries fall far below desirable levels while outputs in terms of weight gain and the number of eggs per hen per year are very low coupled with high mortality rates (Matthewman, 1977; Sonaiya, Branckaert & Guèye, 1999). The poor production state according to Sarkar & Golam (2009: 257) was attributed to the multiple functions performed by the indigenous poultry. The authors stated that indigenous poultry lay eggs, hatch chicks, brood over them and care for the chicks. These multiple functions prevented the indigenous poultry from fulfilling their full egg production potential (Sarkar & Bell, 2006). In spite of all these challenges, the village chickens still play a significant role in the national economy of developing countries, contributing to improving the nutritional status and income of many smallholder farmers and landless communities.

3.2 Importance and contributions of village chickens to food security of households

3.2.1 Low labor requirements

Village chickens are highly suitable for female headed households (whose number may increase due to civil wars/disturbances and HIV/AIDS) as they can manage and protect their poultry assets satisfactorily (Copland & Alders, 2005; IRPC, 2005).

3.2.2 Provision of high-quality nutrition

The village chickens are sources of cheap, readily harvestable protein-enriched chicken meat and eggs, and are available too for immediate home consumption, and at times, are converted to income generation (Dolberg & Petersen, 2000; Mapiye & Sibanda, 2005; Miao, Glatz, & Ru, 2005; Copland & Alders, 2005). The size of one bird is sufficient for a family, and a cold storage chain is not required for the preservation of “leftovers”. Village chickens survive where other poultry species would not easily do so (Copland & Alders, 2009).

3.2.3 Income generation

Village chickens provide income for family activities such as education, health and clothes. According to Mapiye *et al.* (2008:1683), village chickens are reserve banks or buffers for immediate access to liquid cash for the payment of school fees, medical costs, village taxes and other uncertainties. The extent to which chickens are used as buffers or banks depends on the

socio-economic status of each rural household (Julian, 1992; Muchadeyi *et al.* 2004). Village chickens have constantly commanded a premium price over commercial birds and there is a wide market demand for village chickens products (Copland & Alders, 2009). The most preferred quality chicken and egg come from this sector, which is sold at a premium market price.

3.2.4 Gender sensitive

The management of village chickens is generally gender skewed in favor of women and children who own the chickens and, most often are an essential pillar of food security of female-headed households (Guèye, 2000; Bagnol, 2001).

3.2.5 Low environmental impact

Compared with commercial birds and ruminants, village chickens are more environmentally neutral (Alders & Spradbrow, 2001). They are well suited to remote areas where there are limited markets. For example, Guèye (2000: 131) indicates that poultry has a mystical function in Senegal and farmers believe that bad spirits which target the family can be diverted to chicken. As a result of this, the chosen birds often show neurological symptoms. The author further indicated that chickens perform a hygiene function as they feed on household refuse, earthworms and insects. These are returned to the soil in the form of manure.

3.2.6 Robust and agile

Village chickens are better survivors in natural disasters such as floods and fires. Alders & Spradbrow (2001: 59) explained that village chickens can fly and run to escape disasters and predators unlike commercial birds, which lack such agility.

3.2.7 Cultural and social life

The village chickens are regarded as playing an important role through their contribution to the cultural and social life of smallholder farmers who are, in the main, resource poor (Dolberg & Petersen, 2000; Pedersen, 2002). In some cases, farmers give birds and eggs as gifts to visitors and relatives, and as starting capital for youth and newly married women as well as a token of appreciation for services rendered (Kusina & Kusina, 1999).

Table 3.2: Comparison of village and commercial chickens

Feature	Village chickens	Commercial chickens
Labor	Inputs minimal	Considerable
Housing	Trees; chicken houses of local material; Inexpensive	Chicken unit using conventional materials; Expensive
Nutrition	Scavenging feed resource base, leftover food, cereals, no supplements; inexpensive	Balanced commercial ration; expensive
Water	Well water, used water, natural sources	Clean water supply essential
Production	Low; could improve with better nutrition,	disease control and shelter from predators High; but requires a high level of inputs
Meat quality	Little fat; pleasant flavor; preferred texture	More fat; less flavor; poorer texture
Adaptability	Good: good flight skills, more likely to escape predators, can scavenge for own food	Limited: poor flight skills, easily caught by predators, less skilled at scavenging
Veterinary inputs	None; Newcastle disease vaccination; highly pathogenic avian influenza and fowl cholera vaccination in some countries	Control of many viral, bacterial and parasitic diseases essential for efficient production
Environmental impact	Minimal: can be positive through provision of organic fertilizer and pest control	Negative: intensive production of cereals for rations; occasional improper use of antibiotics, excess ammonia production

Adapted from Copland & Alders (2009)

3.3 Poverty

Poverty remains an issue of discussion in the economy of the South Africa due to its negative impact. Since 1994 when the country became democratic, various initiatives and policies have been enacted and steps taken towards poverty reduction. Poverty, according to the description by the Eastern Cape Province (ECP) (2009: 14) is ‘the inability of individuals, households or communities to command sufficient resources to satisfy a socially acceptable minimum standard of living. It is more than merely income insufficiency. It includes a lack of opportunity, a lack of access to assets as well as social exclusion’. The ECP, through organized debates on poverty in the 11 poorest Local Municipalities within the Province in 2009, revealed that the most vulnerable groups to poverty are:

- a. Older people;
- b. The unemployed- mostly the youth with low levels of education;

- c. Children- mostly those who grew up in poor families;
- d. Women – especially single parents and particularly black women and the discriminated against on gender basis;
- e. People with disability – mostly the physically challenged;
- f. People living in poor areas, who are predominantly settled in the former Bantustan regions, informal settlements and historically black townships.

Poverty is a challenge to development (Eneh, 2011: 2), and its presence anywhere is a threat to development everywhere. It manifests in household lack and denial, unemployment, illiteracy, water and sanitation crises, inadequate medical services, poor child welfare and health and gender issues. According to Sharma (2007: 36), poverty is one of the main causes of food insecurity and civil conflict. It also poses as a barrier to the achievement of sustainable economic and social development. It is characterized by large inequalities in wealth distribution between rural and urban areas, which restricts the growth of domestic markets and contributes to the stagnation of agriculture. But, in whatever form poverty is approached, the clear understanding of the entire world is the need to reduce poverty. This came to fruition in September 2000 when the largest-ever gathering of world leaders endorsed the Millennium Declaration by 189 countries. The eradication of extreme poverty and hunger was the number One Millennium Development Goal (MDG1).

A significantly large proportion of South Africa's population (43 %) still live more or less permanently in rural areas (Jacobs & Hart, 2012: 5). South Africa has high levels of poverty, especially in rural areas where approximately 70 % of its poor people reside (StatsSA, 2003). The poverty challenge is first and foremost a rural phenomenon with overwhelming majorities as smallholders (Department of Agriculture, Forestry and Fisheries (DAFF), 2011). Studies in South Africa by Aliber (2005, 2009 cited in Baiphethi & Jacobs, 2009:466) have shown that the number of households engaging in subsistence agriculture as a main source of food and income is declining, while there is a rise in the number of households engaging in subsistence production as an extra source of food. The paradigm shift in the farming business indicates the willingness to commercialize farming. However, as discussed earlier, the poor skills of the farmers remain a daunting challenge.

The holistic efforts of the government are noted in all spheres of human intervention for poverty reduction. Notable amongst the intervention initiatives is the use of agriculture to address poverty. Agriculture has been identified as a strategic sector that could address the multiple

challenges of achieving the broad based objective of economic growth, creating wealth and employment, reducing poverty, and attaining national food security.

3.3.1 Agriculture and poverty reduction

Agriculture continues to be Sub-Saharan Africa's dominant economic activity. According to the World Bank report, (2007 cited in Raabe, 2008: 2), agriculture accounts for 40% of African GDP, 15% exports and 60-80% of employment. However, Cervantes-Godo & Dewbre (2010: 4) asserted that much of the teeming populace of Africa, who depend on agriculture for a living, still remain poorer than others who work in the non-agriculture sectors of the economy. Furthermore, The Netherlands' Directorate-General for International Cooperation and Wageningen UR (DGIS-Wageningen UR) (2013: 8) partnership for pro-poor development in a proposal titled "Globalization and Sustainable Rural Development", stated that "Over three-quarters of the African population lives in rural areas, most of them being dependent on small-holder agriculture (crops, livestock and mixed systems) under conditions of degenerating natural resources including water and biodiversity".

Elsewhere, there has been empirical evidence of where agriculture has been used to reduce poverty. For example, a paper produced by Department for International Development (DFID) (2004 cited in Cervantes-Godo & Dewbre, 2010:6) shows a historically close correlation between different rates of poverty reduction over the past 40 years and differences in agricultural performance – particularly the rate of growth of agricultural productivity. The authors identified four transmission mechanisms which rested on a growth rate in agriculture. These are: "a) a direct impact of improved agricultural performance on rural incomes; b) the impact of cheaper food for both urban and rural poor; c) agriculture's contribution to growth and the generation of economic opportunity in the non-farm sector; and d) agriculture's fundamental role in stimulating and sustaining economic transition, as countries (and poor people's livelihoods) shift away from being primarily agricultural towards a broader base of manufacturing and services". In SSA and mostly in Asia countries, Haggblade, Hazell & Reardon (2007) have documented the existence of positive multiplier effects from agriculture to non-agriculture. The green revolution of Asia countries in the 1970s and 1980s actually proved the impact of agriculture to reduce poverty, as it became the engine of growth for the industrial sector. Agriculture remains a panacea for poverty reduction and rural development in Africa. According to Christiaensen, Demery & Kuhl (2011), agriculture remains the survival enterprise of the majority of poor people in the developing countries. Growth in agriculture has been described as having the power to reduce poverty in most agriculture-based economies (Salami, Kamara &

Brixiova, 2010). According to the World Bank (2008), the expansion of smallholder farming systems through income raising and reduction in food expenditure will reduce income inequality. Ravallion (2001) also asserted that an increase in average household income by 2% leads to a fall in the poverty rates by about 4% on average. In line with that assertion, the 2008 World Development Report observed that growth in GDP originating from agriculture is about four times more effective in reducing poverty than GDP growth from other non-farming sectors (World Bank, 2008).

As a result, a concerted effort has been advocated towards the redesigning of policies and more investment in agriculture, which will promote 'pro-poor' or 'shared' growth, with an impact on poverty reduction (Kraay, 2006: 201). This is with the intention that the majority of poor people living in rural areas that depend on agriculture (World Bank, 2007) will benefit more from improved livelihoods. However, there are other opposing arguments that agricultural development will not benefit the poor but only larger farmers, particularly in Africa (Maxwell, 2004; Collier & Dercon, 2009). Hope was never lost, as other authors argued that benefit could come through the indirect labor market and employment expansion in non-traditional agro export sectors (Anriquez & Lopez, 2007; Maetens & Swinnen, 2009).

3.3.2 Agricultural extension in the life of the smallholder farmers

The agricultural sector in the developing world is changing rapidly and is driven by a number of external and global factors. The challenges the sector is facing are ever increasing and becoming more complex. Consequently, the demands placed on extension services which have a crucial role to play in promoting agricultural innovation to keep pace with the changing context and improve livelihoods of the dependent poor, have also increased greatly (Anandajayasekeram, Puskur, Sinduworkneh & Hoekstra, 2008:13). The well-being of the rural population is invariably linked to the performance of the agricultural sector and to the sector's ability to cope with the challenges that result from rising population pressures, changing demand for food and agricultural products, resource scarcity, climate change, and greater production uncertainty (Raabe, 2008). The World Development Report 2008 (World Bank, 2007 cited in Raabe, 2008:7) emphasizes agricultural extension as an important development intervention (a) for increasing the growth potential of the agricultural sector in light of rising demand- and supply-side pressures, and (b) for promoting sustainable, inclusive, and pro-poor agricultural and hence economic development. South Africa (SA) is yet to overcome some of the challenges militating against smallholder farmers. There are challenges relating to the inadequate delivery of extension services and capacity development that could lead them out of

poverty. These smallholder farmers reside in rural areas and are still largely dependent on primary agricultural activities as their primary livelihood strategy. According to Takenaka (2006) agricultural extension services have failed in improving the life of rural smallholder farmers for various reasons, which may include but are not limited to, their weak organizational structure, insufficient incentives to extension workers, poor participation of target groups, and lack of communication among researchers, policy makers, and extension workers. This situation was well captured by Worth (2008) that agricultural development and extension to the smallholders seem to have focused on technology transfer around primary production without adequate reference to some crucial issues relevant to farmers and land users. Statistics from the National Department of Agriculture (2002) showed that about 80% of extension staff are unqualified for the job and this has a negative impact on their ability to deliver technical information. In addition, the ratio of extension agent to farmers, according to Shao *et al.* (2004: 595) is 1:1500, which is too high for extension agents to provide quality services for farmer training, field visits, and other services. These challenges have largely prevented the extension system from adequately and responsively addressing the needs of smallholder farmers.

The smallholder farmers on the other hand are not without any knowledge or farming skills. Their capacity to produce food, fiber and fuel requires further development in the face of emerging challenges in farming activities and management. Thus, the extension services have a crucial challenge in addressing these challenges in the most pragmatic way. Extension personnel have to be adequately equipped with knowledge, the correct attitude, and technical information for effective extension delivery. The South African agricultural extension systems are in transition, having come from a system that largely ignored subsistence farmers. The new agenda of extension programs, according to the World Bank (2002), requires a paradigm shift from agricultural production to services relating to marketing, environmental conservation, poverty reduction and off-farm activities. Thus, the new agenda places an enormous task on the South Africa agricultural extension system towards the development of a new approach, focused on subsistence farmers. The new approach requires a re-examination, re-programming, re-forming and re-directing, in order to address rural poverty.

A critical analysis of extension services worldwide indicates there is considerable scope to include rural development. Unfortunately, traditional extension systems are still common. The essential processes of updating staff and recruiting new ones are not taking place fast enough and have hindered impact. The emphasis on a holistic approach to rural development is challenging traditional extension roles like training farmers, disseminate technologies, scaling-up and market linkage. Although the scope of work for extension officers has expanded

significantly since 1994 in SA, Vink & Rooyen (2009) explained that extension services have created a significant shift in client focus. This shift has required staff to play new roles, including institutional development for small farmers, assisting them to get access to finance and other production requirements, to market their produce, and to access second-economy, government support projects, such as cooperatives, land reform, food security and land care.

However, SA agricultural extension service delivery is still mired with challenges the new participatory programmed extension approach (PPEA) notwithstanding. For example, Akpalu, (2013) reported poor extension service delivery to the small-scale farmers in a case study of Thorndale in the Limpopo Province, South Africa. The author explained that the contact between farmers and extension officers has been restricted to verbal instructions rather than demonstrative, innovative and hands on practical guidance to the farmers. Also, an acute shortage of extension personnel with appropriate skills has been reported in South Africa, as only 20% of extension personnel possessed the spectrum of appropriate generic skills deemed necessary to perform effectively (DAFF, 2008). This lack of technical competence might be a reason for poor and insufficient service delivery. According to Akpalu, (2013: 8038) extension officers and systems often lack on-the-ground supervision by managerial staff including inadequate incentives for good performance, that often result in poor productivity and low morale. The role of agricultural extension services, according to Glendenning, Babu & Asenso-Okyere (2010), is to facilitate problem solving, create essential market linkages with other players in the agricultural value chain and provide access to information, skills, and technologies. Within the agricultural fields, authors like Feder, Willett & Zijp (2001) and David (2008) placed the farmer at the centre stage along with agribusinesses, extension officers, researchers, trainers and educators. In creating effective communication therefore, several authors (van Veldhuizen, Waters-Bayer & de Zeewu, 1997; Machethe & Mollel, 2000; Adhiguru, BIRTHAL, & Kumar, 2009; Glendenning, Babu & Asenso-Okyere, 2010; Akpalu, 2013) have identified a two-way communication flow where problems flow from farmers and agribusinesses to the extension officers and researchers, who, in return help in solving the problems and relay solutions back to the aforementioned stakeholders. Extension services in agriculture are, therefore, indispensable and aim to improve production and processing, flow of information and transfer of knowledge and scientific findings to farmer (Zivkovic, Jelic & Rajic, 2009). And in this context, agricultural extension personnel have to be competent in agricultural skills, to communicate efficiently with producers and stimulate agricultural extension clientele to acquire new knowledge and skills.

3.4 The role of smallholder poultry systems

In Bangladesh, where a large proportion of the rural people are landless or poor, family poultry has been used effectively to reduce poverty through the various projects that have used the so-called Semi-Scavenging Smallholder Poultry Model. Alam (1997) showed that among the beneficiaries of one of such projects called, the Smallholder Livestock Development Project, monthly income increased by 3.19 US\$ and total savings by 27 US\$; while at the same time consumption of eggs, chicken, meat, and milk also increased. Bangladesh has successfully developed a model called “Small Farming Poultry Development Model” which is popularly known as the “Bangladesh Model”. It aims to improve the productivity of native chickens through the supply of birds with improved productivity, the supplementation of scavenging with feed, the training of villagers, cheaper credit from local rural banks and the involvement of NGOs and SHGs (Sharma, Banerjee, Singh & Singh, 2001).

China has successfully retained most of its indigenous poultry germplasm and has been able to considerably improve its productivity by two fold from a meager production of 60 eggs to 120 eggs a year (Sharma, 2007). China is also one of the largest producers of chicken eggs and meat in the world, 80% of which came from family poultry.

Findings in India estimated that 10 native hens can provide the same income as what a woman earns from a day’s work and she can stay at home and take care of her children and other household activities without affecting the family income (Banerjee & Sharma, 1998: 506). It requires less capital, has wider acceptability and gives quick returns and hence more crops turn-outs per unit of time.

3.5 Skills development programs for indigenous poultry production

Skill is one of the key elements essential contributing to the prosperity of nations and to better lives for individuals. For society, skills represent a major component of its productivity, competitiveness and innovation. According to the World Bank (2004), skills are an important means to increase incomes and sustainable livelihoods for the poor. Skills development according to Food and Agriculture Organisation (FAO) (2010:1), and a policy brief prepared by Eskola & Gasperini, (2010) “is central to improving rural productivity, employability and income-earning opportunities, enhancing food security and promoting environmentally sustainable rural development and livelihoods”. A successful farming enterprise requires that farmers be equipped with new knowledge, skills and competencies even at the ‘low’-level end of the jobs’ skill spectrum (Williams, Packham, Thomas & Thompson, 2010).

3.6 Training and skills development

Training is a major component of human resource development (HRD) that adds to the general learning and development efforts (Walton, 1999). Training and skills development has been identified as an important step towards poverty eradication in the Sub-Saharan African region (Sydhagen & Cunningham, 2007). The success story of the utilization of IPP in poverty eradication had been linked to training, skills and capacity development of all the stakeholders, who are majorly the farmers and extension personnel.

3.7 Small scale farmers' skill improvement

Skills' training was the basis upon which the Bangladesh poultry model achieved its success. According to Huque (1996), the training programs have the following components:-

1. Group formation of IPFs: this was based on interest, needs of incumbent and their level of social and educational background.

The training program was based on:

- a. Theoretical training on poultry production and health care management along with practical knowledge;
 - b. Functional training at the farm level involving all stages of poultry production to the final stage;
 - c. Refresher training at certain intervals following the problems faced by the poultry farmers are organised to upgrade farmers' skill and management practises.
2. Demonstration: Demonstrations in each step of the production chain along with its economic benefits and sustainable production systems.
 3. Group meetings: Group meetings among the IPFs with the technical official. Organised Farm Visits: Regular farm visits in a group with the members of IPFs to the neighbouring poultry farms/ demonstration farms.
 4. Mass communication: This is the use of radio, television, and video to propagate technologies on all aspect of IPP with its economic viability.
 5. Publications: Publication and distribution of posters, leaflets, pamphlet, training materials etc. are recognized as tools for skill improvement.
 6. Input services: Input services like birds, feeds, vaccines and medicines, credit etc. are essential for expressing the skills following the training.
 7. Advisory services: Advisory services for continuous upgrading of technical knowhow are regularly provided by the extension workers.

8. Efficiency improvement training: Efficiency improvement training is conducted to increase the level of skills for higher technical knowledge.
9. Output services: Output services such as an increased focus on marketing and processing of the products are pursued vigorously for skill improvement.
10. Field days, workshops and seminars: are essential components of the training activities that increase farmers' knowledge and skills.
11. Inter-agency cooperation: for continuous inputs and outputs services are used for keeping standard flow of the operation which helps to maintain the improved skills.
12. Management information system: A group of best farmers' skills and information are pulled together through a management information system and identify best management practices for higher production, and transfer these gained experiences to the other producers.

3.8 Conclusion

Chapter three had a critical look at the development of indigenous poultry production over time and its' contributions to the socio- economic well being of the resource poor farmers most especially the women. Poverty, which is still a major challenge confronting South Africa, was analyzed with the identification of the most vulnerable groups to poverty in the society. The inter-relationship between poverty and agriculture was discussed with empirical evidence of the contributions of agriculture towards poverty reduction. The significant contributions of indigenous poultry production to poverty reduction were also discussed and supported by evidence from some countries with success stories. Finally, skills and training that are critical in farming enterprises were also discussed.

In conclusion, it is evidenced from the literature that, the fight against poverty in the society can be effectively carried out using indigenous poultry production. However, because the IPP has not been consciously introduced in the various government poverty reduction initiatives in the Eastern Cape Province of South Africa, it is vital that a situation analysis is carried out with an attempt to ascertain the state of inputs and level of knowledge and skills of the farmers in IPP.

CHAPTER 4

METHODOLOGY

4.1 Research design

Research design is the blueprint in terms of which a study is conducted (De Vos, Buyens & Schalk, 2003). The methods for determining the type of capacity development needed in extension varies and they depend on which focus of the research and the objectives are to be realized. This research studied the nature of indigenous poultry production in the Eastern Cape Province under on-farm conditions with a view to providing baseline data and evaluating agricultural extension services to rural farmers. The research was approached from two different perspectives: that of the farmers and of the extension services in order to arrive at more detailed information about the capacity development program for extension. The approach was both quantitative and qualitative with design methods of investigation gathered from questionnaires and participatory research. A descriptive study, amongst others, attempts to explain the reasons for the characteristics of a population by examining samples of the population (Cooper & Schindler, 2003). The approach was to carry out a needs analysis of the indigenous poultry farmers using questionnaires. The capacity of the extension workers was analyzed using questionnaires with the skill variables derived from the indigenous poultry farmers' needs analysis. Also germane to this work is the rating of the capacity development training for the extension workers as conducted within and by external institutions.

4.2 Survey design

The research design consisted of three data collection sets with questionnaires. One of objectives was based on the theoretical concepts for the development of a model.

- a. Needs and Situation Analysis Questionnaire (NSAQ) for indigenous poultry farmers (IPF) in the Eastern Cape Province (ECP) of South Africa. The Bottom-up Demand Driven Extension Strategy (B-upDDES) was used to identify farmers' needs, the demographic description, the method of housing, feeding, health care system, record keeping and marketing chain of indigenous poultry production by respondents. B-upDDES is research generating data from the grassroots, community base approach in which programs are determined by those who will benefit from the results. According to Nwana (2011), it is a system of research that looks for a more rational combination of science with practice where practice is being referred to as Indigenous Knowledge (IK) (Nwana, 2011). According to the Millennium Ecosystem Assessment

(MA), science is to give deserving recognition to IK in order to improve sustainability and environmental friendliness in the promotion of overall human well-being (Thaman, Lyver, Mpande, Perez, Cariño & Takeuchi, 2013). The questionnaires delved into identifying those IK that have sustained the IPP over the years from generation to generation.

- b. A Likert-scale type of questionnaire was used for the skills competency measurement of both the IPFs and the ADTs. The 32 skill items used to develop questionnaires were identified from the review of relevant literature on skills essential to indigenous poultry production (Sonaiya & Olori, 1990; Roberts & Gunaratne, 1992; Sonaiya, Branckaert & Gueye, 1999; Safalaoh, 1997; Sonaiya & Swan, 2004; Riise, Permin & Kryger, 2005; Sharma, 2007; Osinem, 2008). The major factors identified by the various authors as essential for the farmers in the management of IPP are: housing, feeding, breeding, and health care, marketing and record keeping. The questionnaires consisted of questions eliciting information on the basis of the skill assessment competency level from poor (1), fair (2), good (3), very good (4) and to excellent (5).
- c. The Capacity Assessment Questionnaire (CAQ) for the agricultural development technicians (ADTs) of the Amathole district, Department of Rural Development and Agrarian Reform (DRDAR), Eastern Cape Province (ECP), South Africa elicited information on demographics, professional experience, and capacity development training, amongst others. Likert-type rating scale questionnaires were used to rate the various types of capacity development programs of the DRDAR. The scale ranged from 1 (Not effective), 2 (A little effective), 3 (Effective), 4 (Very effective), and 5 (Most effective)
- d. The analysis of a theoretical concept of “open social system” theory (Allahyari, 2009:781) was used to come up with a conceptualized production model for indigenous poultry keeping in the Eastern Cape Province. According to Norlin (2009) a social system is a situation where two or more persons work together in a coordinated manner to attain common goals. The features of the social system include people, goal directed in nature, attainment of goals through coordinated efforts and interaction with the external environment (Norlin, 2009). Within the features are interrelated sets of elements that function as an operating unit called a system (Senge, 2006). An open system therefore consists of five basic elements (Scott & Davis, 2008) that include; inputs, a transformation process, outputs, feedback, and the environment.

4.3 Survey areas

Among the primary stakeholders of extension are the farmers that constitute over 70% of the rural dwellers in Eastern Cape Province. The majority of them are located in Alfred Nzo, OR Tambo, Amathole, Joe Gqabi and Chris Hani district municipalities where unemployment and poverty are high (ECSECC, 2012). These farmers have challenges that slow down their farming activities in production which may be due to the lack of appropriate technologies and scaling-up. Purposive sampling was used to select an Amathole district municipality, one of the poor areas in the province. The Nkonkobe local municipality was randomly chosen out of the eight municipalities under Amathole. The Nkonkobe local municipality is made up of 21 wards. Wards 5, 10, 12, 13, 14, and 15 were randomly chosen. Fourteen villages were randomly selected out of 21 villages for data collection. The villages are; Woburn, Dyamala, Bergplaas, Ncera, Ntselamanzi, Msobomvu, Melani, Khayaletu, Kwezana, Gqumahashe, Hala, Alice, Hopefield and Mbizana LHP. The chain-referral sampling technique was used to identify respondents.

For testing the skills of the ADTs, the entire Amathole District was chosen. This was aimed at having a good sample size for the ADTs.

A survey was conducted between May to November, 2012 in 14 villages (Figure 1) under the Nkonkobe Municipality in the Amathole District Municipality. Secondary information was collected from the DRDAR offices at Bisho, Alice, Middledrift and Fort Beaufort and the Cape College.

Non-probability snowball sampling was used to identify farmers rearing indigenous poultry in the study area. Only those who were willing to participate after they had understood the objectives of the baseline survey were interviewed.

Study Locations

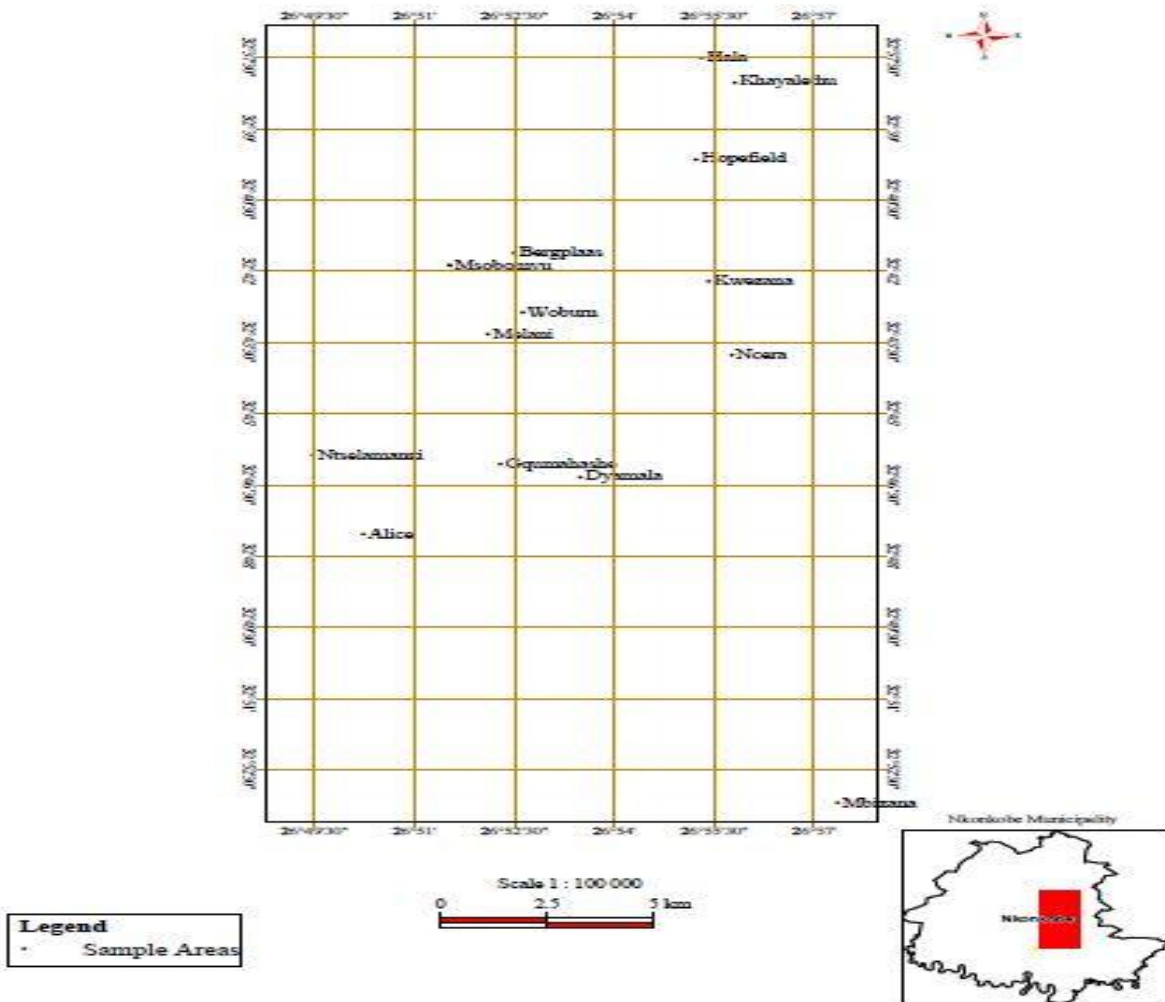


Figure 4.1: The study areas

4.4 Sample

4.4.1 Power Analysis

According to Chadwick (2001: 45) 'inadequate and inappropriate sample size influences the accuracy and quality of research'.

The appropriate sample size for a population-based survey is determined largely by three factors: (a) the estimated prevalence of the variable of interest, (b) the desired level of confidence and (c) the acceptable margin of error.

The survey design was based on a simple random sampling. The sample size required was calculated using the formula: $N = t^2 \times p(1-p) / m^2$ (IFAD, 2004)

Description:

N = required sample size

t = confidence level at 95% (standard value of 1.96)

p = estimated prevalence of indigenous poultry farmers in the project area at 54.3% (AgriSETA, 2010)

m = margin of error of 5% (standard value of 0.05)

$$N = 3.8416 * 0.543 (1 - 0.543) / 0.05^2$$

N = 381 households (estimated study sample)

Population: The study area household population was 1836 according to the Nkonkobe IDP Review, (2011/12). In power analysis, when the estimated household sample is more than 5%, Cochran's formula (1977) is applied in order to get the sample size, thus the sample household to be sampled was calculated at;

$N' = \text{estimated sample} / (1 + \text{estimated sample} / \text{population})$

$$N' = 381 / [1 + (381 / 1836)]$$

$$N' = 316$$

Sample size = 316

Since the response rate is expected at 99%, the total number of households to be sampled will be

$$N' = 316 / 0.99$$

Appropriate sample size = 319

In order to have a fair distribution of the questionnaires among the various households rearing indigenous poultry across the entire ward 12, which is made up of 14 villages, each village was regarded as a cluster. The appropriate sample size was divided by the total number of clusters. This gave the minimum number of samples per village $N = 319 / 14 = 22.7$ using the snowball sampling technique to identify respondents. An average of 23 households each per cluster was interviewed and where the total number could not be reached, an adjacent village was used to secure more household interviews. This situation affected almost all the villages sampled. A total of 312 questionnaires were found adequate for the data analysis with the rejection of seven questionnaires that were found to be faulty in filling.

4.5 Sampling for capacity assessment questionnaires (CAQ)

Agricultural development technicians (ADTs) from Amathole District areas were sampled using the purposive sampling technique. The training needs of ADTs as conceived in this study area implies the results of indigenous poultry farmers' needs assessment evaluation juxtaposed with

the skills, those conditions which were optimal for meeting these needs. Variables identified from the NSAQ measured the ADTs Training Needs (ADTTNs) using the Likert type scale on point 5. For example, a 5- point Likert- scale ranging from “strongly agree” (5). “Agree” (4), “Undecided” (3), “disagree” (2), to “strongly disagree” (1) was used to assess respondents' perceptions of the ADTs; training needs (ADTTNs). Total and mean perception scores were computed for each need item after which a cut-off means scores of 3.5 [(1+2+3+4+5) /5+0.5] was used to differentiate between ADTTNs ($x \geq 3.5$) and a non-ADTTNs ($x < 3.5$). A total of 120 questionnaires were distributed in all the eight municipalities at the rate of 15 questionnaires per municipality that make up the Amathole District. Weekly checking of the questionnaires was done with telephone calls. After eight weeks of distributing the questionnaires, 39 (32.5%) questionnaires were returned, six (5%) were discarded for poor data entry while only 33 (27.5%) were found to be useable for the data analysis.

4.6 Ratings of capacity development methods against competency requirements

The ADTs from the study areas further answered questionnaire that involved the rating of capacity development methods used by the province to train ADTs.

The various methods identified included:

- a. Workshop training;
- b. In-service-training;
- c. In-house-seminars;
- d. Farmers Field Schools;
- e. On-the-job-training;
- f. Cross-visit and study tours;
- g. Mentoring;
- h. Staff meeting;
- i. Monthly review meetings;
- j. Formal study;
- k. Using the internet and reading documents.

The rating used a Likert - scale ranging 5=most effective, 4=very effective, 3=effective, 2=a little effective and 1=less effective

Technical questions and skills aptitudes were drawn from the responses derivable from the NSAQ to make for a capacity development rating effectiveness for the extension workers.

4.7 Data collection

Data were collected using the Needs and Situation Analysis Questionnaire (NSAQ) for the indigenous poultry farmers. The NSAQ describes the demographic database of respondents, chicken housing, and feeding as well as health management. A total of 319 households from 14 villages (Woburn, Dyamala, Bergplaas, Ncera, Ntselamanzi, Msobomvu, Melani, Khayaletu, Kwezana, Gqumahashe, Hala, Alice, Hopefield and Mbizana LHP) were interviewed. Seven questionnaires (2.19%) were discarded for poor data recording. Personal observations were made in addition to photographic collection of the types of housing, feeding methods and water troughs and plant species used in chicken health care.

4.8 Validity and reliability

The instrument was field pre-tested at Roxeni, Lalani and Memela villages for reliability and validity. The internal consistency reliability was run using Cronbach's coefficient alpha ($\alpha = 0.81$). The sample size was determined using the power analysis with the formula $N = t^2 \times p(1-p) / m^2$. Data were analyzed using descriptive statistics for SPSS version 20 (2012).

4.9 Data collection

4.9.1 Instruments

The researcher used questionnaires as the main data collection tool for the NSAQ of the indigenous poultry farmers and the CAQ of ADTs. The questionnaires were used to collect the data necessary to answer the intertwining research questions. The NSAQ questionnaire was made up of three parts.

- a. The first part dealt with the socio-economic and demographic profile of respondents;
- b. The second section contained one open-ended question which provides three most crucial skills or pieces of knowledge essential to run their IP farms?
- c. The final part discussed skills in indigenous poultry production, which are housing, feeding, record keeping, breeding, and healthcare management. These were rated 5= 'excellent', 4='very good', 3= 'good', 2='fair', and 1= 'poor'.

The five point Likert scale format was used to address the CAQ for the ADTs. The content of the questionnaire was developed from the analysis of the results of the NSAQ. The rating range was from 1-5; 1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree", and 5 = "strongly agree"

4.9.2 Administration of the questionnaire

Interviewing of respondents was carried out by trained enumerators along with the researcher who understood the Xhosa language effectively. Fifteen enumerators were given a one-day training session where they were introduced to the objectives of the research and taken through the questionnaires. The questionnaires were translated into the Xhosa language with three Extension personnel attesting to the correctness of the trained enumerators' translations. The CAQ were distributed at the DRDAR offices in Alice, Middledrift, the Cape College and the Nkonkobe local municipality offices and retrieved through the same sources.

4.9.3 Validity and reliability test of questionnaires

The two instruments (NSAQ and CAQ) used were subjected to validity and reliability tests. The NSAQ was pilot tested at the Ngqushwa village by eight of the enumerators administering three questionnaires each. The questionnaires were checked for correctness of entries and the average time taken to complete a questionnaire. Five of the enumerators were dropped for poor data entries while two others were dropped for their inability to complete three questionnaires within three hours. From the second batch of the enumerators, seven were taken to Madwaleni village in Mbhashe Local Municipality for the administration of the NSAQ. The enumerators were also graded using the same criteria of correctness and timing. Five of the enumerators were dropped for poor data entry. A total of 25 questionnaires was field pre-tested for reliability and validity at Roxeni, Lalani and Memela villages by the three enumerators and the researcher. The internal consistency reliability was run using Cronbach's coefficient alpha ($\alpha = 0.81$). Data collection was from May 2012 to November 2012. The CAQ was administered to the agricultural development technicians (ADTs) at the Buffalo City Municipality. The reliability scores for the instrument were Cronbach's alphas (0.890).

4.10 Ethical considerations

The researcher was issued an ethical clearance certificate, Reference Number: LAT01 1SYUS01 by the University of Fort Hare's Research Ethics Committee (UREC) to proceed with the data collection. Details of the university approval for the research project and the ethics backing the research project were explained to all stakeholders.

4.11 Data analysis

Data analysis is the process of evaluating data using analytical and logical reasoning to examine each component of the data provided (Business Dictionary.com 2011). It has to do with

the description of facts, detection of patterns, development of explanations, and testing of hypotheses.

4.11.1 Objective Number 1: To characterize the indigenous poultry production systems in the study area

Questionnaires were used to elicit information from farmers that addressed the farmer's characteristics. These included age, level of education, occupation, marital status, gender and household size.

Information on farm characteristics- types of indigenous poultry kept, size and breeds, reasons for keeping the types was elicited

Information on management characteristics discussed methods in the management of the indigenous poultry, particularly housing, feeding, and health care, production styles, record keeping and constraints as well as the ADTs support to the farmers.

Descriptive statistics was used, such as frequency counts, percentage, means and standard deviation.

4.11.2 Objective Number 2: Determine the indigenous technical skills of the farmers and the level of skills of the agricultural development technicians (ADTs) on IPP

Skills competency measurement for both the IPFs and the ADTs was a Likert scale questionnaire developed from the review of the relevant literature on skills essential to indigenous poultry production (IPP). A total of 32 skill items were identified within the production activities, comprising housing, feeding, breeding, and health care, marketing and record keeping. The questionnaires consisted of questions eliciting information on the basis of the skill assessment competency level from poor (1), fair (2), good (3), very good (4) and to excellent (5). Total and mean perception scores were computed for each skill item after which a cut-off means score of 3.5 $[(1+2+3+4+5) /5+0.5]$ was used to differentiate between the skills gap for both the IPFs and the ADTs at $x \geq 3.5$ rated competent and $x < 3.5$ rated skill deficiency.

Descriptive statistics analysis was used while an exploratory Principal Component Analysis (PCA) (Orthogonal rotation technique) was performed on the data collected for the indigenous poultry farmers using the SPSS version 20 (2012). PCA could not be performed on the ADTs because the total returned questionnaires was 39, which was below the acceptable sample size of 300 (Tabachnick & Fidell, 2001) and 150 (Field, 2009) for PCA analysis.

4.11.3 Objective Number 3: Analyze the agricultural growth options that can support the formation of a more comprehensive rural development component using indigenous poultry production

An evolving model is a response to a new reality and emerging opportunities. As a result, there is no one size-fits-all models. The prevailing situation in an environment usually dictates how a model is shaped or designed. According to Shafique & Mahmood (2010), model development is an effective research method that provides the essential ingredients towards designing new systems or services. Its development requires the fulfilment of some parameters, which according to Mandal, Khandekar & Khandekar (2005) serve as indicators of good models. The authors identified six indicators: productivity, efficiency, stability, durability, compatibility and equity. Approaches towards mobilizing resources for model design vary, but with a common foundation (Hagel & Brown, 2005). Earlier efforts in this approach were based on “push” factors that were passive with the top down approach (Hagel & Brown, 2005). However, attention is shifting to the “pull” approach, which creates a platform that assists people to mobilize resources when the need arises (Hagel & Brown, 2005). A model will be considered to have effective performance when it has activity embedded as a “system” (Allahyari, 2009). In this study, the concept of Allahyari’s (2009) approach to model development using an “open social system” was adopted. According to Norlin (2009) a social system is a situation where two or more persons work together in a coordinated manner to attain common goals. The identified features of the social system include people, goal directed in nature, attainment of goals through coordinated efforts and interaction with the external environment (Norlin, 2009). Within the features are interrelated sets of elements that function as an operating unit called a system (Senge, 2006). An open system therefore consists of five basic elements (Scott & Davis, 2008): inputs, a transformation process, outputs, feedback, and the environment. These five basic elements were described and analyzed in designing an indigenous poultry model.

4.11.4 Objective Number 4: Evaluate the professional development of agricultural extension personnel in the study area

The data collected were analyzed using descriptive and inferential statistics. Descriptive statistics including means, standard deviations, frequencies and percentages were used while the Chi square goodness of fit was used to determine the significant level of the various human resources programs. Data were analyzed using the SPSS (version 20) (2012).

CHAPTER 5

CHARACTERIZATION OF INDIGENOUS POULTRY PRODUCTION SYSTEMS IN THE NKONKOBE MUNICIPALITY, EASTERN CAPE PROVINCE SOUTH AFRICA

5.1 Introduction

Three quarters of the world's poorest people get their food and income from farming small plots of land (B&MGF, 2011). Common to these resource poor farmers is the rearing of indigenous poultry that scavenge for feed and from kitchen wastes (Okeno, Kahi & Peter, 2011). Indigenous poultry production (IPP) is important for many rural households. Various studies carried out in several countries confirm indigenous poultry production's contribution to income, improved nutritional status, reduced livelihoods vulnerability and provision of food security for rural households (Kitalyi, 1998; Sonaiya, Branckaert & Gueye, 1999; Dolderg, 2004; Sonaiya, Olukosi, Obi & Ajuwon. 2002; Ahuja & Sen, 2007; Moges, Tegegne & Dessie, 2010). Nearly all rural and peri-urban families in developing countries keep a small flock of free-range chickens (Jens, Anders, Charlotte, Ains & Lone, 2004). A common type of production system is low input-low output and of poor quality (Fentie, Abebe & Kassa, 2013). However, low level of risk of scavenging poultry farming has made it a choice of livelihood strategy for subsistence farmers (Sonaiya, 2009). Large scale commercial poultry production in South Africa notwithstanding, indigenous poultry production still contributes meaningfully to means of livelihoods and food security (Gondwe, 2004; Moreki, 2006). According to Sharma (2007: 37) the challenge of fighting poverty and malnutrition could be effectively met and to a large extent, by strengthening indigenous poultry production. It has low input requirements, which conform to the socio-economic conditions of rural families (Abdelqader *et al.* 2007). However, there has been little research conducted in this regard in South Africa (Mwale & Masika, 2009) and little empirical evidence to back up the use of indigenous poultry production to alleviate poverty in Eastern Cape Province. The emphasis has often been on commercial poultry (intensive) production systems (Aklilu, 2007). As a result of this, there are no accurate data on the actual population of village or backyard poultry and its' contributions to the total poultry population of the country (Bwala 2009). Mtileni *et al.* (2009) also confirmed the lack of information on the status of chicken production in most communal areas of South Africa. According to Swatson, Nsahlai & Byebwa (2001) there is a gap in research on indigenous knowledge and associated traditional production practices of village chickens and their impact on rural livelihoods. This neglect has made it difficult for any meaningful investment to harness these valuable resources as a means

to alleviate pervasive poverty (Ndegwa, Norrish, Mead, Kimani, & Wachira, 2000). Improving indigenous poultry production requires skills and extension support, but findings by Mlozi *et al.* (2003) indicate that most rural communities lack the required husbandry skills, training and opportunity to effectively improve their indigenous poultry production and that it is considered a sideline activity (Burgos *et al.* 2007). To impact on smallholder farmers, an effective extension intervention is needed (Mwalusanya *et al.* 2001), while knowledge of the production systems is fundamental in forming a foundation for improvement. Towards this end, a characterization of the indigenous poultry production is imperative. Unfortunately, there is scanty information on research conducted in this area in the Eastern Cape Province (ECP). According to Muchadeyi *et al.* (2005), the lack of adequate information usually leads to difficulties in designing and implementing programs that could benefit rural households. In an attempt to establish an efficient and effective extension working system, an in-depth understanding and analysis of the present status of indigenous poultry production systems are required. According to Mtileni *et al.* (2009); and Danda *et al.* (2010), characterization of production systems should be the first step towards undertaking a study that could identify the threats and opportunities for improvement of the indigenous poultry production. Okeno *et al.* (2011) supported these steps as they help in understanding the production and management practices of farmers and the associated factors crucial to developing improved strategies. In carrying out characterization studies Pedersen (2002) suggested that there should be carried out under on-farm situations through baseline data collection rather than on-station experimental studies. The characterization will explore the “how”, and “why” in tracking all the stages involved, from housing, feeding, and health care, in establishing functional data about indigenous poultry production systems. This study therefore, is aimed at the characterization of the indigenous poultry production systems in their present forms in the Nkonkobe Local Municipality. This is because it has been practiced this way over the years by resource poor farmers, and it is necessary to ascertain the production areas (meat and eggs), feeding, health care and housing that have kept the systems going.

5.2 Materials and methods

5.2.1 Study areas

A survey was conducted between May to November, 2012 in 14 villages (Figure 1) under the Nkonkobe Municipality in the Amathole District Municipality. Secondary information was collected from the DRDAR offices at Bisho, Alice, Middledrift and Fort Beaufort and the Cape College.

Non-probability snowball sampling was used to identify farmers rearing indigenous poultry in the study area. Only those who were willing to participate after they had understood the objectives of the baseline survey were interviewed.

5.2.2 Data collection

Data were collected using the Needs and Situation Analysis Questionnaire (NSAQ) for the indigenous poultry farmers. The NSAQ describes the demographic database of respondents, chicken housing, and feeding as well as health management. A total of 319 households from 14 villages (Woburn, Dyamala, Bergplaas, Ncera, Ntselamanzi, Msobomvu, Melani, Khayaletu, Kwezana, Gqumahashe, Hala, Alice, Hopefield and Mbizana LHP) were interviewed. Seven questionnaires (2.19%) were discarded for poor data recording. Personal observations were made in addition to a photographic collection of the types of housing, feeding methods and water troughs and plant species used in chicken health care.

5.2.3 Validity and reliability

The instrument was field pre-tested at Roxeni, Lalani and Memela villages for reliability and validity. The internal consistency reliability was run using Cronbach's coefficient alpha ($\alpha = 0.81$). The sample size was determined using the power analysis with the formula $N = t^2 \times p(1-p) / m^2$. Data were analyzed using descriptive statistics for SPSS version 20 (2012).

5.3 Results

Indigenous poultry (89.6%) dominated the other poultry species of ducks and turkey in the study area (Table 5.1.). There were more chicks observed during the survey than growers. This was as a result of many hens which had just hatched a large number of chicks.

5.4 Socio-economic characteristics

Generally, the trend in the socio-economic characteristics was similar in all the study areas. Females (76%; n=312) were the principal actors. They were older people (46-65 years) and attained some level of literacy (primary and secondary education) (Table 5.2). The married were (45.5%; n=312) and headed a household (Table 5.3).

Table 5.1: Flock size and structure of poultry in the study area

Parameters	Mean	Median	Range	SD
Chicks	8.16	7.00	0-59	8.759
Growers	4.45	3.00	0-28	4.527
Cocks	4.86	4.00	0-23	3.390
Hens	12.52	10.00	3-58	7.727
Hen: Cock Ratio	1:2.58			
Duckling	0.26	0.00	0-17	1.668
Duck female	0.84	0.00	0-43	3.866
Drake	0.37	0.00	0-23	1.917
Toms	0.04	0.00	0-8	0.483

Table 5.2: Percentage distribution of respondents according to their social characteristics (n=312)

		N	%	Median	S D
Gender	Male	75	24.0		
	Female	237	76.0		
	Total	312	100.0	2.00	.428
Age	25-35	34	10.9		
	36-45	54	17.3		
	46-55	88	28.2		
	56-65	86	27.6		
	66 and above	50	16.0		
	Total	312	100.0	3.00	1.220
Education	No Formal Schooling	9	2.9		
	Primary School	104	33.3		
	Some Secondary School	120	38.5		
	Completed Grade 10	39	12.5		
	Completed Grade 12	12	3.8		
	Certificate/ Diploma	13	4.1		
	Degree Program	15	4.8		
Total		312	100.0	3.00	1.850

The distribution pattern of feeding on chicken products and eggs indicates that egg consumption per week per household was 52.56% for 1-2 eggs. Between 1-2 chickens were slaughtered for consumption per month (Table 5.3). Cattle rearing (24.7%; n=312) and pig production (21.5%; n=312) were the dominant livestock among the respondents. Backyard gardens were common in many households (59%; n=312). Most (61.2%; n=312) claimed that crops produced from the backyard gardens were insufficient for household consumption while, very few (1.0%; n=312) claimed the crops were sufficient.

Table 5.3: Percentage demographic distribution of households and chicken/egg consumption characteristics

Marital status	Single	Married	Divorced	Widowed/ Widower	
Frequency /%	116 (37.2)	142 (45.5)	3 (1.0)	51 (16.3)	
Size of households	1-2	3-4	5-6	7-8	9 and above
Frequency / %	26 (8.3)	124 (39.7)	111 (35.6)	43 (13.8)	8 (2.6)
Head of households	Male		Female		
Frequency / %	145 (46.5)		167 (53.5)		
Egg consumption /week	0	1-2	3-4	5-6	
Frequency/ %	27 (8.66)	164 (52.56)	103 (33.01)	18 (5.77)	
Slaughtering of chicken/month	0	1-2	3-4		
Frequency / %	43 (13.78)	248 (79.49)	21 (6.73)		

5.5 Mode of feeding

Findings from the study area indicate that the majority of birds (92.6%; n=312) were mostly kept under a free range system and the bulk of the feeds were obtained through scavenging and supplements (Table 5.4). The major components of the scavenging feed resource base (SFRB) were plant materials, insects, worms, field remnant grains and kitchen left over (Badhaso, 2012). The newly hatched chicks were given crushed yellow maize while farmers who could afford to buy feed, fed the newly hatched chicks with chicks' mash. However, the types of supplements, the number of feedings per day, quantity and quality were functions of the financial capability of the household or the owner of the flock. After hatching, the chicks were

mostly confined in a moveable safe enclosure made of wire mesh/gauze or confined to a safe place e.g., an abandoned room or garage. In the majority of cases (93.6%; n=312), farmers provided the chickens with drinking water in different containers: plastic containers, a cut vehicle tire, and plastic bowls.

5.6 Housing

Most (74.7%; n=312) of the farmers provided shelter for the birds at night, with a few (12.5%; n=312) allowing the birds to perch on top of trees at night (Table 5.4). Housing was mostly constructed with corrugated iron sheets. The use of burnt bricks (15.1%; n=312) and planks with wire mesh (15.1%; n=312) was also observed.

Table 5.4: Indigenous poultry management practices by farmers

Parameters		Overall means %	Median	SD
Mode of feeding	Scavenging alone	7.40		
	Scavenging with supplements	92.6	2.0	.262
Mode of providing supplements	Poured on ground	92.6		
	Feeding trough	7.4	8.0	1.4
Provision of water	Provided	33.0		
	Not provided	6.4		
	Provided with <i>aloe ferox</i>	60.6	3.0	.929
Types of housing	Night lock-up	74.6		
	Local perches	2.6		
	Tree top	12.5		
	Enclosed at night and some on tree top	10.3	1.0	1.055
Housing material commonly used	Burnt bricks	15.1		
	Wrought iron sheet	45.5		
	Planks with wire gauze	15.1		
	Planks alone	9.9		
	Mud house	5.1		
	Nesting box only	9.3	2.0	1.459

5.7 Health management

In many instances (60.6%; n=312), farmers added *Aloe ferox* leaves to the drinking water for various reasons: as a prophylactic approach to disease control in birds (94.3%; n=189), to boost their immunity against diseases (81.8%; n=189) and to make the birds hardy (65.5%; n=189). Apart from the use of *Aloe ferox*, the farmers also made use of different types of traditional remedies and human medications to treat chicken diseases (Table 5.5). In the majority of cases (84.6%; n=312), farmers treated or protected their birds using home-made ethno-veterinary remedies.

Table 5.5: Some ethno-veterinary methods of treating chickens in the study area

Diseases	Indigenous medication
Swollen face	Cleaning of the swollen face of birds with dettol (antiseptic) and rubbed with light brown shoe polish. This makes the face to peel off naturally.
Immunity	Oral Rehydration Therapy (ORT) as a drink for newly hatched chicks for the first five days. The use of <i>iZifozonke</i> (essential vitamins mixed with herbs) in water.
Internal parasites	<i>iZifozonke</i> is applied in drinking water.
Lice, mites and ticks	Potassium permanganate; Blue death (permethrin); <i>Karbar</i> dust 50DP (5 mg/m ³ Carbaryl, 10mg/m ³ Nuisance dust) <i>karbaspray</i> 850WP (5 mg/m ³ Carbaryl, 10mg/m ³ Nuisance dust); Use of a brake fluid mix with <i>Madubula</i> (13% Carboic acid) and used as a body spray for the birds; <i>Bulalazonke</i> (Mercaptothion) is sprayed on the body of birds.
Drowsiness, lameness, closed eyes, discharge from the mouth	Affected birds are given black coffee to drink.
Pimples on the face of growers	The use of engine oil, and shoe polish applied to the affected part twice daily.

5.8 Chicken flock ownership, management and decision making

Female headed households (FHH) owned just under half of the chicken flocks (51.0%; n=312) (Table 5.6) while ownership by collective household ownership (CHO) (36.5%; n=312) was higher than male headed households (10.9%; n=312). Shelter construction for the flock was mostly (55.4%; n=312) by CHO efforts, which included cleaning (58.0%; n=312), feeding

(61.2%; n=312) and health care (55.8%; n=312). Marketing was sparingly done because most (69.5%; n=312) households kept chickens for home consumption.

Table 5.6: Chicken flock ownership and management

Parameters	MHH	FHH	CHO	Boys <18	Girls <18	Median	SD
Chicken flock ownership	10.9	51.0	36.5	1.0	1.0	2.0	.697
Flock management	-	23.7	55.4	12.2	0.6	3.0	.799
Shelter construction	8.0						
Cleaning	4.2	27.2	58.0	3.2	7.4	3.0	.859
Feeding	3.5	29.8	61.2	1.6	3.8	3.0	.731
Health care	6.4	35.9	55.8	0.6	1.3	3.0	.684
	NM	Male	Female	CH			
Marketing	86.9	2.9	7.1	3.2		.00	.728

Key: MHH=Male Headed Household; FHH= Female Headed Household; CHO= Collective Household Ownership; NM= No Marketing

5.9 Mortality in flocks

Mortality in the flocks was common among the chicks, and was attributed to sudden death, diseases and cold, cold weather and attack by mice and giant rats (Table 5.7). Mortality in growers, adult hens and cocks was very low. In the majority of cases (84.6%; n=312), farmers treated or protected their birds using home-made ethno-veterinary remedies. Birds of predation, hawks, owls and eagles were a menace to chicks (85.3%) during summer while wild cats and giant rats were common predators to growers, adult cocks and hens mostly of farmers sharing borders with forests or highly undulating poor topographical rocky environments.

Table 5.7: Overall mean of causes of mortality in birds (n=312)

	Sudden death	Diseases and cold	Cold	Cold and thunder	Mice and Giant rats	No mortality	Hot sun	Small insects	Total
Chicks	19.6	14.5	16.3	4.2	11.9	33.3	0.3	NA	100
Growers	6.7	10.6	12.5	9.3	4.8	56.1	NA	NA	100
Adult hens	0.6	9.0	2.2	2.2	11.2	67	7.7	NA	100
Adult cocks	4.2	5.5	2.2	4.5	1.3	75.6	4.5	2.2	100

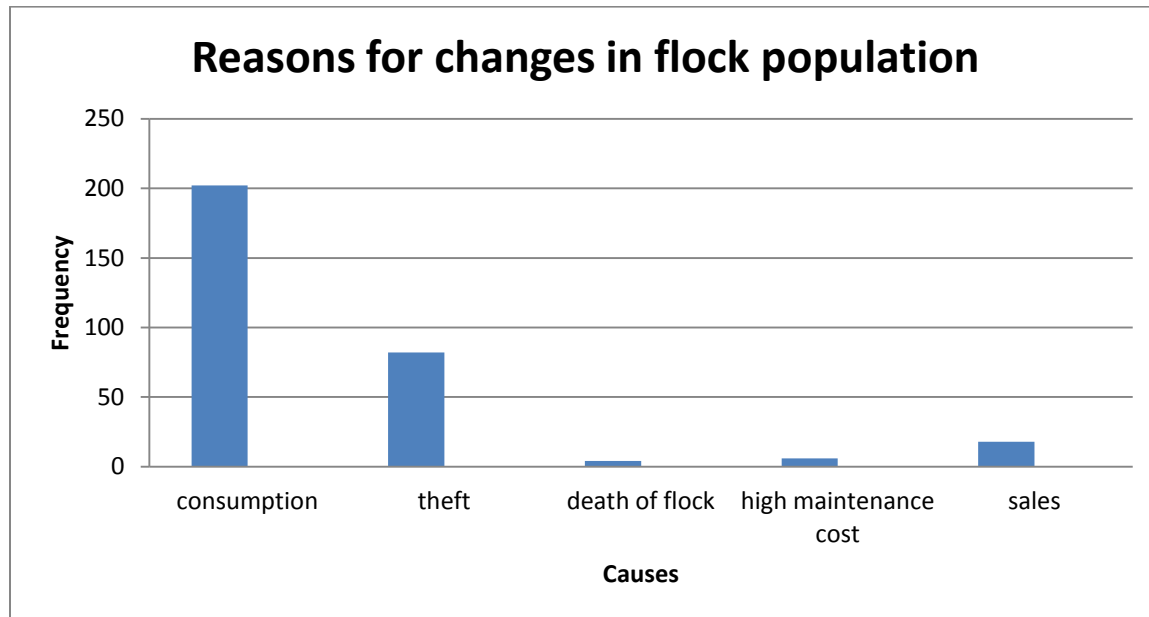
5.10 Production and reproduction pattern

Chicken flocks were dominated by breeding hens, as an attempt to increase flock size through the hatching of eggs. Natural brooding was common in the study areas. The broody hen usually sits on 6-25 eggs per clutch, with the hatching rate varying from 4-17 (Table 5. 8). Out of the total (56.25%) number of chicks hatched, only 31.25% attained the age of eight weeks due to death mostly associated with predator attacks. Clutches per hen per year varied from two to four times. Most (64.74%; n=312) of the farmers attributed changes in the flock population to household consumption, while stock theft (26.28%) was also reported (Figure 5. 1).

Table 5.8: Production and reproduction pattern of hens (n=312)

Parameters	Range	Overall mean	Mean %
Number of clutch per year	2-4	3	78.56
Number of eggs per clutch	10-26	18	75.92
Number of eggs incubated	6-25	15.5	61.76
Number of chicks hatched	4-17	10.5	56.25
Number of chicks attained adulthood (8wks)	1-13	7	31.25
Number of times hen hatches per year			
Two		25	8
Three		184	59
Four		103	33

Figure 5.1: Reasons for changes in flock population



5.11 Discussion

The study was based on the production system of indigenous poultry in the Nkonkobe Municipality with a critical review of the housing, feeding, healthcare and marketing activities. The findings concur with those of (Safalaoh, 1997), which indicated that indigenous poultry husbandry is largely associated with resource poor farmers (landless, marginal and small farmers), who kept the chickens under an extensive system, with the associated characteristics of low-input low-output. Most (69.56%; n=312) derived their income from several of the social government grant categories that include old-age pension, disability, war veteran's, child grant (Foster child grant), care dependency, child support grant and grant-in-aid.

The majority of farmers (89.8%; n=312) kept chickens, but few kept ducks (9.6%; n=312) and turkeys (0.6%; n=312). Most farmers do not keep ducks because of the water requirements for bathing; ducks have a longer hatching period (28 days), and take longer time to be plucked. On the other hand, turkeys were considered to require higher management skills, have low resistance to diseases under the scavenging system and require high quality supplements. Similar trends of a high ratio of chicken to ducks and turkey were reported in Zambia (Mwenya, 2001), Uganda (Kugonza, Kyarisiima & Lisa, 2008), Ethiopia (Badhaso, 2012) and in Dakshin Dinajpur district, India (Biswas *et al.* 2011).

The findings revealed that females (76%; n=312) were the principal players and caretakers of indigenous poultry. Traditionally, males engaged in other bigger livestock such as cattle, rather than chickens, which were considered to be at the bottom of the “livestock ladder”. Older people (46-65 years) were more involved in chicken production, pointing to the ageing phenomenon in the rural farming community (Oboh & Sani, 2009; Ayinde, 2011). South Africa’s ageing phenomenon could be attributed to the high rural-urban migration of able-bodied men in search of jobs in the mining industry (Magubane, 1979; Van Niekerk & Kopelman, 2005). It could also be attributed to the scourge of HIV/AIDS that has resulted in the death of the able bodied men and women (Ndegwa *et al.* 2000), thereby leaving the rural communities with aged people. The ageing phenomenon, if not addressed, could worsen the poverty and food security situation of people in the rural areas. The low levels of youth participating and showing an interest in farming could be another factor, which has also been confirmed by Adekunle, Oladipo, Adisa & Fatoye (2009). The rural areas are fast becoming desolate due to the absence of desirable job opportunities, the poor quality of education facilities (Echebiri, 2005) and migrants’ attempts to acquire relevant skills in the cities (Olayiwola, 2005). The situation has created an escape route for the youth to migrate to the cities. In an attempt to address this trend, the rural environment could to be turned into village models that could attract industrial development.

A good number of respondents had attained secondary (38.5%) and primary (33.3%) school education. A person’s level of education has been found to contribute to their rate of adoption of new technologies. According to Ochieng, Owuor & Bebe (2012), in their findings on adoption of management intervention in IPP in Kenya, farmers’ education level had a positive marginal effect on the adoption of feed supplementation and vaccination.

The overall mean flock size of chickens was 29.98 per household, which was more than the average flock sizes reported earlier for the Eastern Cape Province (ECP). Mtileni *et al.* (2009) reported as overall mean flock size of 10.9 ± 1.95 in their study of three districts (Vhembe and Mopane districts; Kgalagadi and Alfred Nzo districts) in the Limpopo and EC provinces, South Africa, with no significant differences in the flock sizes in the provinces. Khosa (2003) reported an average holding of 11 chickens by 34% of households in two settlements in the Limpopo Province. Farooq, Shakir, Mian, Mussawar, Durrani & Cheema (2004) reported a flock size of 23.14 ± 1.97 birds per household in Chitral, Pakistan. Sonaiya, Dazogbo & Olukosi (2002) reported an average flock size of 15 ± 8.1 bird per family in Nigeria. Halima, Neser, Van Marle-Koster & De Kock (2007) reported a mean flock size of seven per household in north-west Ethiopia. An average flock size of 16 birds was reported in some areas in Ethiopia and Kenya (Tadelle, Million, Alemu & Peters, 2003; Njenga, 2005). An explanation for this high flock

size in the study areas could be an attempt at food security by the household or to earn extra income. Moreover, the fowls exhibited high adaptability to the environmental challenges as observed in the low mortality rate. According to Njagi, Nyaga, Bebor, Michieka, Mbuthia, Kibe & Minga (2010) climate is a risk factor, especially in the dry hot zone compared to the cool wet zones, characterized by the prevalence of Newcastle disease (NCD). The study areas fell within the cool wet zone. Other reasons for these high flock sizes could be the available scavenger feed resource base, good ethno-veterinary management of birds, and to some extent, the security of flocks.

The majority of farmers (69.5%; n=312) reared the chickens for household consumption, which also provided a cheap and ready source of animal protein for the family. The consumption pattern indicates that most (52.56%) households consumed one to two eggs/week and three to four (33.01%) eggs/week while the majority (79.49%) slaughtered either one or two chickens per month. Indigenous poultry rearing provides a cheap source of animal protein to poorly resourced households (Magothe, Okeno, Muhuyi & Kahi, 2012), while its consumption has been confirmed to develop body immunity to diseases, healthy nutrition, body weight and better performance by children in school (Florence, Asbridge & Veugelers 2008; MacLellan, Taylor & Wood, 2008; Wang & Veugelers, 2008). Elsewhere, in Nigeria (Atteh, 1989), Niger Republic (Bella & Abdou, 1995) and Zimbabwe (Pedersen, 2002; Muchadeyi *et al.* 2004) findings supported the rearing of chickens for mostly home consumption. The rearing for consumption mostly in the study areas was attributed to the indeterminate nature of markets for local chickens. As a result of this situation, there is the need to assess the market and the conditions in an event of intervention.

Sex ratio in poultry production is an important factor that affects fertility (Alsobayel & Albadry, 2012). The sex ratio of cock to hen observed in the study area was 1:2.58. Mopate & Lony (1999:1) reported a ratio of 1:6 cock to hen, Khalafalla, Awad & Hass (2001:1) observed a cock to hen ratio of 1:4.4 in Sudan. The average cock to hen ratios of 1:3.3, 1:3.2 and 1:2.2 were reported in Bure, Fogera and Dale, respectively (Moges, Mellese & Dessie, 2010:7). However, in exotic poultry production, the recommended cock to hen ratio in modern light and heavy breeds is 1:10 and 1:8 respectively (Moges *et al.* 2010:8). The low sex ratio in this study could create unhealthy rivalry and in-fighting that often times result in physical injury to the cocks. Cocks were more favored for consumption, while the multiplier effects of hens were better preferred for reproduction. Also, most farmers depended on neighbors' cocks for mating, with ignorance of the over stretching the cock and eventual genetic erosion. Farmers will therefore need to be educated on the importance of keeping a minimum number of cocks in ratio to the

hen flock sizes. The flock structure of the study area was mainly composed of hens, chicks, and cocks and followed by growers (12-15 weeks old). Growers are most often disposed of by selling and as gifts.

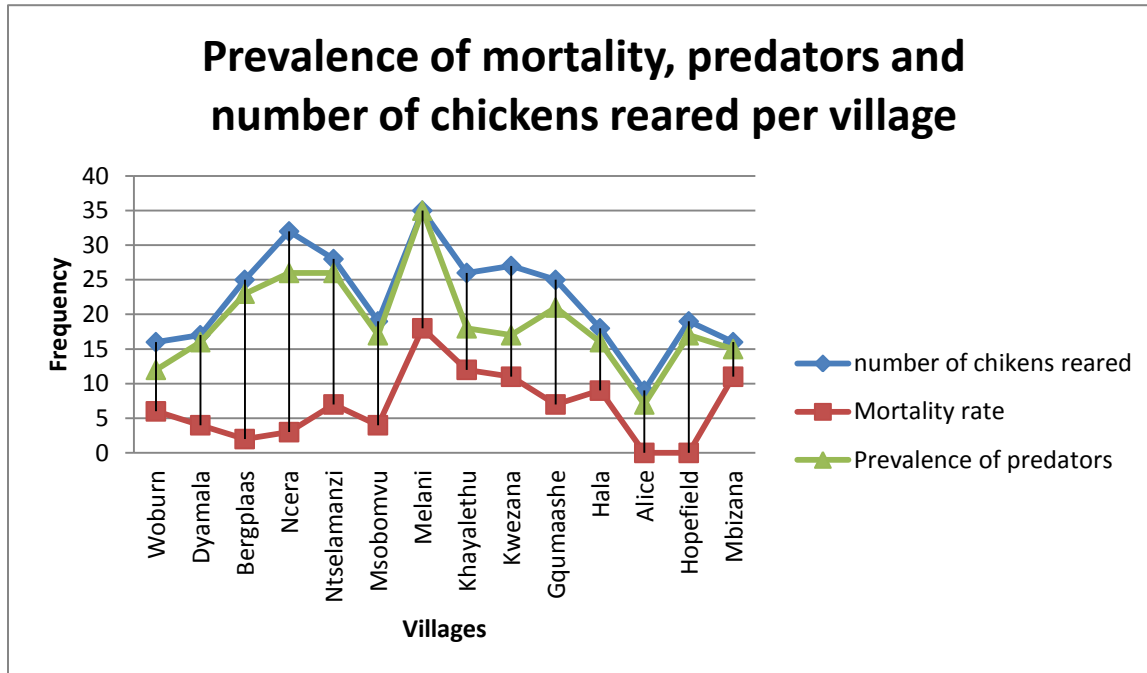
The production system commonly practiced by the farmers is extensive. Birds roam freely about scavenging for insects, (which in some instances could expose the birds to insects that are intermediate hosts of intestinal worms), grasses and waste. Some of these insects include ants, cockroaches, grasshoppers, houseflies, and beetles, and molluscs like snails. However, the findings of Butcher & Miles (2012) indicated that ingestion of insects that are intermediate hosts often resulted in gastrointestinal parasites for scavenging chickens. Scavenging reduced the cost of supplements, which were expensive; for example, a 10kg bag of chicks' mash (Phase 1) was sold at R60 (ZAR 9.04=\$1 on 3rd May, 2013) and 10kg of growing mash was R73.80 at *Umtiza*, (a local supplier). However, birds were faced with the problem of theft, environmental hazards, predator attacks and many laid their eggs in unidentified places. Most of the chicken houses were in poor hygienic condition. The houses were not adequate to protect the birds from inclement weather and, hence, the many reasons given for the loss of chickens, such as cold, rainfall, the hot sun and thunder. Most birds lost their eggs in this poor state of housing especially birds not provided with nesting materials. Some hens laid their eggs in the bush where dogs or other wild animals attacked them, and some were pilfered in such unsecured places. Hens that lay in the same nest were also observed fighting, at times during brooding. The poor and un-hygienic system of housing was similar to those reported earlier by Natukunda *et al.* (2011), Mapiye *et al.* (2008), Halima *et al.* (2007), Tadelle *et al.* (2003), and Pedersen (2002). This scenario, common to the production system, negatively affects production; for example, the loss of eggs, which could be a threat to household food security. The challenges of theft and predators were also reported by Bett, Bett, Peters, Kahi & Bokelmann (2012) in Kenya.

The majority (92.6%) of the farmers provided supplementary feeding in the form of crushed maize for the chicks and whole grain maize for the adults, while some provided rice grain. Other scholars Minh, (2005); Mapiye and Sibanda (2005); Halima *et al.* (2007); Goromela, Kwakel, Versteegen & Katule (2008) also observed similar trends in supplementary feeding, but most of the supplements identified included maize, millet, sorghum, rice bran, and guinea-corn and wheat bran. Reports from other African countries confirmed the common practice of feed supplementation: Malawi (Ahlers, 1999; Gondwe, 2004); Ethiopia (Dessie & Ogle, 2001); and Burkina Faso (Kondombo, Nianogo, Kwakkel, Udo & Slingerland, 2003). However, the types of supplements available could be attributed to the climatic conditions prevalent in the region or

country. Meanwhile, the challenges of the free range production system in the study area include the seasonality of scavenging feed resource base (SFRB), stock theft and the high cost of chick mash. The amount and availability of SFRB per bird, according to Badhaso (2012), is dependent on the season, grain availability for the households, time of sowing and harvesting the grain and the biomass of the village flock. The relative scarcity of water (Ortmann & Machete, 2003) in the ECP could compound the challenge of the availability of the SFRB. Therefore, in an attempt to promote improved technologies for indigenous poultry to the rural communities of the ECP, these factors are crucial. Most farmers (92.6%) pour feed on the ground, which could expose the chickens to parasites and disease causing organisms and is a source of feed wastage, while the remaining made use of feeding troughs. A similar trend was observed by Halima *et al.* (2007) in north-west Ethiopia. In order to check the method of pouring feed on the ground, feeding trough use was strongly encouraged. Mortality in chicks was 50.4%, which was attributed to several causes: sudden death (19.6%; n=312), cold (16.3%; n=312) and diseases and cold (14.5%; n=312) and attributed to be prevalent after hatching (42.6%; n=312). Mortality was low in adult hens and cocks (5.4% and 4.5%) respectively. The findings were similar to that of Mtileni, Muchadeyi, Maiwashe, Chimonyo, Mapiye & Dzama (2012). Chicks require protein for good growth and building of immunity to diseases (Kugonza, Kyarisiima & Lisa, 2008). Other nutritive elements are also needed in the feeds. However, these are lacking in crushed maize, which was the main supplement given to chicks. An attempt to correct the nutrient imbalance requires feeds that are high in protein and other essential ingredients that could be sourced locally are affordable and readily available in an event of intervention. Vaccination initiatives are also required to reduce chick mortality. Water is an essential part of the feeding regime of chickens and according to Tadelle & Ogle (1996), regular provision of water for scavenging birds is an important way of achieving optimum production. Provision of water was common (93.6%) while 60.6% (n=189) provided water with *Aloe ferox*. The finding was consistent with that of Moges, *et al.* (2010); Petrus, Mpofu & Lutaaya (2011). The use of *Aloe ferox* was reported by Dold and Cocks (2001), Mwale & Masika (2008, 2009); Chulayo, Muchenje, Mwale & Masika (2012) in the Eastern Cape Province, and in Uganda (Kugonza *et al.* 2008) for the treatment and control of indigenous poultry diseases. Similarly, Okitoi, Ondwasy, Obali & Murekefu (2007) observed the use of *Aloe ferox*, pepper, Neem juice and sisal as common indigenous knowledge of treating chicken diseases in the Western part of Kenya. The efficacy of the properties of *Aloe ferox* as an anti-inflammatory, anti-bacterial, anti-viral and energy tonic has been reported (Rabe & Staden, 1997; Balch & James, 2000; Joseph & Justin, 2010; Nandal & Bhardwaj, 2012). Thus, it could be concluded that the low incidence of

diseases in adult hens and cocks could be attributed to the creativity and ingenuity of these resource poor farmers who constantly include *Aloe ferox* in the drinking water for the birds. Mortality in chicken flocks, when not controlled, could have a negative impact on sustainability and production (Kugonza *et al.* 2008). The high mortality of chicks from both diseases and predators could pose a threat to food security. The variations observed in the mortality rate were attributed to disease and predators (Figure 5.2) and showed that aerial predators were common in all areas, while there was a low incidence of predator attacks in Khayaletu & Kwezana. On the other hand, mortality in chicks was common in Woborn, Dyamala, Msobomvu, Melani, Khayaletu and Gqumashe. In an attempt to reduce this mortality, the IPFs in the study area made use of various indigenous methods of disease and pest control. Amongst the medicines used are *Madubula* (a household disinfectant with 13% carbolic acid as active ingredient), Karbadust (Carbaryl 5%), Karbaspray (Carbaryl 5%). Others are *Izifozonke* and *Bulalazonke* (trade name) (active ingredient, Mercaptothion). The use of *Madubula*, Karbadust, Karbaspray and *Bulalazonke* in active ingredient form was reported by Moyo (2009). Moreki (2012) reported the use of Karbadust in Botswana and other common remedies such as paraffin, used engine oil, ashes and potassium permanganate. The report of the use of used engine oil is consistent with Moyo (2009); and Matekaire & Bwakura (2004). Some of these treatments has been proved to be effective, to a certain degree (Moyo, 2009), however, the health implications of using some of these drugs should be investigated.

Figure 5.2: Prevalence of mortality, predators and number of chickens reared per sampled village



5.12 Conclusion

The present situation of the indigenous poultry farmers in the study areas was evaluated based on the housing, feeding, healthcare management, breeding and marketing conditions. Findings revealed poor housing that is not conducive for optimum production. The poor housing exposed the birds to extreme climatic conditions and theft. Feeding was mostly by scavenging with supplementary feeding of grains. Farmers made use of ethno-veterinary methods in the health care management of the flock. The majority rear chickens for home consumption to secure food at home. The present capacity of the IPFs is a solid platform upon which further capacity development training could be built. And based on the findings, the following recommendations are made:-

There is the need for institutional support for the IPP in the study areas to the farmers. This should take the form of massive campaigns on the awareness of the commercialization advantages of the IPP, demonstrate, organize and train the farmers in all stages of production that could lead to massive adoption of the production technologies. Finally, the farmers have demonstrated the potentialities inherent in their present husbandry method. This could be improved upon and used to design an appropriate production model.

CHAPTER 6

SKILL GAPS AND TRAINING NEEDS OF THE FARMERS AND AGRICULTURAL DEVELOPMENT TECHNICIANS ON INDIGENOUS POULTRY PRODUCTION IN NKONKOBÉ MUNICIPALITY, EASTERN CAPE PROVINCE, SOUTH AFRICA

6.1 Introduction

Achievement in a farming enterprise (whether small or large scale) depends on skills at the disposal of the farm entrepreneur. Skills or competencies, according to Vreyens & Shaker (2005), are observable abilities that manifest from an individual indicating how to do something. Skills are an important means to increasing incomes and sustainable livelihoods for the poor (World Bank, 2004). According to Eskola & Gasperini (2010:1) skills development “is central to improving rural productivity, employability and income-earning opportunities, enhancing food security and promoting environmentally sustainable rural development and livelihoods”.

Indigenous poultry production is an age-old farming activity (Kingori, Wachira & Tuitoek, 2010; Mtileni *et al.* 2009; Ochieng, Owuor & Bebe, 2012). Many farmers regard chicken production as a secondary or tertiary enterprise, best suited to the time after the real day’s work (Sonaiya & Olori, 1990: 244). The knowledge of its production and management is usually passed from one generation to the other. This gives some of the farmers’ better local technical skills in indigenous poultry production. Importantly, local technical skills are crucial for farmers’ survival, but it is not enough to make the resource poor compete in an ever expanding market (Asenso-Okyere, 2009: 1). New challenges are also emerging daily for rural poor farmers. There are, for example, challenges relating to health (the recent outbreak of avian flu), Newcastle disease, the need to look inward for local materials as sources of feeding, housing, breeding, genetic erosion and an effective management intervention of indigenous poultry production. South Africa has been classified as having two groups of critical skill demands (Daniels, 2007). These according to the author, are generic skills and particular occupation skills required for performance within a specified enterprise. A successful farming enterprise requires that farmers be equipped with new knowledge, skills and competencies even at the ‘low’-level end of the job skills spectrum (Williams *et al.* 2010:17). McElwee (2005: 235) asserted that the development of farmers’ entrepreneurial skills is a significant issue which needs to be addressed by all stakeholders in the agricultural socio-economic network. The efforts of government at reducing poverty in South Africa have been directed at several levels. At the provincial level, among the programs implemented to reduce poverty include: the Integrated Development Plan (IDP), the Provincial

Growth and Development Plan (PGDP) and the Local Economic Development (LED) Framework. However, the report of the Public Service Commission (PSC) (2007) identified flaws, the lack of capacity, and poor skills development of personnel handling projects as some of the reasons responsible for the failure of the programs at various stages. Also Gichohi (1992); Ochieng, Owuor, Bebe & Ochieng (2011) identified the lack of capacity and skills as key factors responsible for the “missing link” in economic development and transformation within the society or in communities. Caillods (2003), Fluitman (2005); Palmer (2007) identified the neglect of skills development as a step in poverty reduction programs as a big gap, while Nuthall (2006); Palmer (2007) criticized the neglect of skills development in the informal economy that illuminates the rural environment as worrisome. The literature revealed that, many poverty reduction strategy papers (PRSPs) lack skills development initiatives (Palmer, 2007), while the International Labor Organization (ILO) (2003: 8) averred that “a striking feature of most poverty reduction strategies is the absence of vocational education and training”. As a result of these lapses, Phiri (2009) concluded that with the implementation of various programs aimed at poverty reduction, the economic life of an average person in the rural areas worsened. Skills and capacity development of farmers and extension workers are part of the success factors in all the models. According to Dolberg (2003: 34), research and training were identified as precursors to scaling up at using poultry production as a tool in poverty reduction. This assertion was supported by Asenso-Okyere (2009: 2) that, agricultural productivity will continue to decline if the capacity of farmers and other actors in the agricultural value chain remain undeveloped, preventing them from innovating. However, the research focus on IPP in ECP has mainly been on the socio-economic factors of production (Mtileni *et al.* 2012; Khosa, 2003; Mwalusanya *et al.* 2001; Swatson & Holton, 2001), ethno-veterinary practices (Mwale & Masika, 2008, 2009; Chulayo *et al.* 2012); chicken genetic resources (Van Marle-Koster & Nel, 2000; Mtileni *et al.* 2011; Mtileni *et al.* 2009; Norris *et al.* 2007); Veterinary microbiology (Thekiso, Mbatia & Bisschop, 2004; Abolnik, Gerdes, Kitching, Swanepoel, Romito & Bisschop, 2008; Bwala, 2009), and food quality and preference (Dyubel, Muchenje, Nkukwana & Chimonyo, 2010). Very scanty information is available on skill competencies and capacity development of the IPFs and the ADTs in indigenous poultry production. A critical review of the pillars of the Extension Recovery Plan (ERP) indicates that “re-skilling and orientation” of extension workers is paramount (Mudau, Geysers, Nesamvuni, & Belemu, 2009:178). However, no conscious effort has been devoted to the skill audit required for up scaling, thereby creating a gap. In an attempt to design developmental programs for IPP, it is important to determine the current level of the local technical skills of farmers and the knowledge and skills audit of the ADTs to ascertain their

strengths and weaknesses. This will lead to the identification of skills gaps and where resources and energy need to be channeled for training. Therefore, this study was aimed at identifying the indigenous technical skills of the farmers and the level of skills of the ADTs in IPP in an attempt to design a skill training model.

6.2 Methodology

The population for the study was made up of 312 indigenous poultry farmers (IPFs) taken from 14 villages (Woburn, Dyamala, Bergplaas, Ncera, Ntselamanzi, Msobomvu, Melani, Khayaletu, Kwezana, Gqumahashe, Hala, Alice, Hopefield and Mbizana LHP) in the Nkonkobe Municipality (NM) and all the ADTs were the target population from the DRDAR, in the Nkonkobe Municipality. Data were collected using the snowball technique for the IPFs. Questionnaires for the ADTs were distributed at the DRDAR offices in Alice, Middledrift, and the Cape College in Fort Beaufort. Retrieval of the questionnaires was through the same route.

The skills competency measurement for both the IPFs and the ADTs was a Likert scale questionnaire developed from a review of the relevant literature on skills essential to indigenous poultry production (IPP). A total of 32 skill items were identified within the production activities, comprising of housing, feeding, breeding, health care, marketing and record keeping. The questionnaires consisted of questions eliciting information on the basis of the skill assessment competency level from poor (1), fair (2), good (3), very good (4) and to excellent (5). Total and mean perception scores were computed for each skill item, after which a cut-off means score of 3.5 $[(1+2+3+4+5) / 5+0.5]$ was used to differentiate between the skills gap for both the IPFs and the ADTs at $x \geq 3.5$ rated competent and $x < 3.5$ rated skill deficient.

Content and face validity of the questionnaire were established by an expert on IPP and an agricultural extension expert in the Agricultural and Rural Development Research Institute (ARDRI) and the Department of Agricultural Economics and Extension, University of Fort Hare respectively. The Cronbach's alpha reliability coefficient was 0.92. Questionnaires were administered by the author, assisted by two agricultural extension officers and six enumerators from May to November, 2012.

6.2.1 Data analysis

Descriptive statistics analysis was used, while an exploratory Principal Component Analysis (PCA) (Orthogonal rotation technique) was performed on the data collected for the IPFs using the SPSS version 20 (2012). A PCA could not be performed on the ADTs because the population sampled was below the acceptable sample size of 300 (Tabachnick & Fidell, 2001)

and 150 (Field, 2009). Descriptive and inferential statistics including means, standard deviations, frequencies and percentages were used.

6.3 Results

6.3.1 Demographic distribution of agricultural development technicians (ADTs) and indigenous poultry farmers (IPFs)

Data was collected from ADTs (the extension officers) consisting of 15 males (45.45%) and 18 females (54.54%). Fifty three percent of the extension workers were married, and the mean age was 40.97 years (SD=7.393). The majority (57.59%) were holders of a diploma in agricultural extension, and 42.42% were degree holders also in agricultural extension. The IPFs were made up of 237 (76%) female and 75 (24%) male. The mean age was 47.61 years (SD 1.220). Most (45.5%; n=312) were married, and the literacy level of the total population was 97.1%. The majority (35.2%; n=312) learnt their indigenous technical skills of managing chickens from their mother. There were almost no (99.7%; n=312) extension packages on IPP for the farmers in the study area (Table 6.1).

Table 6.1: Sources of knowledge and extension services support to farmers

Sources of knowledge in IPP by the respondents	N	%
Mother	110	35.2
Parent (both father and mother)	95	30.4
Self learning	54	17.3
From friends and neighbors	7	2.2
Parent and further self learning	43	13.8
Brother / family member	3	1.0
Total	312	100.0
Extension support to farmers on local chicken by public extension services	N	%
No	311	99.7
Yes	1	.3
Total	312	100.0

6.3.2 Indigenous poultry farmers (IPFs) and agricultural development technicians' skills assessment competency level

6.3.2.1 Pest and diseases management skills

Table 6.2 indicates the pest and diseases management skills competency levels amongst the IPFs and the ADTs. The table reveals that IPFs had competencies in five out of the eight skills examined, while the ADTs showed competency below the critical value of $x \geq 3.5$ in all the eight parameters evaluated. IPFs showed high competencies in the ability to identify chicken predators ($x = 3.92$), methods of ethno-veterinary drug treatment for chickens ($x = 3.72$), and control of predators ($x = 3.77$), amongst others.

Table 6.2: Pest and disease management skills

Items	Mean IPFs	SD	Remarks	Mean ADTs	SD	Remarks
	n=312	IPFs	IPFs	n=33	ADTs	ADTs
1 Identify signs of diseases in birds	3.69	.824	CO	3.31	.855	NCO
2 Identify ecto parasites in birds	3.51	.935	CO	3.15	.376	NCO
3 De-worm birds	2.12	1.146	NCO	3.46	.519	NCO
4 Administer drugs to sick birds	3.22	.971	NCO	2.69	.630	NCO
5 Identify chicken predators	3.92	.928	CO	3.15	.987	NCO
6 Control of predators	3.77	1.066	CO	2.85	1.144	NCO
7 Disposing dead birds	3.16	1.395	NCO	2.54	.776	NCO
8 Methods of ethno-veterinary drugs to treat diseases and parasites	3.72	1.160	CO	2.31	.480	NCO

Keys: CO=Competency Observed, NCO=No Competency Observed

6.3.2.2 Feeds and feeding material

Table 6.3 indicates that both the IPFs and the ADTs lacked the ability to identify local feeding materials, apart from maize, that could be used to prepare supplementary rations. Indigenous poultry farmers actually depended on maize or rice grains to feed the birds as supplements that have both economic and food security implications.

Table 6.3: Feeds and feeding stuff skills

Items	Mean IPFs	SD	Remarks	Mean ADTs	SD	Remarks
	n=312	IPFs	IPFs	n=33	ADTs	ADTs
1 Use of local feeding stuff to feed birds of different age groups	2.55	.944	NCO	2.85	.899	NCO
2 Identify local feedstuffs at different period of the year to feed birds	2.34	.894	NCO	3.00	.000	NCO
3 Use of supplementary feeding for birds of different age groups	2.21	1.037	NCO	2.54	.519	NCO

Keys: CO=Competency Observed, NCO=No Competency Observed

6.3.2.3 Selection and management of flocks and chicks

Of all the parameters assessed in Table 6.4, IPFs were competent in the ability to identify high yield birds ($x = 3.79$) and the protection of chicks against diseases, pests and predators ($x = 3.52$). Findings indicate that there was no breeding program in place. The stock breeding system relied on chance. The level of competence displayed by the ADTs was very low in all the parameters while the IPFs also displayed poor skills in six of the eight skill items.

Table 6.4: Selection and management of flocks and chicks skills

Items	Mean	IPFsSD	Remarks	Mean	ADTsSD	Remarks
	n=312	IPFs	IPFs	n=33	ADTs	ADTs
1 Ability to identify high yielding birds	3.79	2.524	CO	2.85	.555	NCO
2 Care of chicks against diseases and pests and predators	3.52	1.039	CO	3.15	.689	NCO
3 Artificial brooding	2.93	2.189	NCO	2.00	.913	NCO
4 Supplementary feeds for brooding hen and chicks	2.88	1.176	NCO	2.85	.555	NCO
5 Identify laying conditions in hen	3.45	1.019	NCO	2.92	1.038	NCO
6 Culling as a result of diseases	3.01	3.125	NCO	2.92	.760	NCO
7 Culling due to old age of birds	3.04	3.100	NCO	2.08	.760	NCO
8 Culling due to poor productivity	2.88	1.176	NCO	2.62	.768	NCO

Keys: CO=Competency Observed, NCO=No Competency Observed

6.3.2.4 Housing and equipment skills

Most of the IPFs showed competence in the ability to use local materials to make nest boxes ($x = 3.66$) and improvising for drinkers and feeders ($x = 3.61$). Other factors that are essential to housing and directly proportional to the health care of the birds were very low (Table 5); for example, knowledge of litters and management ($x = 1.98$) and disinfecting the pen after the brooding period ($x = 1.87$). There was no skills competence displayed by the ADTs in any of the items assessed under housing and equipment.

Table 6.5: Housing and equipment skills

Items	Mean	IPFsSD	Remarks	Mean	ADTsSD	Remarks
	n=312	IPFs	IPFs	n=33	ADTs	ADTs
1 Shelter construction with local materials	2.99	1.181	NCO	2.85	.689	NCO
2 Cleaning poultry house	2.03	1.300	NCO	3.00	.707	NCO
3 Knowledge of litters and management	1.98	1.155	NCO	2.85	.801	NCO
4 Disinfecting pen after brooding period	1.87	1.274	NCO	3.15	.801	NCO
5 Prepare brood for hens	2.82	1.137	NCO	3.00	.577	NCO
5 Make perches	3.12	1.139	NCO	3.31	.480	NCO
6 Make nesting boxes using local materials	3.66	1.352	CO	2.85	.801	NCO
7 Improvise drinkers and feeders with local materials	3.61	1.347	CO	2.54	.660	NCO

Keys: CO=Competency Observed, NCO=No Competency Observed

6.3.2.5 Record keeping and marketing skills

The importance of record keeping and access to markets are crucial in any agricultural enterprise. Record keeping is an effective indicator of whether the farming business is moving in the right direction or not. However, Table 6 indicates that both the IPFs and the ADTs lack the prerequisite skills in record keeping. The IPFs displayed poor knowledge of the local market for the IC which could be attributed to the fact that the majority (69.5%; n=312) reared the chickens for home consumption.

Table 6.6: Record keeping and marketing skills

Items	Mean n=312	IPFsSD IPFs	Remarks IPFs	Mean n=33	ADTsSD ADTs	Remarks ADTs
1 Record keeping of flocks, sex, hatching period and age	1.44	.850	NCO	2.77	.927	NCO
2 Sales of eggs	1.16	.520	NCO	2.92	.954	NCO
3 Sales of chicken	1.53	1.008	NCO	3.38	.650	NCO
4 Slaughtering and dressing of local chicken for markets	1.74	1.115	NCO	3.00	.707	NCO
5 Knowledge of markets for local chickens outside the village or in the cities	2.38	1.439	NCO	3.23	1.092	NCO

Keys: CO=Competency Observed, NCO=No Competency Observed

6.4 KMO and Bartlett's test for the 32 skills components

The 32 skill items were subjected to the Principal Component Analysis (PCA) (Orthogonal rotation technique). Prior to performing the PCA, a test was performed for the suitability of the data for factor analysis. Inspection of the correlation matrix revealed the presence of many coefficients of .4 and above. The Kaiser-Meyer-Olkin (KMO) value was .914 exceeding the recommended value of .5 (Field, 2009). Bartlett's test of Sphericity was significant at $p < 0.001$, supporting the factorability of the correlation matrix. A principal component analysis (PCA) with varimax rotation was performed to ascertain the dimensionality of the skill item measures. The Eigen value and the Scree plot suggested a 6-factor skill items (Table 6.7). The six factors accounted for 77.317% of the variance scores. The item loadings on the factor ranged from 0.523 to 0.93. The six components that had the Eigen value of > 1 were extracted. They are:

1. Identify signs of diseases in birds;
2. Identify ecto-parasites in birds;
3. De-worm birds;
4. Administer drugs to sick birds;
5. Identify chicken predators;
6. Control of predators.

Before the rotation, the main component (ability to identify signs of diseases in birds) accounted for more variance than the remaining five (36.785% compared to 11.681, 9.727, 7.956, 6.168 and 5.174 respectively).

Table 6.7: Total variance of the Eigen values from the 32 skills items

Total Variance Explained						
Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.771	36.785	36.785	5.178	18.182	18.182
2	2.778	11.681	48.466	5.079	17.871	36.053
3	2.153	9.727	58.193	3.625	13.327	49.380
4	1.906	7.956	66.149	3.190	11.969	61.349
5	1.334	6.168	72.317	2.870	10.969	72.318
6	1.205	5.174	77.491	2.528	5.173	77.491

Extraction Method: Principal Component Analysis.

Using the Kaiser criterion, six components were extracted. The Scree plot indicates a clear cut between component 1, which captured more of the variance scores and the remaining five components. In order to determine the number of components to retain, parallel analysis was conducted. The result (Table 6.8) suggests that only five components be retained.

Table 6.8: Comparison of Eigen values from PCA and criterion values from parallel analysis

Component number	Actual Eigen value from PCA	Criterion value from Parallel Analysis	Decision
1	11.771	1.720033	Accepted
2	2.778	1.631054	Accepted
3	2.153	1.539073	Accepted
4	1.906	1.487967	Accepted
5	1.334	1.304664	Accepted
6	1.016	1.387546	Rejected

Table 6.9 shows the factor loadings after rotation. The skills item that clustered on the same component suggests that Component 1 represents Brooding, Shelter and Care of the chicks; Component 2, Predators and Healthcare; Component 3, Hygiene and Litter Management; Component 4, Feeds and Feeding stuff, and Component 5 represents Record Keeping and Marketing.

Table 6.9: Factor loadings

Rotated component matrix ^a					
	Component				
	1	2	3	4	5
Supplementary feeds for brooding hen and chicks	.719	.706			
Make perches	.701	.706			
Prepare brood for hens	.721	.688			
Care of chicks against diseases and pests and predators	.703	.665			
Artificial brooding	.444	.602			
Make nesting boxes using local materials	.576	.585			
Shelter construction with local materials	.645	.573			
Identify laying conditions in hen	.568	.554			
Improvise drinkers and feeders with local materials	.652	.551			
Culling due to poor productivity	.566	.542			
Ability to identify high yielding birds	.234	.541			
Identify chicken predators	.769		.840		
vControl of predators	.756		.826		
Identify ecto parasites in birds	.741		.739		
Identify signs of diseases in birds	.672		.671		
Administer drugs to sick birds	.616		.660		
Methods of ethno-veterinary drugs to treat diseases and parasites	.687		.651		
Disposing dead birds	.417		.469		
Culling as a result of diseases	.154				
Cleaning poultry house	.786		.840		
Disinfecting pen after brooding period	.732		.809		
Knowledge of litters and management	.792		.764		
De-worm birds	.524		.492		
Identify local feedstuffs at different period of the year to feed birds	.812				.824
Use of supplementary feeding for birds of different age group	.721				.787
Use of local feeding stuff to feed birds of different age groups	.778				.781

Culling due to old age of birds	.140	
Sales of eggs	.642	.765
Slaughtering and dressing of local chicken for markets	.750	.756
Sales of chicken	.673	.736
Record keeping of flocks, sex, hatching period and age	.548	.625
Knowledge of markets for local chickens outside the village or in the cities	.702	.571
Extraction method: Principal component analysis.		
Rotation method: Varimax with Kaiser normalization.		

6.5 Discussion

The study aimed to identify the indigenous technical skills (ITS) possessed by IPFs and ADTs in the wake of baseline studies of knowledge and skills audit on indigenous poultry production (IPP). The IPFs were competent ($x \geq 3.5$) in nine out of 32 skill items analyzed that include abilities to identify diseases in birds; identify ecto-parasites; administer ethno-veterinary drugs to treat diseases and parasites; identify high yielding birds and skills in making nesting boxes using local materials; care for chicks against diseases, pests and predators; and improvise drinkers and feeders with local materials. The majority (35.5%; $n=312$) of the IPFs claimed to have learnt the technical skills from their mothers, while a substantial number (30.4%) attributed their skills acquisition to both father and mother. Parents are the first and most enduring teachers of children (Kaiser and Hancock, 2003), transferring family enterprising skills heritage to the young ones through informal education. The findings identified low capacity among the farmers and the lack of motivation from the extension workers, as there was no extension information disseminated to the farmers (99.7%; $n=312$) on IPP in the study areas. Poor skills development has been reported as a hindrance to profitable and sustainable IPP. Findings by Mlozi *et al.* (2003) confirmed a lack of the skills and training required for chicken management to improve household chicken production. The lack of proper chicken husbandry skills (Safalaoh, 2001), limited technical skills, knowledge and appropriate technologies (Gueye, 2002; Morrison, Murray & Ngidang, 2006; Alders, Pym & Rushto, 2009), technical inefficiency (Keramidou & Mimis, 2011) and poor education and training of farmers involved in family poultry (Gueye, 2005) are some of the challenges negating the good performance of the IPP industry. The findings have further justified the widening gap between the farmers' indigenous technical skills and the required scientific knowledge skills for improvement (Branckaert, Gaviria, Jallade &

Seiders, 2000; Gueye, 2009). However, skills training and capacity development of the farmers have been confirmed by various studies as capable of improving the production scale in IP farming (Natukunda, Kugonza and Kyarisiima (2011), Roothaert, Ssalongo & Fulgensio (2011), Riise *et al.* (2004), Eskola & Gasperine (2010), Farooq, Shakir, Mian, Mussawar, Durrani & Cheema (2004); Shamsuddoha & Sohel (2004)).

The findings on the ADTs indicate poor skill development in relation to indigenous poultry production. The poor skills of extension workers have been confirmed in the literature (DAFF, 2008 and ECP Report, 2010/2011). However, their poor skills in IPP may not entirely be the fault of the ADTs if their training at Colleges or Universities does not cover the topic. Also, the lack of IPP content in the capacity development training program of ADTs does not help. Taylor (1999) mentioned a study of agricultural education and training in sub-Saharan Africa (Wallace, Mulhall & Taylor, 1996) which indicated that many agricultural education curricula have serious shortcomings. The study found that many curricula are unresponsive to the socio-economic and technological changes in the rural sector and are inappropriate for the local context. Furthermore, many curricula do not involve any form of systematic training needs analysis and often adopt delivery modes and mechanisms that fail to suit the reality of rural dwellers who are mostly farmers (Rodríguez & Bang, 1999).

In an attempt to identify the critical skill items in designing a training program for indigenous poultry farmers, attention should be placed on the factors extracted from the components. Therefore, a suggested road map of activities was designed (Table 6.10).

Table 6.10: Training road map

Critical factors identified	Suggested activities for the road map
Brooding, shelter and care of the chicks	Advice on designing an appropriate chicken housing structure made of local materials, designed to be appropriate and flexible chicken runs. Training area to include a breeding program. The concept of artificial incubation using simple incubators and hatcheries.
Predators and healthcare	Research into ethno-vaccination and ethno-veterinary concoctions is suggested. A simple housing using local materials for the chicks and fenced chicken runs to guide against predators.
Hygiene and litter management	Advice on materials for litter, and sanitation. The constituents of litters, management, a preventative rather than curative program through good hygiene.
Feeds and feeding stuff	Scavenging Feed Resource Base (SFRB) assessment of the province. Training on the establishment of protein banks through the cultivation of leguminous crops adaptable to the climatic conditions that could serve as plant supplements to the chickens. Advice on locally available feed ingredients and mixing, the making of feeders, and drinkers; regular provision of feed and water.
Record keeping and marketing	Training of farmers in simple record keeping, management and marketing tips.

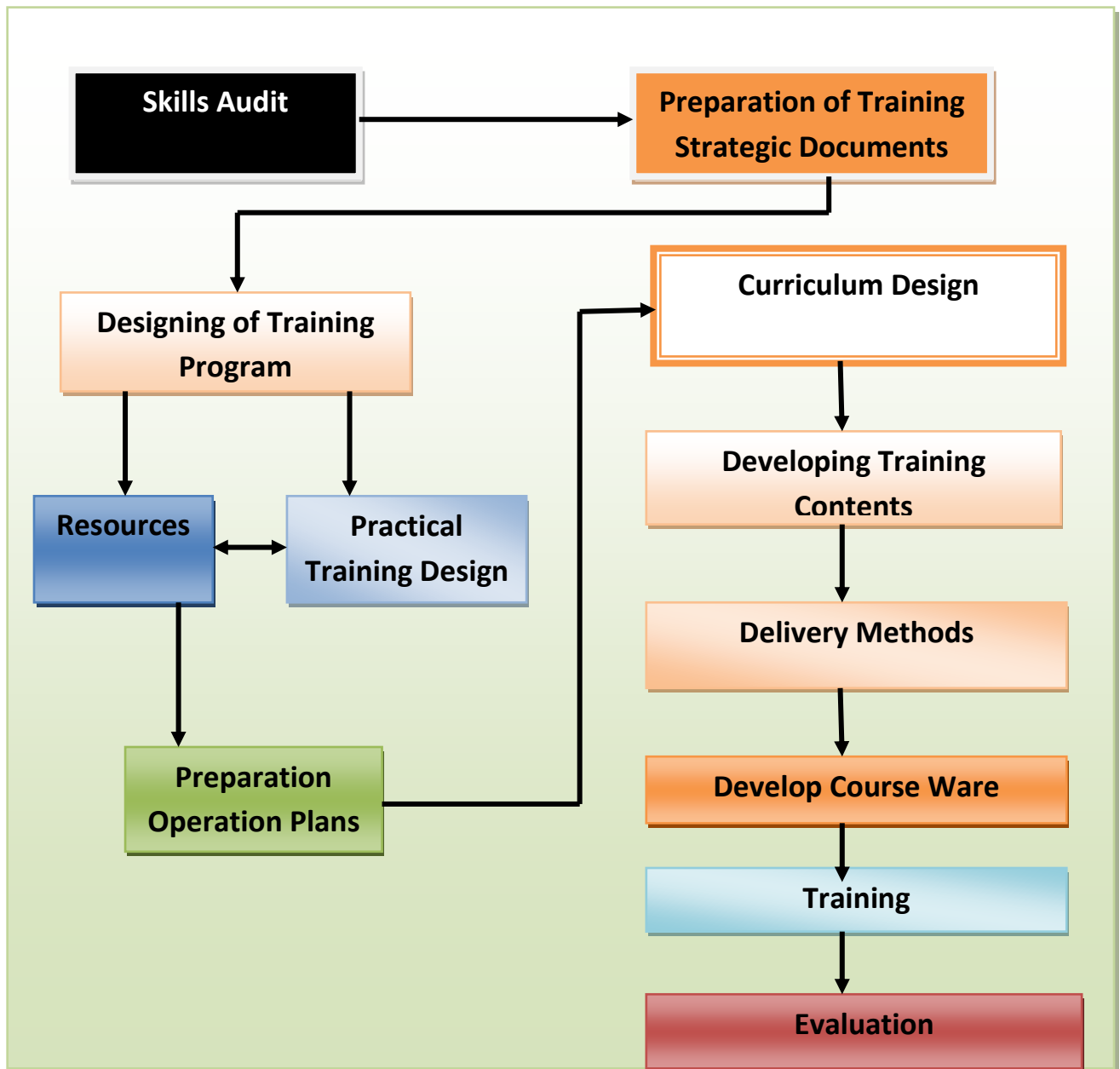


Figure 6.1: Conceptualized training design program for agricultural development technicians (ADT)

The conceptualized training design program was conceived to meet the needs of the farmers who are the intended end users of the training from the ADTs. The stages involved were:

- a. Knowledge and skills audit that will lead to the preparation of the training strategy documents;
- b. Development of a functionally and practically oriented curriculum that will capture all stages of indigenous poultry production;
- c. Capacity development of the ADTs will be anchored on both theoretical and practical aspects of the five identified critical factors on the training road map (Table 10);
- d. Creating training delivery that meets the unique needs of both the ADTs and the IPFs;
- e. Training will be measured through an evaluation program.

6.6 Conclusion

Indigenous poultry production has remained largely unsophisticated, as farmers have no in-depth technical knowledge or skills required for good production. There has not been any conscious effort either by the extension services or institutions towards the capacity development of the IPFs. The poor skills of the ADTs were also observed. This situation has created multiple challenges, which as a result, has created a limited expansion program for production because farmers make use of only local skills. Other challenges such as limited scavenging feed resource base (SFRB), predators and poor housing have compelled the farmers to remain stagnant, hesitant to invest and extremely cautious in expansion. The sector however, remains in the hands of farmers who are unable to take bold steps, due to their poor economic capacity. They are content with what little benefit the indigenous poultry is able to afford them. With this situation persisting, IPP may remain crude. If no adequate capacity development program for farmers, extension workers and other actors in the production, management, and marketing lines are put in place, things will not change. Based on these findings, therefore, it is recommended that: A practical training curriculum should be developed and used to develop the capacity of both the ADTs and the IPFs.

CHAPTER 7

AN INDIGENOUS POULTRY PRODUCTION MODEL FOR RURAL POVERTY REDUCTION IN THE EASTERN CAPE PROVINCE: A THEORETICAL DESIGN OF A VILLAGE COOPERATIVE SYSTEM

7.1 Introduction

The target year by which poverty would be reduced by half, according to the millennium development goal, is 2015. It is now two years to the deadline, but how has South Africa (SA) fared so far? According to the report of the Eastern Cape Socio Economic Consultative Council (ECSECC) (2012:13), the goal is still a mirage. This report indicates that there are approximate 22 million (44%) people living in poverty in South Africa and nearly 3.9 million (57%) live in the Eastern Cape. A report by the Human Sciences Research Council (HSRC), (cited by Cohen, 2008: 9), indicates that there are 12 million children living in poverty. Four million of these children are starving and 40% have growth problems. Poverty, described as “multidimensional” in nature (Ravallion, 2011; Grewal, Grunfeld & Sheehan, 2012), is more prevalent in rural areas (Sodjinou, 2011), with agriculture being the centre of their lives (Meyer, Breitenbach, Fenyés & Jooste, 2009). Agriculture is said to be a vital part of economic growth and development and an antidote for poverty (World Bank, 2007). A report by the Organization for Economic Co-operation and Development (OECD) (2006) entitled “Promoting Pro-Poor Growth Agriculture” indicates that a large number of economies around the world developed their affluence starting with agriculture. The Forum for Agricultural Research in Africa (FARA) (cited in Williams, Mayson, Satgé, Epstein & Semwayo 2008:4) maintains that, for each 1% increase in agricultural productivity in Africa, poverty is reduced by 0.6%. Strong empirical evidence has emerged, aligning poverty reduction more with improvement in the agricultural sector than that obtained in the manufacturing sector (Grewal, Grunfeld & Sheehan, 2012:59). The agricultural sector is often seen as an important segment for growing the economy, contributing to poverty alleviation (Agenor, Aizenman & Hoffmaister, 2004:29). In recognition of the importance of this sector by the South African government, a number of international and national policies, programs, and projects have been initiated to rapidly grow the sector and reduce poverty. However, the program of actions of the various initiatives has never considered the use of IPP as an effective, simple and affordable solution. As a result, the indigenous poultry industry remains an untapped potential economic source. It was against this background, that this study analyzed the agricultural growth options that can support the formation of a more comprehensive rural development component using IPP. In particular, the study sought to reposition the rural

economy landscape, with a sustainable agricultural enterprise, by developing a model for IPP. For this purpose, as well as to assist the policy makers and other players in making informed decisions, a conceptualized indigenous poultry model for the rural Eastern Cape Province (ECP) was developed. For this purpose, the study drew on the working modalities, strengths and weaknesses of several successful IPP models used elsewhere, namely the BPM, Rakai, the RIU, the Benin Model and the *Projet pour le Développement d'Aviculture Villageois* (PDAV) model.

7.2 Methodology

Developing a model is usually a response to new realities and emerging opportunities. As a result, there is no one size-fits-all model. The prevailing situation in an environment usually dictates how and in what forms a model is shaped or designed. According to Shafique & Mahmood (2010), model development is an effective research method that provides the essential ingredients in designing new systems or services. Its development requires the fulfillment of some parameters, which, according to Mandal, Khandekar, Singh & Khandekar (2005:876), serve as indicators of good models. The authors identified six indicators, which are productivity, efficiency, stability, durability, compatibility and equity. Approaches to mobilizing resources for model design vary, but with a common foundation (Hagel & Brown, 2005). Earlier efforts to use this approach are based on “push” factors that are passive, with a top down approach (Hagel & Brown, 2005:5). However, attention is shifting to a “pull” approach that creates platforms that assist people to mobilize resources when the need arises (Hagel & Brown, 2005: 5). A model will be considered to have effective performance when it has activities embedded as a “system” (Allahyari, 2009: 783).

7.3.1 Research design

The research design for this study is qualitative research, which is an approach rather than a particular set of techniques. Its appropriateness is derived from the nature of social phenomena to be explored (Morgan and Smircich, 1990:491).

The assumptions and rationale for using qualitative design are that:

- a. The design of the model has to do with process, rather than the outcomes of products;
- b. The anticipated production model is related to meaning, positively correlated with the livelihood patterns of the farmers whom the model is targeting, experiences, and structures around them (the external environment);

- c. The researcher is the primary instrument for data collection analysis. Data are mediated through this human instrument, rather than through inventories, questionnaires, or machines;
- d. Qualitative research is fieldwork. This means that the researcher interacts with the study environment where respondents are observed. In this case the village settings, methods of poultry production (housing, feeding, health care, breeding), behavioral attitudes to questionnaires on their living patterns were observed and creates an informed opinion upon which the conceptual model was designed;
- e. The study is descriptive. The researcher is main points of focus are the processes, meaning and an understanding that is gained through discussions, photographic capturing, cultural information, economic behavioral activities, livelihoods and reasons for specific aspects of the model, like, in this case, housing, feeding, health care, breeding;
- f. The inductiveness of qualitative research gives support to build abstractions, concepts, hypothesis, and theories from details that create the conceptualized model (Adapted from Merriam, 1988:19-20).

In this study, the concept of “Open System Theory” (OST) was used. The OST conceives an organization as a combination of parts with interdependent relationships and open to interactions with the external environment (Hanson, 1996; Hanna, 2000). According to Thien & Nordin (2012), the external environment is regarded as government regulations, socio-cultural, economic and political forces that influence the operation of the OST. According to Hanna (2000 cited in Thien & Nordin, 2012), the external environment is one of the influential factors that determines the survival of a system. A social system is an enabling environment for two or more persons to work together in a coordinated manner towards the achievement of common goals (Norlin, 2009 cited in Lunenburg, 2010: 2). The OST view organizations as organic, living, goal-seeking organisms with structures and systems that attain equilibrium within the context of their internal climate and withstanding the external forces and pressures to remain afloat (Breckenridge Institute, 2013:4).

An open system is made up of three elements that constitute the perfect organic organization. These are: the strategic view; the execution; and the organizational climate. The social system has features that include people, a goal directed nature, the attainment of goals through a coordinated effort and interaction with the external environment (Norlin, 2009). The open system

model is composed of the environmental conditions (physical, social, economic, cultural) and the organizational sources of resources. Within the two compartments are:-

- a. Non-members residents where membership is derived (willing membership);
- b. The resources- the technical skills, attitudes and beliefs that are common to the members;
- c. The organizational structure- this is the structure upon which the organization will be created and the functions;
- d. The organizational climate: The sense of cohesion, task focus and the leadership control of the organization;
- e. Internal resources: The attitudinal and behavioral tendencies of members.

Outputs: The maintenance as entity in the community and sponsorship of activities around programs and projects (Figure 7.1).

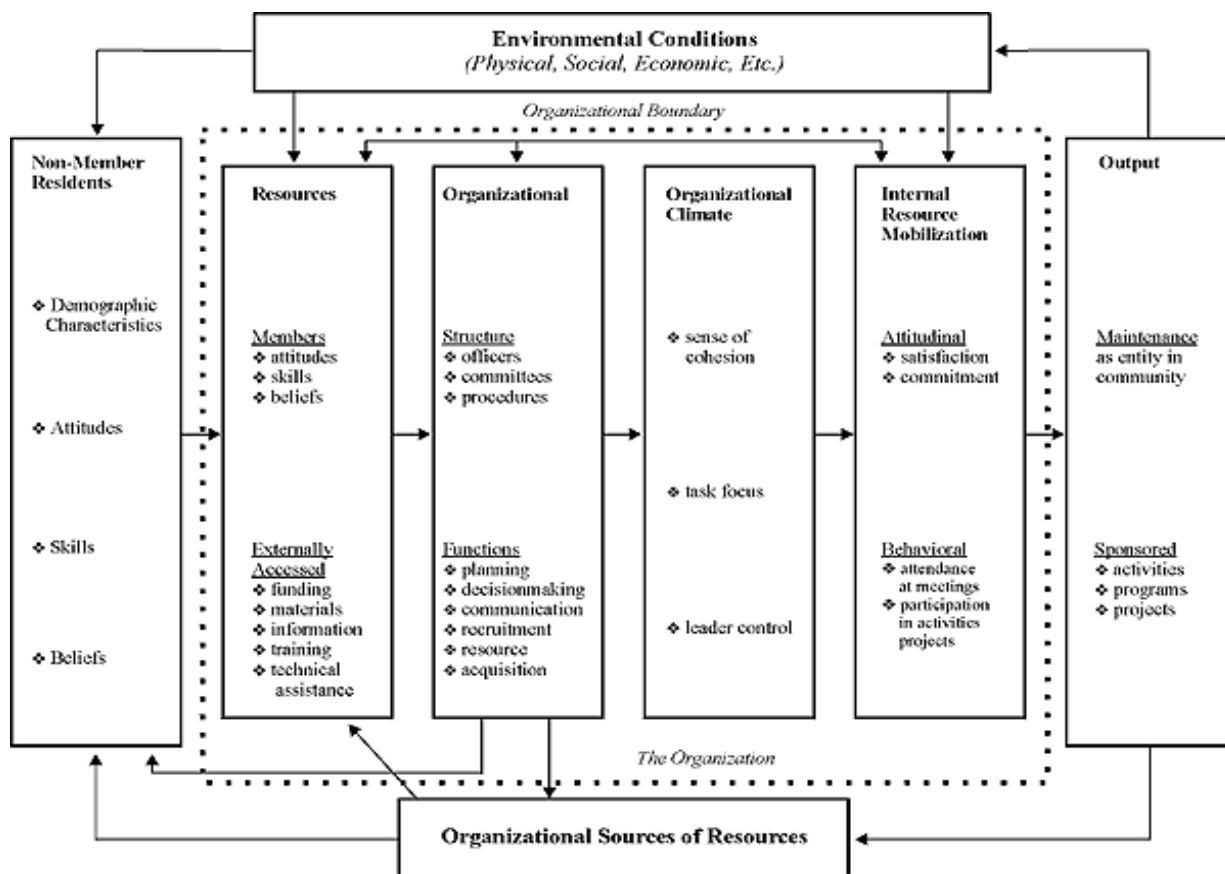


Figure 7.1: The Open Systems Model. Adapted from Chavis, Florin & Felix, (1992)

However, there are basic fundamental processes which are very critical in the measurement of both the input and the output of the organization. According to Hanna (2000), these processes include:-

- a. Negative entropy- the negative entropy indicates the ability of a system to import more than its export by changing its purpose in order to meet the environmental needs;
- b. Specialization- specialization refers to the formation of new specialized functions to cope with the growth of the process so that the steady state can be achieved or maintained;
- c. Equifinality- Equifinality is indicative when the system reaches the same final state or results from a variety of initial conditions or pathways;
- d. Feedback- Feedback refers to the information about the input that measures the acceptability of both output and goals of the system. There are two types of feedback; the positive and negative feedback. The constructive feedback measures whether the desired goals are aligned with the environmental demands, meanwhile, negative feedback measures whether the output aligns with the desired goals;
- e. Equilibrium- Equilibrium or the steady state of the system refers to the natural tendency for the system to stabilize its transformation processes within a certain limit. Equilibrium is necessary in order to ensure the survival of an organization.

According to Thien & Nordin (2012:891), the five fundamental organizational processes are important when the system breaks down or achieves disequilibrium due to failure in the system goals to meet environmental needs. The authors further explained that, at the point of disequilibrium, negative entropy will react directly to increase the system's ability to exert more energy to the input of the organization. When this occurs, the system forms, at least, one new function to be able to cope with the environmental demand that exceeds the elements' ability. With the organic organizations, a state of equifinality could erupt. This explains the numerous paths that could be operated in order to achieve a state of equilibrium of the system (Thien & Nordin, 2012). An important factor is access to information on the environment, from both community assessments and the feedback, including criticism, on organizational activities. Feedback should be cyclical, that is, continually repeated, for future planning, implementation and outcomes. The holistic analytical contents of the model suggest that the fundamental processes of negative entropy, specialization, equifinality, feedback and equilibrium are essential to ensure the survival of the system (Thien & Nordin, 2012).

7.4 Review of some indigenous poultry models around the world

7.4.1 Bangladesh Poultry Model

The semi-scavenging Bangladesh Poultry Model (BPM) has a long history of development (Islam & Jabbar, 2005). The revolution in the poultry model came with the initiatives of non-governmental organizations (NGOs). The Bangladesh Rural Advancement Committee (BRAC) in partnership with the Department of Livestock Services (DLS) developed the BPM for poverty alleviation through a series of field trials. According to Islam & Jabbar (2005), the BPM consists of a supply chain of seven types of enterprises –breeders, mini hatchery, the chick rearers, the key rearers, the poultry workers, the feed sellers and the egg collectors.

Table 7.1: The Bangladesh Poultry Model

Production	Supply	Service
Breeders	Parent stock	Village groups
Hatcheries	Feed	Training
Chicken rearers	Vaccine/ medicine	Credit/ saving
Smallholders	Marketing	Extension

Source: Jensen & Dolberg (2003)

Table 7.2: The components of the three-line organization of the poultry model (Adapted from DANIDA 1999) in: Permin *et al.* (2000)

Primary production	Input supply and marketing	Services to establish and maintain the model
1. Mini hatcheries Small low-cost hatcheries operated with solar energy and kerosene. Black pillows filled with rice husks are heated in the sun or by means of a kerosene lamp, and the eggs are placed into a	1. Parent stock The parent stock is supplied from government or an NGO hatchery at market price for day-old chicken.	1. Surveys and group information The involved NGOs perform area and household surveys. Potential beneficiaries are selected based on poverty criteria and organized to form small village groups with

<p>cylinder between two pillows for hatching.</p> <p>Each hatchery has a capacity to hatch 1000 chickens per month.</p>		<p>some 30 members each. The groups hold weekly meetings to discuss relevant subjects and new poultry holders are selected from the groups.</p>
<p>2. Chicken rearers</p> <p>Small rearing farms, each with a capacity of 200–300 chickens-4 batches per year. The chickens are reared in low cost houses from day-old to 8 weeks of age. The chickens are fed balanced feed supplied by the local feed mixers and sellers.</p>	<p>2. Feed mixers and sellers</p> <p>The feed is supplied by a number of small feed sellers located in the villages. The sellers purchase local by-products from the milling industry and mix it with fishmeal, vitamins, and mineral. A feed mixer and seller prepare and sells about 1 ton of feed per month.</p>	<p>2. Training</p> <p>Before a poultry holder is established, she must undergo a compulsory 3–day training program. Regular refresher courses are also designed as follow up in the training.</p>
<p>3. Pullet rearers</p> <p>Small rearing farms which receive 8-week-old pullets from chicken rearers (or government farms) and rear them to the age of 18 weeks.</p>	<p>3. Poultry workers</p> <p>A number of poultry workers are trained to make simple diagnoses and vaccinate the birds. The vaccine is supplied by the government and the poultry workers charge a vaccination fee.</p>	<p>3. Credit</p> <p>Depending on the activities, each group member is provided with a small loan ranging from US\$25 to US\$200. The repayment period is one year.</p>
<p>4. Model breeders</p> <p>Small low-cost parent farms with 25 parent hens per farm. The hens are kept in confinement and fed with balanced feed. The parent stock is either RIR males and Fayoumi females or Fayoumi males and</p>	<p>4. Egg collectors</p> <p>Table eggs and chickens are collected from the key rearers by egg collectors and marketed in the nearby towns, or the poultry holders sell the eggs and chickens themselves in the village.</p>	<p>4. Extension</p> <p>Extension services are provided as cooperation between the government and the involved NGOs.</p>

commercial hybrid females.

5. Key rearers (95% of the beneficiaries)

Small farms with only 10 hens, mainly improved breeds supplied by the chicken rearers, and a few hens of local breed.

The hens are kept under semi-scavenging conditions and fed with 30–70% supplementary feed.

5. Research

Research is conducted as per identified needs by national and international universities and sector research institutions.

The BPM exhibited some strengths that enabled its success, to including a combination of technical features and pragmatic implementation which, among other things, focused directly on the resource poor and landless women (Permin, Pedersen & Riise, 2000. The following technical features facilitated the active participations of poor women in the program (Permin, *et al.* 2000):

- a. No start up asserts were required;
- b. The model was based on traditional poultry rearing knowledge;
- c. The use of locally available inputs rather than externally sourced;
- d. The marketing strategy had a built-in marketing and sales mechanism (aiming at village and local markets); and
- e. The model had a strong network of activities that incorporate the community groups.

The model was able to achieve the followings according to Permin *et al.* (2000):

- a. The real poor women benefited through active participation;
- b. It contributed to the improvement of the nutritional status of households;
- c. It raised social awareness of the women;
- d. It promoted the economic empowerment of women (women influence household decisions);
- e. It generated massive employment opportunities and income generation for the poor.

However, the model was not without some technical deficiencies. Some of these technical deficiencies were identified in a report on workshops in Bangladesh by the Network for

Smallholder Poultry Development. According to Permin *et al.* (2000), some of the technical deficiencies could be improved through the following strategies:

- a. Improvement in the technical packages that could make them more economically viable;
- b. The external supply of inputs such as parent stock, vaccines, and feed ingredients needs to be better secured;
- c. The development of staff capacity in nongovernmental organizations (NGOs) (training of trainers) to improve the quality of the beneficiaries of NGO staff training;
- d. Strengthening the working relationship between government institutions and NGOs with the development of operational procedures that will give clear guidelines for the division of work and responsibilities.

The BRAC model, according to Dolberg, Mallorie & Brett (2002), was identified as having significant development potential because its establishment was rural based, required low levels of skills and capital to start, had potential for high returns on investment, enabled the consumption of chicken products, which improved the diet, involved women, who also made room for other tasks, had cultural acceptability and enterprise in which women were able to retain ownership and control of the production process and the output arising there from.

7.4.2 The rakai model

The Rakai model was developed in Uganda by the Indigenous Consultants Researchers and Trainers (INCORET) (Ssalongo, 2003). The model was aimed at the synchronization of hatching by a selective breeding program of local hens to produce large numbers of day-old chicks of exactly the same age (Roothaert, Ssalongo & Fulgensio, 2011: 223). The technology infused into the Rakai model has the following advantages, as described by Roothaert *et al.* (2011:223):

- a. Creating room for an effective vaccination program of day old chicks, for brooding and for good feeding management;
- b. Making it possible for farmers to design marketing strategies on how to dispose birds at harvesting;
- c. Innovating local technology for hatching;
- d. Improving hatching periods per year from two to seven times per hen;
- e. Creating the comparative advantage of producing chicks at cheaper rate as against commercial production;
- f. Introducing technologies that are very simple, affordable and sustainable.

7.4.2.1 The production technique of the rakai model

The model involved the use of Rakai local hens crossed with improved bovan specie at the ratio of 1:7. A separate laying nest was usually provided for each hen with a decoy egg to initiate false incubation. This was followed by the daily removal for safe keeping of the eggs laid, causing minimal disturbance to the birds.

Once incubation commenced with a hen sitting on decoy eggs, the situation was allowed to continue for 10 days, by which time other hens had already joined in the incubation process. At this stage, 17 fertile eggs were given to each of the incubating hens. Exactly three weeks later, chicks are hatched and removed. The process can then be repeated again for the hens.

7.4.2.2 Brooding of the chicks

Brooding is carried out under hygienic conditions with the provision of heat using homemade charcoal briquettes.

7.4.2.3 Breeding program

The Rakai model breeding program was a tripartite arrangement that involved INCORET, Community Integrated Development Initiatives (CIDI) and the farmers. The breeding program involved a plan that used both local and improved strains of birds. It was divided into four stages, which were described by Roothaert *et al.* (2011:224) as follows:

- a. Selective breeding of the indigenous Rakai chicken for egg production;
- b. Cross-breeding of the selected indigenous Rakai hens with Bovan White cocks, leading to Rakai₁ (R₁) offspring (Figure 7.1). This offspring laid more and bigger eggs than the local Rakai chickens;
- c. Cross-breeding of the R₁ hens with selected broiler cocks to get Rakai₂ (R₂) offspring. The R₂ birds have the ability to grow faster and put on more meat, and at the same time lay more eggs than the local Rakai chickens;
- d. Cross-breeding of the R₂ hens with selected indigenous Rakai cocks to introduce more disease resistance in the required Rakai₃ (R₃) offspring, while retaining the ability to grow fast, put on more meat and lay more eggs. R₃ was the desired end product of the breeding plan.

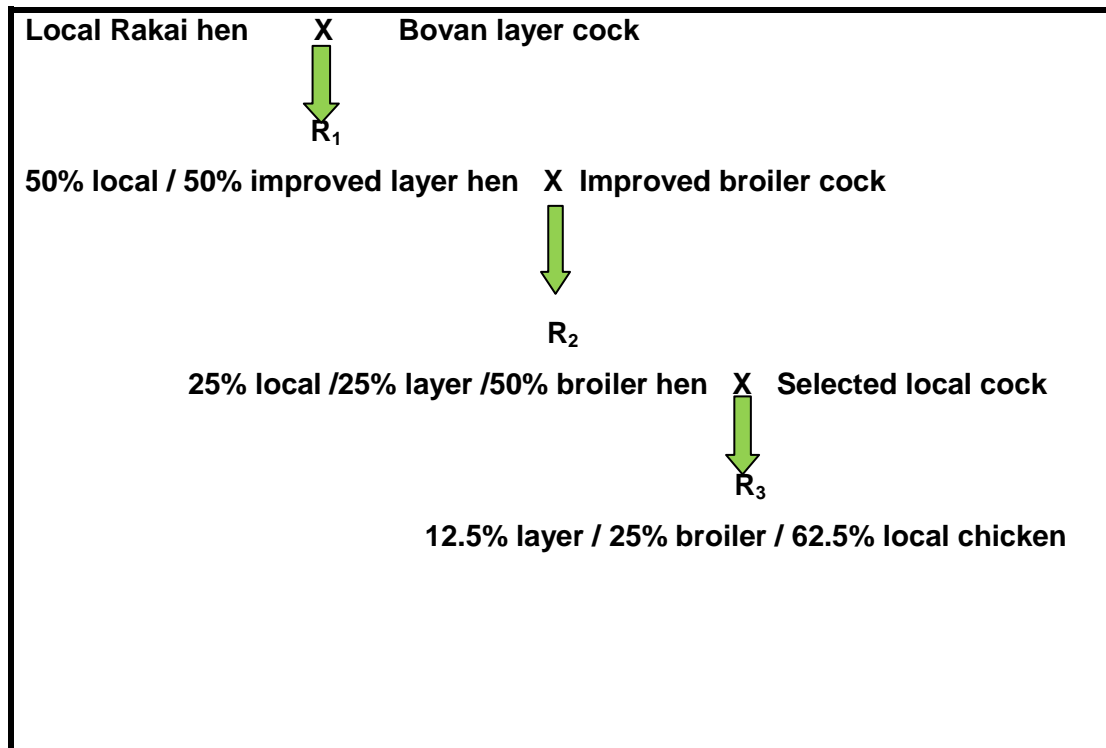


Figure 7.2: Schematic illustration of the Rakai cross-breeding program. Adapted from Roothaert, Ssalongo and Fulgensio (2011:224).

The cross-breeding of the local chicken with exotic breeds was meant to produce the following characteristics:

- a. The development of a faster growth rate from the product, characterized by early maturity;
- b. The ability to laying more eggs of a bigger size than the indigenous ones;
- c. An improved conversion feed rate, creating heavier stock;
- d. An acceptable feed consumption;
- e. The development of a flavour similar to that of the indigenous poultry;
- f. Stock that is hardy and has greater resistance to diseases and parasites than the exotic breeds and hybrids;
- g. A program that creates easy multiplication and better rearing management, easy marketability.

7.4.3 The Benin model

The semi-scavenging poultry model of Benin (Chrysostome, Riise & Permin, 2002:15) is organized around three pillars, which are: the production, the service and the supply pillar. Two national non-governmental organizations (NGOs), the APRECTECTRA and GRAPAD were involved. The former handled the technical development of a chicken production system at the village level while the latter handled the financing of the production inputs, group formation, credit training and follow up. A strong foundation was established with the locals that included private veterinarians, craftsmen for the supply of locally made poultry keeping equipment, personnel of the "*Direction d'élevage*" for technical support; and of scientists of the *Faculté des Sciences Agronomiques* of Abomey Calavi University and the Network for Smallholder Poultry Development in Denmark for the specific support in research and for the development of the system (Chrysostome *et al.*, 2002). Each pillar has specific functions and tasks within the model.

7.4.3.1 Production pillar: this pillar consists of indigenous poultry farmers who have between 8-10 hens. The system of production is semi scavenging with supplements of less than 40% with local ingredients.

7.4.3.2 Supply pillar

This pillar is composed of Village Vaccinators (VVV), who are trained specifically in vaccination techniques. Private veterinarians supply the vaccines mostly for the Newcastle disease (NCD). The VVVs charge a fee for the service they provide to the farmers.

- a. **The sellers:** They are responsible for the collection of poultry from the farmers for onward sales at the market or in surrounding towns.
- b. **The craftsmen:** These are the peasants who are specialists in the production of poultry equipment, housing, feeders, perches, and drinkers from local materials.

The Benin model did not have parent stock that affected the supply of Day-Old-Chicks (DOCs) to the farmers and this created room for the adaptation of local breeds with the delivery of vaccines and medicines.

7.4.3.3 Service Pillar

The pilot phase of the project involved 10 villages from the North (Department Donga) and 10 villages from the South (Department Mono). Each village had 40 members, totalling 800 farmers plus 40 VVVs. The participating NGOs formed small village groups with 5 members. The groups held weekly meetings to discuss relevant matters that revolved around the entire chicken

production. New poultry keepers were allowed to join the village group known as *Association Villageoise de Producteurs d'Aviculture Traditionnelle* (AVPAT) after receiving 2 to 3 days' mandatory training conducted by this NGO. The participating university staff were responsible for the technical training for the VVV and extension workers of the participating NGOs.

Credit is available to the farmers based on the type of activities it is required for. For example, a small loan of 30,000 F CFA for producers and 25,000 F CFA for VVV and poultry sellers. The repayment period is 1 year for poultry producers and 6 months for the others. The interest rate is 12% per semester while the rate of saving is 18% per semester and a penalty rate of 2% a month on the capital remaining due.

7.4.3.4 Achievement

Many farmers joined, leading to the formation of 20 AVPATs. Forty VVVs were trained and participation was excellent. There was high reduction in mortality from 90-100% to an estimated 5 - 10% after the vaccination campaigns. The rapid adoption of simple technologies, the terracotta troughs, improved nests, utilization of local feed stuffs, and grouped marketing were well established in the villages, giving a sustainable effect.

7.4.4 The Tanzania Research Into Use (RIU) model

The high level of patronage that commercial poultry enjoyed in Tanzania between the early 1970s and the late 1990s slumped in the early 2000s due to the health consciousness of consumers of poultry products (RIU, 2012). The health awareness grew from the perception of the drugs and hormones used in the poultry industry as potential health hazards to the consumers. As a result of this, the high layers' annual population growth rate of 26% experienced between 1995 and 1999 declined to 11.7% over the period 1999 to 2003, while that of broilers dropped sharply from 30% to 2% over the same period (RIU, 2012:3).

The sharp shift in the consumption pattern of the consumers created a shift in the demand and supply of indigenous poultry. This was attributed to confidence in the healthy feeding of the birds and better taste. In an attempt to close the supply gap, the Research Into Use (RIU) (a NGO) created an enabling environment for the commercialization of the indigenous poultry production. The modality used involved the mobilization of champions (female or male leader of a group of indigenous poultry farmer) who were empowered to raise 100 birds each, with a future planned increase of 200 to 300.

The RIU skills strategy enhancement was holistic and involved all the value chain activities. Between 2009 and 2011, remarkable changes took place in the local chicken sector in Tanzania

as a result of RIU's work. Local farmers increased their stocks from 10 or 20 to more than 200, turning local chicken production into a business. The first strategy was to identify the typology of stakeholders that were made up of the farmers, input suppliers, extension agents, live chicken traders, business advisory services providers, local government authorities, and regulators.

Due to the identified challenges of the existing government extension system, and because the farmer field schools (FFS) approach could not provide the needed skills development for the farmers, the RIU (2012) mapped out training for the farmers in their own environment. A novel idea of using livestock production certificate holders as "household caretakers" was introduced. Their duty was to stay with the farmers for the first 30 days, putting them through all stages of managing day old chicks for the first 30 days before the government extension workers would take over. The training revolved around feeding, health care with a poultry keeping guide book, vaccination calendar, and record keeping with all necessary documentation materials provided for the farmers. As results of this approach, RIU was able to achieve significant success within two years of starting the project. For example, networks of more than 500 farmers keeping between 100- 300 chickens were made available for the market every 3 to 4 months. In total these farmers were providing about 50,000 mature chickens ready for consumption every month. Contract farming assured farmer's ability to purchase inputs including chicks, drugs, vaccines, feeds and extension services.

7.4.4.1 The RIU road map

The road map introduced by the RIU led to the creation of:

1. An increase in stocks owned by the farmers;
2. IPP turning into a business venture;
3. The establishment of a special centre for DOCs with specialized hatcheries;
4. The establishment of contact between farmers and buyers and guaranteed markets;
5. Easy access to extension and veterinary services.

The RIU designed novel strategies of reaching the farmers through using a bottleneck modeling approach which consisted of the following modalities (RIU, 2012:4):

- a. Increase in the use of new knowledge and technologies amongst producers;
- b. Increase investments in inputs, outputs and service provision systems;
- c. Increase production scales of smallholder rural farmers.

The above sets of modalities were achieved through the following strategies:

- i. Identification of key actors;

- ii. Identification and analysis of challenges within the different stages in the entire chicken production value chain;
- iii. An integrative coordination and solution implementation with all stakeholders to address identified challenges.

7.4.4.2 Implementation

1. The value chain of producers was focused on egg hatching, hatchery coordination, and delivery of chicks, chicken production, service provision and selling of indigenous poultry;
2. Development of hatchery;
3. Support to the rural farmers with 100 DOCs;
4. Farmers supplied with 200 DOCs were linked with household poultry advisors (HHPA) to train them on poultry husbandry;
5. Through the development of contract farming system, farmers were linked to the market to sell their chickens;
6. As a way of sustaining the project, the RIU developed a business initiative codenamed "KukuDeal" (RIU, 2012: 6).

7.4.4.3 Indigenous poultry hatcheries and breeders' farms

With the emergence of indigenous poultry hatcheries and breeders' farms (ICH and BFs), the government set up a regulatory program for the operations. The essence was to stop the spread of diseases and ensure a smooth transition in the poultry sector. Also, the government enforced regulations for the poultry feed producers to ensure quality control. The poultry sector was motivated to encourage a multidisciplinary approach to solving any problem that might arise in the industry. The mutual interaction of the government and the stakeholders allowed for loan accessibility, land, market, and slaughter lab development and marketing facilities to be put in place. The government invested in capacity building within the entire value chain. The situation strengthened the farmers and the hatchery owners by ensuring access to extension services for technology transfer and know-how to breeder's farms, hatcheries and commercial farms.

7.4.4.4 Strategies with the farmers

The employed HHPA were posted to live with the farmers for 30 days. They used the staying period to train the farmers in using DOC management strategies. The HHPA were accommodated by the farmers for the period.

Farmers were provided with soft loan of 60% costs of 100 DOCs and the following:

1. Two drinkers and feeders each;
2. A poultry keeping guide book;
3. A laminated vaccination calendar;
4. An exercise book for simple record keeping;
5. Charts showing the type of records to be kept;
6. A pen and coupon for procuring vaccines, drugs and bags of feeds that will be enough for the first one month.

For any farmer to benefit from the above, he or she must have a poultry shed large enough to accommodate 100 DOCs to marketing stage. These sheds were inspected for various parameters needed to keep poultry. Farmers were responsible for paying the balance of 40% of the soft loan for the purchase of the DOCs. Loan recovery was a process that started after the birds have matured and been sold. A village champion, who has demonstrated a high level of commitment to the project, and has the mentoring capacity to motivate others, was appointed from amongst the farmers. He or she coordinates, mobilizes, advises and collects the 40% initial payment for the DOCs from farmers.

The HHPA taught farmers how to vaccinate their flock, how to detect early signs of diseases, how to keep simple records, learn what, why and when to feed chicken, how to mix a balanced ration with locally available ingredients such as cassava, millet, maize, fish meal, sunflower cake, groundnut cake, banana, and potato peels.

The impact of the RIU model could be summarized from the testimony of one of the champions of the project thus "I want this story to encourage the host and other non state actors to realize that small scale farmers are not born or made for poverty, because this is not true, ...what we need is the right approach to educate and empower us and we will slowly transform our conditions ourselves" (Mkongea, Poultry farmer and District Champion, Rufiji District Tanzania (RIU, 2011:25).

7.4.5 *Projet pour le Développement d'Aviculture Villageois (PDAV) in Burkina Faso*

The poultry model *Projet pour le Développement Aviculture Villageois (PDAV)* in Burkina Faso, was funded by *Coopération Francaise* (Sonaiya, 2007:9). The model has broad objectives to improve the hygiene, housing and feeding of family poultry (guinea fowl) and the transport and marketing of poultry products (Ouandaogo, 1990:31). The model employed a massive training program and placement of "*vul-garistateurs villageois volontaires*" (VVV), so that within ten years (1979 to 1989), 1, 821 VVV were trained; they administered 13 million Newcastle (NCD)

vaccinations and 1.2 million antihelminthic treatments (Sonaiya, 2007:9). The training strategies of the PDAV included: awareness campaigns for the program; publicity campaigns that target the resource poor farmers and rural dwellers in the villages; debates in schools; pamphlet distribution; village meetings; VVV meetings; training and retraining of the VVV; farmers' visits to livestock centers and technical conferences of livestock agents (Sonaiya, 2007:10). The program covered 15 provinces (out of 30 in the country), 4, 378 villages (out of 7 500) and 5, 646,125 beneficiaries (Sonaiya & Aklobessi, 1991; Sonaiya, 1992:689). One of the major factors of success of the PDAV, according to Sonaiya (1992), was the strong political will of the government coupled with the high level of commitment by the government to the development of the rural areas using agriculture as a basis.

7.5 A conceptual Indigenous Poultry Production Model (IPPM) for the Eastern Cape Province (ECP)

In the design of an IPPM, the five basic elements that were considered are: inputs, a transformation process, outputs, feedback, and the environment (Scott & Davis, 2008).

- a. **The inputs:** - are the human resources, financial resources, physical resources and information resources (Lunenburg, 2010);
- b. **Transformation process:** - It is the activities that synthesize the various resources towards attaining the goals of the model. According to Lunenburg (2010:3), the transformation process includes the internal operations of the organization and its system of operational management. The components of the system of operational management include technical competence, a business plan, and ability to cope with changes;
- c. **Outputs:** - This has to do with the attainment of the goals and objectives of the organization which is represented by the increase in the number of chickens kept by the farmers, improved housing, improved health care, a vaccination program, access to a market, healthy loan repayment behavior, quality assurance, and brand name acceptance. The output will translate into an improved livelihood for the indigenous poultry farmers and improvement in the rural economy;
- d. **Feedback:** - This is the process in which part of the output of a system is returned to its input in order to regulate its further output. Feedback will be from the extension services or the Non Governmental Organizations (NGOs), the IPFs and the public on the product(s) of the organization;

- e. **Environment:** - The environment in which the organization operates impacts on its activities and this will be directed towards sustainability. According to Lunenburg (2010:4), the environment in which an organization operates is usually affected by the social, political and the economic contexts at various levels of governance. The establishment of the cooperative may be affected by both the internal and external pressure. The issues of globalization, trade liberalization, conflicts, insecurity, government policy, technical, privatization and genetic engineering, amongst others, could affect the success or otherwise of the organization.

7.5.1 The goal and guiding principles of the model

To promote sustainability economic empowerment for the uplifting of the resource poor, and creating an improving rural livelihood through indigenous poultry production

In developing an IPPM for the ECP, some guiding principles were developed:

- a. The concept of voluntary / interested person participation shall be a guiding principle rather than a 'project' meant for all;
- b. The fulfilment of entry requirements from individuals, in term of simple assets, will be promoted. This is to allow for serious minded participants to join the society that will be under the umbrella of an Indigenous Poultry Farmers Cooperative Society (IPFsCoop) otherwise to be known as *Abafuyi Benkukhu Zemveli* (ABZ);
- c. There will be the creation of strong interrelationships between the IPP farming enterprise and the development of the human resource;
- d. The source for local content as input material for feeding, poultry equipment using craftsmen, and housing;
- e. A need- based development content.

In order to create a very strong synergy, members that form a village ABZ Co-op are expected to work as a team. In addition, the following must happen:

- i. The equity trust shall be based on individual contributions, which shall be the bases of profit and loss sharing formula for the society;
- ii. The appointment of ABZ Co-op executive committee by the majority through selection or election. The appointed committee requires mentoring abilities, resourcefulness, and charisma;
- iii. The ABZ Co-op will be self sustaining by generating its own capital base through share holding subscriptions by members;

- iv. Value chain connectivity- The various components of the IPP shall be invested into by the ABZ Co-op;
- v. The ABZ Co-op shall be governed by central rules and regulations but each axis at village level shall create its own bye laws for the members.

7.5.2 Capacity development

To achieve the objectives of the ABZ Co-op, for all the members as a group, capacity development will be by institutional support, University Community Engagement, and Non Governmental Organizations (NGOs), in the following skills as identified by Terblance (2008),

- a. Technical skills;
- b. Communication skills;
- c. Group facilitation skills;
- d. Extension management skills.

The IPPM will have the major goal of establishing a sustainable and economic empowerment for the support of the resource poor and improved rural livelihood through IPP.

7.5.3 Components of the IPPM

The following shall constitute the components of the IPPM upon which the cooperative shall revolve round (Figure 7.3):

- 1. The ABZ Co-op;
- 2. The IPFs;
- 3. The Breeders and Hatcheries;
- 4. The Veterinary services;
- 5. The Feed mills;
- 6. The IPF rearers;
- 7. Capacity development;
- 8. A chicken processing plant;
- 9. Marketing.

7.5.3.1 The ABZ Co-op

The ABZ Co-op shall be the umbrella body for any member willing to be part of the cooperative. A member must register as an IPF residing in the village or a nearby village not more than 2km away. This is to facilitate an assemblage of members for training and regular meetings. The office of the ABZ Co-op shall be located in a central place, with a training centre and an office.

The ABZ Co-op shall operate fully as a coop society that shall generate money internally through members' contributions. It shall have amongst its' products savings, thrifts and loan to members.

7.5.3.2 Indigenous Poultry Farmers (IPFs)

Criteria for membership

- a. Member must be identified as poorly resourced farmer either male or female;
- b. Own at least two hens with or without cockerel;
- c. Be able to make a daily contribution of R2 minimum or R15/ week minimum to the ABZ Co-op to be entered into his or her account as equity contribution or holding;
- d. Have a simple housing unit that can accommodate 20 birds with space for future expansion of up to 200 chickens;
- e. Have compulsory three week training program that will revolve round the management of IP.

7.5.3.3 The breeders and hatcheries

The model will promote some members to be breeders. The criterion for promotion will be to have had a large flock under his or her management in the last five years with a good track record of hygiene, resourcefulness and modest financial base. Such an identified member shall be given institutional support in the form of improved breeds of foundation stock at a subsidized rate. The breeder will be supplied with either eggs or day-old-chicks by the supporting institution. The supporting institution will partner with Fowls for Africa, a registered trademark with the Agricultural Research Council (ARC) for the supply of DOCs and eggs for hatching by the breeders. The supporting institution will partner with the ARC for the supply of proven indigenous poultry that are well adapted to household production. The breeds of *Potchefstroom Koekoek*, *Venda*, *Black Australorp* and *Ovambo* shall be promoted. The *Potchefstroom Koekoek* is a dual purpose fowl with sex linked feathering (South Africa Indigenous Breeds (SAIB), 2013); the *Black Australorp* is a dual purpose fowl; the *Venda* has very good egg production ability while the *Ovambo* can survive under very harsh and poor weather conditions (ARC, 2013). The breeder will only be concerned with raising these breeds to hatch the eggs for immediate purchase by the chicks' rearers. A minimum of 50 hens shall be the target. The supporting institution will also partner with the SURE HATCH Company for the supply of incubators and a hatchery on behalf of the ABZ Co-op. The company will also be responsible for the capacity building of the selected farmers that will serve as breeders. The

company's SH90 semi-automatic model with the capacity of 90 chick's hatchability per month shall be promoted during the pilot project period. The SH90 has a measurement of 25x32x60 cm with a total weight of 3kg. It has power usage with the maximum use at start up of 60 watt. It is purely electronic, semi-automatic and made of polystyrene (Surehatch, 2013).

7.5.3.4 The veterinary services

Amongst the team of the farmers shall be trained village vaccinators (VV). The *Umtiza* (An Agro-allied Company) based in the ECP will initially be partnered with for the supply of vaccines and drugs for the veterinary services to the farmers. The VV will be under the University Community Engagement (a supporting technical institution) for their training. Meanwhile, the VV will charge fixed amounts for the services rendered to the chick rearers and other rearers.

7.5.3.5 The feed mills

The *Umtiza* Agro-allied Company will also be responsible for the supply of feed for the various categories of chicken production. Meanwhile, training will be conducted in the establishment of Scavenge Feed Resource Base (SFRB) along with a "plant protein bank" garden for the chickens to peck. The challenge of winter poor scavenging feeds will be addressed through the development of compost for insect growing. In order to bring down the cost of feeding and using local resources, farmers will be trained in feed formulation using locally available feed resources. A contractual arrangement with *Umtiza* will be for a period of not more than five years where the ABZ Coop should have developed good grounds and established her own feed mills company.

7.5.3.6 The IPF rearers

The IPF rearers will be divided into two groups. Members will determine which area of interests he / she will like to venture into. The first group will be farmers brooding day old chicks for up to eight weeks. They will sell off the brooded chicks to the farmer growers.

The second group of the farmers will be the growers who will buy the chicks at eight weeks old and raise them till slaughter age. They will sell directly to the ABZ Co-op processing plant.

7.5.3.7 Capacity development

The capacity development of the IPFs and the public extension personnel will be undertaken by the University Community Engagement; Agricultural Research Council; Surehatch Company; a NGO; and *Umtiza*. The capacity development area will focus on all components of indigenous

poultry production: business development, record keeping, health care management, feeding and feed formulation, SFRB establishment, processing, marketing development, cooperative society growth and development, and sustainability management strategies.

7.5.3.8 Chicken processing plant

In an attempt to exploit all the value chains within indigenous poultry production, small scale chicken processing plants will be established. The supporting institutions will be encouraged to support them as part of developing the local economy and community empowerment. The owner of the processing plant will be transferred to the ABZ Co-op after it has paid 60% of the cost of building to the funding agency. The repayment procedure will be through both direct and indirect deduction. The direct repayment uses part of the daily contributions to offset the loan. The indirect loan repayment will be through the deduction of between 20-25% of net profit per chicken processed at the plant. The processing plant will have the following components: a slaughtering slab, processing, packaging and cold store, and quality assurance.

7.5.3.9 Marketing

The ABZ Co-op shall be responsible for the marketing of the members' products via marketing channels to both the wholesalers and retailers. Also, there will be the creation of direct selling points to the consumers. It is suggested that the product be registered under a trade name e.g. ABZ Chickens or ABZ *Umlaqwa*. The essence is to create a market niche for the product to be identified with by the farmers producing the chickens.

7.5.4 Implementation strategies

The model implementation will be in three phases, as suggested by Jensen & Dolberg (2003) as follows:

1. Draft model formulation;
2. Field test;
3. Model adjustment.

7.5.4.1 Draft model formulation /awareness campaign

The first stage will have the following objectives:

- a. To create awareness of the IPP and promote the value chain associated with its' rearing;
- b. To enlighten the farmers about the income generating potential of rearing indigenous poultry;

- c. To promote vaccination of day old chicks (DOC).

7.5.4.1.1 Campaign strategies

- a. A campaign team will move from village to village to sensitize the farmers and villagers on the values and the high potential values of rearing indigenous poultry and targeting the very low level of farmers, even with one hen; the physically challenged, people living with HIV/AIDS, female and children headed households, the pensioners, widows and widowers;
- b. Sensitization of prospective members of the cooperative under which the farmers will operate within his/her village of domicile;
- c. The sensitization and mobilisation shall include the rediscovery of the latent potentials of farmers on IPP comparative advantages which shall be used as income generating assets (IGA) for the farmers;
- d. The use of various communication strategies that shall include media campaigns: cinema, audio, video, leaflets, radio, and television;
- e. The campaign shall involve all the identified stakeholders along the value chain of indigenous poultry production, who are: the feed millers, the veterinarians, the agricultural development technicians; the marketing officials, potential supermarkets franchise sellers, and quality assurance experts;
- f. This stage also shall involve a vaccination awareness campaign (VAC) against the Newcastle disease, the control of aerial and land predators, the display of simple poultry housing model using local materials and plastic bottles;
- g. Discussions and workshops for all the potential stakeholders;
- h. Selection and inauguration of a taskforce that will be responsible for the implementation of the first stage of the project.

7.5.4.2 Field test

The field test or the pilot stage shall first be limited to villages that actually showed deep interest in the project. The stage will involve operationalization of the model and all the components: vaccination, protection against predators and feed supplementation. Wire-mesh gate protection for the day old chicks, which is very effective against predators, will be promoted. The campaign on vaccination will not be limited to Newcastle disease alone but also other diseases of an endemic nature. Supplementation of feed will involve training farmers on how to establish a scavenging feed resource base farm, a protein bank, and compost heaps.

The cooperative society envisaged as ABZ Coop Society will be formally launched at this stage for the members to start their contributions. At this stage, members with distinguishing qualities to lead the organisation will be identified and studied. The criteria for membership, benefits and withdrawal of membership shall be spelt out for clear understanding. The cooperative shall be registered with the appropriate government institution. Its' operation shall be governed by rules and regulations that will be jointly formulated and accepted as guiding principles. The ABZ Co-op rules shall be translated into the local language of the community.

7.5.4.3 Full-scale village test

At this stage, it is envisaged that the project will have received the patronage of the government, NGOs, and micro-credit providers or an international organisation. The design of the structure at this stage will depend on the funding institution. However, the criteria that must follow the design as suggested by Jensen and Dolberg (2003) shall be adopted. The four elements in the design are:

- a. The IPFs must experience the pilot project with the concept of an institutional set up in place and without any subsidies coming to the beneficiaries;
- b. All pilot activities at village level must mirror an end-of-project situation;
- c. The pilot project shall involve all the potential stakeholders who must participate actively both in design and implementation of the test;
- d. A strategy for all activities must be set up to simulate an end-of-project situation.

7.5.4.4 Modalities

The full-scale stage requires wider implementation of the project. It will require the support of funding agencies, international donors, government, NGOs, private sectors, village authorities, and all stakeholders including the beneficiaries. In order to have an effective full collaborative implementation of the project, the guiding principle for the different players must be in place. The modalities according to Jensen and Dolberg (2003) must include:

- a. The role and responsibilities of the stakeholders;
- b. The activities and participatory involvement level of the funding agency or government institution;
- c. Budgeting that should cover all the stages of the project;
- d. Monitoring, evaluation and supervision of the project, including key performance indicators (KPI).

7.6 Success and sustainability indicators of the IPPM

- a. The model designing was on the principles of member-driven, member-controlled and member-responsive organization which shall be run as a transparent, accountable, justice, fairness and respect for the core values of the organization emanating from the model;
- b. The principle of “joint-use” concept as a basis for model operations;
- c. The model value addition incorporation will give it an edge towards gaining competitive advantages in the market place;
- d. The model sought to create strong linkages with all the stakeholders in the IPP industry. The interface will create a forum for support to members through capacity training, credit facilities and input support;
- e. A catalytic mechanism is envisaged that will promote cohesion due to the willingness / interest factor embedded rather than persuasion for membership approach;
- f. The model envisaged service delivery directly in response to the felt-needs of members. It will serve the members and at the same time be under the control of the members.

7.7 Role of extension services in IPPM

- a. Farm guidance: The capacity development of the farmers in all aspects of the IPP value chains;
- b. Indigenous Poultry Production Cooperative Society: Capacity development shall include, management, record keeping, conflict resolution, leadership training, and membership cohesion strategy;
- c. Market intelligence information: Regular provision of market information to the society that is directly proportional to the enhancement of the added value chains;
- d. Financial training: The extension workers shall train the farmers on financial management, sourcing loan and repayment strategy.

7.8 Conclusion

The study focused on the design of an Indigenous Poultry Production Model (IPPM) for indigenous poultry farmers in the Eastern Cape Province (ECP). The study draws on the working modalities of the Bangladesh Poultry Model, the Rakai Model in Uganda, Research Into Use (RIU) achievement in Tanzania, and the Benin Model. The development of the conceptual

framework was based on the concepts of an “open social system” that are based on productivity, efficiency, stability, durability, compatibility and equity. A theoretical model IPPM was developed with components that including: the Indigenous Poultry Farmers Cooperative Society otherwise known as Abafuyi Benkukhu Zemveli (ABZ), the IPFs, the Breeders and Hatcheries, Veterinary services, Feed mills, the IPF rearers, Capacity development, Chicken processing plants, and Marketing. The model was designed to graduate the resource-poor households out of extreme poverty to more stable and sustainable livelihoods. The model aims to provide core values to the members through value chain components, cooperative society management (with special focus on the savings culture) and food security.

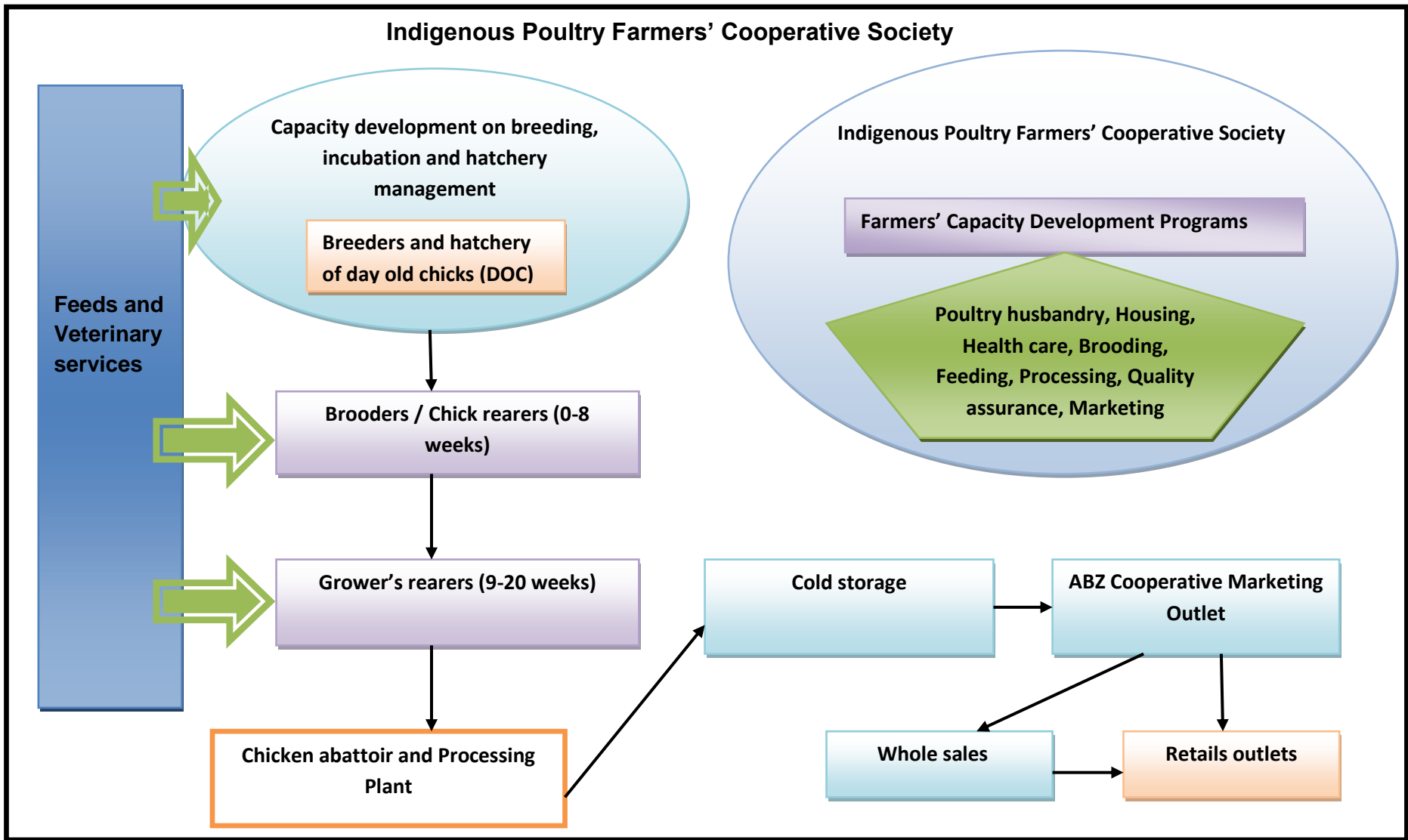


Figure 7.3: A conceptualized Indigenous Poultry Production Model for the Eastern Cape Province

CHAPTER 8

HUMAN RESOURCE DEVELOPMENT CHALLENGES FACING THE DEPARTMENT OF RURAL DEVELOPMENT AND AGRARIAN REFORM IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA: EMPIRICAL EVIDENCE FROM AMATHOLE DISTRICT

8.1 Introduction

The importance of the Human Resource Development (HRD) is acknowledged globally. The 1989 General Assembly Resolution 44/213 of the United Nations declared that: "Human resources development is a broad concept ... requiring integrated and concerted strategies, policies, plans and programs to ensure the development of the full potential of human beings ... so that they may, individually and collectively, be capable of improving their standard of living" (United Nations Program in Public Administration and Finance, 1995:121). The significance of HRD issues in rural areas in relation to socio-economic and livelihoods are critical in South Africa. The Eastern Cape Province has a population of 6.562 million (Census, 2011) with 4.2 million living in poverty (AfricaScope, 2013) and will require a set of policy implementation and effective strategies to address rural poverty. According to the report of Tony Blair's Commission for Africa, weak capacity was identified as a major problem confronting most African countries (Blair, 2005). In line with this shortcoming, Sachs and McArthur (2005) maintained that weak human resource management systems and infrastructure, coupled with inefficient public administration retarded Africa's growth. Agriculture is very significant to the South African (SA) economy. Primary agriculture contributes about 3% to South Africa's gross domestic product (GDP) and about 7% to formal employment (SAGovInfo, 2011). The agro-industrial sector contributes about 12% of GDP (SAGovInfo, 2011). However, most of the contributions came from large scale white commercial farmers who occupied 86% of the agricultural land, while the remaining 14% was occupied by the blacks who were mainly subsistence small scale farmers (NDA, 2005). As a result of this lopsided development, the South African Public Agricultural Extension Services (PAES) were amalgamated into a single service (Düvel, 2004) with a strategic focus on the small scale, resource poor farmers. This was with the aim of developing the skills base of farmers, which is in line with the primary objective of extension services (Vink & van Rooyen, 2009).

Efforts by the South Africa government to improve the rural livelihood are currently being threatened by a dearth of capacity at all levels. For example, the report of the Accelerated and

Shared Growth Initiative for South Africa (ASGISA) (2006) identified a shortage of suitably skilled labor as one of six binding constraints that slow down accelerated economic, industrial and agricultural growth. In support of this claim, the Department of Agriculture, Forestry, and Fisheries (DAFF) (2008:32) also listed some of the challenges confronting the agricultural extension services, including: capacity shortfalls and constraints; knowledge and skills shortfalls of extension personnel; a lack of effective information management systems; a lack of professionalism and commitment; and an environment that is not conducive to efficient and effective service delivery. This situation also pervades at the provincial level. The poor skills challenge was reported in the Eastern Cape Province, which is classified as one of the poorest provinces in South Africa (McConnachie & Shackleton, 2010). The report of the Eastern Cape Socio Economic Consultative Council (ECSECC) (2009:24) identified five specific challenges confronting HRD in the province including:

- a. An extremely low skills base;
- b. Under-investment in skills development;
- c. Rising unemployment;
- d. Poor alignment of training programs with social and economic development strategies;
- e. Mismatch between training outputs and skills requirements.

In an attempt to address these complex issues, the South African government, since democratic rule, has enacted various policies meant to reposition the development of human resources. The establishment of the Joint Initiative on Priority Skills Acquisition (JIPSA) in 2006 is one such policy aimed at a high level partnership between government, business and organized labor. The purpose was to accelerate the acquisition of priority skills in order to meet the demand of the Accelerated and Shared Growth Initiative for South Africa (ASGISA) (National Business Initiatives (NBI), 2011). The JIPSA, which was later changed to the Human Resource Development Strategy for South Africa (HRD-SA), in 2009, was repositioned with the implementation of government policies that will revitalize human resource development to meet the country's key strategic priorities. The background information presented raises questions about the challenges confronting the government in investing in human resource development. Secondly, it also calls attention to the implementation strategies of government policies aimed at accelerating human resource development.

8.2 Agricultural human resource development (AgrHRD)

The achievement of food security is anchored on agriculture, while agriculture remains the wellspring of income and work, which are the core elements of human development (UNDP, 2012). It is indisputable that AgrHRD is one of the key requirements for the success of any agricultural revolution targeting resource poor farmers in South Africa. However, the wind of change that is blowing globally on the agricultural sector requires renewed AgrHRD. The challenges to meet global competitive markets, improve rural livelihoods, the rural economy, sustainable development, climate change, rural innovation, and food (in)security are issues to contend with. According to Lopokoiyit, Onyango, Kibett & Langat (2013:84), Human Resource Development (HRD) is a corner stone in capacity building, leading to the overall efficiency of functionaries involved in implementation, monitoring, evaluation, research and extension programs. The United Nations Economic and Social Council (ECOSOC) (2013:1) defined HRD as “the empowerment of people by fostering the contributory capacities that they can bring to the improvement of their own quality of life and that of their families, communities, enterprises and societies”. The HRD revolves around human and the institutional capacity development within socio-economic policies and development / plans and strategies. It is a framework through which employees develop personal and organisational skills, knowledge, and abilities that facilitate achieving sustainable, equitable development and the enhancement of well-being. Training is one of the components through which capacity is developed. It is a vital aspect of organisational structure through which agricultural extension personnel could meet their professional obligations. Rivera & Alex (2008) say that the programs embedded within the agricultural HRD sector include formal agricultural education, the science and technology system of curricula, the non-formal agricultural and extension education system of programs, in-service training and development system of programs, and the mass-media/distance learning system. This, according to Lopokoiyit *et al.* (2013:88), is the basic assumption underlying the ability of HRD to advance in the professional field that will lead to better performance. In an attempt to meet these requirements, the AgrHRD is positioned to be constantly monitoring, evaluating and organizing regular training that will meet the needs of both extension personnel and the end users of agricultural knowledge. The training of agricultural extension personnel is classified into three categories (Qamar 1997, as summarised by Lopokoiyit *et al.* 2013:85)

- a. Pre-service training: Training received prior to employment;
- b. Induction training which the staff receives immediately upon joining an extension organization;

- c. In-service or on-the-job training that extension staff are expected to receive from time to time during the course of their employment.

Human capacity development is one of the critical areas still facing the Eastern Cape Province (ECP) in the agricultural sector. The challenge of capacity development of extension services has created employment for young and vibrant officers just coming from the universities. However, despite the academic qualifications of these officers, effective extension service delivery still requires good communication skills, which most of these new recruits may be lacking (for example, communication skills, organizing and facilitating farmers training, youth training etc). There has been various proven capacity building methods for extension workers, like workshops, conferences, demonstration plots, formal training, in-service training, coaching and mentoring, and on the job training (Stephen, Brien & Triraganon, 2006 cited in Photakoun, Millar & Race, 2010:92). Building the capacity of extension workers (ADTs) should central to improving the livelihoods of indigenous poultry farmers. However, extension capacity building is often overlooked in the rush to get the results of research and development products out of the door and taken up by rural communities (Millar & Connell, 2010:219). This attitude has created a disconnection between the dissemination of technologies and their use by the target audience. Addressing the challenges will entail having another look at the training programs for extension workers. The general objective of the study was to evaluate the professional development program for the Agricultural Development Technicians in the ECP with empirical evidence from the Amathole District.

8.3 The specific objectives are to:

- a. Determine the capacity development methods used for the Agricultural Development Technicians for skills and competence development;
- b. Determine the most preferred capacity methods that could improve the effectiveness of the Agricultural Development Technicians

8.3.1 Research questions are:

- a. What are the methods of capacity development used for the training of Agricultural Development Technicians in the Amathole District?
- b. What are the most preferred capacity building methods that could lead to improvement in the effectiveness of the capacity of Agricultural Development Technicians?

8.4 Methodology

8.4.1 Ratings of capacity development methods against competency requirements

The extension workers from the study areas answered a questionnaire that involved their rating of capacity development methods being used by the province to train extension workers.

The various methods identified included:

- a. Workshop training;
- b. In-service-training;
- c. In-house-seminars;
- d. Farmers Field Schools;
- e. On-the-job-training;
- f. Cross-visit and study tours;
- g. Mentoring;
- h. Staff meetings;
- i. Monthly review meetings;
- j. Formal study;
- k. Using the internet and reading documents.

8.4.2 Population and sampling size

A total of 120 questionnaires were distributed among all the eight municipalities that make up the Amathole District at the rate of 15 questionnaires per municipality. Weekly checking of the questionnaires was done via telephone calls. After eight weeks (July to August, 2012) of distributing the questionnaires, 39 (32.5%) were returned, six (5%) were discarded for poor data entry while only 33 (27.5%) were found to be useable for data analysis.

The questionnaire developed for the ADTs was divided into two parts. The first part elicited information on their demographic profile while the second part elicited information on the various types of human resources programs on Likert-type rating scales ranging from 1 (Less effective), 2 (A little effective), 3 (Effective), 4 (Very effective), and 5 (Most effective). Respondents rated the levels of effectiveness of the types of human resource programs common to the human capacity development program for the department. Mean scores were computed for each program item after which a cut-off means a score of 3.5 $[(1+2+3+4+5) / 5+0.5]$ was used to differentiate between the most effective and least effective of the human resource programs, $x \geq 3.5$ rated most effective and $x < 3.5$ rated less effective, where x is the mean score. A reliability coefficient (r) of 0.890 was obtained and considered a good and reliable measure as an instrument for data collection.

8.4.3 Data analysis

The data collected were analyzed using descriptive and inferential statistics. Descriptive statistics including means, standard deviations, frequencies and percentages were used while Chi square goodness of fit was used to determine the significant level of the various human resources programs. Data were analyzed using the SPSS (version 20) (2011).

8.5 Results

8.5.1 Demographic profile of the agricultural development technicians (ADTs)

Data collected from the ADTs indicated that there were more (54.5%) females in this part of the public extension services than male. Most of the ADTs (39.5%) were between the ages of 46-50 years (SD 7.393). The majority (57.6%) were holders of a diploma while many (48.5%) of the workers had put in between 16-20 years in the service (Table 8.1).

Table 8.1: Demographic profile of the ADTs (n=33)

		N	%	S D
Gender	Male	15	45.5	
	Female	18	54.5	
Age	25-30	5	15.2	
	31-35	1	3	
	36-40	9	27.2	
	41-45	5	15.2	
	46-50	13	39.5	7.393
Marital status	Single	12	36.4	
	Married	21	63.6	.489
Education	Diploma	19	57.6	
	Degree	14	42.4	.502
Job description	Agricultural Development Technicians	33	100	
Years	1-5	4	12.1	
	6-10	6	18.2	
	11-15	4	12.1	
	16-20	10	30.3	
	21-25	7	21.2	
	26-30	2	6.05	1.281

Figure 8.1 shows the total number of mentions by the respondents of the capacity development methods used for training extension workers. The most commonly mentioned were in-service training (81%; n=33), formal study (81%; n=33), staff meetings (84.85%; n=33), workshops (72.73%; n=33) and on the job training (OTJT) (66.7% n=33). However, the use of FFS (3.03%; n=33), village learning activities (VLA) (6.06%; n=33), onsite training (9.09%; n=33), cross-visit and monthly review training (MRT) (12.12%; n=33) and mentoring (18.18%; n=33) were uncommon.

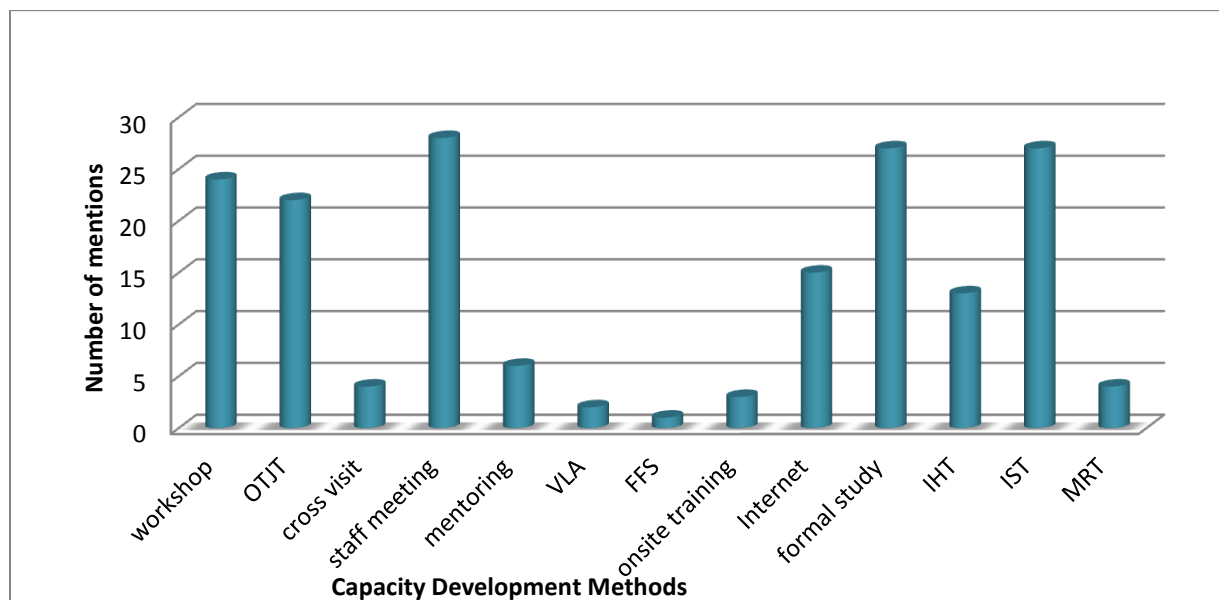


Figure 8.1: Capacity development methods used

Table 8.2 shows the human resource development programs of the Department of Rural Development and Agrarian Reform (DRDAR) indicates that onsite training had a mean score of 3.39 (SD=1.059), and was ranked the most favored by the Agricultural Development Technicians for training. This is followed by staff meetings 3.33 (SD=0.957), formal study 3.18 (SD=1.131). The farmers field school (FFS) had the lowest mean score of 2.30 (SD=1.104).

Table 8.2: Ranking of most preferred capacity development methods (N=13)

Training programs	Mean	S D	Ranking order
Onsite training	3.39	1.059	1
Staff meeting	3.33	.957	2
Formal study	3.18	1.131	3
In service training (IST)	3.12	1.053	4
On the job training (OTJT)	3.12	1.269	4
Monthly review training (MRT)	3.09	1.182	6
Village learning activities (VLA)	2.97	.810	7
Mentoring	2.82	1.211	8
Workshop training	2.76	1.119	9
Cross visit and study tours (CVandST)	2.76	1.226	9
In house training (IHT)	2.64	.962	11
Using internet	2.52	1.228	12
Farmer field school (FFS)	2.30	1.104	13

Table 8.3: Chi-square goodness of fit of the capacity development programs

Training programs	P value
Workshop training	.007**
On the job training	.626
Cross visit and study tours (CVandST)	.062
Staff meeting	.001**
Mentoring	.003**
Village learning activities (VLA)	.001**
Farmer field school (FFS)	.292
Onsite training	.001**
Using internet In service training	.033*
Formal study	.003**
In house seminar	.116
In service training	.000***
Monthly review training (MRT)	.033*

*p<0.05; **p<0.01; ***p<0.001

8.6 Discussion

An improvement in the livelihoods of farmers and the rural dwellers is one of the goals of agricultural extension services. As a result, training the working force is one of the vital parts of human resource development. Training, according to Warr (2002), seeks to improve effectiveness in a current job role. It usually involves planned activities that enable an employee to develop the skills, attitudes, competencies and knowledge base needed by the organization and the work requirements. The training has to do with the improvement of the capabilities of both the employees and the organization.

8.6.1 Capacity development methods of DRDAR

Capacity development methods commonly used by the department to train the ADTs are identified, in order, as: of staff meeting (84.85%), in-service training and formal study (81.8%) each, workshop (72.73%) and on-the-job training (66.7%). Figure 8.1 shows the total number of mentions by the respondents of capacity development methods used. The majority of respondents indicated limited use of methods such as FFS, village learning activities (VLA) and onsite training. The level of significance of the capacity development training programs was investigated through the chi-square goodness of fit. As shown in table 8.3, the chi-square goodness of fit of the capacity development programs of the DRDAR indicates that workshop training, $X^2 (12, N=13) = 0.007, p < 0.01$; staff meetings, $X^2 (4, N=13) = 0.001, p < 0.01$; mentoring, $X^2 (3, N=13) = 0.003, p < 0.01$; village Learning Activities, $X^2 (4, N=13) = 0.001, p < 0.01$; on-site-training, $X^2 (4, N=13) = 0.001, p < 0.01$; In-service-training $X^2 (4, N=13) = 0.000, p < 0.001$ and formal study $X^2 (4, N=13) = 0.003, p < 0.01$ are statistically significant. However, on-the-job-training, $X^2 (4, N=13) = 0.626, p < 0.05$ cross visit and study tours, $X^2 (4, N=13) = 0.062, p < 0.05$ and FFS $X^2 (4, N=13) = 0.292, p < 0.05$ are not statistically significant.

8.6.2 Rating of capacity development methods favored by the respondents

The study revealed the different forms of training programs available for the Agricultural Development Technicians in the study area. Onsite training ($x=3.39$), staff meetings ($x=3.33$) and formal study ($x=3.18$) had the highest means score in descending order. These are closely followed by in-service training and formal study. Onsite training has been confirmed to be an effective means of training and updating the skills of the extension workers (De Silva, Phillips, Sih & Zhou, 2001). For the effective use of onsite training as a method, De Silva *et al.* (2001) advocate for greater interaction between the extension trainees and farmers. Staff meetings were ranked second with a mean score of $x=3.33$. Staff meetings are a method with inbuilt

mechanisms of creating a lively environment for sharing ideas and planning together (Photakoun, Millar & Race, 2010:96). The staff meetings have long been in use, which has the advantage of creating an enabling environment to present progress reports, outputs and outcomes of activities, get feedback from the field and collective brainstorming for problem solving and making plans (Photakoun *et al.* 2010:96). On the other hand, formal education is the attendance of formal schooling, which could also be described as in-service-training. Formal education has the propensity to change people's attitude to and manner of addressing sustainable development concerns. A majority (89.7%; n=33) of the respondents had attended in-service training, both from within the district and outside the province, in a formal educational setting. The effectiveness of extension hinges on the quality of the extension personnel. As a result, in-service training is designed to equip the Agricultural Development Technicians to meet the job requirements and improved competencies. The training placed the extension workers in the vantage position of addressing the needs and challenges of the farmers from their informed and creative knowledge. A lack of integrated training in developing extension workers could develop into stopgap training (Gooderham & Lund, 1992 cited in Lopokoiyit *et al.* 2013:89). In an attempt to overcome the shortcomings, an effective in-service training program infused with knowledge based extension service has been advocated (Rivera & Alex, 2008). Various authors Karroubi & Matani, (2009), Khanmohammadi (2010); Sarboland & Mousavi (2012) have confirmed the effectiveness of in-service training in improving the performance, skills, competence, motivation and job satisfaction of workers.

8.6.3 On the job training

This is a method of training that allows for practical skills learning and demonstration. Most of the respondents advocate for its inclusion in the training due to its practical effects. It has the advantage of cementing good working relationships between the extension workers and farmers. It also creates opportunities for the farmers, extension workers and the scientists to gain knowledge, skills, competence, experience and confidence (Photakoun *et al.* 2010) in an atmosphere of working together and sharing knowledge.

8.7 Conclusion

The following summarize of the findings:

- a. Staff meetings were identified as the most common capacity development method and this was followed by in-service training, formal study, workshop and on-the-job training;

- b. The Farmer field schools, village learning activities, monthly reviews, cross visit and study tours were sparingly used;
- c. Respondents were in favor of the following methods of capacity development for the department: onsite training, staff meetings, formal study, in-service training, on-the-job training and monthly review meetings.

8.7.1 Implications

The ultimate aim of looking at the capacity development methods for the ADTs is to identify which one are relevant for the indigenous poultry farmers the study is advocating for. The ADTs are to train the IPFs and invariably require being capacitated. Most of the preferred methods could be costly to use at all times, for example, on-site training and monthly review training. Indigenous poultry production is aimed at resource poor farmers who are already trapped and advocating for the privatization of extension could be burdensome for the majority. As a result, the government will have to support the project and also seek the assistance of international donors in its implementation. Most of the methods may also require the support of experts and institutions in the capacity development of the ADTs. The technical issues developed at the monthly review meetings could also lead to the production of technical bulletins that will serve as guides for the scientists and the ADTs.

8.7.2 Recommendations

- a. There is need for a combination of different capacity development methods that will create variety and spread the cost of training;
- b. Management should take advantage of the most favored methods of the staff and this should assist in the design and use of training methods suitable to the staff.

CHAPTER 9

CONTEXTUAL ISSUES

9.1 Introduction

This thesis has explored a neglected dimension of the poverty reduction program for the Eastern Cape Provincial government, namely the use of indigenous poultry production (IPP). The study aimed to develop a new approach, based on a conceptualized model, to address the poverty situation common to the resource poor rural dwellers of the ECP. The study had a critical look at how the traditional method of keeping birds at scavenging level could be used for poverty reduction. The study has explored various perspectives on addressing principal issues from the IPP enterprise. The first key issue of discussion was the characterization of the indigenous poultry production systems as practiced by the rural people (Chapter 5). The chapter addressed the production practices of the indigenous poultry farmers (IPFs) from the perspective of the types of housing, feeding regime, healthcare management, breeding program and marketing channels in use as well as the perception of the farmers. The second key issue discussed was the skills gap and the training needs of the indigenous poultry farmers (IPFs) who were evaluated along with those of the Agricultural Development Technicians (ADTs). This was done to ascertain the skills competency levels of the IPFs in order to attempt to design a training program (Chapter 6). The third key issue delved into the various models of IPP as practiced in other parts of the world. A conceptualized indigenous poultry model was developed, taking into consideration the socio-cultural and economic capacity of the target beneficiaries (Chapter 7). The concept of an "Open System Model" was used in the development of the new poultry model. The fourth key issue addressed the challenge of the Human Resource Development (HRD) in the Department of Rural Development and Agrarian Reform (DRDAR) (Chapter 8).

Indigenous poultry production is a farming system typically used by the resource poor. The Bariadi model (RLDC, 2010) on factors affecting chicken rearing was used in the characterization process of the IPP in the study area. Four critical areas that anchor the effectiveness of the IPP were examined in a situation analysis: feeding, housing, health care and breeding patterns. The situation analysis allowed for a better understanding of what were available, and areas of strength and weakness that existed in the study areas. The thesis appraised the local practices of IP keeping, with the basic aim of understanding the how and why of a method. The methodology led to the establishment of a functional data base for the IPP for resource poor farmers.

The IPP is low input farming common to the resource-poor. The prospects of IPP in the ECP are yet to be exploited for addressing pervasive poverty in South Africa, despite the growing preference for their meat. Most of the researches on IPP in South Africa focused on technical aspects and excluded action research. From discussions with the respondents on the various production parameters, it became obvious that many of the challenges hinged on poor skills and poor extension services support. Extension services hardly discuss or advise the respondents on the various threats and challenges that they experienced (Chapter 5). The skills challenge of the ADTs (Chapter 6) was also obvious, with the majority having no experience in managing indigenous poultry (IP). A pragmatic approach to this project led to the development of a conceptualized model for implementation in the ECP. More so, the HRD analyzed and the roadmap provided for developing the human capacities of the ADTs.

9.2.1 Indigenous poultry production

The research process enabled the researcher to have better in-depth knowledge of the production styles of the IPFs common to the study areas. The understanding revolves around the housing, feeding methods, health care management of the chickens, breeding strategies and the purpose of keeping IP. The perceptions of the farmers were also sought in the commercialization of IP, which was very favorably received. The indigenous technical skills of the farmers were evaluated using a 32 skills index extracted from the various literatures.

9.2.2 Indigenous poultry production and food security

One aspect of IPP is to understand whether and how poultry production relates to food security of the resource poor. Various researches have confirmed that the IPP unlocks farmers from poverty in several parts of the world (Dolberg, 2004; Dossa, Birner, Wollny, 2003; Peacock, 2005). The rearing of IP is synonymous with the women who use it for various activities that support livelihoods (Sonaiya *et al.* 1999; Guèye, 2000). This study confirmed that IPP contributes significantly to the improvement of the quality of life of those who keep chickens to support their livelihoods, contribute to the social wellbeing of the households, and improve the quality of nutrition intake through the consumption of eggs and meat. Poultry droppings also add to the fertility of the home garden for those who grow vegetables. Two-parent families consumed more poultry and eggs than single parents, widows/ widowers or child-headed households. The larger consumption of poultry products could be related to the management style of the collective families' holdings of poultry. This poultry keeping style was common among married couples. This collective rearing method proved advantageous as a result of the

division of labor in the handling of the management of the chickens. However, most of the farmers do not see the IPP from a point of commercialization and where a few households kept large numbers for commercial purposes, a death in the family of either the husband or wife created a major collapse of the business. A large proportion of the female-headed households, more than male-headed households, were involved in IPP and no other livestock. Most of the female-headed households, including widows and the aged, were able to support their households with the rearing of IP, thus giving credence to the strong connection between IP and the resource-poor. Many of the resource-poor that are involved in the IPP could identify opportunities for up-scaling but are constrained due to prevailing challenges in the environment, and poor institutional support (Chapter Five).

9.2.3 Economic context

There is high ignorance about the commercialization potentiality of the IP among the majority of the farmers. Apart from household consumption, the majority were keeping birds from the social point of view and as gifts. However, the majority from who chickens was bought from by the researcher and team members affirmed that they would be relatively economically comfortable to buy essential things in the house if they could sell at least two chickens per week at the rate of R35 per adult chicken. That is, improve their ability to buy electricity, buy coffee, pay for transportation and take care of the households. The willingness to venture into large numbers of birds was very high. Exotic poultry production was not considered while research findings elsewhere had indicated the preference for indigenous poultry meat due to the tender nature of the meat (McCarthy, O'reilly, Cotter & De Boer, 2004; Pym, Guerne, Bleich & Hoffmann, 2006). The growing preference for organic food may be an advantage for IPP.

Presently, there is no organized market for the selling of indigenous poultry in the study areas, hence the model developed by the researcher has processing and marketing channels (Chapter 7). Processing and marketing chains were included in order to eliminate challenges faced by the smallholders in accessing the market. Among these are: to reduce the gap between producers and consumers in accessing the finished goods; to eliminate the involvement of intermediaries in the marketing chain that create bottlenecks and hijack the price; and the transportation challenge of farmers in remote villages. This assertion was supported by Aklilu (2007) who found that the formation of a marketing group could significantly reduce transaction costs for the producers through the organization of a transport system and infusing it with uncontrolled access to information, as well as the elimination of middlemen, thereby increasing the negotiating power of the farmers.

9.2.4 Socio-cultural context

The impact of the socio-cultural environment is not conspicuous in the rearing of IP in the study areas. There is no particular driving dynamics that associate poultry keeping with any socio-cultural activities of the people, who are mainly the isiXhosa. The only cultural driving force observed was the demand by the *sangoma* (Native Doctor) for chickens with black feathers, which are not common in all the sampled areas. However, an upsurge in the demand for chicken around the festive periods of Christmas and New Year had been reported (Taha & Hahn, 2012). Another significant force that could play a major role in the future is the health concern of people. For example, questions are being raised about the food people buy: where does it come from, how has it been produced, how healthy is it really, does it contain antibiotics, growth hormones, pesticides, or fertilizers (Ottermann, 2013). This situation may create a comparative advantage of increase in demand for indigenous poultry meat in the market. However, turkey meat also attracts high demand during the Christmas period as testified by the limited number of respondents in the study areas.

9.2.5 Indigenous poultry production (IPP) for improved poultry production

The overall mean flock size of chickens in the study areas was 29.98 per household. This was more than the findings of Sonaiya & Swan (2005) of 5 to 20 chickens regarded as the limit that can be kept by a family without the need for supplementary feeding, improved housing and extra labor in production. Even before exploring a mechanism for improved poultry production, the stage of IPP in the study areas already required the support and capacity development of the farmers. Therefore, in an attempt to improve the present situation of the farmers, there was a need for a pragmatic approach that would be feasible, affordable, simple, with local content and sustainable. The expansion to larger flocks by the farmers will require vaccines, and the promotion of good hygiene. This will invariably impact positively on the mortality rate. Once mortality is reduced, a significant increase in flock size will require supplementary feeding, good housing, security against theft and predators, and the establishment of forage grass. Sparsely developed forage grass may encourage wider travelling for the chickens seeking grasses and insects which would further expose the chickens to danger, theft and predators. However, there was a need for support to the farmers in the initial stage of the project for credit facilities to purchase inputs (feed, drugs, vaccines, housing and improved breeds). The modality of repayment is suggested in the cooperative structure for the IPFs (Chapter, 7).

CHAPTER 10

SUMMARY AND RECOMMENDATIONS

10.1 Summary of the findings

The study focused on IPP as practiced among the rural dwellers in selected villages in the Nkonkobe Municipality.

The rearing of indigenous poultry was popular and was dominated by the women-folk, the majority of whom had secondary education. Households were mostly headed by females. The poultry was primarily kept for household consumption and the production style basically free range, with supplements for the chickens. Newly hatched chicks were given crushed maize, with a few using chicks' mash. Housing for the birds was poorly constructed, mostly with corrugated iron sheets. The birds were treated using ethno-veterinary drugs with *Aloe ferox* leaves as the major plant drug. The *Aloe ferox* is used both as prophylactic and curative treatment of different ailments in poultry. High mortality of chicks (between day and six weeks old) was common among the majority of the IPFs. These deaths were attributed to sudden death, diseases, cold weather, mice and giant rats attack. Some IPFs gave newly hatched chicks oral rehydration therapy (ORT) in the first three days and that reduced mortality by more than 80% among the chicks that attained adulthood. Aerial predators were also preying upon chicks, resulting in high loss. There was generally low mortality in adult poultry as a result of disease and pests, but the birds faced the challenge of wild animals such as dogs, snakes, and nocturnal predators were common to farmers sharing borders with the bush or rocky environments. The ADTs were poorly skilled in the IPP. Most hold diplomas in agricultural extension and others have degrees in agricultural extension. On the other hand, the IPFs showed competencies in nine out of the 32 skill competency areas identified from the literature, while the ADTs did not show any skill competencies. The IPFs' skills competencies were: the ability to identify signs of diseases in birds; ecto-parasites in birds; chicken predators, control of predators; and methods of ethno-veterinary drugs to treat diseases and parasites.

10.2 Human resource development

Staff meetings were identified as the most common capacity development method and this was followed by in-service training, formal study, workshops and on-the-job training. The use of farmers field school (FFS), village learning activities, monthly reviews, cross-visits and study tours were uncommon. However, respondents preferred onsite training, staff meetings, formal study, in-service training, on-the-job training and monthly review meetings, in that order.

10.3 Skills development and IPP

Skills development in IPP remains an essential component of improving the system. An attempt to have a better understanding of the skills of both the farmers and the ADTs led to a skills audit. Road map training on skills development was designed for both the IPFs and the ADTs in the study (Chapter 6).

The IPPM presented by the researcher integrated economic, production and capacity development of the farmers (Chapter 7).

10.4 Policy implications

The research was carried out using a scientific approach to improve indigenous poultry production to address pervasive rural poverty and contribute to knowledge. With the present condition of IPFs, in terms of knowledge, skills and available infrastructure, socio-cultural settings and the willingness to commercialize IP, there is high propensity for the success of the IP as a farming enterprise. Therefore, there is a need to fill the vacuum created by the lack of institutional support that exists in the study areas. As a result of this gap, and with an attempt to capitalize on the collective efforts of the farmers, an indigenous poultry production model was developed with an inbuilt cooperative society. The aim of investigating the capacity development methods for the ADTs is to identify which methods will support the capacity development methods for the indigenous poultry farmers. The ADTs are to train the IPFs and invariably require being capacitated. Most of the methods the ADTs prefer are costly, for example, onsite training and monthly review training. Indigenous poultry production is aimed at resource poor farmers, hence advocating for the privatization of extension (as is being done in some quarters) could be burdensome for the majority. As a result, the government will have to support the project and also seek the assistance of international donors in its implementation.

Most of the areas identified as crucial to the development of a viable model will require the support of experts and institutions. For example, the development of highly nutritive poultry feeds with local contents, designing of appropriate housing, the use of ethno-veterinary remedies, capacity development of IPFs and the ADTs, cooperative management, and marketing structures. Also, technical issues to be developed at various fora of the pilot implementation stage could lead to the production of technical bulletins that will serve as guides for scientists, ADTs and IPFs. All these will require supportive funding, training and capacity development of all stakeholders. A synergic working relationship involving private organizations, NGOs and government departments is necessary and require strong working relationships based on a sound memorandum of understanding.

10.5 Recommendations

There is the need for institutional support by government departments, the University Community Engagement and nongovernmental organizations (NGOs) to disseminate material, demonstrate, organize and train the farmers in all stages of production.

The farmers' present IPP husbandry methods could be improved upon by implementing the conceptual model to upscale the industry.

There should be a conscious effort towards the capacity development of Agricultural Development Technicians in indigenous poultry production infused with practical training.

A combination of different capacity development methods to create variety and spread the cost of training, while capitalizing on the most favored methods is proposed.

Future research may need to compare the production cost of raising IP purely on free-range, organic and grass-fed production systems or combinations of different production styles. Also, future research can attempt at identifying the most suitable types of grasses and leguminous plants that can best support IP in terms of nutritive values, digestibility and growth promotion.

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Appendix A



Typical indigenous poultry housing in the study area. Photograph by the author



Roosting chamber for hens. Constructed in this form to guard against predators' attack. Photograph by the author



Eggs laid in the bush by hens. Photograph by the author



Aloe ferox in drinking water for the chicks and adult birds as prophylactic treatment against diseases Photograph by the author



Aloe ferox plant. Photograph by the author



Healthy flocks of adult birds. Photograph by the author

Appendix B

QUESTIONNAIRES (A) FOR THE INDIGENOUS POULTRY FARMERS

Section A: Socio-economic Characteristics

Town / Village:

Municipality

Gender Male [] Female []

Marital Status: Single [], Married [], Divorced [], Widowed [], Single Mother []

Age () Occupation

Level of Education

The size of your household.....

No of Male [] Female []

Major source of income for the household.....

Do you belong to any cooperative society or commodity group?

If yes, name the society or the group.

The main activity of the society /group

.....

Do you discuss the indigenous poultry production at your group meetings?.....

If yes, list three areas of your last discussion

a.

b.

c.

Is the discussion of any benefit to your indigenous poultry production improvement?

List the benefits

a.

b.

c.

d.

Apart from indigenous poultry production, what other practical farming activities discuss in your forum?.....

In which way are they beneficial to your household/ livelihoods?.....

.....

INDIGENOUS POULTRY OWNERSHIP PATTERN AND MANAGEMENT AT HOUSEHOLD LEVEL

Indicate the type of poultry you are rearing:

Type of birds	Size of stock	Chicks (Day to six weeks old)	Growers (Either male or female from 6-15wks old)	Hens (Sexually matured female)	Cocks (Sexually matured male)

List the types of breeds of chicken kept?

- a.
- b.
- c.

Total number of birds owned in the last couple of years

Types of birds	2007	2008	2009	2010	2011

Reasons for the increase in flock size

- a.
- b.
- c.

Reasons for the decrease in flock size

- a.
- b.
- c.

When last do you have poultry disease outbreak on your farm or in the community?

What is the nature of the disease?

How is it treated?.....

Give the average number of eggs laid by hens per clutch and times per year

.....

Average number of eggs hatched per clutch.....

Average number of chicks raised up to six weeks.....

What are the factors responsible for the death of the chicks? List them

- a.
- b.
- c.

Who owns the poultry in the household?

- a. Adult male (>18 years)
- b. Adult female (>18 years)
- c. Boys (<18 years)
- d. Girls (<18 years)
- e. Collective household ownership

What are the main activities in looking after the poultry?

Activity	Responsible member of household

What are the uses and functions of poultry and poultry products?

- a.
- b.
- c.

What do you do with the birds and the poultry products?

- a.
- b.
- c.

If sold, at which markets?

- a. In the same village

- b. In the neighboring village
- c. In the nearest markets
- d. In town
- e. Purchased by middle men?
- f. Supermarkets like Spar?

Rate the demand for the indigenous poultry products along the scale

Key: Low Demand (LD), Moderate Demand (MD), High Demand (HD), Period of the year (PY)

Products	LD	PY	MD	PY	HD	PY
Eggs						
Weaned chickens						
Adult hen						
Adult cockerels						
Ducks						
Guinea fowls						
Pigeons						
Others						

How do you use the income from the sales of the poultry products?

- a.
- b.
- c.
- d.

What are the types of supplementary feeds given to your birds? List them

- a.
- b.
- c.

Knowledge and skills required to run your indigenous flocks of poultry

What are the 3 most crucial skills or pieces of knowledge you would like to acquire to run your indigenous poultry farm?

- 1.....

2

3.....

Skills in indigenous poultry production

How would you rate your knowledge and skills against the identified abilities in the indigenous poultry production enterprise? **Using the Likert rating scale from 1-5: 1= 'Poor', 2= 'Fair', 3= 'Good', 4 = 'Very Good', 5= 'Excellent'**

Pest and disease management

The ability to:	Poor	Fair	Good	V. Good	Excellent
Identify signs of diseases in birds					
Diagnose diseases					
Identify ecto-parasites in birds					
De-worm birds					
Carry out vaccinations					
Administer drugs to sick birds					
Identify poultry predators					
Local knowledge of predator control					
Know who to contact for bird health problem					
Disposing of dead birds					
Knowledge of ethno-veterinary drugs to treat diseases and parasites					
Feeds and feeding					
Use of local feeding stuff to feed birds of different age groups					

Identify local feedstuffs at different time of the year to feed birds					
Use of supplementary feeding for birds of different age group					
Provision of water for birds					
Knowledge of local feedstuff for birds					
Selection and management of flock and Chicks					
Ability to identify High Yielding Birds					
Care of the chicks against diseases, pests and predators					
Artificial brooding					
Supplementary feeds for brooding hen and chicks					
Identifying laying conditions					
Knowledge of bird culling as a result of					
a. Diseases					
b. Old age					
c. Poor productivity					
Housing and Equipment					
Shelter construction with local materials					
Cleaning poultry house					

Knowledge of litters and management					
Disinfecting pen after brooding period					
Prepare brood for hens					
Make perches					
Make nesting boxes using local materials					
Improvise drinkers and feeders with local materials					
Make hand woven basket					
Make bamboo cages					
Record Keeping and Marketing					
Record of flocks of sex, hatching period and age					
Selling of eggs					
Selling poultry					
Knowledge of market for local poultry					
Slaughtering and dressing local poultry for markets					
Knowledge of markets for local poultry outside the village or in the cities					

From where do you acquire the knowledge /skills aforementioned in indigenous poultry production and management?.....

Listed below are several sources of assistance for indigenous poultry farmers. During the past 2 years, have you used these sources in your local poultry management decisions? If you have

used a source, please indicate how useful you found that contact to be. **(Check “yes” or “no.” If “yes,” evaluate the usefulness).**

Key: NU {Not useful}, LU {limited usefulness}, SWU {somewhat useful}, VU {very useful}

	Have you had contact?		Usefulness of these contacts (check one)			
	No	Yes	NU	LU	SWU	VU
Government extension agents		⇒				
University extension outreach agent/ university community engagement outfit		⇒				
Non-governmental organization (NGO) extension outreach agent		⇒				
Farmers Unions		⇒				
Farmers Commodity Association		⇒				

List how you would like to be supported in improving your indigenous poultry production?

- a.
- b.
- c.
- d.
- e.

Which organization or service group would you prefer for service support?

- a.
- b.

State factors/ reasons responsible for your choice

- a.
- b.
- c.

We greatly appreciate your time and effort and value your thoughts about farming in Eastern Cape Province! Nkosi, Siyabulela. Thank you!

QUESTIONNAIRES (B) FOR AGRICULTURAL DEVELOPMENT TECHNICIANS

Section A: Socio-economic Characteristics

Working area / village:

Municipality

Gender Male [] Female []

Marital Status: Single [], Married [], Divorced [], Widowed [], Single Mother []

Age []

Educational qualifications and dates:

Years of experience in service as an extension worker:

Do you give extension support to the farmers rearing indigenous poultry under your ward coverage Yes [] No []

If yes how many are within your ward coverage.....

How often do you meet them.....

List problems commonly encountered when dealing with indigenous poultry farmers?

- a.
- b.
- c.
- d.
- e.

Skills in indigenous poultry production

How would you rate your knowledge and skills against the identified abilities in the indigenous poultry production enterprise? **Using the Likert rating scale from 1-5: 1= 'Poor', 2= 'Fair', 3= 'Good', 4 = 'Very Good', 5= 'Excellent'**

Pest and disease management

The ability to:	Poor	Fair	Good	Very Good	Excellent
Identify signs of diseases in birds					
Diagnose diseases					

Identify ecto-parasites in birds					
De-worm birds					
Carry out vaccinations					
Administer drugs to sick birds					
Record chick mortality					
Identify poultry predators					
Local knowledge of predator control					
Know who to contact for bird health problem					
Knowledge of ethno-veterinary drugs to treat diseases and parasites					
Feeds and feeding					
Use of local feeding stuff to feed birds of different age groups					
Identify local feedstuffs at different time of the year to feed birds					
Use of supplementary feeding for birds of different age group					
Provision of water for birds					
Knowledge of local feedstuff for birds					
Selection and management of flock and Chicks					
Ability to identify High Yielding Birds					
Care of the chicks against diseases,					

pests and predators					
Artificial brooding					
Supplementary feeds for brooding hen and chicks					
Identifying laying conditions					
Knowledge of bird culling as a result of					
Diseases					
Old age					
Poor productivity					
Housing and Equipment					
Shelter construction with local materials					
Cleaning poultry house					
Knowledge of litters and management					
Disinfecting pen after brooding period					
Prepare brood for hens					
Make perches					
Make nesting boxes using local materials					
Improvise drinkers and feeders with local materials					
Make hand woven basket					
Make bamboo cages					
Record Keeping and Marketing					

Record of flocks of sex, hatching period and age					
Selling of eggs					
Selling poultry					
Knowledge of market for local poultry					
Slaughtering and dressing local poultry for markets					
Knowledge of markets for local poultry outside the village or in the cities					

How do you acquire the knowledge and skills in indigenous poultry production and management?

Does the university / Technicon / College of Agriculture attended has the teaching of indigenous poultry in her curriculum?.....

If yes, list five major contents of the course

- a.
- b.
- c.
- d.
- e.

Rate the extension capacity development (CD) program under the extension service of the Department of Agriculture ECP

The rating will use Likert scale ranging 5=most effective (ME), 4=very effective (VE), 3=effective (EF), 2=a little effective (LT) and 1=less effective (LE)

Methods of CD	ME	VE	EF	LT	LE
Workshop training					
On-the-job-training					
Cross-visit and study tours					

Staff meetings					
Mentoring					
Village learning activities and Farmer Field School (FFS)					
On-site-training					
Using the internet and reading documents					
Formal study					
In-house seminar					
In service training					
Monthly review meeting					

Capacity development of extension workers on indigenous poultry production

How many trainings / workshops have you attended in the last two years on:-

- a. Indigenous poultry production
- b. Exotic broiler production.....
- c. Commercial layers production.....
- d. Exotic cockerel production.....
- e. Any other poultry production.....
- f.
- g.

Using the table below, describe the types, methods and contents of the training

Date	Training	Training methodology	Training contents

Kindly use extra sheet or overleaf if need be.

We greatly appreciate your time and effort and value your thoughts about extension services in Eastern Cape Province! Nkosi, Siyabulela. Thank you!