An investigation into the contribution of table egg production to household protein consumption in Goromonzi District

A dissertation submitted in partial fulfilment of the requirements for the Master of Science Degree in Food Security and Sustainable Agriculture
(Production Option)

Bindura University of Science Education

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I hereby declare that the research project entitled "**An investigation into the contribution of table egg production to household protein consumption in Goromonzi Distric**t" submitted to Bindura University of Science Education, Department of Agricultural Economics, Education and Extension is a record of an original work done by me under the guidance and supervision of **Dr A.T. Chikwanda** and this work is submitted in partial fulfillment of the requirements for the award of a Master of Science Degree in Food Security and Sustainable Agriculture. The results embodied in this thesis have not been submitted to any University or Institute for the award of any degree of diploma.

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DEDICATION

This research is dedicated to all smallholder farmers who are working tirelessly to provide nutritious food in their communities.

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The Lord Almighty has made this journey a success through His grace, love and guidance. I am also grateful to my family for the support during this Masters journey. Your love and patience were wonderful.

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Abstract

This study determined the contribution of table egg production to household protein consumption in Goromonzi District. Data was collected via questionnaires and focus group discussions and analysed using SPSS. The study showed many residents in peri-urban communities were into table egg production projects which contributed immensely to the consumption of protein with over 88% of the respondents agreeing to this claim. Egg consumption was, therefore, a ready alternative for many who could not afford to purchase meat regularly but would still get valuable protein from the product. The study also showed that egg consumption is not only limited to breakfast but also consumed at lunch (33%) and super (52%) as relish to the staple food sadza. Furthermore, the study managed to give recommendations to the relevant stakeholders to rally behind smallholder farmers on egg production in peri-urban communities on how best these projects can be adopted.

Keywords: household protein consumption; Nutrition; table eggs;

LIST OF ACRONYMS AND ABBREVIATIONS

FAO:	Food and Agriculture Organization
UNICEF:	United Nations International Children's Emergency Fund
EU:	European Union
PIGAD:	Partners for Integrated Growth and Development
ZPA:	Zimbabwe Poultry Association

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CHAPTER 1

1.0 Background of the study

Food security has been a topical issue world over, especially in the face of climate change. Many countries have invested billions of dollars in the quest to ensure that their citizens have adequate nourishment and are food secure (Gurung, 2010). Nutrition is a vital aspect of many nations' agenda irrespective of political or religious affiliation (Boik, 1996). In Zimbabwe, food security has been taken seriously and many farming support programmes have taken a huge chunk of the budget. In the past 15 years there has been the Farm Mechanisation, followed by Command agriculture which focused on crop production and recently there has been an extension into command livestock farming (Nyika, 2017). Accessing the means of securing human nutrition e.g. land, inputs has also been a controversial political topic in the country which contributed to turbulence in the economy of the country.

There have been some episodes of shortage or in-availability of basic food commodities in the length and breadth of the country's landscape (Mutasa, 2015). This has been followed by a mass exodus of human capital to neighbouring countries and abroad in search of better paying employment opportunities (Munyoro *et al.*, 2016). Peri-urban agriculture has intensified as families attempt to enhance their food security (UNDP, 2013). A lot of crop cultivation has sprouted in peri-urban areas surrounding major cities. Crop seed houses have also increased number of demonstration plots in these areas to encourage these peri-urbanites to grow crops that can do well in their areas.

A good majority of people have also embarked on small stock livestock production i.e. broiler chicken, table egg layers, rabbit production and at some point "*chihuta*" Quell bird, was a popular talk as a meat and egg source (ZPA, 2015). However, the small size of the "*Chihuta*" militated against its significant contribution and widespread adoption in the fight against food insecurity. There seems to be some seriousness in the production of table eggs in and around urban settlements where layer chickens and or indigenous chickens are used. There is need to investigate the contribution of eggs to human nutrition. Table eggs are proclaimed to be good sources of nutrition (Bertechini and Mazzuco, 2013). A typical egg contains 11.30% protein, 3% sodium, 6% iron, 2% calcium, 10% vitamin A, 15% vitamin D, and 50% vitaminB12 among other important nutrients required by a human body (Egg Nutrition Centre, 2012). A single egg is acclaimed to contribute to 23% of the daily

requirement of an adult human's protein requirements (Egg Nutrition Centre, 2012). It is necessary to investigate the contribution of eggs to people living in communities near large cities or towns for example the Goromonzi district.

Zimbabwe has been in a dilemma in the past decade trying to address food security the worst part being in 2008. Various challenges have been encountered in the journey. The country has not had its own currency for almost two decades and the citizens have been badly affected by the reliance on retail foods when there is turbulence in the exchange rates (Munyoro *et al.*, 2018). In worse of circumstances people have either awoken up to find empty shelves in food shops or to find the products pegged at expensive prices beyond the reach of many (Munyoro *et al.*, 2016). Food security in that regard, and the adequacy of nourishment to the people has, therefore, been badly compromised. According to the Government of Zimbabwe (2014) the nation is faced by a growing level of chronic malnutrition which is exacerbated by food insecurity and deepening poverty. This challenge is certainly beyond the capacity of a single sector or agency to address, hence requires multi-sectoral interventions. The interventions by other sectors have thus triggered the research on egg production in fighting malnutrition.

1.1 Problem statement

Infants, children, women and the old have traditionally been vulnerable to nutritionally related challenges (ZIMSTAT, 2014). Malnutrition among these societal sectors presents a serious health dilemma to local authorities, government and the international donor community (Government of Zimbabwe, 2014). Despite efforts as school feeding programmes and other donor funded activities, designed to mitigate malnutrition, millions of women and children across Zimbabwe continue to suffer from one or more forms of under nutrition, including low birth weight, stunted growth, anaemia, underweight, wasting, vitamin A deficiency and Iodine deficiency disorders (Zimbabwe poverty Atlas, 2014). The majority of the peri-urban population is leaving in abject poverty and cannot afford a healthy diet (Takundwa, 2013). The current hyperinflationary environment and pricing of basic commodities, including food items against the scarce United States Dollar has worsened the plight of urban and peri-urban dwellers. It is against this background that the study sought to assess the contribution of eggs to the diets of peri-urban communities.

1.2 Justification

Malnutrition among infants, children and women continue to be a scourge to the rural and urban poor. These malnourished groups easily succumb to diseases and other health challenges especially in the face outbreaks such as the Cholera and typhoid of 2008 and 2018. Despite the deteriorating economic environment, there is scope that simple projects targeting animal and or plant protein urbanites and peri-urban people may contribute to reducing the level of malnutrition in such communities. This study investigates the contribution of table egg production to household protein consumption. The study seeks to build on information on contribution of egg production to protein consumption by women and children. The data, thus collected, will provide baseline information that could be used by government or Non-Governmental Organisation (NGOs) in coming up with strategies to curb malnutrition among infants, children and women.

1.3 Objectives of the study

The main objective of the study was to assess the contribution of localised table egg production to protein consumption by households in the peri-urban community of Goromonzi District.

1.3.1 Specific objectives

The specific objectives to the study were to:

i. To determine the contribution of small scale-egg production to human nutrition in peri-urban communities.
ii. To determine number of meals consumed by peri-urban households per day and the diversity of the meal constituents.
iii. To determine the diversity of animal or crop projects that peri-urban communities are involved in that could contribute to their nutrition.

1.4 Research questions

i. What is the contribution of small-scale egg production to human nutrition in peri-urban communities?
ii. What is the average number of meals and variety per meal consumed per household in peri-urban communities?
iii. What are the animal and or crop projects that peri- urban communities are involved in that could contribute to diversity in meals consumed?

1.5 Scope of the study

The study took the diverse and dynamic approach in studying the contribution of table eggs to human nutrition. The approach is normally taken by NGOs, it's a case study done under the support of PIGAD (Partners for Integrated Growth and development) which is a humanitarian organisation.

CHAPTER 2:

2.0 LITERATURE REVIEW

2.1 Introduction

Over the years the issue of nutrition has been topical world over with many countries investing billions of dollars in it. As suggested by Boik (1996) nutrition is a vital aspect of any nation's agenda irrespective of political or religious affiliation. Continentally nutrition has been a major point of discussion in various countries with Zimbabwe being a key country affected by this issue (Birkbeck 1983). Nutrition has been on the agenda list of the government of Zimbabwe since time immemorial in this country. The government of Zimbabwe has made drastic efforts to address this issue but there are gaps lacking due to various factors.

The majority of the peri-urban population is leaving in poverty due to economic hardships facing the nation (Takundwa, 2013) hence cannot afford a healthy diet. Therefore, it is against this background that the study seeks to assess the contribution of table egg production to household protein consumption in peri-urban communities.

2.3 Human nutrition

Nutrition can be defined as the process of taking in food and using it for growth, metabolism, and repair (Bloss *et al.,* 2011). Gurung (2010) goes on to suggest that nutritional stages are ingestion, digestion, absorption, transport, assimilation, and excretion.

Jelliffe (1966) suggested that nutrition refers to a nourishing substance, such as nutritional solutions delivered to hospitalized patients via an intravenous (IV) or intragastric (IG) tube. This synergizes with the school of thought by Kandala *et al.* (2011) who proposed that nutrition is the intake of food, considered in relation to the body's dietary needs. They further suggested that good nutrition in conjunction with an adequate and well balanced diet is a cornerstone of good health while poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity (Bloss *et al.,* 2011).

Nutrition, in contrast, is defined by Jelliffe (1966) as the science that studies food and how food nourishes our bodies and influences our health. He further suggests that it identifies the processes by which we consume, digest, metabolize, and store the nutrients in foods, and how these nutrients affect our bodies. Nutrition also involves studying the factors that influence our eating patterns, making recommendations about the amount we should eat of each type of food, maintaining food safety, and addressing issues related to the global food supply (Thompson *et al.,* 1962).

On the other hand Joshi (2012) was of the view that nutrition, nourishment, or aliment, is the supply of food materials required by organisms and cells to stay alive while UNDP (2013) argued scientifically that nutrition is the science or practice of consuming and utilizing foods. Nutritional science studies how the body breaks food down (catabolism) and how it repairs and creates cells and tissue (anabolism). Catabolism and anabolism combined can also be referred to as metabolism. Nutritional science also examines how the body responds to food. Boik (1996) argued further that nutrition is about eating a healthy and balanced diet meaning that food and drink provide the energy and nutrients you need to be healthy. Therefore, having explored the above definitions, in this study nutrition is defined as the study of nutrients in food and drinks, how the body uses nutrients, and the relationship between diet, health, and disease.

2.4 Nutrition and age

All children, no matter where they live or their circumstances, have the right to survive and to thrive thus consequently have the right to good nutrition (UNICEF 2017). However, famine and undernourishment has led to the loss of life of 10.6 million children below 5 years of age die every year with two-thirds of the childhood deaths occur during infancy worldwide (Ananth and Vintzileos, 2006). Furthermore, about 45% of all child deaths beyond infancy are closely associated with nutrition-related causes with stunting, severe wasting and intra-uterine growth retardation are the major contributors to child mortality, accounting for about 2.3 million deaths of under-fives annually (The Lancet Series, 2013). According to (Black et. al., (2008) about 43% of all deaths among under-fives occur in Africa and under-nutrition being the number one cause of morbidity for all age groups, accounting for 11% of the

disease burden. USAID (2018) pointed out that 155 million children in the world are stunted, 52 million children are wasted, and 41 million children are overweight.

Africa has seen an *increase* in the number of children with stunted growth despite a decrease in the prevalence of stunting in other continents. Together, Africa and Asia account for nearly all the global burden of stunting (European Union 2017). To date Tanzania has 34 percent or 3.3 million children under 5 years suffering from chronic malnutrition (stunting or low height-for-age) and 58 percent or 5.6 million suffering from anaemia, according to the most recent Demographic and Health Survey (2018).

In Zambia, as of 2018, 1.12 million children (40 percent) under 5 years suffered from chronic malnutrition (stunting or low height-for-age) and 420,000 children (15 percent) under 5 years suffered from acute malnutrition (wasting or low weight-for-height). About 6% of children under 14 were underweight in South Africa. These statistics indicate that under nutrition was high in the country. As observed by the European Union (2018), in 2000, Ethiopia had an astonishing 58% stunting and 41% underweight children although these figures dropped to 38% and 24% respectively in 2016.

In Zimbabwe the high prevalence of stunting in children under-five years of age remains the country's top nutrition challenge. In 2010, 32% of children below five years were found stunted as observed by ZDHS, (2010/11). In addition, the results of the MNS, 2012 indicate a slight improvement to 30%. However, the prevalence of stunting (of 30% on average) remains at an unacceptably high level, with significant social and economic consequences on the country. According to the European Union (2017) an estimated 161,105 children die before their fifth birthday (under-five mortality rate (U5MR) of 84/1000). Although the causal factors are many, malnutrition is one of the leading underlying causes of under-five deaths. Prevalence of micronutrient deficiencies is high across all age groups of the Zimbabwean population

2.5 Nutrition and gender

In most cases women are at greater risk of malnutrition than men (Gurung 2010) . Malnutrition in mothers, especially those who are pregnant or breast feeding (Jelliffe, 1966), can set up a cycle of deprivation that increases the likelihood of low birth weight, child mortality, serious disease, poor classroom performance and low work productivity. World over no country is on track to meet targets to reduce anaemia among women of reproductive age, and the number of women with anaemia has actually increased since 2012 (USAID 2018).

2.6 Nutrition and culture

Cultural beliefs also play a pivotal role in nutrition especially affecting women and children. In rural Zimbabwe usually meat is reserved for the males with the children taking soup if any is left while the mothers will resort to vegetables regardless of them being pregnant or not (Mazuvawanda 2016). This negatively affects both the mother and the unborn child as they will be deprived of necessary nutrients. Also, Allali *et al.* (2006) observed that in Morocco the impact of veiling (a traditional clothing style that completely covers the arms, legs, and head) on bone mineral density among post-menopausal women.. The researchers found that women who wore concealing clothing had nearly twice the risk of developing osteoporosis than those who did not wear concealing clothing (ORs:1.87; 95% CI, 1.05-3.49) (Allali *et al.*, 2006). This is of great concern in the Middle East and southeast Asia. In these regions, prominent religions (including Hinduism and Islam) often require women to wear concealing clothing which reduces the skin's exposure to sunlight. In addition, women residing in these areas tend to spend very little time in the sunlight due to cultural and social reasons (Dawson-Hughes, 2004).

2.7 Nutrition and government policy

The Zimbabwe National Nutrition Strategy (NNS) for 2014 to 2018 was developed following a wide consultative process of all stakeholders to food and nutrition issues in government, the private sector, non-governmental organisations (NGO), the UN, community-based organisations and the community at large. The first objective of the strategy is to operationalize Commitment V of the Food and Nutrition Security Policy which states that the Government of Zimbabwe (GOZ) is committed to ensuring nutrition security for all through

the implementation of evidence-based nutrition interventions that are integrated within a broad public health framework including health services, water and sanitation.

The second objective is to contribute towards making further progress against the other Scaling up Nutrition (SUN) targets. Over the last 30 years, Zimbabwe made remarkable progress in reducing both underweight and wasting in children under the age of five years. Multi-sectoral approaches involving the Ministry of Agriculture, Health and others were important in ensuring the successes. Nevertheless the prevalence of underweight has continued to be 10% or above (10% in 1999, 13% in 2005, 10% in 2010/11,11% in 2012) according to various sources including the ZDHS 2010/11 and the Micronutrient Survey of 2012 and not meeting the MDG 2015 target of reducing it by half.

2.8 Nutrition and economic situation

It is no secret that economic situation of any country has a bearing on the nutrition status of that country. Over the past decade the economy of Zimbabwe has taken a nose dive (Munyoro et al., 2016) thus putting the priorities of many people on basics of survival. As observed by Takundwa (2013), the majority of the peri-urban population is leaving in poverty due to economic hardships facing the nation hence cannot afford a healthy diet. According to Zimbabwe poverty Atlas (2015) the average poverty prevalence for Goromonzi District was over 62.4% indicating that the majority of the population is living in poverty. The map below illustrates the level of poverty in Goromonzi district.

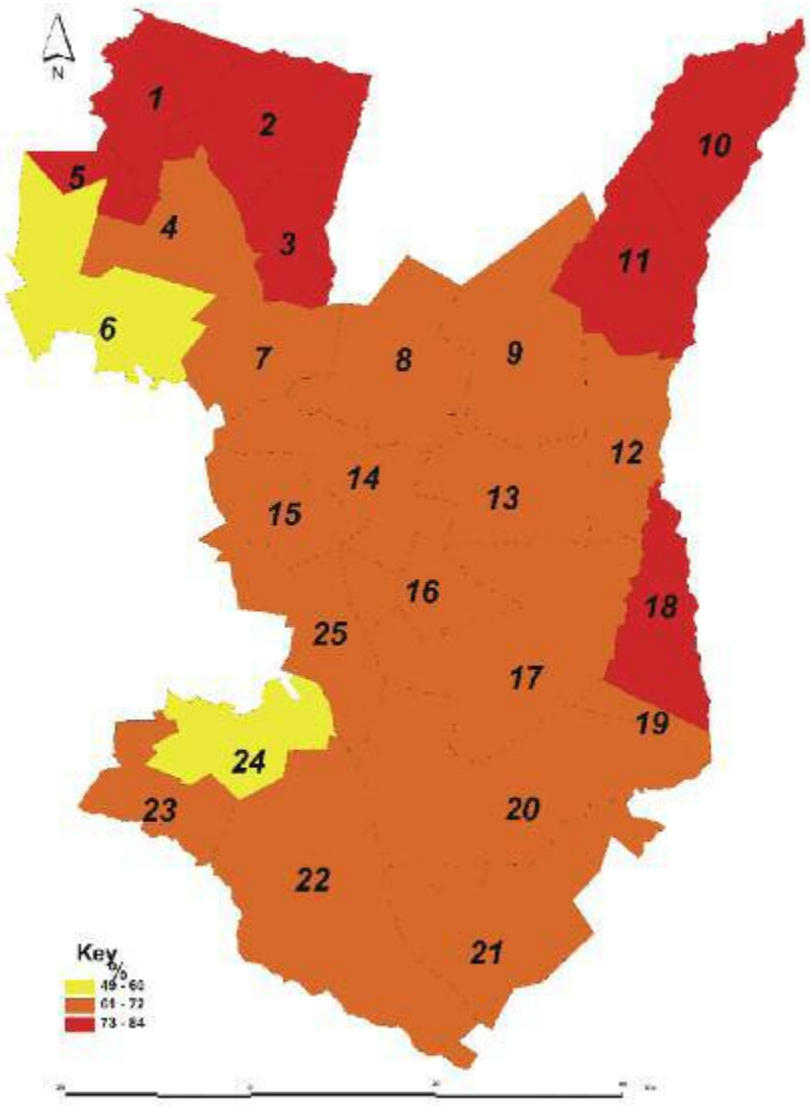

Figure 1: Poverty prevalence in Goromonzi District (Source: Zimbabwe poverty Atlas 2015)

2.9 Nutrition and agriculture

Agriculture and food production are the backbone of our diets and nutrition (European Union 2017) and the common factor between agriculture and nutrition is food. According to Bloss *et al.* (2011) food is a key outcome of agricultural activities, and, in turn, is a key input into good nutrition. Without agriculture there is little food or nutrition. Having said that, under nutrition is one of the world's most serious, but least addressed, public health challenges, with more than 162 million stunted children in developing countries (USAID 2018). As the

world moves towards the new Sustainable Development goals, countries and development partners will need to step up progress on child health and nutrition outcomes to enhance both human and economic development prospects hence stronger nutrition-agriculture alliance will give us a head start.

However, availability of food from agriculture doesn't ensure good nutrition. Since time immemorial, agricultural development was to provide food enough for the health and strength of all people but it seems reasonable to expect that among the top priorities of agriculture would be to look beyond just calories to ensure feeding people well. Likewise, it would seem that the field of nutrition should be closely connected, if not synonymous, with food consumption.

According to Gurung (2010) nutrition is about much more than food availability; it encompasses access to food at the household level, health services and a healthy environment and adequate child caring practices. However most agriculturalists do not consider the main goal of agricultural development to be the improvement of human health, beyond providing sufficient calories, but rather a broader agenda recognizing the important role that agriculture plays as a major livelihood and driver of economic growth in countries. In 2012, about 12% of agriculture projects world over included nutrition-sensitive elements and in 2014, this number jumped to 19%. A good example is found in Uganda where a project brings together agriculture, health and education sectors to find solutions to persistent undernutrition.and there are many other examples too. As suggested by Allin et al (2006) agriculture has the most direct influence and contact with the majority of households where undernourished individuals reside worldwide. Beneficiaries of typical agricultural projects overlap with those most affected by under nutrition and in this case happen to be the rural poor (Bodnar et al 2007). Furthermore, Bray (2004) was of the view that seventy-eight percent of the world's poor are rural, and most of those are smallholder farmers while any development activity reaching this population has enormous potential to influence factors that constrain human capital and well-being, of which nutrition is an essential part. A practical example as observed by Pigad (2014), agriculture extension workers have direct and ongoing contact with smallholder farmers, and therefore have a unique opportunity to strengthen

messages regarding not just production, but also consumption of nutritious foods, including bio-fortified crops, especially by vulnerable groups, including pregnant women and young children.

As observed by Bloss *et al.* (2011), agricultural-led growth is at least twice as effective in reducing poverty as GDP growth since it is more of a pro-poor than non-agricultural-led growth, thereby increasing agriculture's potential to improve nutrition Third, agriculture is the sector best placed to affect food production and consumption of nutritious foods needed for healthy and active lives. Pigad (2014) suggested that physical and economic access to adequate and affordable nutritious food is primarily a function of the agriculture sector, through support to increased production, improved post-harvest storage and processing (including food safety issues such as aflatoxin control), and reduced transport costs which can lower food prices for poor consumers .

As observed by Miles, (1998) there has been considerable interest in chicken eggs as carriers of critical nutrients over the past 20 years. This has implications for improved nutritional status, particularly of low-income people in developing countries. The technology simply entails increasing the content of some nutrients in hens' diets. Several vitamins (folic acid, B12, vitamin E) can be increased in chicken eggs. The benefits of this egg consumption is that it is unlikely to exceed the minerals' safe upper limits in humans because the amounts sequestered into the eggs are limited, irrespective of the levels in the hens' diet, and quickly reach a plateau.

2.11 Conceptual framework

Literature from various studies has shown the extent and depth of effects of malnutrition from a global, regional and local point of view. As suggested by the Global nutrition report (2017) nutrition is recognized as a key determinant of health and well-being, and a contributor to human capital development. Optimal physical growth and cognitive development are founded on maternal and child nutrition in the first 1000 days, with long-term health and economic implications for individuals and nations. The Government of Zimbabwe (2014) goes further to suggest that this challenge is certainly beyond the capacity of a single sector or agency to address, hence requires multi-sectoral interventions. However, interventions have been done

but the problem seems to remain stagnant. This study seeks to point out a single intervention of egg production and tries to assess whether it has an effect on nutrition given the causes of malnutrition sited earlier in this study.

2.12 Empirical evidence

There is no country without a nutrition challenge today. Many countries are still face stunting, whereby both physical and brain capacity are irreversibly damaged, while other countries see obesity and non-communicable diseases running rampant (European Union 2017). According to Sneve (2017) in recent decades the amount of overweight and obese children has grown rapidly around the world and the rising prevalence of childhood obesity can now be seen in developed economic countries, as well as in emerging and less developed economies (World Health Organization, 2016). Also, a growing number of countries are facing both challenges – undernutrition during early childhood, and then obesity and non-communicable diseases during the reproductive age.

According to The Global Nutrition Report *(2017)* a third of people living on this planet are overweight and obese while over a staggering billion and a half suffering from anaemia and other micronutrient deficiencies, and around 200 million children stunted or wasted. As suggested by the African Development Bank (2016) Africa's economic progress is being undermined by hunger, malnutrition and stunting, which cost at least US$25 billion annually in sub-Saharan Africa, and leave a lasting legacy of loss, pain and ruined potential. Stunted children today lead to stunted economies tomorrow. Below are cases of various countries indicating the magnitude of nutrition problems globally.

- **Nepal**

Nepal demographic health survey reported that 41% of children under five years were stunted with 11% wasted and 29% underweight. Several factors were noted to contribute towards malnutrition- such as, socio-economic factors, mother's literacy, acute illnesses, age of the child (European Union 2017). Social problems such as poverty, skewed land distribution and food insecurity are some of the underlying factors which cause malnutrition. World Health Organization (WHO) data from 2011 report the prevalence of moderate and severe

malnutrition to be 29.8% and 8.5% respectively, among boys under five in Nepal. Moderate and severe stunning among Nepali boys who are under five were reported to be 41.3% and 16.8% respectively, and that among girls were 39.5% and 15.8% respectively.

- **Sri Lanka**

According to the 1995 nutritional status survey, the prevalence of stunting in children under five years of age was 20%, that of wasting 13% and of underweight 33%. The nutritional status of pre-school children showed significant inter-provincial differences. • The adult population group is also affected by undernutrition as indicated by the prevalence of chronic energy deficiency which is more than 33% in women and nearly 37% in men. Regarding micronutrient deficiencies, nearly 19% of the population was diagnosed as iodine deficient.

- **Bangladesh**

According to National Institute of Population Research and training (NIPORT) et al (2016) in Bangladesh about 5.5 million children under 5 years (36 percent) are suffering from chronic malnutrition (stunting or low height-for-age) and 14 percent are acutely malnourished (wasting or low weight-for-height).this could be attributed to the fact that Bangladesh is the most densely populated country in the world, with about 163 million people living in a landmass of 147,570 square kilometres hence cultivation land for food is limited.

Furthermore, around one-third of the population is under 15 years (UNICEF 2017) thus indicating the magnitude of the nutrition problem in this particular country. Magnani et al. (2015) also observed that undernutrition is exacerbated by poor dietary diversity, with 70 percent of the diet comprising cereals, and inadequate protein and micronutrient intake.

This has led to a situation were fifty percent of pregnant women and 40 percent of non-pregnant/non-lactating women suffer from anaemia, 57 percent of non-pregnant/non-lactating women are zinc deficient, and 22 percent of non-pregnant/non-lactating women are deficient in B12 (icddr,b et al. 2013).

- **Ethiopia**

As observed by the European Union (2018), in 2000, Ethiopia had an astonishing 58% stunting and 41% underweight children although these figures dropped to 38% and 24% respectively in 2016. However 28 per cent of child deaths in Ethiopia are associated with under-nutrition while a high prevalence of various forms of malnutrition among vulnerable groups has serious implications for social development and economic growth because malnutrition blunts the intellect, saps productivity, and perpetuates poverty (UNICEF 2017).Furthermore the USAID (2018) observed that Anaemia prevalence among under-five children remained as high as57 per cent while 26% of women aged between 15–49 years were undernourished and 24 per cent had anaemia.

- **Tanzania**

In Tanzania malnutrition in childhood and pregnancy has many adverse consequences for child survival and long-term well-being. According to USAID (2018) it also has far-reaching consequences for human capital, economic productivity, and national development overall. To date Tanzania has 34 percent or 3.3 million children under 5 years suffering from chronic malnutrition (stunting or low height-for-age) and 58 percent or 5.6 million suffering from anaemia, according to the most recent Demographic and Health Survey (2018).

- **Zambia**

As of 2018, in Zambia 1.12 million children (40 percent) under 5 years suffered from chronic malnutrition (stunting or low height-for-age) and 420,000 children (15 percent) under 5 years suffered from acute malnutrition (wasting or low weight-for-height). These figures indicate the catastrophic consequences of malnutrition in childhood and pregnant women and have many negative consequences for child survival and long-term well-being (European Union 2018). This has prompted the government of Zambia in collaboration with other stakeholders to invest in hunger and food security initiatives emphasize agriculture as a driver of economic growth. As supported by USAID (2018) in Zambia, Feed the Future programs are being implemented in Eastern Province, with a value chain focus on oilseeds, legumes, and maize, and in selected peri-urban settlements.

- **South Africa**

According to SANHANES (2013) 28% of South African households were at risk of hunger and 26% experienced hunger in 2012 while the prevalence of stunting sitting at 27% of children under three. About 6% of children under 14 are underweight, about one in a hundred. These statistics indicate that under nutrition was high in the country. However, the other end of the scale tells a different story as 19% of children aged between two to five were classified as overweight and 5% were classified as obese in 2012 thus showing the level of economic inequalities cascading down to nutrition.

The 2013 Saving Babies report indicated that low birth weight was correlated with poor infant health with 15% of all live births have a low weight at public healthcare facilities and these low birth weights are associated with the majority of deaths within the first 28 days of life. As supported by Sanders (2014) the main causes of low birth weight is suboptimal nutrition of the mother, especially before and during the early months of pregnancy. He further added that extreme physical labour as well as substance abuse can also cause low birth weight while HIV and other sexually transmitted infections cannot be left out among key causes.

- **Mozambique**

An estimated half of Mozambique is said to be malnourished with an average stunting rate of 44 percent. According to USAID (2018) in Mozambique chronic malnutrition (stunting or low height-for-age) affects more than 2 million children under 5 years (43 percent). This is attributed to the fact that their diet mainly consists of cassava, maize and other grains and 70 percent of the population lives in rural areas where they practice subsistence agriculture. However, efforts are underway to reduce malnutrition with government aiming to strengthen the link between agriculture and nutrition through improved productivity.

2.13 Research gap

Over the last 30 years, Zimbabwe made remarkable progress in reducing both underweight and wasting in children under the age of five years and the table below shows milestones reached in this fight against malnutrition.

Table 1: Nutrition progress and challenges in Zimbabwe

1980s	Concerted efforts were made to identify undernourished children and target them with food assistance
1990s	A transition was made from food aid to community-based nutrition programmes with strong coordination between health and agriculture4 to promote sustainability of the nutrition impact. Early success was recorded in reducing underweight prevalence in under-fives through the multi-sectoral coordination approach. The close partnership between health and agriculture, which was forged through the mechanism of the District Food and Nutrition Management Teams and a strong involvement of village health workers, was instrumental in significantly reducing the prevalence of underweight and wasting in under-fives. That Zimbabwe accomplished what few other African countries were able to after Independence is evidence that Zimbabwe can tackle its most pressing nutrition problems
2010	One in every three children (32%) was found to be stunted (ZDHS, 2010/11), and this situation has not improved in the last decade. Results of the MNS, 2012 indicate a slight improvement to 30%. The prevalence of stunting (of 30% on average, 33% in male children and above 40% in some districts) remains at an unacceptably high level, with significant social and economic consequences on the country. Currently, an estimated 161,105 children die before their fifth birthday (under-five mortality rate (U5MR) of 84/1000)5. Although the causal factors are many, malnutrition is one of the leading underlying causes of under-five deaths. Prevalence of micronutrient deficiencies is high across all age groups of the Zimbabwean population. Vitamin A deficiency affects 19% of under-fives
2015	In line with MDG Target No. 1, has remained elusive, with the rate even temporarily rising from 10% in 1999, to 13% in 2005, declining back to 10% in 2010 (ZDHS, 2010/11), then rising slightly again to 11% (according to the

	Micronutrient Survey (MNS) carried out in 2012). Moreover, the high prevalence of stunting in children under-five years of age remains Zimbabwe's top nutrition challenge

Having noted the above literature, many interventions have been implemented in trying to address the nutrition problem but no research has been made in line with egg production hence it is against this background that this study seeks to establish the contribution of table egg production to household protein consumption

2.14 Conclusion to literature review

This chapter managed to dig into various schools of thought by various authors in relation to the subject at hand. The chapter managed to link the topic to various subheadings which made it simple to understand the background, current situation and possible future of the area under study.

CHAPTER 3:

3.1 METHODOLOGY

The methods used in this study followed the standard ethical norms of conducting research as explained in Section 3.7.

3.2 Study area

The study was conducted in Goromonzi district of Mashonaland East Province. The district is located on GPS coordinates: 17.8108°S, 31.3542°E at 1465m height above sea level. The district has a population of about 2,770,977 people and coming from approximately 55 652 households. The district is characterised by mainly communal settlements and their main source of income is subsistence farming. The average poverty prevalence for Goromonzi District is at 62.4% that is 62.4% of the total district population lives below the poverty datum line and are food insecure. The map below shows poverty prevalence at ward level in the district (Zimstat, 2015).

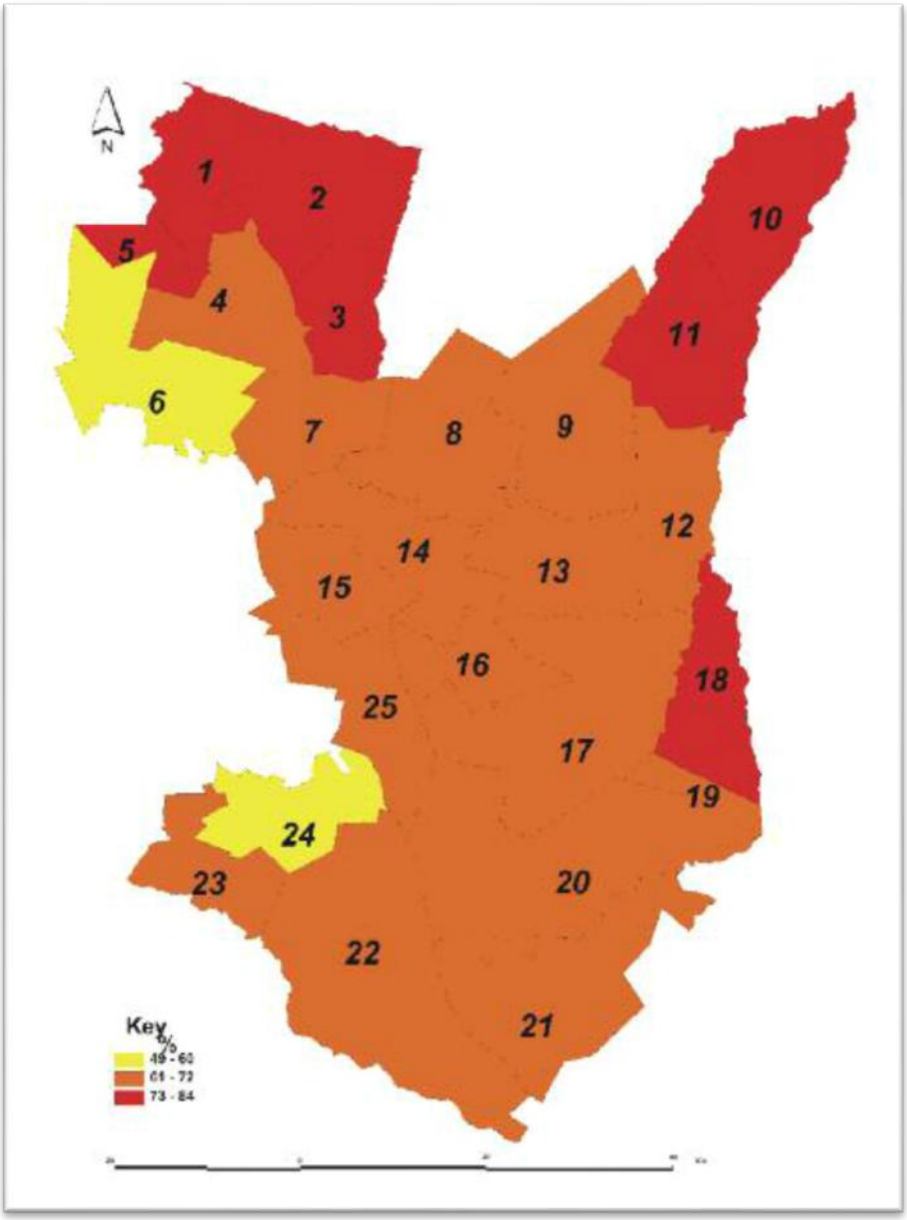

Figure 2: Goromonzi district map showing poverty prevalence (Zimbabwe poverty Atlas, 2015).

3.3 Research Design

Exploratory research was used to gather people's views, perceptions, behaviours and values with regards to contribution of eggs to household nutrition. The method was preferred because of its advantages in defining problem(s) and identifies any specific objectives or data requirements to be addressed through additional research (Field, 2005). Exploratory research helped in developing insights on the phenomena, generate the essential knowledge and clarify

relevant issues and events to divulge variables associated with the problem, uncover information needs or define alternatives for addressing research objectives (Malhotra (2003).

3.4 Sampling procedures

One hundred and seventy general farmers and 30 stakeholders from various organisations were interviewed in this study. The sample size was chosen to match the limited available time and resources for the study. Selection of stakeholders was based on those organisations working closely with the community such as Social welfare, Agritex and health departments. Ten stakeholder interviewees were withdrawn from each of the 3 selected organisations that were working closely with the farmers. As for the general population random sampling was adopted in the wards in which small scale egg production was being done.

Convenience sampling was used to sample the 200 interviewees. Convenience sampling is sometimes known as grab or opportunity sampling which is a type of non-probability sampling which involves the sample being drawn from that part of the population which is close to hand (Munyoro *et al.*, 2016). The researcher using such a sample cannot scientifically make generalizations about the total population from this sample because it would not be representative enough. However, to rectify this challenge the researcher targeted wards in which small scale egg production was being done. The researcher also used stratified sampling since the study sought to interact with two different groups that were general farmers and stakeholders from different organizations hence the need for fair representation of all relevant stakeholders although it had some logistical problems associated with it.

3.5 Data collection procedure

Questionnaires and focused group discussions used to gather all the necessary information relevant to this study.

3.5.1 Questionnaires

A structured self-completed research questionnaire was distributed to the target population and collected after two weeks. The researcher used the questionnaire based on the following advantages as cited by Saunders *et al.* (2005): cost saving because no interviews were

required, it reached scattered populations and enabled easy comparison of information gathered, required little skill to administer, eliminated interview bias (halo effect) and respondents answered questions at their own convenience. In order to test the validity of the tool the questionnaire was piloted on 10 farmers and necessary adjustments were made in areas which were not clear.

3.5.2 Focus groups

Focus group discussions were also used to collect data. A focus group discussion is an interaction among one or more experts and more than one individual with the intention of gathering data (Kothari, 2004). According to Bass and Avolio (2014) a focus group discussion is carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment. It is conducted with approximately seven to ten people by a skilled interviewer ((Kerlinger, 2006). The discussion is relaxed, comfortable, and often enjoyable for participants as they share their ideas and perceptions. Group members influence each other by responding to ideas and comments in the discussion.

3.6 Data analysis procedure

Data collected by questionnaires or focused group discussions was coded, entered into a spread sheet and analysed using SPSS (IBM, 2010). After gathering raw data in the field, data processing followed. Data presentation and analysis was done through a series of logical steps. Firstly, raw data was edited in the completed questionnaires with every questionnaire passing through data validation where the researcher checked whether all instructions were observed and followed. The physical checking of questionnaires was done to check for missing pages, blank pages and for completeness of questionnaires.

The coding process then followed by identifying and assigning numeric or character symbols to previously edited data. Codes were assigned to respond options for easy capturing in a computer package. Tabulation followed after coding (Mercer, 1996). Data was processed and analysed using SPSS and the results presented as tables and figures/ charts.

3.7 Ethical consideration

The study was conducted using the standard ethical norms acceptable in research. A consent form was availed and explained to the respondents who were requested to sign the form. According to Fisher (2006), there is need to ensure individual researcher's ethical behaviour to be put under scrutiny thus implying that the researcher must ensure the adoption of high professionalism standards. This includes the protection of participants and their dignity in terms of publication of sensitive information. The researcher explained to the participants the purpose of the study and that it will be strictly academic hence anonymity will be observed for the protection of privacy and confidentiality of the participants. As supported by Berg (2000), the rights, privacy and welfare of people and communities that form the target group must be guaranteed.

CHAPTER 4:

4.0 RESULTS AND DISCUSSION

4.1 Response rate

In this study, a total of 200 questionnaires were distributed to various interviewees within the confinements of the study and 180 were returned thus putting the response rate at 90% as shown in the chart and table below. The 90% response rate obtained in the current research was satisfactory. According to Wixom and Watson (2001) a response rate of above 75% is good.

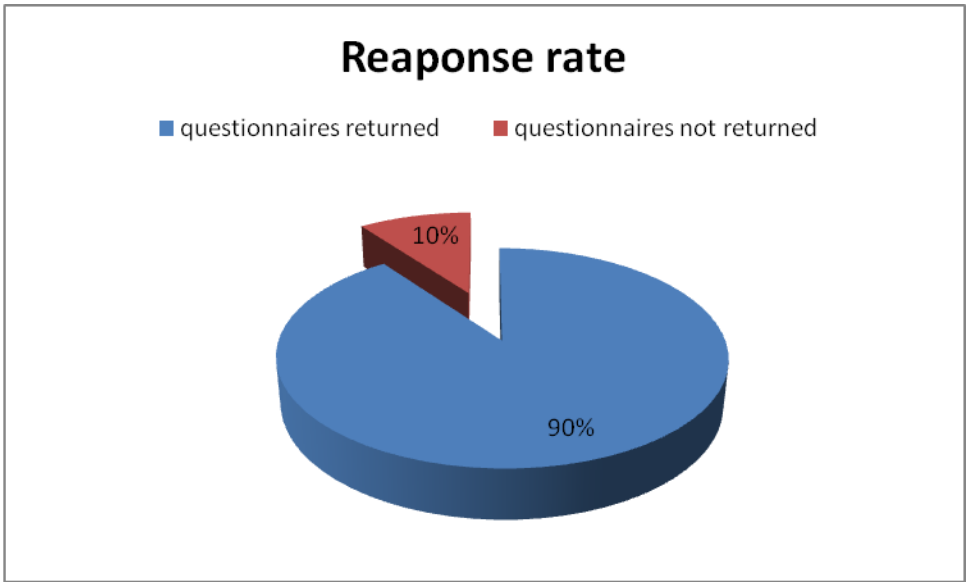

Figure 3: Response rate to questionnaires

4.2 Validation of results

Validation of the results was done using the Cronbach's Alpha reliability test. The study had a Cronbach's Alpha reliability score of 0.83 signifying that the data gathered was reliable George and Malley (2003). According to Wixom and Watson (2001), when using the Cronbach's Alpha reliability test, an alpha score above 0.7 shows that the data is reliable. On the other hand, an alpha value of less than 0.5 is unacceptable, between 0.5 and 0.6 is poor, between 0.6 and 0.7 is questionable, between 0.7 and 0.8 is acceptable, between 0.8 and 0.9

good and above 0.9 is excellent (George and Malley, 2003). Table 1 below shows the results of the reliability test.

Table 1: Alpha reliability test according to Cronbach

Cronbach's Alpha	**N of Items**
0.83	32

4.4 Gender

Table 3 shows response rate by gender. Sixty five percent of the respondents were women and the remaining 35 % were men. In the study, more women were available and willing to participate in the interviews compared to men. This is mainly due to the fact that most men in the area travel to the nearby city of Harare in search of employment and women remain behind.

Table 2: Response rates according to gender

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Male	63	35.0	35.0	35.0
Female	117	65.5	65.0	100.0
Total	**180**	**100.0**	**100.0**	

4.5 Age

The 31-40 years age group contributed 40% of the respondents while the elderly (above 50 years) were 25% of the study. This result may be influenced by the fact that these age groups are the common ages found in peri-urban communities as the youths usually migrate to cities in search of greener pastures. However, it is interesting to note that the youths had a fair representation of 20% showing that they are still present in the peri-urban communities though in small numbers.

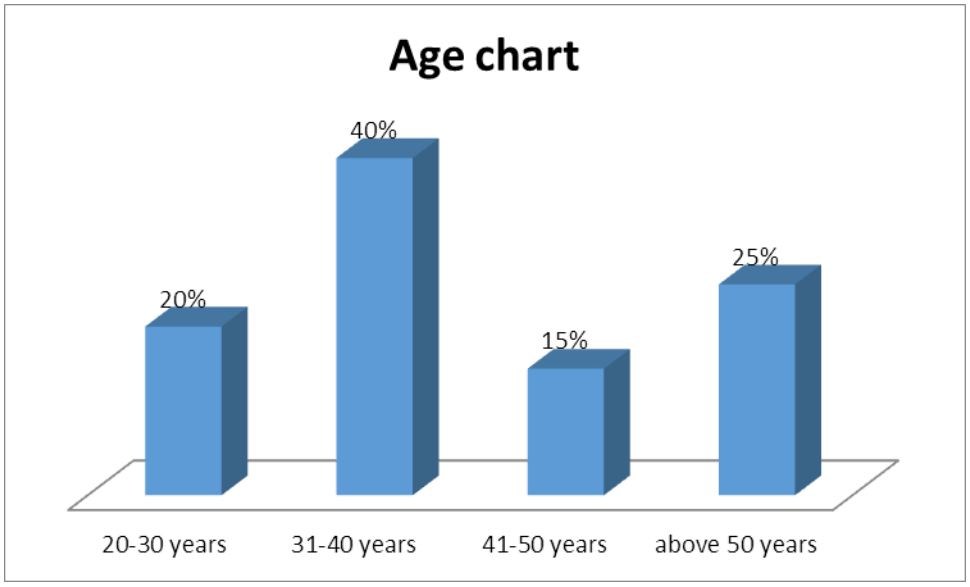

Figure 4: Chart showing ages of respondents in the study

4.6 Level of education

Sixty three percent of the respondents attended secondary education and only 6.7 had a post graduate qualification.

Table 3: showing level of education of respondents

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Secondary	114	63.3	63.3	63.3
Diploma	30	16.7	16.7	80.0
Degree	24	13.3	13.3	93.3
Post grad.	12	6.7	6.7	100.0
Total	**180**	**100.0**	**100.0**	

4.7 Household Egg consumption

Sixty three percent of the respondents highlighted that they ate eggs while 37% did not eat eggs. Of those who do not eat eggs more than 80% of them mentioned that affordability and accessibility of eggs in their areas was a challenge that militated against their consumption of eggs. Their limited consumption of eggs was, therefore, not associated with allergic reaction neither was it related to religious taboos.

Table 4: Frequency of eating eggs

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Daily	12	6.7	6.7	6.7
Weekly	18	10.0	10.0	16.7
Monthly	35	19.4	19.4	36.1
Once in a while	48	26.7	26.7	62.8
Not at all	67	37.2	37.2	100
Total	180	100	100	

As shown in the table and graph egg consumption is low to the extent that only 12% consume eggs daily while 48% consume eggs once in a while. Those who did not eat eat eggs reasons were bassed on religion, culture and natural dislike.

The investigation on which meals eggs were consumed revealed that: 15% of the people consumed eggs for breakfast and 85% consumed eggs as relish for lunch and supper with supper accounting for 52% of the respondents as shown in the Figure 2 below.

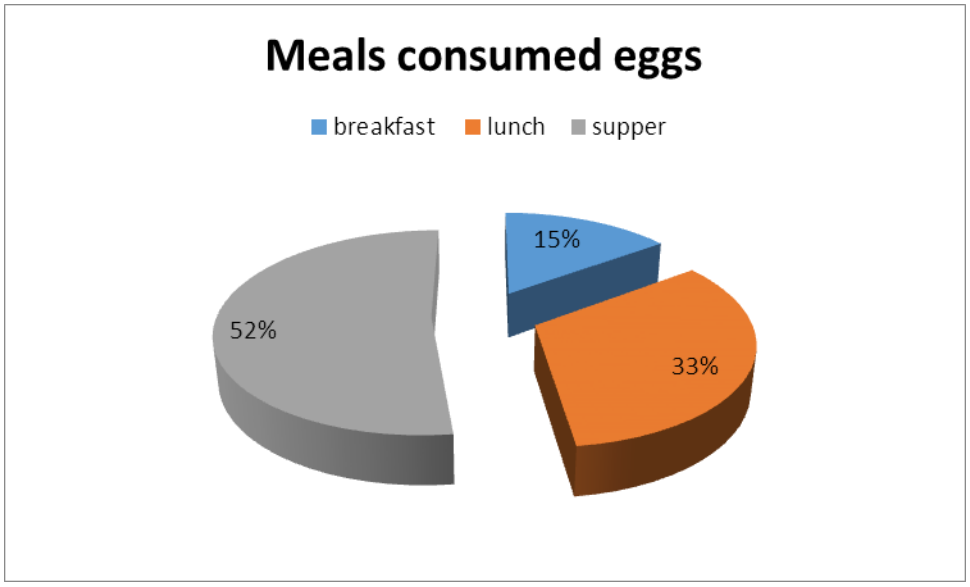

Figure 5: Meals commonly consumed eggs in Goromonzi district

4.8 Egg consumption by age in households

Figure 7 shows the egg consumption by age. Six percent of the respondents indicated that their households did not give their children eggs. The main reasons for not giving children eggs were mainly centred on cultural beliefs which stated that if children ate eggs, they would supper from shock. The observation is worrisome as it affects child development negatively. However, 94% of the respondents highlighted that in their homesteads both children and adults have access to eggs. This is illustrated in the chart below.

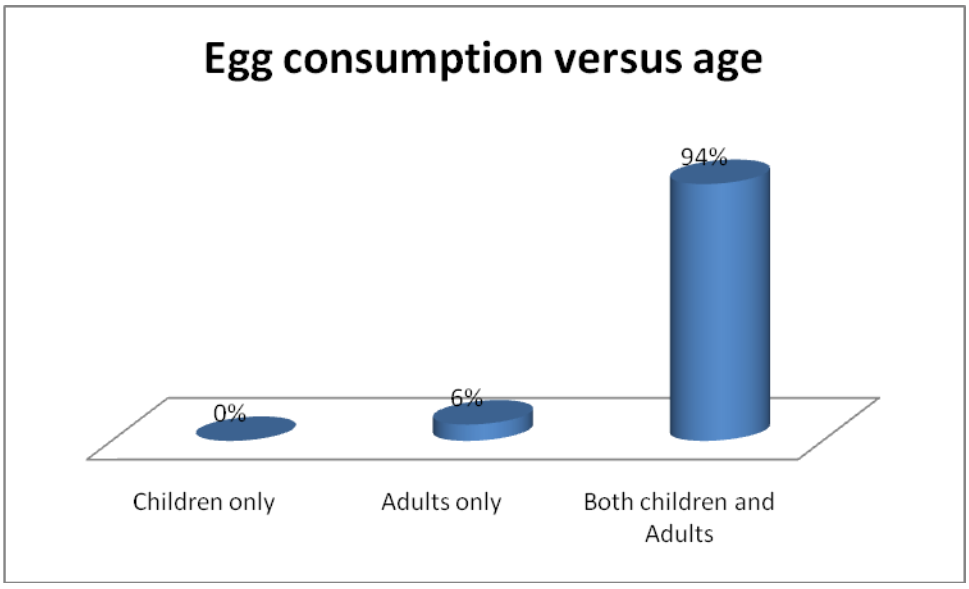

Figure 6: Egg consumption by age in households

4.9 Egg consumption by gender

Figure 8 shows the egg consumption by gender. It was noted in the current study that 3 % of some households did not allow females to consume eggs. Reasons given for these astonishing discoveries were related to religion and cultural beliefs. The reasons cited for women not being permitted to eat eggs were related to the myth that egg consumption would lead to subfertility among women especially by the apostolic sects. The chart below provides a clear view on this matter

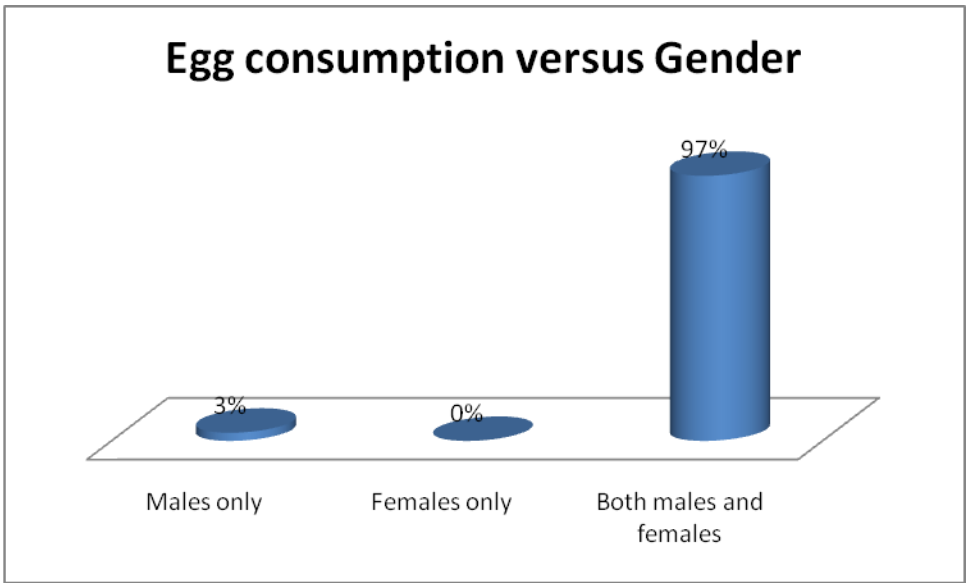

Figure 7: Household egg consumption based on gender

4.9 Other protein sources

Figure 9 shows alternative protein sources as highlighted by the respondents.

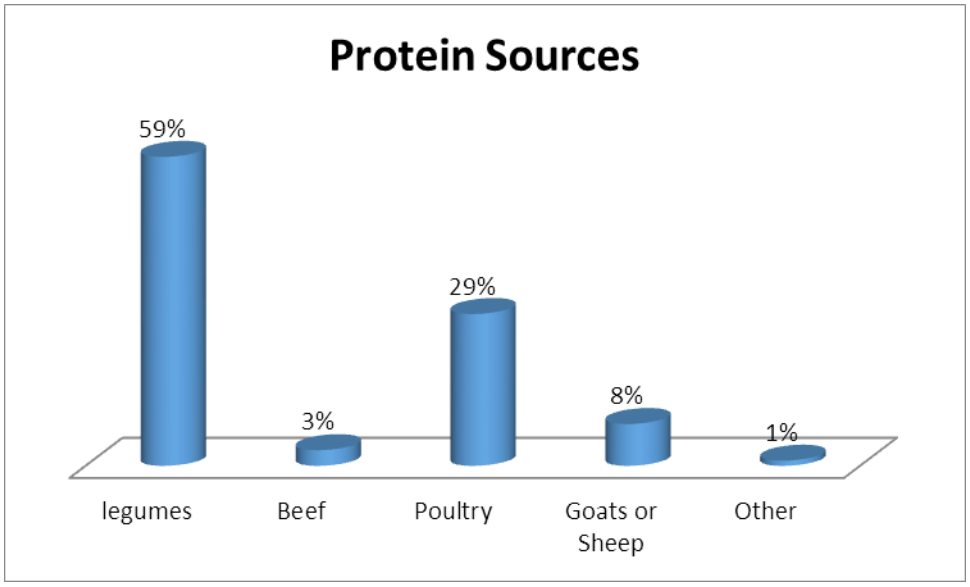

Figure 8: Other protein sources

4.10 Factor Analysis

Respondents' opinions on a number of parameters relating to egg consumption, availability and nutrition were tabulated on a 5-point Likert scale (1=strongly agree, 2=agree, 3=neutral, 4=disagree and 5= strongly disagree) and presented the table below

Table 5: Likert scale results

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Eggs contribute positively to the nutrition of humans	100	60	20	0	0
Eggs have the essential nutrients required by humans	102	35	20	20	3
Eggs are an affordable source of nutrition	150	20	10	0	0
Eggs are readily available and accessible in the community.	90	40	25	17	8
Eggs are easy to prepare for a meal.	162	18	0	0	0
Eggs are helpful in providing nutrition for peri-urban communities	113	24	21	19	3
Women and children can easily have eggs as part of their meals.	38	41	8	51	42

Eggs have negative effects on people's health	0	12	59	49	60

In this study the researcher used the Kaiser stopping method and this method considers factors with an Eigen value above one.

Table 6: Eigen values obtained using the Kaisers stopping method

Component	**Initial Eigen values**			**Extraction Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	1.850	46.259	46.259	1.850	46.259	46.259
2	.979	24.475	70.734			
3	.802	20.047	90.781			

1: gender 2: age 3: education level

From the results gathered above it is clear that gender was the major determining factor to the way respondents answered the questions as it had the highest Eigen value of 1.850 as compared to age and education level which had Eigen scores of 0.979 and 0.802 respectively. After being identified as the main determinant in this study, gender of respondents was then used to carry out the ANOVA test and the table below shows the ANOVA test values.

Table 7: Analysis of Variance

	Mean	Std. Deviation	Anova p.Value
Eggs contribute positively to the nutrition of humans	1.28	0.98	0.64
Eggs have the essential nutrients required by humans	1.63	0.96	0.35
Eggs are an affordable source of protein	2.17	1.000	0.22
Eggs are readily available and accessible in the community.	2.15	1.133	0.08
Eggs are easy to prepare for a meal.	1.21	0.99	0.41
Eggs are helpful in providing nutrition for peri-urban communities	2.8	1.01	0.23
Women and children can easily have eggs as part of their meals.	3.02	1.03	0.1
Eggs have negative effects on people's health	3.42	0.775	0.06

A 5-point Likert scale was adopted in this study with1=strongly agree, 2=agree, 3=neutral, 4=disagree and 5= strongly disagree. Therefore, a mean score below 3 meant agreement; a mean score of 3 signalled a neutral response while a mean score above 3 meant disagreement.

4.10.1 Eggs contribute positively to the nutrition of humans

This study revealed that eggs contributed positively to human nutrition. This claim is supported by a mean score of 1.28 and a standard deviation of 0.98 while an anova p.Value of 0.64 deemed this claim to be significant. Over 75% of the respondents confirmed that they eat eggs and can access them within the district.

4.10.2 Eggs have the essential nutrients required by humans

Seventy six percent of the respondents agreed that eggs have essential nutrients required by humans. In addition, a mean score of 1.63 was recorded meaning that respondents were in agreement while a standard deviation of showed 0.96 that the responses did not vary much from the mean. Furthermore, an anova p.value of 0.35 indicated that this notion was important to the study.

4.10.3 Eggs are an affordable source of protein

This study also revealed that eggs are an affordable source of protein as 94% of the respondents agreed to this notion while a mean score of 2.17 and a standard deviation of 1.00 were observed thus showing that the respondents agreed to this notion. An anova p.Value of 0.22 endorsed this notion to be of great significance to the study.

4.10.4 Eggs are readily available and accessible in the community

Eggs were noted to be available and accessible to the residents of Goromonzi district as 72% of the respondents in the study agreed to this notion and supported by a mean score of 2.15 and a standard deviation of 1.133. An anova p.Value of 0.08 confirmed that this notion was significant to the study. This goes in hand with the annual report of Help Germany (2016) which stated that on average there are over 70 000-layer chickens in Gorormonzi district producing over 55 000 eggs daily thus making eggs available and accessible to the majority of the residence in the district.

4.10.5 Eggs are easy to prepare for a meal.

Also, in this study it was revealed that eggs are easy to prepare for a meal as All the respondents (100%) were in agreement while a mean score of 1.21 and a standard deviation of 0.99 were recorded. An anova p.value of 0.41 showed the importance of this claim to the study at hand.

4.10.6 Eggs are helpful in providing nutrition for peri-urban communities

This study revealed that eggs are playing a big role in the provision of nutrition to peri-urban communities as 76% of the respondents agreed to the notion. This claim is supported by a

mean score of 2.8 and a standard deviation of 1.01. Furthermore, an anova score of 0.23 highlighted the importance of this notion to the study at hand

4.10.7 Women and children can easily have eggs as part of their meals

A point of interest to note in this study was that women and children did not have easy access to eggs. This claim is supported by 52% of the respondents who were of the view that women and children cannot easily have eggs as part of their meals.

A mean score of 3.02 and a standard deviation of 1.03 while a further endorsement is made by an anova p.value of 0.1. This finding is attributed to the religious beliefs in the district as a significant number of the residents in this district are members of various apostolic sects who still practice inequalities based on gender and age due to religious beliefs.

4.10.8 Eggs have negative effects on people's health

Respondents in this study were of the view that eggs do not have negative effects on the health of people as a mean score of 3.42 and a standard deviation of 0.775 were observed. Furthermore an Anova p.Value of 0.06 suggested that this notion was of paramount importance to the study at hand. Also 60% of the respondents did not agree to the notion that eggs have a negative effect to people's health.

CHAPTER 5:

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

This study revealed that egg production projects were of paramount importance to the residence of peri-urban communities and contributed immensely to the consumption of protein in Goromonzi District. Furthermore, the study managed to give recommendations to the relevant stakeholders to rally behind smallholder farmers on egg production in peri-urban communities on how best these projects can be adopted.

5.2 Recommendations

5.2.1 Recommendations to small scale farmers

There is need for small scale farmers to embrace the production and consumption of nutritious foods in order to fight malnutrition. In light of the current economic crisis smallholder farmers can access affordable nutrition through production of small livestock and leguminous crops such as beans and cow peas. Also, there is need for smallholder farmers in Goromonzi to spread the market of their produce within their district instead of travelling to Harare or other surrounding towns in search of markets. This will assist in provision of nutritious foods throughout the district thus reaching out to other wards which are not capable of producing some of the products they farm. Also, this will assist in cutting transportation and logistical costs associated with travelling out of the district to market their farm produce.

5.2.2 Recommendations to Government

There is need for government to come up with a framework that guides smallholder farmers into producing nutritious foods for their communities. Of late most peri-urban communities have been focusing of the production of cereal crops and tobacco which will not provide nutrition to the communities in which they dwell.

5.2.3 Recommendations to the Private sector

Private sector players should also play a role in assisting smallholder farmers in farming of nutritious foods. Some of the challenges faced by small holder farmers include access to finance, access to information and access to markets. These are components which private sector players can assist smallholder farmers with through various schemes such as contract farming, direct marketing or loan schemes.

5.2.4 Recommendations to Goromonzi residence

Residence of the district can adopt the buy local campaign in order to promote smallholder famers in their community. This will also assist them in accessing fresh, affordable and readily available nutritious foods within their community.

5.2.5 Recommendations for further studies

There is need for further studies to compare the contribution of other sources of protein such as beans and fish to household protein consumption of peri-urban settlements as these may be affordable alternatives to the society.

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Apendix 1: Questionnaire

Questionnaire for An investigation in the contribution of table egg production to household protein consumption in Goromonzi District

You have been selected for this interview as a respondent for a study on an investigation in the contribution of table egg production to household protein consumption in Goromonzi District. The purpose of this data collection process is to obtain information about your knowledge and experience concerning Contribution of eggs to the nutrition of peri-urban communities in Zimbabwe. The information that you give will be confidential. The information will be used to prepare academic research recommendations. Please spare some time for the interview. As you complete the questionnaire please share your honest opinions. Do not write your name or personal contacts on this questionnaire. The information obtained in this study will be treated with confidentiality.

Enumerator's name	
Date of Completion	
Questionnaire number	
Date of Return	
Ward	
Village	

SECTION A: Demographic section

A1 RESOPNDED INFORMATION

1. Gender of respondent- tick the appropriate response: [ ] Male [ ] Female

2. Marital status of respondent: [ ] Single; [ ] Married; [ ] Divorced; [ ] Widowed

3. Age or respondent- tick the appropriate response: [ ] 16-25years [ ] 26-35 years [ ] 36-45years [ ] 46-55 years [ ] <55years

4. Highest education qualification obtained: [ ] Primary education; [ ] O' Level; [ ] A' Level [ ] Diploma [ ] Degree Other …….specify

5. Occupation of respondent : [ ] Farmer; [ ] Trader; [ ] Formally employed; [ ] Informally employed; [ ] retired

A2 HEAD OF HOUSEHOLD INFORMATION

6. Is the respondent the Head of Household- Tick appropriate answer: [ ] Yes [ ] No

If the answer to the above question is yes, skip Questions 7- 11.

7. Gender of Head of Household- tick the appropriate response: [ ] Male [ ] Female

8. Marital status of Head of Household: [ ] Single; [ ] Married; [ ] Divorced; [ ] Widowed

9. Age of Head of Household - tick the appropriate response: [ ] 16-25years [ ] 26-35 years [ ] 36-45years [ ] 46-55 years [ ] <55years

10. Highest education qualification obtained by Head of Household: [ ] Primary education; [ ] O' Level; [ ] A' Level [ ] Diploma [ ] Degree Other …….specify

11. Occupation of Head of Household: [ ] Farmer; [ ] Trader; [ ] Formally employed; [ ] Informally employed; [ ] retired

SECTION B: MEALS AND DIVERSITY OF MEALS

12. How many meals are eaten by the household per day? [ ] One; {] Two; [ ] Three; [ ] Other_____ specify

13. Who makes decisions on number of meals to be eaten? [ ] Head of household; [ ] Mother; [ ] Anyone; other--------- specify

14. Is there a difference in number of meals eaten by members of family?: [ ] Yes; [ ] No

15. If the answer to the above is yes, explain your answer. _____

16. Are there any foods that are only eaten by children? [ ] Yes; [ ] No

If the answer is yes to the above, state the foods _____

17. Are there any foods reserved for women to eat alone? [ ] Yes [ ] No

If the answer is yes to the above, state the foods _____

18 Are there any foods reserved for men to eat alone? [ ] Yes [ ] No

If the answer is yes to the above, state the foods _____

19. Who decides on what is to be cooked per day? Tick appropriate answer: [ ] Head of household; [ ] Mother; [ ] Anyone; other--------- specify

20. How many things are included per average meal?

20.1 Breakfast_____ state them (i)_____ (ii)_____(iii)_____

20.2 Lunch _____ state them (i)_____ (ii)_____(iii)_____

20.3 Super_____ state them (i)_____ (ii)_____(iii)_____

19.4 What is used to determine variety per meal?

[ ] Colour of ingredients [ ] Nutrient supplied eg carbohydrate, protein, vitamins; [ ] Other specify

SECTION C

Animal Projects that the household is involved in

20. Is the Household involved in any animal projects [ ] Yes [ ] No

20.1 If the answer is yes, state the projects and number of animal kept

_____

20.2 What are the products from the animal/ livestock project

(i)____

(ii)_____

(iii)____

20.3 What are the products used for [ ] Sale [ ] Home consumption [ ] Hobby

20.4 Of the proportion of the products produced what is the percentage for sale_____; Home consumption_____

20.5 Who decides on what is to be sold_____

20.6 Who decides on what is to be consumed at home_____

20.7 Of the products that are consumed what % is it compared to the total foods eaten by the household?

Crop Projects that the household is involved in

21. Is the Household involved in any crop projects [ ] Yes [ ] No

21.1 If the answer is yes, state the projects and number of animal kept

_____

21.2 What are the products from the crop(s) project (i)____ (ii)_____ (iii)____

21.3 What are the products used for [ ] Sale [ ] Home consumption [ ] Hobby

21.4 Of the proportion of the products produced what is the percentage for sale_____; Home consumption_____

21.5 Who decides on what is to be sold_____

21.6 Who decides on what is to be consumed at home_____

21.7 Of the products that are consumed what % is it compared to the total foods eaten by the household?

21.8 Of the products eaten from the crops project, state what nutrients are obtained:

(i) _____

(ii) _____

(iii) _____

Chicken projects

22. Does the household keep chickens? [ ] Yes [ ] No

23. What type of chickens are kept [ ] broilers; [ ] Layers; [ ] Indigenous

42. If yes which type and quantities

Broilers [ ] Quantity.....
Layers [ ] Quantity.....
Road runners [ ] Quantity.....
Other [ ] Quantity.....

43. Are they enough for you? [ ] Yes [ ] No

44. What is the quantity you intend to keep?.....

45.Can you afford the quantities? [ ] Yes [ ] No

45b. If no give reasons.....
.....
.....

If you keep layers
46.What is the average number of eggs you pick per month?.....

47.How many eggs do you send to the market per month?

a.)Farm gate sales.....

b.) Local Markets.....

c.) Outside Goromonzi Markets.....

48. What is your gross income from egg sales per month?.....

49. For each month on average how much do you use on: a.)feed?.....

b.) Other poultry inputs (drugs and vaccines).....

24 Does the household obtain eggs from the chicken project? [ ] Yes [ ] No

25. How many hens are kept by the household? [0-5]; [6-10]; [11-20]; [>20]

26. How many eggs are produced per day by the hens?_____

27. How many of the eggs produced per day are sold? _____

28. How many of the eggs produced per day are eaten at home?_____

29. Are the eggs consumed by everyone in the household? [ ] Yes; [ ] No

30. Are there people not allowed to eat eggs in the household? [ ] Yes; [ ] No

30.1. If the answer is yes to the above, state who is not allowed to eat eggs in the household

30.2 What are the reasons for forbidding the member to eat the eggs

_____

31. Are you happy with the number of eggs produced by your chickens? [ ] Yes [ ] No

32. Would you want to increase the number of eggs produced? [ ] yes; [ ] No

33. If the answer is yes to the above, explain why

34 On average how many eggs are produced per day

35. Who consumes eggs at your house hold?

a.) Children only [ ] Adults only [ ] Both adults and Children [ ]

Give reasons for your answer above.....

.....

b.) Men only [ ] Women only [ ] Both men and women [ ]

Give reasons for your answer above.....

.....

37 . If yes how often do the household members eat the eggs? [ ] Daily [ ] Weekly [ ] monthly [ ] once in a while

38a. Which meal do you usually consume eggs? Breakfast [ ] Lunch [ ] Supper [ ]

38b.How many eggs does your family eat per meal.....

39. If you do not consume eggs what is the reason? [ ] Affordability [ ] Accessibility [ ] Natural dislike [ ] Religious [ ] N/A [ ] Other (specify).....

40. How are the eggs prepared for eating? Tick the correct aswer: [ ] Fried; [ ] boiled; [ ] raw; [ ] Other ways _____specify

41 Are Eggs used for medicinal purposes in the household? [ ] Yes; [ ] No

41.1 If the answer is yes, state in what for the egg is used _____ are they mixed with other ingredients for medicinal purposes?

41.2 Which disease are eggs used to treat _____

40. What are your other sources of protein?.....

SECTION D

CONTRIBUTION OF EGGS TO HOUSEHOLD NUTRITION

50. On a scale of 1-10, what do you think is the contribution of eggs to the food eaten by the household. 1 being very small contribution. & 10 large contribution [ ]

51. Are you happy with the contribution made by eggs to what is eaten by the household [ ] Yes; [ ] No

52. What do you suggest can be done to increase the contribution of eggs to the nutrition of the household?

53. Do you think egg production is the proper project to support in order to improve household state of nutrition? [ ] Yes; [ ] No

54. If the answer to the above is yes, explain your view _____

55. If your answer to 33 above is NO, which livestock or crop project do you think needs to be supported ahead of chicken _____

55.1 Livestock_____

55.2 Crop/ Vegetable project _____

SECTION E

***(Please put a tick in the appropriate box*)**

Statement	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
56. Eggs contribute positively to the nutrition of humans					
57. Eggs have the essential nutrients required by humans					
58. Eggs are an affordable source of nutrition					
59. Eggs are readily available and accessible in the community.					
60. Eggs are easy to prepare for a meal.					
61. Eggs are helpful in providing nutrition for peri-urban communities					

62. Women and children can easily have eggs as part of their meals.					
63. Eggs have negative effects on people's health					

64.Comments……

……

……

Thank you for your cooperation!!!!!

Appendix 2: Focus group discussion interview guide

Focus group discussion Interview Guide

1. How many meals are eaten by the household per day? [ ] One; {] Two; [ ] Three; [ ] Other_____ specify

2. Who makes decisions on number of meals to be eaten? [ ] Head of household; [ ] Mother; [ ] Anyone; other--------- specify

3. Is there a difference in number of meals eaten by members of family?: [ ] Yes; [ ] No

4. If the answer to the above is yes, explain your answer. _____

5. Are there any foods that are only eaten by children? [ ] Yes; [ ] No

If the answer is yes to the above, state the foods _____

6. Are there any foods reserved for women to eat alone? [ ] Yes [ ] No

If the answer is yes to the above, state the foods _____

7. Are there any foods reserved for men to eat alone? [ ] Yes [ ] No

If the answer is yes to the above, state the foods _____

8. Who decides on what is to be cooked per day? Tick appropriate answer: [ ] Head of household; [ ] Mother; [ ] Anyone; other--------- specify

9. How many things are included per average meal?

10.1 Breakfast_____ state them (i)_____ (ii)_____(iii)_____

10.2 Lunch _____ state them (i)_____ (ii)_____(iii)_____

10.3 Super_____ state them (i)_____ (ii)_____(iii)_____

10.4 What is used to determine variety per meal?

[ ] Colour of ingredients [ ] Nutrient supplied eg carbohydrate, protein, vitamins; [ ] Other specify

12. Is the Household involved in any animal projects [ ] Yes [ ] No

13.1 If the answer is yes, state the projects and number of animal kept

_____

13.2 What are the products from the animal/ livestock project

(i)____

(ii)_____

(iii)____

13.3 What are the products used for [ ] Sale [ ] Home consumption [ ] Hobby

13.4 Of the proportion of the products produced what is the percentage for sale_____; Home consumption_____

13.5 Who decides on what is to be sold_____

13.6 Who decides on what is to be consumed at home_____

13.7 Of the products that are consumed what % is it compared to the total foods eaten by the household?

Crop Projects that the household is involved in

14. Is the Household involved in any crop projects [ ] Yes [ ] No

14.1 If the answer is yes, state the projects and number of animal kept

_____

14.2 What are the products from the crop(s) project (i)____ (ii)_____ (iii)____

14.3 What are the products used for [ ] Sale [ ] Home consumption [ ] Hobby

14.4 Of the proportion of the products produced what is the percentage for sale_____; Home consumption_____

14.5 Who decides on what is to be sold_____

14.6 Who decides on what is to be consumed at home_____

14.7 Of the products that are consumed what % is it compared to the total foods eaten by the household?

14.8 Of the products eaten from the crops project, state what nutrients are obtained:

(i) _____

(ii) _____

(iii) _____

Chicken projects

15. Does the household keep chickens? [ ] Yes [ ] No

16. What type of chickens are kept [ ] broilers; [ ] Layers; [ ] Indigenous

17. If yes which type and quantities

Broilers [ ] Quantity.....
Layers [ ] Quantity.....
Road runners [ ] Quantity.....
Other [ ] Quantity.....

18. Are they enough for you? [ ] Yes [ ] No

19. What is the quantity you intend to keep?.....

20.Can you afford the quantities? [ ] Yes [ ] No

20b. If no give reasons.....
.....
.....

If you keep layers

21.What is the average number of eggs you pick per month?.....

22.How many eggs do you send to the market per month?

a.)Farm gate sales.....

b.) Local Markets.....

c.) Outside Goromonzi Markets.....

23. What is your gross income from egg sales per month?.....

24. For each month on average how much do you use on: a.)feed?.....

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30. Are the eggs consumed by everyone in the household? [ ] Yes; [ ] No

31. Are there people not allowed to eat eggs in the household? [ ] Yes; [ ] No

31.1. If the answer is yes to the above, state who is not allowed to eat eggs in the household

31.2 What are the reasons for forbidding the member to eat the eggs

_____

32. Are you happy with the number of eggs produced by your chickens? [ ] Yes [ ] No

33. Would you want to increase the number of eggs produced? [ ] yes; [ ] No

34. If the answer is yes to the above, explain why

35. On average how many eggs are produced per day

36. Who consumes eggs at your house hold?

a.) Children only [ ] Adults only [ ] Both adults and Children [ ]

Give reasons for your answer above.....

.....

b.) Men only [ ] Women only [ ] Both men and women [ ]

Give reasons for your answer above.....

.....

37 . If yes how often do the household members eat the eggs? [ ] Daily [ ] Weekly [ ] monthly [ ] once in a while

38a. Which meal do you usually consume eggs? Breakfast [ ] Lunch [ ] Supper [ ]

38b.How many eggs does your family eat per meal.....

39. If you do not consume eggs what is the reason? [ ] Affordability [ ] Accessibility [ ] Natural dislike [ ] Religious [ ] N/A [ ] Other (specify).....

40. How are the eggs prepared for eating? Tick the correct aswer: [ ] Fried; [ ] boiled; [ ] raw; [ ] Other ways _____specify

41 Are Eggs used for medicinal purposes in the household? [ ] Yes; [ ] No

41.1 If the answer is yes, state in what for the egg is used _____ are they mixed with other ingredients for medicinal purposes?

41.2 Which disease are eggs used to treat _____

40. What are your other sources of protein?.....

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42. Are you happy with the contribution made by eggs to what is eaten by the household [ ] Yes; [ ] No

43. What do you suggest can be done to increase the contribution of eggs to the nutrition of the household?

44. Do you think egg production is the proper project to support in order to improve household state of nutrition? [ ] Yes; [ ] No

45. If the answer to the above is yes, explain your view _____

46. If your answer to 33 above is NO, which livestock or crop project do you think needs to be supported ahead of chicken _____

46.1 Livestock_____

46.2 Crop/ Vegetable project _____

Thank you for your cooperation!!!!!