

# The Threat of Avian Flu

Predicted Impacts on Rural Livelihoods in SNNPR  
(Ethiopia)

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May 2006

## EXECUTIVE SUMMARY

Chickens are on the world's mind. In countries from Asia to Europe to Africa, a pathogenic strain of the H5N1 avian influenza (AI) virus has emerged. These outbreaks have led to a global effort to prepare for probable outbreaks elsewhere. In Ethiopia, contingency planning is well underway. One initiative is to predict the likely socio-economic impacts of an avian flu outbreak on rural farmers.<sup>1</sup> This study provides a rapid assessment of what food or income gaps may emerge at the household level if the poultry sector collapses.

SNNPR (Southern Nation, Nationalities and Peoples Region) was chosen as the geographical focus of the study. The Rift Valley will likely be the entry point for the H5N1 virus as the Rift Valley lakes are nesting sites for migratory water fowl, carriers of the avian flu virus.<sup>2</sup> Moreover, the midlands of SNNPR, around Lakes Awasa, Abaya and Chamo, have some of the highest poultry and human densities in Ethiopia. This suggests that if the H5N1 virus emerges there, it could affect high numbers of poultry and people quickly. Although the study uses case material only from SNNPR, it is arguably a fair representation of the type and magnitude of impacts that would likely occur in the other regional States in a flu crisis.

To predict the likely socio-economic impacts of an avian flu outbreak in Ethiopia two approaches have been used. The first approach predicts impacts by running scenario analyses from a livelihood baseline dataset. The availability of this important resource—namely a comprehensive set of livelihood baseline information which covers the entire SNNP Region—makes it possible to investigate the likely outcome of best and worst case scenarios through a computer exercise.<sup>3</sup> Various scenarios—including market price deterioration, poultry culling with staple grain price rises and labour losses from human influenza—were applied in this study. The second approach draws on village interviews. A seven-day field visit was made to villages in the Awasa area. The purpose of the field visit was to investigate intra-household dynamics. Ownership and management of poultry production and sales is largely women's work. A gender sensitive field inquiry was important to complement the livelihood scenario results which take "the household" as the core unit of analysis.

Backyard poultry production dominates chicken farming in Ethiopia. An estimated 99 percent of poultry farming takes place in rural villages. The few commercial farms that operate are geographically concentrated in the Addis-Debre Zeit corridor to take advantage of the high urban demand for chicken and eggs in the capital. During the study, one family-owned commercial farm (Alema Farm) was visited in Debre Zeit. The task was to learn about the impact of the recent plunge in urban demand for chickens during what is normally a peak season for chicken sales.

Field work was facilitated by Dr. Gebeyhu Ganga of the Southern Agricultural Research Centre in Awasa and by Dr. Yilma Jobre of FAO in Addis. Dedicated poultry researchers—Dr.

<sup>1</sup> See component D of the Technical Cooperation Project between the MoARD and the UN FAO. The Project is titled "Urgent Intervention for the Early Detection, Prevention, and Control of Avian Influenza in Ethiopia", January – December 2006. The two donors of the project are USAID and DFID.

<sup>2</sup> GFDRE, 2006: *A Three Year National Strategic Preparedness and Response Plan for the Avian Human Influenza Pandemic Threat*. Annex 4 lists high risk districts, e.g., in Sidama and Gamo Gofa Zones, high risk woredas with wetlands include Shebedino, Awasa, Arba Minch, Amaro, Derashi, and Gelana Abaya.

<sup>3</sup> The dataset was developed in 2005 through primary field work by the DPPA, with technical leadership by the Food Economy Group and FEWS NET, and funded by the DPPA and USAID.

Tadelle Dessie at ILRI and Dr. Alemu Yami at the Debre Zeit Agricultural Research Centre—were also interviewed. Their research on poultry production in Ethiopia (Tadelle et al 2003) was an important input in the study.

The results from the scenario analysis show that in SNNPR, households will likely cope with the loss of poultry income without such losses leading to food insecurity. Poultry production is largely opportunistic because backyard chicken farming is characterized by small flock sizes and high mortalities. Moreover, poultry production is most profitable in villages near urban markets or near main roads. Notably, these are also the same areas that offer other income opportunities (which could be drawn on or expanded to cover poultry losses in the event of an avian flu outbreak). Additionally, egg income is too low and chicken income too seasonal to cover major staple grain purchases. By reducing expenditures of non-essential “sauce” foods or of discretionary non-food items, most households will cope without forgoing staple food. Thus, the impact will be felt as an expenditure gap rather than as a food gap. Areas of chronic food security must be monitored most closely as a compound hazard (avian flu plus crop losses for instance) will overwhelm local coping responses. Wolayita, lowland Sidama, and the Southern Special Woredas are key areas to monitor in this regard.

There still remains the issue of who loses poultry income. Clearly women, as the primary owners and managers of chickens, will be most affected. Interviews with village women revealed the wide range of uses for poultry income, ranging from investments in small stock (better-off women) to purchases of daily necessities, such as salt, spices, vegetables and cooking oil (poor women). With the loss of their chickens, women will lose some of their self-reliance. To make up the losses either they will have to rely on their husbands for money or they will have to pursue other income generating activities. For women, this means hard physical labour (collecting firewood or making *kocho* for sale; hauling water for pay; or seeking out physically demanding agricultural work). Poultry production may not be highly productive in its “backyard” form but it is appreciated precisely because it requires so little effort and few inputs. Children will also lose out as they typically manage a chicken or two to earn money for education expenses.

As a means to prevent an increase in women’s labour burden and as income support to cover expenditure deficits, an “incentive” payment to farmers whose chickens are culled is advised. The payment will also give general household income support to cover expenditure deficits. The payment should be paid to the chicken owners, most of whom are women. The incentive payment is also considered crucial to encourage farmers to report chicken deaths. The government’s proposal to pay 80 percent of the “outbreak” market value seems reasonable, and is in line with Thailand’s successful containment strategy (in Thailand, a 75 percent market value price was paid to affected farmers).

Most of the field inquiry and scenario analysis concentrated on the likely socio-economic impacts if the poultry sector was wiped out due to avian flu. The other side of the equation—the worst case scenario—is the devastating effects on human health if the H5N1 virus emerges as a human pandemic. The health factor was not forgotten: a full day was spent in talks with health officials in Awasa to discuss the impact of other endemic diseases (specifically malaria and HIV/AIDS) as well as to learn about their preparations for an avian flu health crisis. A simplified scenario analysis was run to determine the likely magnitude of health impacts. In general, it was agreed that if a pandemic with high adult mortalities occurs, it will without doubt severely compromise food security in the region. To this end, providing sufficient funds for adequate training and supplies to front-line health officials in kebele clinics and the region’s hospitals is a sound strategy for protecting livelihoods.

## Table of Contents

<b>1. Introduction</b>	
1.1 Background & Objectives of the Study .....	6
1.2 The Poultry Sector in Ethiopia .....	6
1.3 Methodology – Measuring Livelihood Impacts .....	8
<b>2. Predicted Livelihood Impacts of Avian Flu in SNNPR</b>	
2.1 Types of predicted Impacts – Three Scenarios .....	10
2.2 Two Views .....	10
2.3 The Best Case Scenario – Southern Special Woredas .....	11
2.4 Moderate Scenario a – Wolayita Maize and Root Crop Zone .....	13
2.5 Moderate Scenario b – Sidama Lowland Maize Belt .....	16
2.6 Conclusions .....	19
<b>3. Predicted Income Impacts of Avian Flu on Women</b>	
3.1 Poultry Income is Women’s Income .....	21
3.2 What Women Earn .....	21
3.3 What Women Buy .....	23
3.4 Options for making up poultry income losses .....	25
3.5 Conclusions .....	27
<b>4. Predicted Impacts of Avian Flu on Commercial Poultry Farms and Poultry Traders</b>	
4.1 Commercial Poultry Farms .....	28
4.2 Poultry Traders .....	30
<b>5. Predicted Health Impacts of Poultry Losses</b>	
5.1 Poultry and egg consumption in rural SNNPR .....	32
5.2 Predicted nutrition impacts of poultry losses .....	33
<b>6. Predicted Livelihood Impacts of a Human Avian Flu Pandemic</b>	
6.1 Prevailing disease prevalence in SNNPR .....	34
6.2 The health system and coverage in rural SNNPR .....	35
6.3 Discussion of likely impacts of a AI human pandemic – Worst Case Scenario	
6.4 Conclusion .....	39
<b>7. Conclusions and Recommendations</b>	
7.1 Conclusions .....	40
7.2 The Incentive Package .....	41
7.3 Protecting Health Protects Livelihoods .....	41
7.4 Recovery – Is there a future for backyard poultry production? .....	42
<b>References</b> .....	43
<b>Annexes</b>	
Annex 1 - Itinerary & People Consulted .....	45
Annex 2 - Village interviews .....	46
Annex 3 - Sample pages from the SNNPR Livelihood Baseline .....	50
Annex 4 - Terms of Reference .....	51

## Abbreviations

AI	Avian Influenza
AHIP	Avian Human Influenza Pandemic
DPPA	Disaster Preparedness and Prevention Agency
FAO	(UN) Food and Agriculture Organisation
FEWS NET	Famine Early Warning System Network
FEG	The Food Economy Group
GFDRE	Government of the Federal Democratic Republic of Ethiopia
HEA	Household Economy Approach
HH	Household
HPAI	Highly Pathogenic Avian Influenza
MoARD	Ministry of Agriculture and Rural Development
MoH	Ministry of Health
SNNPR	Southern Nations, Nationalities and Peoples Region

### *Acknowledgements*

Consultants impose their own timing and schedules on national and local staff which is often less than ideal. For this trip, the timing was particularly bad as it coincided with a major Ethiopian holiday (Easter/Fasika). So—a big thanks to Dr. Gebeyhu who gave up much of his Easter holiday to talk about chickens with villagers and to tour markets in order to observe price dynamics over the holiday weekend. Dr. Yilma ably coordinated the consultancy on the Addis side, allowing a social-economist to crash the ranks of animal scientists for a few days. The welcome was appreciated.

## 1. INTRODUCTION

### 1.1 Background – Objectives of the Study

The threat of a deadly virus traveling across the world by wild fowl and chickens and subsequently by humans is a harrowing thought. Yet it is a very real probability in the next year of two. In Africa, already three countries—Nigeria, Egypt, and Djibouti [and possibly Sudan]—have confirmed cases of the H5N1 virus in their poultry sector. Egypt and Djibouti also have confirmed human cases. Given the enormous risks to human and animal health posed by this virus, it would be a negligent government indeed that did not prepare in some way for the emergence of avian flu.

The Government of the Federal Democratic Republic of Ethiopia (GFDRE) has responded to the threat in a several ways.<sup>4</sup> In March 2006, the GFDRE completed a final draft of its three year AHIP Strategic Preparedness Plan paper. Earlier, (January 2006), a project agreement between the Ministry of Agriculture and Rural Development (MoARD) and the UN FAO was put in place. The project's main objectives are to step up surveillance and diagnostic capacity and to respond quickly to outbreaks through containment (FAO 2006: p.4). Much has been made of the public information campaign after hundreds of chickens died at a state breeding and multiplication centre in Gurarge (all chickens at the centre were eventually culled when a false positive lab report indicated the presence of the H5N1 virus). This situation led to massive consumer panic about chickens, depressed demand, and price falls. Hence, a solid communication strategy and the production of relevant public information materials are also part of the preparedness plan. The overall goal is for the GFDRE to become fully operational to monitor, identify, notify, and rapidly respond to an Avian Human Influenza pandemic (AHIP) when and where the problem emerges.

One element of the contingency plan is to prepare for the possible food security implications of an avian flu outbreak. This inquiry fulfills the demand for a socio-economic assessment. As avian flu has yet to enter Ethiopia, the inquiry is predictive. The core question centres on whether major food or income gaps will emerge if poultry die, or are culled, in large numbers in rural villages of southern Ethiopia (SNNPR). A briefer inquiry was made about the probable economic impact on households if a pandemic of avian human influenza occurs.

### 1.2 The Poultry Sector in Ethiopia

With the spotlight on chickens, we need to start with some basic understanding of poultry production dynamics. In Ethiopia, the poultry sector can be largely characterized like this: most people keep some chickens—typically between 2-12—which scavenge around their compounds and in their gardens. This statement is not to oversimplify poultry production but simply to stress that “backyard” chicken rearing is ubiquitous and accounts for the majority (98-99 percent) of poultry production in Ethiopia. To be sure, there is a commercial sector

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<sup>4</sup> Current actions include: (i) The finalization of a Strategic Preparedness and Response Plan for the Avian Human Influenza Pandemic Threat; (ii) Regular meetings of the National Technical Task Force on AI; (iii) deployment by MoARD of emergency animal health officers and veterinarians to the regions and zones; and (iv) Workshops by MoH for selected zonal, woreda and hospital directors in SNNPR to disseminate new monitoring and reporting formats.

but it is limited to one major agro-industrial firm (ELFORA) as well as a few other commercial family farms, located mostly in the Debre Zeit area.

### **1.2.1 Characteristics of Village Backyard Poultry Production**

If one was to choose a defining feature of backyard chicken keeping, it would be its high level of mortalities. Backyard poultry production is a high risk venture, in the sense that it is quite likely that most of one's stock could go belly up in any given year. Newcastle disease often kills off whole flocks every few years; predators take their share too. Indeed, Tadelle, Alemu and Peters (2000: p.2) write that because poultry production is so high risk, chickens are considered a low grade animal "by the male" and left to women.

If the most noted feature of village poultry production is recurrent and high levels of mortalities, another common characteristic is low input / low output. Indigenous hens lay on average 40-60 eggs/hen/year compared to 220 eggs/hen/year by exotic breeds. Moreover, egg sizes are small and chick survival rates are very poor. Village hens brood and hatch their own eggs; little if no supplementary feed is given to poultry; brooding itself is often unsuccessful; and all these factors in combination lead to low egg output.

Given high mortality rates, high off-take, and the short life span of chickens, flock sizes tend to shift substantially within the year (there is high seasonal variation) as well as between years. It is difficult to pin down a single number for typical flock size.<sup>5</sup> However, one can say that the variability is bounded by a common range. At any given time, a household is likely to have between 2-12 chickens. Of these, layers are predominant (Hailemariam et al, 2006: 181). However, cockerels sell well at festivals, especially those of certain colour and conformation.

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A few figures are important to note. The points below sum up the essential characteristics of village poultry production in Ethiopia.

- 40-50 percent of a current flock are usually laying hens.
  - Over a year, a local hen will produce on average 40-60 eggs and about 12 chicks of eight weeks of age (Tadelle et al 2003: p.9).<sup>6</sup>
  - Field interviews in Sidama revealed that hens typically lay 15 eggs/clutch and averaged 4 clutches/year for a total of 60 eggs/hen/year (household interviews 2006).
  - Output by local scavenging birds varies by season as well as by the age of the hen. Production drops to 50 percent (or lower) during the rainy season. Laying begins after 5-6 months and production is "optimal" for 15 months thereafter. Tadelle et al (2003: p.7) report that local hens laid 8 eggs more by the third clutch compared to the first clutch.
  - About 50 percent of all eggs laid are reserved for hatching. Of these, a few will "spoil". Of the eggs that hatch, only around 50 percent survive to be pullets or young cocks (8 week old chicks). Hence, in a clutch of 16 eggs, a woman will have 5-6 eggs for sale; 2-3 eggs for eating; 3 new chicks; and 4-5 eggs or chicks that did not survive.
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<sup>5</sup> Tadelle et al (2003) noted this high variability across study sites, as well as within a study site. Interviews for this assessment confirm that flock sizes change, often substantially, even within an individual household from year to year. In large measure, the actual number of chickens a household owns at a given moment is determined by season. Flock sizes are lower during periods of high off take either from sales (the holiday season) or from disease-related mortalities (the cold rainy season).

<sup>6</sup> Earlier research from 2000 (Tadelle et al, 2000: p.4) showed that local birds averaged only 35-40 eggs/hen/year. In subsequent primary field work, Tadelle, Million, Alemu and Peters (2003: p.6) found that without hatching, average egg production of local hens was 75 eggs/year; with hatching, it dropped to 46 eggs/hen/year.<sup>9</sup> Overall, across 5 study sites, they found a mean of 18 eggs/clutch/hen and 3 clutches/hen/year (total production, 54 eggs/hen/year).

To avoid losing money in chicken keeping, villagers put little time, money or management into chicken care, accepting that low input will equal low output but that it is the most risk-averse strategy. In this way, with very little invested in the sector, any income earned is a net gain. For women in particular, access to this income, however opportunistic, is very useful. Amounts earned may vary from year to year but at least there is a certain confidence of having some chicken income during the year.

### **1.2.2 The Commercial Sector**

When the major risk factors—disease and predators—are controlled through vaccinations and night-time shelter, poultry can be a profitable enterprise. Supplementary feeding is important too (with exotic, non-scavenging, birds, feed is essential). With these three elements in place, commercial firms can make a living off poultry. Women's groups and micro-enterprise groups also frequently take on either broiler or egg production. Given a careful balance between an input level en par with a group's resources, output can be sufficient to earn participating farmers thousands of birr a year (Alemu, personal communication).<sup>7</sup>

The output differences between the backyard system using local scavenging hens and the commercial sector which uses exotic species in confinement is astounding. Tadelles reports that a typical exotic layer can produce over 200 eggs/hen/year (Tadelles et al, 2000: p.4). Another report (Hailemariam et al, 2006: p.11) reports levels of 27 eggs/hen/month (i.e., almost continual laying). Moreover, with bio-security measures in place in an industrial poultry farm, mortality rates of chicks are reduced to a bare 5 percent (Alema Farms, personal communication). Thus, for those with the capital to finance feed, housing and health inputs, the resulting output is profitable.

## **1.3 Measuring Livelihood Impacts – The Methodology**

The current population of SNNPR is estimated at 15 million people. Given that most chickens are found scavenging in millions of rural compounds, one wonders at the huge practical challenge of measuring the economic contribution of poultry and then assessing the impact when this sector is potentially wiped out.

In the event, a massive door-to-door survey was not needed. In 2005, the DPPA, with technical support from FEWS NET and the Food Economy Group, carried out a complete livelihood baseline survey of SNNPR.<sup>8</sup> The investment in this resource was principally to improve early warning in the region. However, the baseline information can be used to predict the impact on livelihoods of any hazard, including avian flu. The hazard itself must be quantified in order to run an analysis. In cases whereby the hazard is a predicted event, the hazard can be quantified as a number of different “what if” scenarios. Once the hazard, and the resulting economic shock, is turned into a quantified problem (income from chicken and eggs sales is nil, for instance) then the effect on household access to food is determined

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<sup>7</sup> A micro-enterprise group around the Debre Zeit area began commercial egg production last year using exotic breeds and a hay-box incubator. Within 5 months of production, several farmers were able to re-pay their start-up loan of 2,300 birr.

<sup>8</sup> To access this baseline information go to the following websites: [www.dppc.gov.et](http://www.dppc.gov.et) or to [www.foodeconomy.com](http://www.foodeconomy.com) or to [www.fews.net/livelihoods](http://www.fews.net/livelihoods). At this latter site, click on Zone Maps and Profiles, click on Ethiopia on the map; then select Profiling.

through a spreadsheet analysis. The resulting outcome is a change in food or income access from the baseline condition.

The SNNPR livelihood baseline material is based on a specific methodology called the Household Economy Approach (HEA). HEA starts by understanding all the ways people produce food, or earn cash to buy food. During field interviews (which are conducted with separate wealth groups in a defined livelihood zone), field workers must ensure that all the various food and income sources add up to households' annual food needs. HEA has a quantitative core—it is a methodology that adds up and balances various food, income and expenditure elements to ensure reliability—but it also delivers a story about how people survive.

For this study, four scenarios were selected, ranging from a best case (producer price decrease for chickens and eggs) to a worst case (a human avian flu pandemic leads to high adult mortalities and the loss of productive labour as well as loss of poultry). Each scenario was illustrated by a different livelihood zone in SNNPR. Three of the areas selected (Southern Special Woredas; midland Wolayita; and lowland Boricha Woreda) represent some of the places in SNNPR which are at highest risk of food shortages. If the loss of poultry were to lead to food insecurity, it will do so most prominently in these places.

In addition to the scenario analyses using the 2005 HEA baseline data from SNNPR, eight targeted household interviews were conducted with women farmers. The household interviews served to bring insight into gender patterns of income and expenditure. As women are the primary managers of poultry, their perspective on the function of poultry in rural livelihoods was essential. Five woredas in Sidama Zone were visited in late April: Boricha, Shebedino, Dale, Aleta Wendo, and Dara. The woredas covered two different livelihood zones: a lowland maize belt, and a midland coffee and enset zone.

The field study coincided with the Easter weekend. Chickens are a central feature in the Ethiopian *Fasika* holiday. To observe whether rural and urban markets had been affected by a recent slump in urban demand over what is normally a peak period for poultry sales, the study team visited three markets (Awasa, Alaba and Tulu) to record price, supply and demand trends.

***Predicting Livelihood Impacts  
Sample Questions***

*Chickens: How important are they to families in rural Ethiopia?  
What will happen to farmers' incomes if an avian flu outbreak leads to the death or culling of all chickens in the outbreak area?  
Will the loss of chickens mean hunger and increased poverty?  
When poor people lose 100 birr in chicken income, what purchases do they forgo?*

## 2. PREDICTED LIVELIHOOD IMPACTS OF AVIAN FLU IN SNNPR

### 2.1 Types of predicted Impacts

Contingency planning by definition prepares for some imagined future. Typically, a few predicted scenarios are drawn up which become the guiding framework for the plan. The scenarios suggest events which, whilst not certain, are nonetheless likely to happen, and hence call for preparatory measures to be put in place in order to protect at-risk populations. In the case of a pathogenic strain of avian human and bird flu, three scenarios of varying severity can be predicted.

A worst case scenario will mean the emergence and spread of the H5N1 virus in its most virulent form, affecting both chickens and humans. At its worse, the flu pandemic will kill off most of the world's chickens as well as perhaps a staggering 350 million people in the first virulent wave (Dyer 2006: p.46) The impact of a worst case scenario does not require hard thought. Its outcome would be clear and devastating. Economies would collapse. "Nobody would escape the chaos" (ibid: p.46).

From this dire picture we can shift to a more moderate scenario. A moderate scenario supposes that avian flu outbreaks will emerge in certain pockets, perhaps spread to neighbouring areas, but that the virus will be contained to a few zones through rapidly implemented security measures. Containment involves culling, and so the moderate scenario supposes 100 percent chicken losses. In this case, the outcome is less clear. We need to make a judgment about the importance of chickens in the local economy. To what extent do farmers' livelihoods depend on being able to sell eggs and chickens?

The best case scenario supposes that the H5N1 virus, if it emerges in Ethiopia, will be rapidly contained and will not spread beyond the entry point. However, this scenario recognises that the public perception will likely remain fixed on the risk of poultry consumption and this fear will lead to a long-term trend of reduced demand and low market prices for chickens and eggs. Even in this best case scenario, we must imagine reduced income to farmers from poultry production.

### 2.2 Two views

There are two distinct and somewhat polarized views about what will happen to farmers if chicken prices slump or chickens are culled. A very common view at national, regional and woreda level is that 100 percent chicken losses across an affected area will increase food insecurity because poor farmers rely heavily on egg and chicken sales to make ends meet. The argument goes: All farmers have chickens; poor farmers in particular have few other animals except chickens; therefore the impact of widespread chicken losses will almost certainly be enormous.<sup>9</sup> The second view holds that backyard poultry production is a minor

<sup>9</sup> See for instance the Economist (25 February 2006: p.12) on Avian Flu in Africa: "Most of the world's poor live in rural areas and depend on agriculture. In Africa, rather a lot of these poor people depend heavily on their poultry. It is easy to see why some believe that bird flu could turn out to be primarily a development—rather than just a health—issue for the whole African continent". Or this quotation from a local Addis paper on 12 March 2006: "In Ethiopia, 98 percent of the poultry is owned by individual farmers in rural areas. So

sector in the rural economy and an avian flu outbreak will not directly affect the food security of farmers.

This study provides the information by which planners can make an informed decision about what chicken losses will mean to farmers in the SNNP Region.

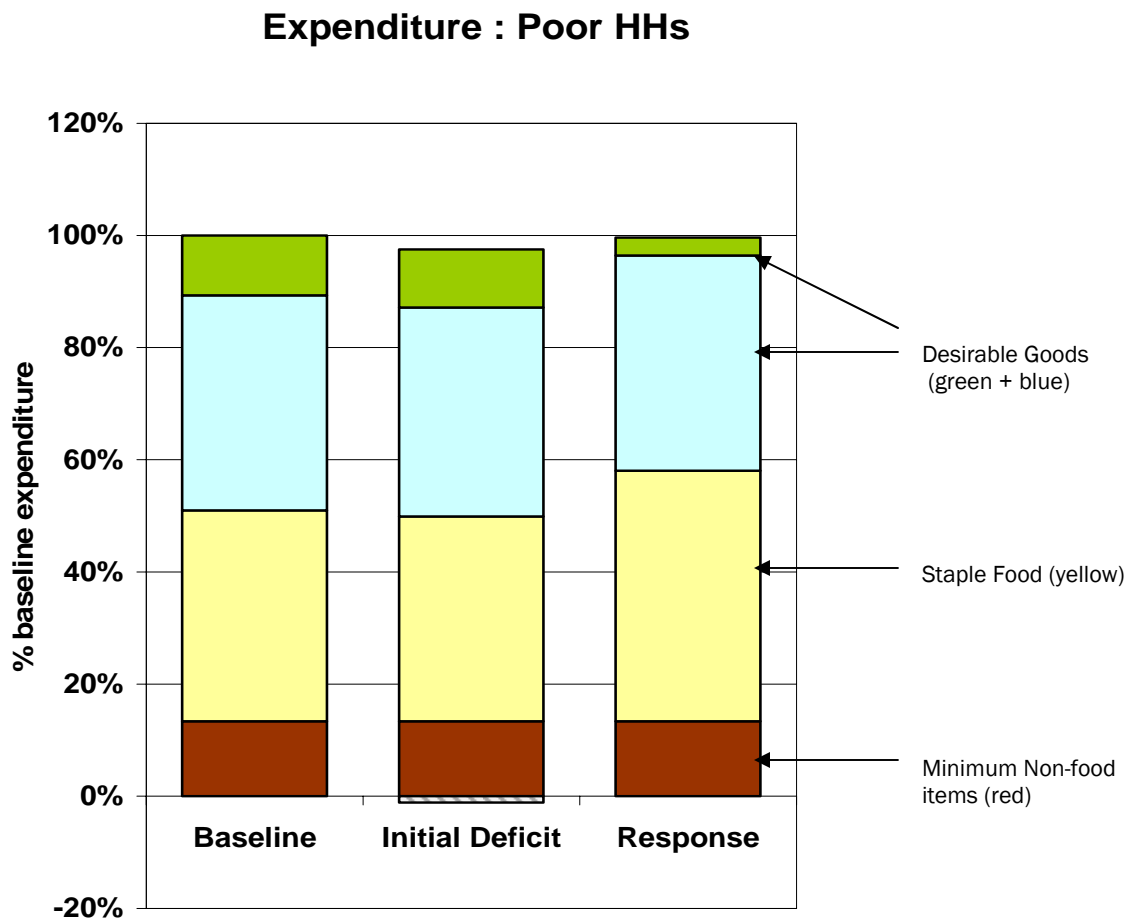
### 2.3 The Best Case Scenario

(Price drop of chickens & eggs)

The context, the problem and the outcome are discussed in the box, next page. The case study selected is from the Southern Special Woredas lowland zone. The focus will be on poor households because they have little buffer against income shocks and are most likely to develop food shortages when an economic crisis hits.

Graph 1: Expenditure Effects

(Source: DPPA, SNNPR Livelihoods Baselines)



whatever happens to the poultry, it will immediately affect the rural poor. Their subsistence is dependent on chicken meat and eggs.”

First: what happens to income? With poultry prices falling, income naturally drops too—but only by about 5 percent (**initial deficit**). Poor households can **respond** by eating less *teff* and selling more. Or they can search further a field for casual employment where the pay is higher than local work. This response is sufficient to make up the poultry income losses.

Second: what happens to expenditures? In graph 1, previous page, the first bar presents a picture of the **baseline** situation—that is, how poor households typically spend their annual income in the reference year. The second bar, the **initial deficit**, shows what happens when a shock (in this case a drop in poultry prices) occurs. The third bar, **response**, shows how poor households adapt their spending to new income levels. In this case, income and spending return to baseline levels because the analysis assumes that coping strategies are adopted. In this zone, one way of coping with income loss from one source is to sell more *teff* and beans. They earn more cash but as they now have less grain to eat, they also must buy more maize. The overall effect is that there is less money to spend on discretionary goods.

### The Best Case Scenario

Avian flu emerges in rural farms but a very rapid response to local lab results by field-based emergency officers prevents further spread. The officers implement a pre-organised containment strategy (culling chickens in a 3 km radius of the confirmed case; vaccinating chickens in an additional 5 km radius, and imposing movement restrictions 10-15 km beyond the entry point) to control the outbreak. Fear about flu transmission leads to a huge drop in urban demand for chickens and eggs and to a sustained price decline as well.<sup>10</sup>

This scenario imagines that the farms initially affected are in the Lake Chamo area. Therefore, although most rural households across SNNPR would be affected by the falling prices—as indeed they were over the Easter holiday—we will take the Southern Special Woredas to illustrate the basic effect of deteriorating price and demand.

### The Context

The Southern Special Woredas—Dirashe, Konso, Amaro and Burji—are characterized by four different livelihood zones. Two are predominant: the Southern Cereal, Enset and Root Crop Zone, and the Lowland Cereal Zone.<sup>11</sup> In the midlands (the cereal & enset zone) steep terrain and poor roads limit market integration. Demand for chickens and eggs is mostly local (direct consumers as well as bakeries and shops). In the lowlands, most households live near to the main roads. Market access is relatively good in the dry season. Local trade is lively and some village market days are as large as woreda markets. Gato on the Konso/Dirashe border is an important supply market for local crops and livestock exported to Arba Minch.

### The Hazard

The relative price of chickens and eggs drops to 50 percent of normal.

The actual price drops from 16 birr holiday price to 8 birr on the village market, and to 15 birr from 25-30 birr at Gato near Arba Minch.

The price of eggs drops from its peak holiday market price of .35/egg to .20/egg.

<sup>10</sup> Although falling urban demand for chickens did not affect egg prices over the recent Easter holiday, this scenario includes a price effect for eggs in order to broaden the impact analysis of this best case scenario.

<sup>11</sup> Both woreda reports and livelihood zone reports of this area can be located from either the DPPA or FEWS NET on their websites (see for instance [www.fews.net](http://www.fews.net)). The lowland cereal belt is listed as LCE; the Southern Cereal, Enset and Root Crop zone is listed as SCE.

### The Finding

Overall annual income for the poor drops only slightly when the price effect is applied. The income drop is not large enough to cause a coping response. Households bear the income loss by forgoing certain “desirable” expenditures.

### Discussion

Chicken and egg income is not the major source of cash for rural farmers in these zones. In the lowland zone, access to roads means that firewood/grass sales are relatively important, as are cash crop (*teff*) and *chaka* sales. Together with cash earned from daily employment, these income sources comprise 85-95 percent of poor households annual earnings. Middle and better-off households have two major income sources—crops and livestock. In this overall picture, chickens and eggs play a marginal role.

In the midland zone, poor households purchase only around 20 percent of their annual food needs. Purchase is relatively low because even the poor produce almost 60 percent of their annual food needs from their own crops. Of their annual expenses, most (40 percent) is financed from the sales of crops (*teff*; maize). Sales of *chaka* (a local brew) and cash earned through casual work make up most of the rest of their annual income. These three sources amount to about 75 percent of cash earnings from essential purchases.

### Conclusion

On the one hand, sales of *teff*, *chaka*, firewood, and goats/sheep, as well as casual employment are the main sources of income in this area. They outweigh the importance of poultry sales. On the other hand, these woredas are very food insecure. There are regular inputs of food aid to poor households. Poor households survive by combining a number of income sources. The loss of a more marginal income source will not change the basic situation in these areas but any loss of income will mean reducing purchases to the bare minimum.

## 2.4 The Moderate Scenario (a)

(Poultry Income is 0%; Maize Prices rise 200%)

The context, the problem and the outcome are discussed in the box, next page. The case study selected is from Wolayita which is primarily characterized as a midland maize, enset and root crop livelihood zone.

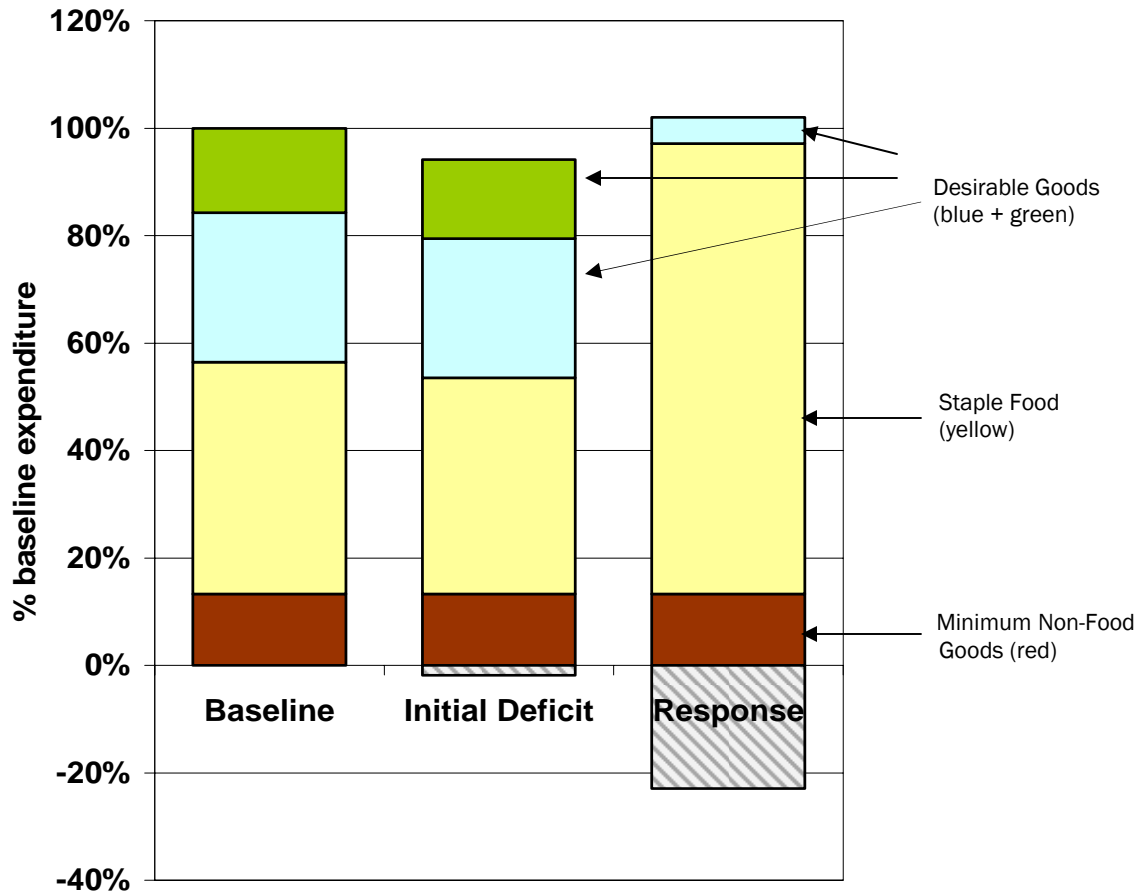
As in the previous scenario, the graph below illustrates income and the expenditure effects. In this case, the scenario presumes chicken deaths of 100 percent, as well as a seasonal increase in staple grain prices.

This graph shows the expenditure effect when poultry income becomes nil and staple grain prices rise. The **initial deficit** bar shows that with the loss of income, households have less to spend. In this scenario, income drops by around 10 percent. One way of coping with a loss of income in one sector is to expand cash earned in another sector.

Graph 2. Expenditure Effects

(Source: DPPA, SNNPR Livelihoods Baselines)

### Expenditure : Poor HHs



Another way of coping is to reduce or switch expenditures. Here, households *respond* (see the third bar) by increasing their cash earned from casual employment. However, as staple grain prices rise to seasonal highs, households switch spending out of discretionary items and into the purchase of staple food. It is assumed that with available income, households must meet their minimum needs, both of essential non-food items (15% of expenditures), as well as staple food (now comprising about 80% of expenditures).

**The Moderate Scenario (a)**

Avian flu emerges on several farms and appears to be spreading. To avoid spread beyond the zone, all chickens in several woredas are culled. Poultry income is effectively reduced to zero for the year. The outbreak occurs in April-May when maize prices are at their peak before the green harvest begins in July.

**The Context**

This scenario imagines that the area affected is the Wolayita Maize and Root Crop Zone in the densely populated administrative zone of Wolayita. Wolayita is a mainly midland area that rises north of Lake Abaya.<sup>12</sup> Weekly village markets, with good onward routes to Hossana and Shashamene outside the zone, encourage petty trade and producer sales of a wide number of items. Eggs are sold regularly to local shops in kebele and woreda centres. Chickens are mainly sold at holiday times, primarily to local urban consumers with the largest demand coming from the six woreda towns in the zone.

**The Hazard**

Income from chickens and eggs drops to zero (0% of normal).  
Maize prices are at their seasonal highs, rising to 2 birr/kg (200% of normal).

**The Finding**

Overall annual income drops by less than 10 percent for the poor. The main effect is an expenditure deficit. All things being equal, affected households must spend 10 percent less (reduce purchases of desirable items, for instance). However, all things are not equal: maize prices have doubled. Therefore, to buy sufficient staple food they must spend almost 85 percent of available income on maize. This leaves an expenditure deficit of almost 25 percent—meaning that poor households now cannot afford “desirable” items—even when taking on additional casual employment to make up lost poultry income.

**Discussion**

Chicken and egg income is not the major source of cash for rural farmers in this zone. The greatest source of cash income for the poor comes from casual agricultural work both local and outside the zone (43 percent of total income).

Poor households survive on an extremely diversified income base. In theory, this makes them more resilient to shocks. The loss of one smaller income source can be recovered if additional seasonal employment outside of the zone is secured.

**Conclusion**

Wolayita has a history of food insecurity. Although the diversity of means to earn income provides a cushion against the loss of one income source, such diversity points to the relentless task to earn money in whatever way possible to buy essential supplies and services. By pursuing income in diverse ways, poor households can earn sufficient money to purchase not only essential food and non-food items but also desirable and discretionary goods, such as utensils and new clothing, or paying into savings groups. These are sacrificed when 10 percent of their income is lost and staple food prices sharply rise.

<sup>12</sup> A full livelihood profile for the Wolayita Maize and Root Crop Zone is listed as WMR.pdf on the FEWS NET and DPPA websites.

## 2.5 The Moderate Scenario (b)

100% Chicken losses; Staple Grain Price Increases; Shoat Price Increase

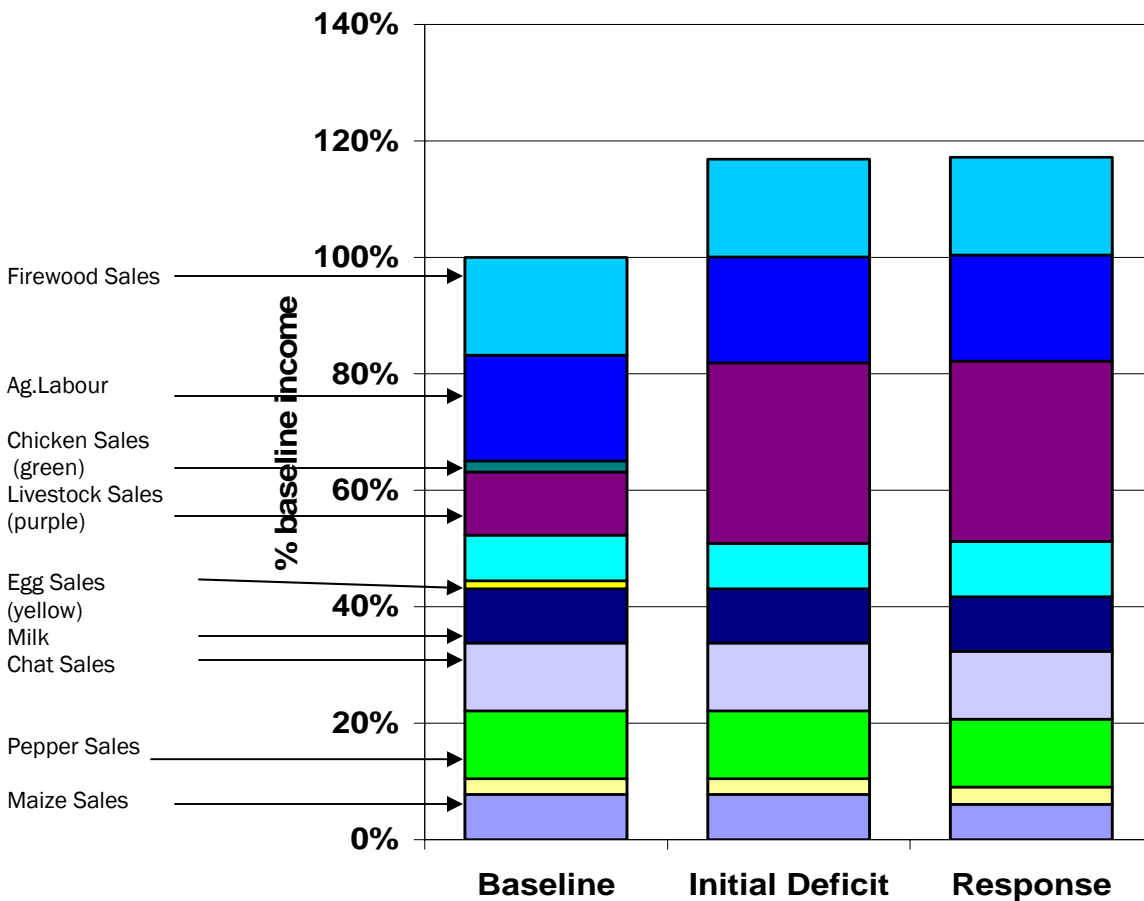
The context, the problem and the outcome are discussed in the box, next page. The case study selected is from the Sidama lowland maize belt in Boricha Woreda. This livelihood zone lies just south of Lake Awasa.

As before, the two graphs illustrate the income and the expenditure effect. In this case, the scenario presumes chicken deaths of 100 percent. As well, there is a seasonal increase in staple grain prices. However, a new factor is added in this scenario: sheep and goat prices have increased substantially. This reflects the real market situation in Awasa, Alaba and Tulu over the *Fasika* holiday.

**Graphs 3: Income Effect**

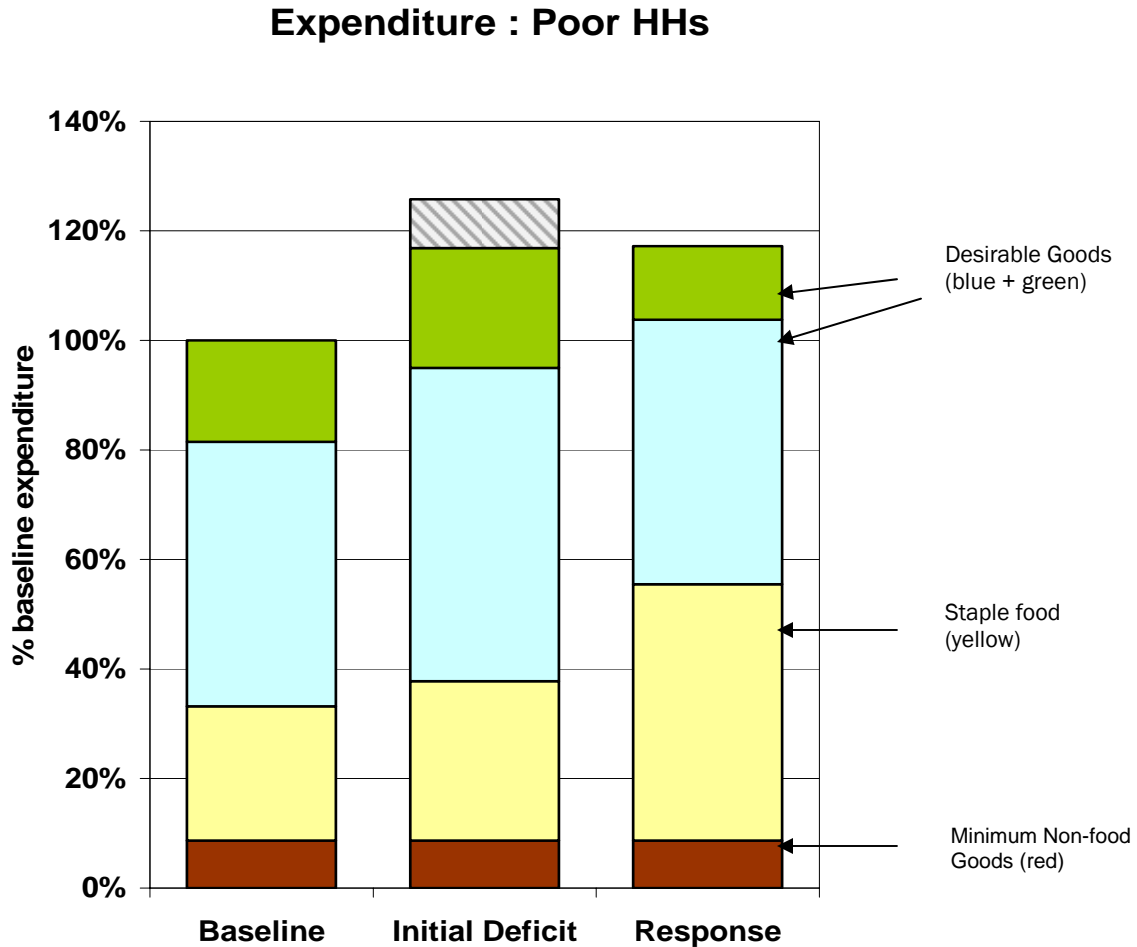
(Source: DPPA, SNNPR Livelihoods Baselines)

### Income : Poor HHs



Graphs 4: Expenditure Effect

(Source: DPPA, SNNPR Livelihoods Baselines)



Despite the loss in chicken and egg income, overall there is a net income gain because even just by selling one shoat, poor households benefit from the high sale prices. In the income graph on page 16, goat sales, which is illustrated by the purple section, more than double. In the expenditure graph above, households will likely cut back on purchases of some desirable goods due to the high price of staple grains. However, with more income available, expenditure cuts will be small. Note that in the reference year, poor households received substantial food aid. This is illustrated by the yellow section, staple food purchases, which in the baseline year was relatively low vis a vis purchases of desirable goods. Food aid gave the poor expenditure support and allowed them to purchase desirable goods during a drought year.

**The Moderate Scenario (b)**

An avian flu outbreak leads to the culling of all chickens throughout one woreda. As the outbreak occurs in April/May, maize prices are at their seasonal highs. However, the combination of higher local demand for shoats (due to fear about contaminated chickens) and higher international demand (mainly from Middle Eastern markets) has pushed up local shoat prices.

This scenario imagines that the culling occurs in the lowland maize belt just south of Lake Awasa (in Boricha Woreda). Most market activity centres around village markets or the woreda market in Boricha (Yerba). However, for large stock sales, the woreda has reasonable proximity to Awasa, the regional capital.

**The Hazard**

Income from chickens and eggs drops to zero (0% of normal).

Maize prices are at their seasonal highs, rising to 2 birr/kg (150% of normal).

Producer goat and sheep prices increase approximately 285% of normal (from 70 birr to 200 birr, although prices in Awasa in April 2006 over Easter reached 300 birr or more).

**The Finding**

Total income for poor households increases during this period by about 220 birr (an increase of 20 percent) due to the positive income effect of higher goat prices. Chickens and eggs comprise only 2 percent of total income. This loss is more than compensated by higher goat prices.

Expenditures on staple grains almost double due to high prices. This price effect is absorbed by the higher goat income and by switching expenditures from discretionary items to staple grain.

**Discussion**

Chicken and egg income is a relatively small cash earner compared to the main income earners (seasonal agricultural employment; sales of cash crops [peppers, chat, maize] sales of firewood; and sales of livestock [goats and shared cattle]). These four main income sources comprise 85 percent of poor household's annual income in the reference year.

In this zone, poor households secure about 60 percent of their food needs through own-crop production. During the reference year, food aid inputs allowed households to spend less on staple grains and more on discretionary and desirable items. Hence, the graph should be read with this food aid "expenditure support" in mind.

**Conclusion**

The lowland maize belt has a diversified crop base, including food and cash crops, as well as livestock and casual labour opportunities to round out livelihoods. Although the lowland climate tends toward unreliable rainfall, affecting cash crop income, the combination of labour, livestock and crop income is a sufficient buffer to absorb the loss of poultry.

The **Worst Case Scenario** is discussed in a later section on health and livelihood impacts of a human avian flu pandemic.

## 2.6 Conclusion

### 2.6.1 Summary of the Scenario Findings

#### Best Case Scenario - Market price drop in chickens lowland Southern Special Woredas

The Finding:

*Overall annual income for the poor drops only slightly (about 5%) when the price effect is applied.*

*The income drop is not large enough to cause a coping response.*

*Households bear the income loss by forgoing certain “desirable” expenditures.*

#### Moderate Scenario (a) - Poultry income nil: staple grain prices double. midland Wolayita

The Finding:

*Overall annual income drops by less than 10 percent for the poor.*

*The main effect is an expenditure deficit. All things being equal, affected households must spend 10 percent less (reduce purchases of desirable items, for instance).*

*However, all things are not equal: maize prices have doubled. Therefore, to buy sufficient staple food they must spend almost 85 percent of available income on maize. This leaves an expenditure deficit of almost 25 percent—meaning that poor households now cannot afford “desirable” items—even when taking on additional casual employment to make up lost poultry income.*

#### Moderate Scenario (b) - Poultry income nil; staple grain prices rise; shoat prices high lowland Boricha Woreda

The Finding:

*Total income for poor households increases during this period by about 220 birr (an increase of 20 percent) due to the positive income effect of higher goat prices.*

*Chickens and eggs comprise only 2 percent of total income. This loss is more than compensated by higher goat prices.*

*Expenditures on staple grains almost double due to high prices. This price effect is absorbed by the higher goat income and by switching expenditures from discretionary items to staple grain.*

### 2.6.2 Why the risk of food insecurity from widespread poultry deaths is relatively low

The results from the scenario analyses may seem surprising. However, there are logical reasons why rural households can absorb the loss of poultry income without major food gaps emerging.

- ✓ Flock sizes per households are low. The typical range is 2-12 chickens. Starter flocks in micro-credit enterprises are typically 100 chickens/household.
- ✓ Nowhere in SNNPR is chicken & egg income counted in the top four income earners for rural households.

- ✓ High mortalities are a regular feature of poultry production. Indeed, avian flu in poultry does not have a different livelihood effect than Newcastle Disease which regularly decimates flocks. Rural households have learned to organize their livelihoods and finances in ways to opportunistically use chicken & egg income for more discretionary spending.
- ✓ Income from chicken sales is highly seasonal, peaking during holiday periods. Three of the peak periods—*Meskel*, the New Year and Christmas (September – December)—occur during the harvest period, before the start of the hungry season and major grain purchases. At these times, chicken income is spent on holiday or discretionary items. Only *Fasika* (Easter) falls during the period of high staple grain purchases.
- ✓ Income from egg sales is regular but low and is usually spent on the “sauce” rather than on staple food.
- ✓ Poultry production is most profitable near town markets. These areas offer other income opportunities that can be expanded if flocks die.

### **2.6.3 The Socio-Cultural Role of Chickens**

A household economy analysis is, by definition, an economic analysis. The outcome is stated in terms of food, income or expenditure deficits. These are important variables for household survival. However, goods often have value beyond their monetary worth. The socio-cultural importance of chickens has not featured yet in this monetary analysis because it cannot be measured in *birr*. This is not to underestimate the value of chickens in village life. Notably, chickens comprise the welcome feast for visitors; chickens are a source of food for women post-birth; chickens are payment to villagers for local health services; chickens are gifts to newly married couples; and chickens strengthen social networks between women. With the loss of chickens, villagers will feel the loss culturally, not just in their purse.

### 3. PREDICTED INCOME IMPACTS OF AVIAN FLU ON WOMEN

#### 3.1 Introduction - Poultry Income is Women's Income

Earnings from chicken production are largely women's earnings. This is an important point to note because in the larger picture of household livelihoods, women have few sources of income that are their own to manage and control. In this regard, the inquiry must be broadened to include intra-household dynamics, adding the question: how do women spend the cash earned from chicken or egg sales, and will the loss of poultry income affect expenditures critical to food security?

Examining the significance of poultry income losses means examining gender differences in spending. Are women more likely than men to spend their money on food? Do their children's needs come first in women's spending habits? Are there certain purchases that women are expected to cover and that men might be reluctant to buy even when women lose access to critical cash income?

The time frame for this study did not allow for a comprehensive investigation into men's and women's spending patterns. However, eight interviews with village women provide good insight into how they spend their poultry income, and what will happen if they no longer have access to this income. The first task, however, is to establish how much money women typically earn from their chickens.

#### 3.2 What Women Earn

##### 3.2.1 Total Income per year

In backyard chicken production, typical flock sizes per household are low, in the range of 2-12 chickens. According to village research, if a woman has 12 chickens, about 50 percent are layers. These 6 hens produce from 40-60 eggs/hen/year as well as 12 surviving chicks. Half the eggs are kept for reproduction but she can sell the other half for, on average, 0.30 birr/egg for a total of 45 birr/year. Of the 12 surviving chicks, about half will be kept as new layers and half will be sold (@ 15 birr/chicken) for a total of 90 birr/year. From her starter flock, she will also have about 3 cockerels for sale (@ 15 birr/chicken), earning 45 birr. From this calculation, her annual income is almost 200 birr.

#### **Poultry Income = Women's Cash to Spend**

##### ***In women's words:***

*I bought a sheep who has now had twins.*

*Every day (except in winter) I sell eggs. I buy salt, kerosene, and a little maize flour.*

*I bought clothes for myself and my children.*

*I pay for 10 litres of water each day. It costs 10 cents. I get 25 cents for each egg that I sell.*

*I bought coffee and food after selling 3 chickens. This was enough for a meal for the workers who built my new tukul.*

### 3.2.2 Income by Wealth Group

In practice, the answer to what does a woman earn from her flock is more complex. There is no quick answer because much depends on whether a woman chooses to focus primarily on egg sales or primarily on chicken sales.<sup>13</sup> This decision depends largely on women's wealth status. A general rule of thumb is that, for the poor, poultry are a means to earn cash. Furthermore, the focus is more on eggs sales than chicken sales. By contrast, better-off households keep chickens for food as well as for cash.

This finding has a logical reason. Poorer households are pushed by regular shortages to sell their eggs daily or weekly. Egg sales are a low risk strategy (there is an immediate return on the asset). However, the relative value of the unhatched egg (.25-.50 cents/egg) is very low compared to a mature chicken (10-30 birr/chicken).<sup>14</sup>

In practice, women practice a mix of chicken and egg sales. Poor women sell more eggs and fewer chickens but strategically aim to have 3-5 mature chickens/year for sale at key holiday periods when market prices are high. Prices peak at *Fasika* (Easter) but are also relatively high during *Meskel*, New Year and *Genna* (Christmas). Overall, a poor woman's total earnings are typically around 100-150 birr/year. Middle-income and better-off women typically pursue a more diverse strategy. Their earnings are more variable as they balance, from clutch to clutch, consumption and sale priorities. Earnings range from 50 – 230 birr/year. *Annex 2 contains the results from specific interviews.*

Other research shows even higher levels of earnings especially for the poor (Tadelle et al, 2003:7). This study comprised 250 households in 5 areas (10 market sheds) of Ethiopia. What strikes the reader first, when looking at their data on annual cash income from chicken farming, is the variability across study sites. No doubt this reflects the unpredictability of backyard chicken farming. Nonetheless, there are conclusions to be drawn. Their most important statement is as follows: "... (we found) a significant and negative correlation between wealth status and cash income from chicken farming" (ibid: p.7). Put briefly, poor women generally earn more from chickens and eggs than the better-off. Here are some other interesting findings from their study:

- Around 80 percent of poor women earned more than 100 birr/year from poultry.
- Around 33 percent of better-off women earned <100 birr/year from poultry compared to 20 percent of poor women.
- In 4 study areas, 55 percent of poor households earned between 100-300 birr/year.
- In Tepi, 77 percent of poor women earned more than 300 birr/year.

Tadelle, Million, Alemu and Peters 2003 research stands out amongst the various papers on poultry production as the only study to provide quantitative data on village household

<sup>13</sup> These management decisions affect laying output. If the focus is primarily on egg sales then hens are not allowed to brood and more clutches of eggs are laid per year. If hens are left to brood and hatch their eggs then there will naturally be a longer period between clutches and fewer eggs laid per year.

<sup>14</sup> For those who can afford this risk, the return on mature chickens is better than its value as an egg. For instance, a local hen typically lays 15 eggs per clutch. If all the eggs are sold, the farmer earns from 4 – 7.5 birr (@ .25 - .50 birr/egg). Now, suppose that all the eggs are hatched. Of the 15 eggs, 5 become mature chickens. At an average current market value of 15 birr/chicken (ranging from 10 birr/hen to 20-25 birr/cockerel at typical holiday rates) the total value of 5 chickens is 75 birr. Even if one assumes double the egg production in the time it takes to hatch and brood a clutch of chicks, eggs sales (8-15 birr) still amount to a much lower value than chicken sales (75 birr).

earnings, by wealth group, from chicken and egg sales. Women, clearly, can earn a sizeable income from chickens. At 300 birr/year, this represents 25 percent of the typical annual income of most poor households in SNNPR.<sup>15</sup> Even at a lower estimate of 150 birr/year, this amount to 12.5 percent of an annual income of 1200 birr. We can conclude from this that poultry earnings, although opportunistic and variable, are an important contribution to the household economy. Chickens are not an insignificant resource.

### 3.3 What Women Buy with Poultry Income

#### 3.3.1 Women's Expenditures by Wealth Group

Women can earn good money from chicken and egg sales. How do they spend this money? What do spending patterns reveal about women's priorities when using their own cash? On balance, is poultry income used more for staple food, or for "the sauce", or for non-food items? An examination of spending patterns can provide a clue about the relative importance of poultry income for food security.

Interviews with women in lowland and midland Sidama show that spending priorities are strongly related to a woman's wealth status. A logical outcome of being poor means that any money earned is spent on essentials: staple grain, cooking oil, and a bare-minimum "sauce" (salt, spices, etc). By contrast, women from middle-income and better-off households have more choice in their spending decisions. More of their food needs are covered through own-crop production. Staple grains are also typically purchased from the sale of high-value cash crops. Better-off women, therefore, can use their earnings to buy "desirable" items in addition to some staple food. Interviews with village women reveal many smart spending decisions. The ways they spent their poultry earnings are summarized below.

	What women purchased from Egg Sales	What women purchased from Chicken Sales
<b>Poor Women</b>	Salt, Spices, Vegetables Cooking Oil	Maize, maize flour <i>kocho</i>
<b>Middle and Better-off Women</b>	Salt, Spices, Vegetables Cooking oil Kerosene for home lighting Coffee Water (cost @ 0.1 birr / 10 L water)	Clothes (woman + children) Sheep (investment not food) Improved maize seeds + fertilizer New dishes + pots Food + coffee = meal for labourers building new <i>tukul</i> School supplies

Source: Village interviews 2006, Sidama Zone

Another way of looking at what poultry income can buy is to compare women's earnings from poultry production with the available baseline information on typical annual expenditures. Two sample pages from the baselines from the Sidama lowland maize belt and from the Sidama coffee and enset zone are shown, below.

<sup>15</sup> The SNNPR livelihood baselines indicate that poor households typically earn between 800-1200 birr/hh/year.

SIDAMA LOWLAND MAIZE BELT (*Boricha and Shebedino Woredas*)

<b>Expenditure summary (in birr @ 8.86 birr = USD \$1)</b>	<b>V.Poor</b>	<b>Poor</b>	<b>Middle</b>	<b>B/Off</b>
staple food				
<i>maize + kocho</i>	210	280	350	270
non-staple food				
<i>haricot beans; coffee; salt; spices</i>	138	138	211	219
HH items				
<i>soap; kerosene; utensils; grinding</i>	255	255	458	625
Inputs				
<i>Seeds; fertilizer; pesticides; livestock; labour hire</i>	43	156	375	1100
social services				
<i>school; savings groups; tax; ceremonies</i>	55	90	200	900
clothes	75	200	350	700
Other				
<i>Medicine;</i>	66	167	125	602
<b>total</b>	<b>842</b>	<b>1286</b>	<b>2069</b>	<b>4416</b>

Source: SNNPR Livelihood Baseline Dataset, DPPA Ethiopia

In this zone, poultry income will not cover staple food purchases even though grain purchases are quite low. (In part this reflects the expenditure support of food aid which was provided in the baseline year.) However, with about 150 birr/year to spend, the table above shows what chicken/egg earnings will buy. Poor women can buy all of their non-staple foods or pay for social services plus clothes for the children, or pay for medicine over the year.

SIDAMA COFFEE AND ENSET ZONE (*Boricha and Shebedino Woredas*)

<b>Expenditure summary (in birr)</b>	<b>V.Poor</b>	<b>Poor</b>	<b>Middle</b>	<b>B/Off</b>
staple food				
<i>maize + kocho</i>	853	853	641	906
non-staple food				
<i>haricot beans; coffee; salt; spices</i>	150	211	316	493
HH items				
<i>soap; kerosene; utensils; grinding</i>	121	141	203	296
Inputs				
<i>Seeds; fertilizer; pesticides; livestock; labour hire</i>	17	70	286	845
social services				
<i>school; savings groups; tax; ceremonies</i>	55	150	185	400
clothes	80	100	300	500
Other				
<i>Medicine;</i>	52	134	177	292
<b>total</b>	<b>1328</b>	<b>1659</b>	<b>2107</b>	<b>3732</b>

Source: SNNPR Livelihood Baseline Dataset, DPPA Ethiopia

In this livelihood zone, staple food costs are very high. This reflects that farmers' land in this midland area is in large part devoted to coffee and other cash crops. Consequently, own-crop production is relatively low and staple food purchases relatively high. Poultry income, in

comparison to the dominant income earners (coffee, chat, *kocho* [prepared enset] and other crop sales), is relatively low. Nonetheless, even in this strongly cash-orientated economy, poultry income is sufficiently high to cover major expenses such as non-staple food, or clothes, or medicine, or household supplies, or social services for the year.

### 3.3.2 Seasonal Patterns in Expenditures

In the SNNPR woredas near Lakes Awasa, Abaya and Chamo, the hungry season begins around February and lasts until green maize and beans are available in June/July. Where root crops grow, notably in Wolayita, the March-April sweet potato harvest is essential to prevent serious food gaps. Purchases of maize flour continue during this period, to make porridge in the morning or to supplement the main dish of sweet potatoes. Notwithstanding the potato harvest, throughout this February-June period, all poor families get a great proportion of their food from the market, and most income earned during this period goes to staple food purchases. This is a time when layers are still relatively productive (before hitting the rainy season low period) so egg income in particular, as well as chicken income in April, goes proportionately more toward small purchases of staple food at this time.

### 3.4 Options for making up poultry income losses

In all the scenarios—except the best case scenario that involves a market price drop only—families suffer the loss of all of their chickens. This is not an insignificant loss. As demonstrated above, earnings of 150 birr/year represents a spending loss for the poor of 12 -15 percent in many areas of SNNPR.

Without poultry income, women have four choices:

- Forgo those items normally purchased with chicken and egg sales (reduce expenditures);
- Forgo other items and switch around expenditures;
- Earn additional income through other (women's) work to make up the income gap;
- Rely on their husbands to earn additional income to purchase those items normally covered by chicken and egg sales.

#### **Women's Income and the Effects of Newcastle Disease mortalities**

*Regular outbreaks of Newcastle Disease mean that flock sizes remain low. It is difficult for women to increase their numbers of chickens when mortalities are so high due to disease.*

*Coping with the loss of her flock, one woman explained her strategy: "I saved the little money my husband gave me and bought a pullet for 2 birr. 4 months ago, in December, I had 12 chickens; these all died. Now (in April,) I have rebuilt my flock to 4 chickens. The hens are just starting to lay again".*

*Another woman said: "When I lose my chickens to disease I have no other money except for the pots I can sell as well as a little kocho and haricot beans."*

The actual choice will be affected by a number of factors. The most crucial will be whether poultry losses occur in a year of reasonable rain and crop/livestock production, or whether it falls on a year of general shortage and hardship. The wealth status of a household also affects women's options. There is also a seasonal dimension as argued above. Clearly, if poultry culling occurs in the February-June period, when staple food purchases are highest and chickens would have been still laying before winter rains set in, poor households in

particular will have to switch around expenditures or find ways to make additional income in order to buy sufficient staple food.<sup>16</sup>

A look at the sort of work women do to earn money shows that for the most part, women's income options all involve hard physical labour at low pay. The list below shows the various ways women can make-up the 150 birr spending deficit if she loses poultry income for a year.

Type of Work	Typical Earnings
Firewood or grass sales	4-6 birr/bundle (firewood). Typically sold 4-6 bundles/month.
Local Agricultural labour	<p>Lowest rate: 0.4 – 0.6 kg grain/day + meals Weeding work available 1 month only: 60 kg/month (worth 120 birr at peak rainy season prices or 4 birr/day)</p> <p>Enset processing @ 2 birr/day</p> <p>Coffee cleaning: 2-3 birr/day, seasonal work (lasts 3 months). Usual labour rate is 5 birr/day but women are often paid less.</p>
Fetching water and other domestic work	<p>0.10 / 10 L jerry can of water hauled.</p> <p>Domestic work: pay very variable as it may involve bed and board.</p>
Petty trade	<p>Typical earnings from petty trade in low value goods is 2 birr/market x 1-2 p.week or 2-4 birr/week</p> <p>Chaka sales in Konso and Derashe are higher at around 5 birr/week.</p>
Fruit or vegetable sales	Poor women must double normal year sales of fruit/vegetables (@ 150 birr/year in ref. year in the Sidama coffee zone).
Sales of pottery jugs, baskets and other handicrafts	Pottery jugs @ 0.5-1 birr/jug.

**Based on these rates, to earn 150 birr, a woman must:**

- Sell firewood for 4-9 months.
- Work 50-75 days (or 1.5-2.5 months) on a local farm doing casual work.
- Haul 1,500 jerry cans of water to earn 150 birr. This represents 4 x 10 L jerries/day, every day of the year.
- Carry out petty trading for at least 9 months (using the estimate of 4 birr/week).
- Double normal year sales of fruit/vegetables
- Sell an additional 150-300 pottery jugs/year to earn 150 birr

<sup>16</sup> Interviewed women echoed this view. Better-off women said they rely on their husbands to pay for those items normally purchased with poultry earnings when poultry die. Poor and middle-income households, by contrast, take on additional work in order to make up the income gap.

As seen above, women's work includes enset processing and cooking, fetching water, collecting firewood or grass for sale, petty trade in lower value goods, coffee cleaning, preparation and sale of local brew (*chaka* in the southern special woredas), selling home-made baskets, jugs and pots, and other casual domestic jobs. Every single one of these types of work is “burdensome” in that it is physically demanding and takes time. By comparison, backyard chicken production, as currently practiced in Ethiopia, is both low input—chickens scavenge for their food, are kept in the main house at night and are rarely vaccinated—and low labour. Rarely does it require more than 30 minutes per day.

### 3.5 Conclusions – Income impacts of Avian Flu on Women

Women often face the seasonal loss of poultry income during the rainy season when disease and mortalities are high. These losses are temporary as they quickly begin to re-build their stocks after the rains. It takes a full year to fully re-build stocks after Newcastle disease wipes out a flock. However, there is some income flow during re-stocking. An avian flu pandemic suggests more sustained income losses over a longer period of time. Without any income flow from poultry women will lose some of their self-reliance. Control over personal income for spending correlates strongly with higher participation in household decision-making and community events (FARM-Africa 2003: 8). Alternatively, if a woman needs or wants to make up the poultry income loss, she must take on physically demanding and time-consuming work. It is no easy task to replace 150 birr of relatively “easy money” a year.

With the loss of our chickens we will lose another piece of our self-reliance. (Even for those with only three or four hens) the loss of a few chickens is far from trivial.”

Rebecca Sooksom (2006: p.50)

## 4. PREDICTED IMPACTS OF AVIAN FLU ON COMMERCIAL POULTRY FARMS AND POULTRY TRADERS

### 4.1 Commercial Poultry Farms

#### 4.1.1 Characteristics of the Sector

It is estimated that the commercial sector comprises only 1-2 percent of the nation's chickens (Tadelle et al 2000: p.2). The commercial sector itself is highly skewed with a few companies controlling most commercial production. Debre Zeit is the geographical focus of intensive poultry enterprises. In Debre Zeit, one company, ELFORA, accounts for approximately 60 percent of poultry production in that area (Ato Lema, personal communication). Alema Farm accounts for a further 30 percent (figures approximate). The final 10 percent is held by about 5 small-scale farms and projects.

The scale of production at these various enterprises varies enormously. ELFORA is a massive enterprise, delivering around 420,000 chickens to the Addis market every year as well as around 34 million eggs/year.<sup>17</sup> The next scale down is Alema Farm. Alema Farm primarily produces broiler chickens, with some layers as well as pigs. The Farm recently went through a rapid expansion increasing from a production level of 60,000 – 100,000 broilers sold/year to 200,000/year—a doubling the size of operation (figures approximate). Alema Farm has its own parent stock for hatching (around 3,000 hens); it operates its own feed factory; it has on-site slaughter facilities as well as cold storage rooms; and it transports the frozen chickens to Addis with its own trucking fleet.

In Debre Zeit—which is considered the chicken centre of the region—this type of vertically-integrated commercial poultry enterprise is restricted to ELFORA and Alema Farm. The next scale down is a farm operating at 15 - 30 percent of the production capacity of Alema Farm, with 30,000 broiler chickens sold/year. Another enterprise, Genesis Farm, operates on the 10,000-12,000 hen range (layers primarily). The remaining 3 - 4 poultry operations are significantly smaller and operate on a scale of 1,000 - 3,000 chickens managed per year. In addition to these commercial enterprises are farmers who own fewer than 1,000 chickens. These farmers operate on a more commercial basis but the scale is small (typically 100-500 chickens). Many are operating under the auspices of a project and were given start-up loans and management training to begin their operation.<sup>18</sup>

#### 4.1.2 Avian Flu Comes to Ethiopia – Sort of...

Ethiopia has not had a confirmed case of the H5N1 strain in birds or domestic fowl. However, in March, hundreds of chickens died at a state breeding and multiplication centre in Gurage. A false positive result emerged from the initial screening in Ethiopia. Subsequent analysis at a lab in Italy showed up negative. However, as a precautionary measure, the government culled all the chickens at the farm after the initial positive lab

<sup>17</sup> These figures are taken from the ELFORA website, [www.ethiomarket.com/elfora](http://www.ethiomarket.com/elfora)

<sup>18</sup> The Debre Zeit Agricultural Research Centre, for instance, assisted 15 farmers to enter into commercial egg production (the foundation stock was 100 layers). They have also assisted women's groups in town to operate broiler chicken production although these activities folded when fears emerged about avian flu contamination.

report. In addition, the government ran public information bulletins advising people of the risks of touching diseased fowl. Later, these bulletins were replaced with information explaining public safety measures when handling healthy, and potentially sick, chickens.

The impact of these public service announcements was to instill a sense of panic, particularly in Addis. As a result, demand for chickens plummeted. Demand for chickens is usually low in April during the one-month fasting season for Orthodox Christians but over the Easter holiday itself, demand rises to peak levels. Orthodox Christians break their fast on Easter Sunday with a traditional chicken-based meal of *doro wot*. Thus, although there is currently no avian flu in Ethiopia, the panic alone caused significant shifts in market demand and price. These shifts in the chicken market provides an excellent case study about the potential impact of an “avian flu outbreak” on the commercial poultry sector. A case study from Alema Farm illustrates the likely impact on commercial enterprises.

### The Case of Alema Farm – Impact of Decreased Urban Demand.

80-90 percent of production capacity at Alema Farm is broiler chickens. Of the remaining 10-20 percent of output, some is devoted to egg production [the farm currently operates with 20,000 layers], and some to pork production [the farm has a current stock of 2,000 pigs]

During the *Fasika* holiday season, demand normally doubles. Alema Farm has the capacity to deliver 1,500-2,000 chickens/day. They typically operate at full capacity (2,000 chickens/day) over the holiday season although demand itself is on the order of 3-4,000 chickens/day. This year, demand plummeted to 500 chickens/day. In short, demand for chickens dropped to 25-30 percent of normal. There are no alternative markets for chickens. Currently, the backlog is stored on site in the cold-storage room but unless demand in Addis picks up again these chickens will be considered a loss.

These days the farm’s owner is not talking about bankruptcy. Instead, he is taking positive measures to diversify production to avoid being caught with too many unsold frozen chickens in his cold room. If the measures are implemented soon, his business should survive. Given the real threat of avian flu, diversification cannot come soon enough.

The panic about avian flu and subsequent measures (import ban on new chicks and movement controls for instance) as well as the drop in urban demand hit other enterprises hard too. At least one group of women in Debre Zeit who were operating a small-scale broiler chicken enterprise folded completely. Almaz Farm (with operations on the scale of 30,000 broiler chickens) also folded its chicken operations.

#### 4.1.3 Surviving Avian Flu commercially requires diversification

The key to the survival of a commercial enterprise is diversification. ELFORA has a diversified base with operations in all livestock sectors. (ELFORA, for example, will benefit from current high sheep and goat prices which will offset chicken losses.) By contrast, Alema

Farm is highly concentrated in broiler chicken production with only 10-20 percent of its operations in egg and pork production. Presently, there has been no parallel drop in egg price or demand so this side of the operations continues at full production levels. However, in the event of a real case of avian flu, the farm's layers would be culled as well.

Alema Farm, on its own initiative, invited a German businessman to advise the farm on how to diversify its operations. This is an essential move given current conditions. Without diversification, the Farm remains susceptible to collapse in the event of a full avian flu outbreak. Even if Alema Farm remains in business, running its pork operations, cut-backs will affect its 200 employees, probably leading to a high degree of staff lay-offs. In later years, if a vaccine against the H5N1 virus is made available, commercial farms may re-start poultry operations by enforcing strict bio-security controls. However, costs of building a new parent stock of broilers and layers, as well as costs for new vaccines, would be a substantial barrier to beginning over.

Very small-scale commercial poultry production—village farms on the scale of 100 layers for example—will no doubt require assistance to start-over after a flu crisis. Local examples of supporting family-run, on-farm egg production show that it can be quickly profitable (Ato Alemu, DZARC, personal communication, see also text box at right). As the pay-off can be substantial, loans to purchase inputs to start-up production are arguably worthwhile. Certainly, it should be considered as a sensible post avian-flu development investment opportunity.

***Micro-credit to Egg Farmers - An Example from Debre Zeit***

*In a project guided technically by the Debre Zeit Agricultural Research Centre, 15 farmers were given loans of 2,300 birr to purchase 100 pullets and other inputs for commercial egg production. These loans were repaid within a year. Effectively, loans were repaid after only 4-6 months of production because there was an initial "holding period" before the pullets matured into laying hens. This level of profitability is extremely encouraging but it did require the commercial touch. This "commercial touch" means supplying four upgraded inputs: supplementary feed, hybrid and/or exotic layer breeds, night-time protective shelter, and some medicine. In other words, there must be a higher level of input to improve output and profit.*

## **4.2 Poultry (and Egg) Traders**

### **4.2.1 The Marketing Structure**

There has only been one notable study carried out of the chicken and egg marketing structure in Ethiopia (Kenea et al 2003). The picture painted in this study is of a system characterized primarily by local selling and buying. In the study, 42 percent of all transactions reported at Meki, Mojo and Debre Zeit markets were local farmers selling their chickens to local consumers. Another 39-40 percent of transactions involved local farmers selling to traders who re-sold the chickens to urban consumers. The remaining 20 percent of sales were local farmers selling directly to restaurants or to small-scale producers.

Of the trading activity which involved some middle-men, the study found that there are no big traders monopolizing the chicken trade (ibid, p.72). Instead, traders operate on a small-scale basis, handling about 10-50 chickens each. One reason why these figures are so low is many of these traders are older students trying to earn some extra cash during holiday periods. Re-selling chickens for a profit of 2-5 birr/chicken is a common way that students generate some income for clothes, books and other incidental expenses. Students typically

handle a few chickens only (around 5-10) as initial financing to purchase chickens is hard to come by.

More established traders handle higher numbers of chickens, especially during peak holiday periods (Easter, *Meskel*, the New Year, and Christmas). Those traders interviewed at Awasa, Alaba and Tulu markets reported a wide range in number of chicken sales. At the lower end, were traders dealing with 20-30 chickens: they comprised the largest group. A couple of traders dealt with a larger supply, in the range of 100-400 chickens. Of the traders interviewed, only one trader had planned an onward shipment of chickens to the Addis market.

There is little research on the structure of egg trading in Ethiopia. Logically, one would presume that it is a sector dominated by local farmers selling to local consumers (including local shops and restaurants). In Debre Zeit, there are more opportunities for traders to enlarge their business as the demand in Addis is substantial. Overall, an estimate figure of the number of traders operating this corridor was not found.

#### 4.2.2 Impact of the Avian Flu Scare on Prices and Demand

The recent panic about an avian flu outbreak had a significant effect on chicken prices at local markets in Ethiopia. In Awasa, Alaba and Tulu markets, prices dropped to 50-60 percent of normal over *Fasika* (Easter). This holiday period normally records peak prices. With the end of fasting, demand shoots up, and with it, prices. Peak prices, in this instance, are typically 90-100 percent higher than prices on ordinary market days. The only good news this Easter was that those with access to hotel, restaurant and supermarket contracts, did not bear a similar fall in prices.

Cockerel Prices (price in birr)	AWASA				ALABA			
	Selling price of live chickens + Number of chickens sold							
	Seller 1	Seller 2	Seller 3	4	5	6	7	8
Easter 2006 - Farmer		15 birr	18-20 birr Had 4 to sell	20 birr		10-15 birr	10-15 birr	11 birr Sold 3
Easter 2006 - Middle-man	20 birr  (@ 2-3 birr profit p. chicken x 18 birds			20-25 birr	20 birr			
Other holidays in 2006/2005	30 birr			30 birr New Year			20 birr Ch'mas 5 sold	30 birr Ch'mas
Easter 2005 (1 yr. ago)	60 birr	30-35 birr	30-45 birr	40-50 birr	25-35 birr	25-35 birr		

Just as price plummeted over April, so too did demand. This plunge in demand was most pronounced in the Addis market. As stated earlier, Alema Farm saw a drop in demand to 25-30 percent normal. The huge drop in demand in Addis was also felt in Awasa. One trader, who last year during the *Fasika* festival season sold 400 chickens to a contract buyer in Addis, this year saw his contract closed. He still expected to sell around 150 chickens in the Awasa market, in part through his contracts with local hotels and restaurants, but access to the Addis market had certainly diminished overall sales.

In face of a steady supply of chickens, the drop in urban consumer demand was clearly the main reason why prices had plummeted. Demand in Addis soaks up rural chicken supply even in markets as far away as Awasa. With fewer chickens being sent to Addis and a consequent “flooding” of chickens on the local markets, price was bound to fall. Local urban demand also dropped. There were no hard figures of fallen local demand in regional and woreda towns but rough estimates were of at least a 30 percent fall.

Egg supply, demand and price trends were normal over the holiday season. Any fears surrounding an avian flu outbreak did not affect sales or prices of eggs. Eggs sales increase somewhat over the *Fasika* holiday (eggs are used in the preparation of *doro wot*). During the year, demand at major urban markets remains relatively high because eggs are an essential ingredient in baked goods.

#### **4.2.3 Impact of low price and low demand on Poultry Traders**

Those hardest hit by falling prices and demand are commercial enterprises, such as Alema Farm, or women’s groups specializing in broiler production, with little diversification. Poultry traders, by contrast, will see a decline in their income normally raised during the holiday season. However, traders in poultry are rarely (if ever) just poultry traders. The sector is too seasonal to be the main-stay of traders’ livelihoods. Most chicken traders take advantage of higher demand over holiday periods to buy and re-sell chickens. During the year, they have a few steady contracts with hotels, restaurants and shops. These activities supplement other trading ventures. They are not principal activities themselves. In short, a diversified trading base, which includes items in addition to chickens, ensures that even as they take an income loss, most traders will be able to survive the price and demand drops caused by an avian flu outbreak.

## **5. PREDICTED HEALTH AND NUTRITION IMPACTS OF POULTRY LOSSES**

### **5.1 Poultry and egg consumption in rural SNNPR**

The threat of an avian flu outbreak affects not only households’ cash earnings from chicken and egg sales but also families’ nutritional status. Chickens and eggs offer a quality protein source throughout most of the year. Access is wide-spread (every household owns at least a few chickens) and eggs in particular require little preparation.

However, rural households eat very little poultry. Most interviewed households appreciated the nutritional benefits of chickens and eggs. Nonetheless, they ranked income as the most important function of chickens. This response varied by wealth group. The poorer the household, the fewer (if any) chickens and eggs are eaten. Poor households sell their chickens and eggs because of the urgent need to earn cash. Better-off households eat more chickens and eggs because they can afford the “luxury” of an animal protein. This finding is backed by other field research. For example, FARM-Africa reported that *58 percent of households in their East Hararghe study area ate no meat at all* (2003, p.5).

Even amongst better-off households, chickens are not an every day food. Chickens are consumed mainly during holiday periods, particularly *Fasika*, at which time 1-2 birds will be prepared for the holiday meal. Chickens are also served if a special guest arrives. After a woman gives birth, a chicken may be killed to provide supplementary protein. Beyond these occasions, chickens are rarely consumed. In part, this reflects that in rural villages, all meat is a relative luxury. In part, it reflects that in Amhara culture, chickens are primarily used in *doro wot*, which is a time-consuming dish to prepare, and which does not lend itself to every day meal preparation. Overall, chicken consumption amounts to less than 1 percent of households' total annual food needs.

Better-off families consume eggs more frequently than chickens. Eggs are primarily reserved for children. Accurate figures through the recall method were difficult to achieve; however, the figures presented here tell a story about the overall low level of animal protein intake in the rural diet. The highest level recorded was 6 eggs/month. Middle-income women suggested lower rates in the range of 1-3 eggs/month. These low figures are born out in Tadelle, Million, Alemu and Peters' (2003) study of poultry uses in Ethiopia. In their research, on average 23 percent of eggs produced were consumed by households (ibid 2003: p.4). Using their average production figures (i.e. breeding females/household; eggs produced/year) they show consumption levels of roughly 5 eggs/month. FARM-Africa also reported similar consumption levels from Hararghe where they support a woman-focused goat development program which has a side-line in poultry. Participating families (those with children) reported eating 3-4 eggs/month, or 35-40 percent of total egg production recorded there.

### Who Eats Eggs and Chickens?

*Not the poor. Poor households never eat eggs and rarely eat chicken.*

*Middle and better-off households regularly eat eggs (but only a few). Chickens are eaten during festivals.*

*On balance, village women keep chickens to earn money, rather than to eat.*

## 5.2 Predicted nutrition impacts of poultry losses

**Impact on poor families:** Poor households eat chicken rarely and almost never eat their eggs. In this light, the loss of chickens from death or culling during an avian flu outbreak will not have a direct nutritional impact on poor families. However, clearly, severe poverty is not a standard to aim for and the initial statement—loss of chickens and eggs will have no direct nutritional impact—should be understood in the context of such poverty, and the strict environment of shortage that rules most every day decisions.

**Impact on better-off families:** Regular protein supplements of eggs to children provide an important nutritional benefit. FARM-Africa reports that in Ethiopia only 7 percent of households' energy sources come from an animal source food and this shortage may be one of the major factors contributing to high infant mortality rates and delayed growth in children (FARM-Africa 2003, p.12). Field work bears out the fact that rural villagers eat very little animal protein. For children of middle and better-off families, what they do get is a low but steady diet supplement of eggs. At such low levels, eggs contribute a marginal amount to meeting people's energy needs. However, as a nutritional supplement in a diet lacking in nutritionally rich animal protein foods, eggs play an important role. Thus, those hardest hit by the death or culling of chickens will be children of middle-income and better-off households whose better health must in some part be due to the additional protein supplements they receive during the year from eggs.

## 6. PREDICTED LIVELIHOOD AND FOOD SECURITY IMPACTS OF AN AI HUMAN PANDEMIC

### 6.1 Prevailing disease prevalence in SNNPR

If the H5N1 avian virus becomes transmittable between humans, leading to a pathogenic human avian flu pandemic, it will occur in context of an underlying disease environment. Clearly, high levels of poverty—which in SNNPR run around the 40 - 50 percent mark—suggest that people who are less well fed will be more immune-stressed and hence more at risk of succumbing to new infections.<sup>19</sup> Other factors are also of concern. If people are already exposed to severe diseases which regularly leave them weakened then a flu pandemic may spread more quickly and leave more devastation. To this end, the prevalence rates of major diseases in SNNPR were investigated at the Bureau of Health in Awasa.

#### 6.1.1 Malaria

Malaria is the most common disease affecting the highest number of people in SNNPR. Statistics from June 2004 – August 2005 show that the actual incidence was much lower than had been projected due to control measures taken by the government (including vast DDT spraying as well as the distribution of one million sleeping nets [ITN] in recognized malaria areas). As a consequence, the actual number of outbreak cases (30 kebeles across 15 woredas) was only 12.5 percent of the projected outbreak rate. Some other figures of note are summarized below:

- Actual cases of severe cerebral malaria (*plasmodium falciparum*) were only 32 percent of projected rates (30,502 people were affected).
- it was predicted overall that in 2004-2005 half a million people (3.5 percent of the total population in SNNPR) would be treated for malaria at the region's clinics and hospitals—a figure based on the previous year's treatment numbers.
- Actual cases were around 220,000. (Of these, almost 80 percent were treated symptomatically on an outpatient basis without lab verification.)
- Actual case numbers represent 1.5 percent of a regional population projected at 15 million.
- Malaria is a lowland disease so the numbers must be placed in that context accordingly. Relative to the lowland population, the prevalence rate would be higher than 1.5 percent.

These numbers paint a picture of an endemic disease significantly reduced by major control measures. The down-side is that malaria is highly seasonal and affects people at the peak labour period during the agricultural cycle (i.e. at sowing time in April/May; and at harvest and threshing time in September-December). Given that so much of farming depends on timely action, the loss of productive labour for 1-2 weeks at critical labour periods can create critical production losses for individual households. In terms of expenses, malaria does not create major direct expenses as treatment drugs for cerebral malaria are provided free (chloroquine for non-fatal malaria treatment is locally available at low cost).

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<sup>19</sup> The 40 - 50 percent figure is drawn from the SNNPR Livelihood Baseline Profiles. Poverty is defined by local definitions of what makes people in their community poor, middle or better-off. Although the proportion of better-off to poor varies in the region, a typical figure is 40 - 50 percent.

### 6.1.2 HIV/AIDS

The other disease affecting significant numbers of people in SNNPR is HIV/AIDS. Prevalence rates vary considerably between town and village as the estimated figures below show.

- In 2005/6, around 9 percent of the urban population was confirmed HIV positive. The figure for the rural population is an estimated 2.4 percent.
- In general, rates have increased over the last eight years (annual reporting on HIV/AIDS began in 1998).
- The most notable rise occurred in Hossana town where the incidence rose from an estimated 3.6 percent in 1998 to around 12.4 percent today.
- Awasa town makes an encouraging exception to the general trend. The incidence rate decreased between 1998 to 2006, dropping from an estimated 14.4 percent to around 8 percent.
- Estimated numbers of people of all ages living with HIV/AIDS for SNNPR are 218,740 people. 90 percent of those infected are in the peak productive age (15-49 years old).
- More women than men are living with HIV/AIDS.

Malaria and HIV/AIDS are the two most prevalent, potentially fatal, diseases affecting the population in SNNPR. The current situation shows a government committed to reducing the prevalence of an endemic disease (malaria) through a major control effort. The example of Awasa town also shows that where the government, complemented by additional privately-funded initiatives, provided serious support behind a public information campaign, HIV/AIDS prevalence rates can be brought under control and significantly reduced. Both these diseases, for the last reporting year, had similar numbers of people affected (220,000 people) although there the similarity ends.

## 6.2 The health system and coverage in rural SNNPR

When discussing the region's performance numbers, the malaria control experts in Awasa were blunt about one important caveat: half the rural population lives too far away from a clinic or hospital to make use of the service. Quite literally, the statistics tell only half the story. There are reasons to also treat the HIV/AIDS figures with caution. HIV/AIDS survey work in rural areas is taken from ante-natal clinics. This sampling mechanism may lead to under-reporting of incidence levels in rural areas as many rural women live too far to benefit from pre- or ante-natal services.

*The enormous problem for the health system in SNNPR will be to provide coverage to half their population who live in communities remote from the current network of clinics. Even for those who can reach a clinic in a timely way, treatment options may not be sufficient. Moreover, malaria and flu have common febrile symptoms and this may mask the onset of flu in malarial areas.*

A community isolated from medical services is not isolated from a disease that can be introduced by wild, migratory birds and chickens. In this sense, rural villagers (and their chickens) in the Rift Valley are no more isolated from the avian flu as they are from malaria. Moreover, whereas the risk factors for HIV/AIDS infection are lower for rural populations, this is not the case for the potential human form of bird flu. Human-to-human transmission occurs by air when an infected person coughs or sneezes. Viral transmissions typically spread where people are grouped. Rural villagers gather

frequently at weekly markets. These gatherings, so essential to village life, encourage viral transmission.

These challenges are not lost on health officials as they prepare for a possible pathogenic human avian flu outbreak. To date there has been an initial training for 13 selected zonal and 8 selected woreda heads as well as (the 17) hospital directors in the region to establish reporting formats and templates. Now that these are in place, there is an urgent need for funds to cascade the training down to kebele level, to the 2,246 agricultural extension officers and the 3,000 health workers who will be at the front line of reporting and treatment. Moreover, there is an urgent need to establish pre-allocated contingency funds to enable the region to quickly set up temporary isolation units and to purchase antibiotics for treatment of secondary diseases (such as pneumonia) as well as sufficient anti-virals and vaccines (as available). There still remains a great deal to do before the region is ready to control a possible human avian flu outbreak.

### 6.3 Discussion of the likely impacts of an AI human pandemic

No one can predict how far down the “phase” scale—WHO has a 6 phase classification for the avian flu—Ethiopia will go given that it has not yet experienced a single case of the H5N1 virus. Most people believe that it is simply a matter of time before the virus arrives. We do know that the rural reach of the current health system is half the breadth it needs to be. We know that preparations for the avian flu are still in very early stages. We also know that current endemic diseases are taxing on the population but are not at levels that gut the local economy, although HIV/AIDS rates in towns may be soon heading that way.

Overall, there are two probable scenarios.

- The human pandemic arrives in Ethiopia in the first wave and hence in its most virulent form, killing a swathe of adults and leaving thousands of orphans in its wake. The effect would be very rapid and unprecedented in Ethiopia. This scenario resembles the HIV/AIDS situation in Southern Africa—where HIV/AIDS prevalence rates in the five hardest hit countries are an estimated 20-40 percent, affecting mainly adults—in that local and national economies are struggling to deal with a rapidly shifting demographic. Historically, flu pandemics have led to particularly high mortalities in certain age groups. Although it is not known which age group influenza A (H5N1) will attack most virulently, the Spanish influenza of 1918 hit young, healthy people the hardest (GFDRE 2006: 47).
- OR - The human flu virus enters Ethiopia in the second or third wave and in a less severe form. It becomes endemic, like malaria in the lowlands. Local economies remain functional but every year affected households bear the cost of illness in terms of lower production, lower income and reduced expenditures.

#### 6.3.1 The Worst Case Scenario,

In the worst case scenario, local economies as a whole will stumble as large numbers of households become impoverished from illness.

Economic consequences at the household level:

- The loss of productive labour will lead to a fall in crop production and a drop in food access from own-crops.
- Assets (livestock) will be sold to purchase food if crop losses are significant (e.g., if there is a compound hazard of disease and drought), and if the initial food gap cannot be filled simply by switching expenditures.
- If there is an adult death in the family, the loss of productive labour will have a major income effect as adult farmers are key income earners in the off-season period. Reduced income will affect spending patterns as well as access to food.
- Expenditures on health will increase. In a pandemic, anti-virals and antibiotics are provided free by the government but shortages in government supplies may encourage the emergence of private sales at a higher cost. Related expenditures also increase (anti-pain medication; special food for the ill person; funeral expenses and so on).

Economic consequences at the community level:

- Schools, if they are not closed during the pandemic, will certainly see a huge drop-out in students as healthy children become essential income earners for their families.
- Wealth will become more concentrated as those few better-off families spared a death or major illness of an adult, find access to additional land opening up as increasing numbers of “sick” households are pushed into organizing lease arrangements. They may also be able to build up livestock assets, taking advantage of crisis sale prices. This will exacerbate the skewing of wealth in local communities.
- Local demand for all but the most essential food items will drop drastically.

There are good case studies from Kenya and Zambia which model the food, income and expenditure effects of real-time HIV/AIDS conditions (Boudreau, 2003). These studies contribute to our detailed understanding of the impoverishing effect that a major illness causes. This effect can also be illustrated with a case example from SNNPR. The case used is the *Sidama Coffee and Enset Zone*, a densely populated, midland area south of Awasa town.

To illustrate the potential impact on livelihoods of an human avian flu crisis, the hazard has been defined in this way:

- The death of one adult means that crop production drops to 75% of normal except enset.
- The death of one adult from flu means that cash income from one person’s casual work over the year is nil. In this case, coffee processing employment is 0% of normal.
- Egg and chicken income is nil (0% of normal).
- Maize prices are high due to falling supply (150% of normal).
- Goat prices are high (200% of normal) due to high export demand which competes for local demand. (IF there was suddenly crisis selling of shoats, prices would, however, fall.)

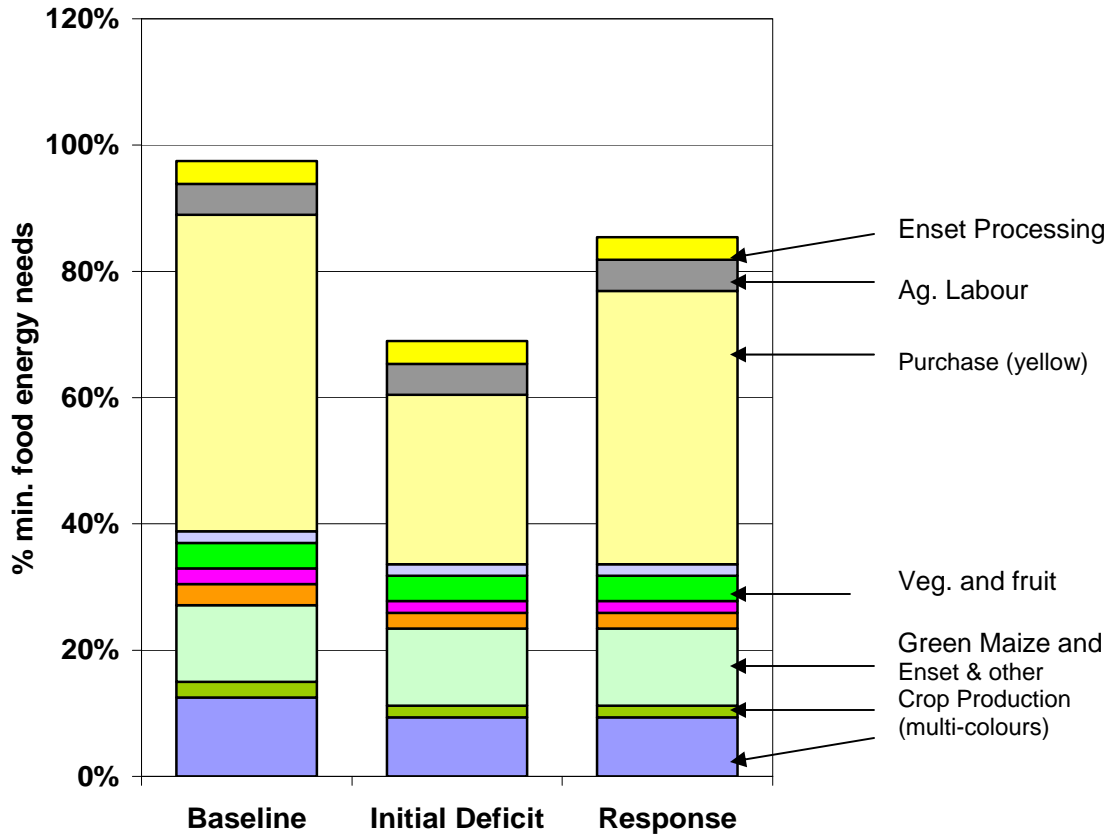
***Income Effect of HIV/AIDS - Zambia***

*In a drought year, a household with one adult living with HIV/AIDS will suffer a massive drop in income (to 35-50 percent of the baseline income).*

*Less income means less purchases. In the 2003 study, the result was that all income was devoted to food with a small (10 percent) amount spent on medicine (Boudreau, 2003).*

**Graphs 5: Effect on Food Access of a Human Avian Flu Crisis  
Sidama Coffee and Enset Zone** (Source: DPPA, SNNPR Livelihoods Baselines)

**Sources of Food : Poor HHs**

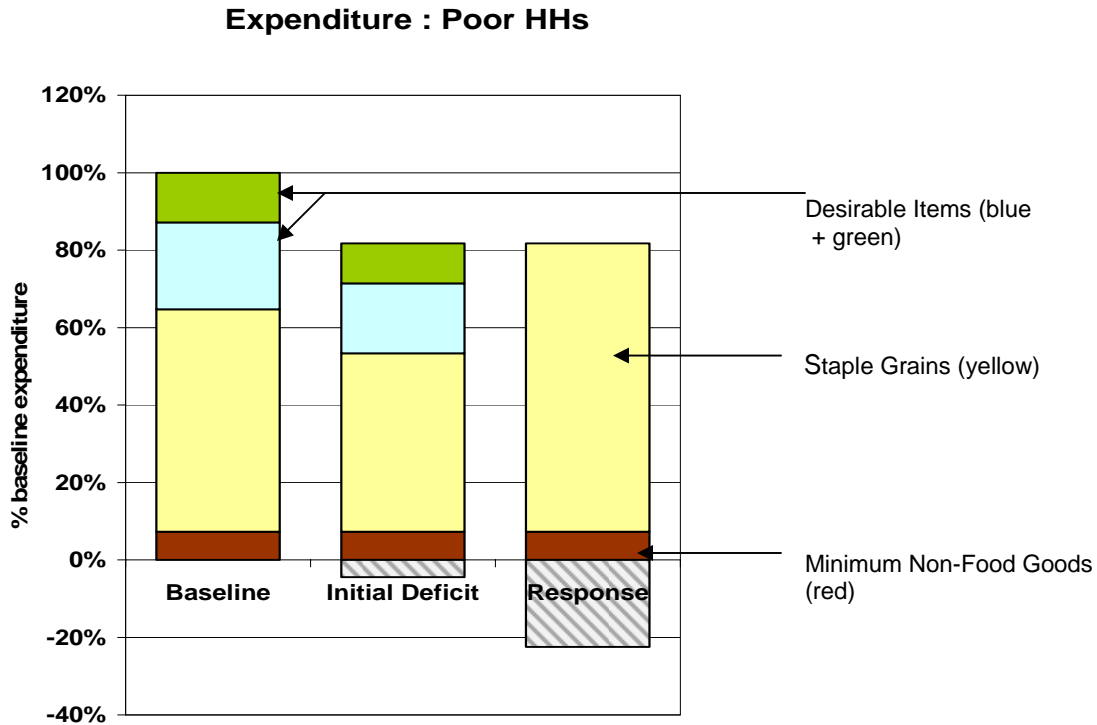


The Outcome

- Food access initially drops to 70 percent of annual food needs (food graph above, **initial deficit** bar).
- Households respond by selling an additional goat. High goat prices mean the impact of lost employment and poultry income is less severe (or coping is more effective). Yet food access only reaches 82 percent of their needs, even with coping (**response** bar, food graph above).
- As income drops, households cannot purchase as much food (expenditure graph, next page, **initial deficit** bar).

**Graph 6: Expenditure Effect**

Source: DPPA, SNNPR Livelihood Baselines



The Outcome

- Due to an increase in staple grain prices, poor households re-direct almost all their income to staple grain purchases, dropping discretionary spending (**response** bar).
- **There remains a food deficit of almost 20 percent as well as an expenditure deficit of about 20 percent.**

**6.3.2 The Moderate Scenario**

In the moderate scenario, individual households will be affected by a less virulent form of human bird flu. Much like malaria in adults, those affected will be sick for a couple of weeks but will then recover.

Economic Consequences at household level:

- Households affected by less-virulent human bird flu will see reduced production and or cash earnings for a season but not on a scale that leads to serious food deficits.
- Health expenditures will not significantly increase as most affected people will simply be “laid low” for a week but are unlikely to need specific medicines to recover.

**6.4 Conclusion**

Even without a separate study, it is clear that a severe human pandemic would be devastating and would lead to widespread food insecurity as the “human capital” of the region became undermined by disease. A milder form would become a contributing factor—rather than a principal factor—in maintaining poverty as the full productive potential of affected households would not be achieved.

## 7. CONCLUSIONS & RECOMMENDATIONS

### 7.1 Conclusions – Impact of Poultry Losses on Food Security

- ✓ Chickens will not make-or-break household food security. Food security hinges instead on sufficient access to daily employment and on own-crop production, as well as sales of cash crops, shoats, and firewood. However, chickens are not a trivial resource either. An annual income from chickens of 150 birr/year/hh is not uncommon.
- ✓ If the poultry sector is wiped out, poor households will suffer income losses of an estimated 2 – 10 percent of baseline annual income (the SNNPR livelihood baseline). The village interviews suggested a higher income loss of 12 – 15 percent.
- ✓ Most households will be able to absorb the loss of a “secondary” income by switching or reducing expenditures. This strategy usually results in an expenditure deficit in the sense that discretionary spending is curtailed as most income is shifted to staple grain purchases.
- ✓ Villagers are accustomed to adapting to regular losses of chicken income as Newcastle Disease often wipes out whole flocks.
- ✓ Poultry production is most profitable near town markets. These areas offer other income opportunities that can be expanded if flocks die.
- ✓ The loss of chicken income affects women most. Women will forgo “non-essential” items—clothes, household supplies, savings and investments, relishes and sauce—and rely more on their husbands to purchase such items, as possible.
- ✓ To make up the income gap, women will have to increase other activities, all of which require heavy physical work.
- ✓ The February – June/July period is most critical. This is the usual “hungry season” when any cash income earned is spent on food. Income from eggs and chickens is more likely used to buy maize during this period than at any other time of the year.

Chronically poor areas—particularly very poor households living in those areas—will be the least likely to absorb the loss of chicken and egg income. They have little or no buffer against income losses. Most shocks in recent years have sent poor and very poor households to the verge of serious food gaps.

If poultry losses occur in conjunction with losses in a principal livelihood sector (crop or livestock production for instance, or casual employment), or if households lose an adult worker from disease, then it is likely that severe food shortages will occur. Chronically poor areas to monitor carefully are listed in the table below.

Woredas at Risk	Why at Risk
Sidama Maize Belt	Lowland area with unreliable rainfall. In the reference year, poor households received 25% of their annual food needs from food aid.
Southern Special Woredas (Amaro, Burji, Konso)	Food aid is regularly delivered to these woredas due to chronic food insecurity. There are few high value income opportunities in the more remote midland areas which could be expanded to cover chicken losses.
Wolayita (Kindo Koiysha, Ofa, Humbo, Damot Weyde)	Chronically poor insecure area. The February to July period is especially critical. This is the usual hungry season and household food security depends greatly on the outcome of the sweet potato harvest in March, and the onset of green maize in July.

## 7.2 The Incentive Package and Income Support

For poor households, the loss of chicken and egg income results in an expenditure deficit, rather than a food deficit. Cash support to protect women's income base can be provided in the form of an incentive payment. The government has proposed that farmers whose birds are culled will receive 80 percent of the outbreak value per culled bird. This incentive package is not essential for food security. It is recommended in order to ensure that dead or sick birds are reported. It is also essential to ensure that households have sufficient income to buy needed goods over and above the bare minimum. Incentives must be paid to the chicken owners, most of whom are women.

Other types of income and expenditure support can be explored if poultry rehabilitation is expected to be delayed for over a year.

- Education support (books; uniforms)
- Non-staple foods (salt; cooking oil; coffee), purchased locally
- Household supplies (soap, kerosene), purchased locally

## 7.3 Protecting Health Protects Livelihoods

The loss of productive labour from an adult death will have a more severe effect on livelihood and food security than the loss of chicken income, especially in those households with young children. In such situations, food insecurity will likely become chronic. Avoiding the emergence of human-to-human avian flu transmission by containing outbreaks in poultry and stopping the spread is the critical first step. However, preparing for a potential human flu pandemic also makes sound economic sense.

- On the side of health planning, there is an urgent need for funds to cascade present training programmes down to *kebele* level, to the 2,246 agricultural extension officers and the 3,000 health workers who will be at the front line of reporting and treatment on human avian influenza.

#### 7.4 Recovery – Is there a future for backyard poultry production?

After culling poultry and imposing movement restrictions between infected and non-infected areas, there should be a time when it is safe to resume backyard chicken farming. There is a strong incentive for farmers to rehabilitate their flocks because chickens are relatively easy money. However, there may be an effort to enforce changes in backyard chicken management to make it more bio-secure. The risk is that these factors will impose an entry barrier to women farmers. For this reason, interventions that are low cost and that offer high take-up rates need to be investigated.

Recovery under potential new bio-security regulations will depend on two factors:

1. Improved inputs that will make village chicken production safer as well as affordable:
  - **FARM-Africa:** FARM-Africa has done research into low-cost chicken coops that allow chickens and humans a greater degree of separation (to lower transmission opportunities) but that are still affordable.
  - **Debre Zeit Agricultural Research Centre (DZARC):** Researchers are experimenting with hay box incubators to lower costs of production in micro egg enterprises.
  - **DZARC & the International Rural Poultry Centre:** Research into service delivery of vaccinations (currently with respect to Newcastle Disease) continues in order to find the price and delivery mechanisms that might make chicken vaccinations affordable to villagers. These efforts—in Ethiopia by the Debre Zeit Agricultural Research Centre and in Southern Africa by an Australian-based research team—need to be monitored and acted on as the research starts to yield solutions.<sup>20</sup>
2. Business loans and micro-credit to small-scale commercial enterprises (including women's groups, income-generating groups, and small poultry farms) are important in the rehabilitation period. Priority should be given to those groups who can show that they were able to produce a profit before avian flu struck.

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<sup>20</sup> Much of the research work in Southern Africa is being conducted by researchers from the International Rural Poultry Centre, Brisbane, Australia.

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**ANNEX 1**  
**ITINERARY & PEOPLE CONSULTED**

16-17 April 06	Jennifer Bush travels to Addis Ababa
18 April 06	Briefing at FAO with Dr. Yilma Jobre and Rod Charters. Attend meeting of the National Technical Task Force on Avian Influenza. Interview with Dr. Tadelle Dessie at ILRI.
19 April 06	Travel to Awasa. Briefing with Dr. Gebeyhu Ganga of the Southern Agricultural Research Centre. Arrangements made for joint village research.
20 April 06	Market interviews – Awasa and Alaba. Visit and interview participants of a micro egg enterprise supported by IPMS.
21 April 06	Village interviews (x 4) in the midland Sidama coffee & enset livelihood zone. Market interview in Tulu market. ( <i>Good Friday in Ethiopia</i> )
22 April 06	Village interviews (x 4) in the lowland Sidama maize belt.
23 April 06	Data entry and initial scenario analysis. ( <i>Easter Sunday</i> ).
24 April 06	Interviews with Bureau of Health officials in Awasa, including Ato Asrat Wolde/Meskel (Malaria Expert Team Leader), Ato Tessema Awano (Malaria Control Expert), Ato Esey (Malaria Consortium Regional Coordinator), Dr. Sahlemariam Gebre/Senber, (HIV/AIDS Regional Department Head), and Dr. Meskele Lera, (Disease Prevention & Control Department Head). ( <i>Easter Monday</i> .)
25 April 06	Interview with Dr. Alemu Yami at the Debre Zeit Agricultural Research Centre. Interview with Ato Lema of Alema Farms in Debre Zeit. Return to Addis.
26 April 06	Desk work on the scenario analyses. Secondary data collection from local offices.
27 April 06	Meeting with Sally Crofter at FARM-Africa. Preparation of presentation.
28 April 06	Presentation of the initial findings.
29-30 April 06	Return travel from Ethiopia to Canada.

**ANNEX 2**  
**VILLAGE INTERVIEWS**

**Boricha Woreda**

<b>INTERVIEW # 1: ANJA CHAFA - "Middle-income"</b> HH = 7 (5 children); Pottery makers; poor village Flock Size: 8 hens + 2 cockerels = 10 mature + chicks (1 yr. ago: 20 hens + 8 cockerels = 28 mature)				<b>INTERVIEW # 2: ANJA CHAFA - "Poor", Widow, HH = 6 (5 children)</b> Flock Size: 4 hens + 2 cockerels = 6 (1 yr. ago: 6 hens + 4 cockerels = 10)		
SOURCE OF FOOD						
Eggs	#eggs eaten/clutch/hen x x # of clutches p. year x # laying hens (0 eggs x 12 hens x 4 clutches = 0 eggs)		% Annual Fd. Needs	#eggs eaten/clutch/hen x # of clutches p. year x # laying hens (0 eggs x 4 hens x 0 clutches = 0 eggs)		% Annual Fd. Needs
	Peak 0 eggs	Low 0 eggs		0	Peak 0 eggs	
Meat/Chicken	0 chickens		0	0 chickens		0
SOURCE OF INCOME						
	# sold	Selling Price	Total	# sold	Selling Price	Total
			230 birr			145 birr
Eggs	12 eggs x 8 hens x 2 clutches = 192 eggs @ .45/egg = 86 birr 12 eggs x 8 hens x 1 clutch = 96 eggs @ .25/egg = 24 birr 288 eggs sold in total			12 eggs x 4 hens x 2 clutches = 96 eggs @ .40/egg = 38 birr 6 eggs x 4 hens x 2 clutches = 48 eggs @ .25/egg = 12 birr 144 eggs sold in total		
	288 eggs	.25-.45/egg	110 birr	144 eggs	.25-.40/egg	50 birr
Chicken	12 sold at a range from 8-12 birr/chicken, at reg. market days (= 120 birr) (current price at Boricha market = 20 birr/cockerel			7 sold at 12-13 birr, at Boricha		
	12 chickens	10 birr	120 birr	7 chickens	12.5 birr	95 birr

Purchases				INTERVIEW # 2		
	Item /frequency	Price/kg (or other unit)	Total	Item /frequency	Price/kg (or other unit)	Total
From sales of eggs	Maize flour	2 birr/1 kg maize flour: Apr-Sept		Maize Flour		
	Spices, Salt	1.1 birr/1 kg maize flour: Sept-March				
From sales of chickens	Maize Kocho			Maize Kocho		
	<b>TOTAL</b>			<b>TOTAL</b>		

**Boricha Woreda**

<b>INTERVIEW # 3: DOCHALE - "Middle Income"</b> HH = 5 (3 children) Flock Size: 1 hens + 1 pullet = 1 mature (1 yr. ago = 1 hen)	<b>INTERVIEW # 4: IMOSHE HUMO - "Middle Income"</b> HH= 8 (6 ch) + 2 <sup>nd</sup> wife Flock Size: 2 hens + 2 cockerels = 4 (1 yr ago = 3 chickens; 3 died of disease)
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SOURCE OF FOOD						
Eggs	#eggs eaten/clutch/hen x # of clutches p. year x # laying hens		Total	#eggs eaten/clutch/hen x # of clutches p. year x # laying hens 7 eggs x 2 hens x 2 clutches = 28 eggs/year 5 eggs x 2 hens x 2 clutches = 20 eggs		Total
	Peak	Low		Peak	Low	
		0	0	28 eggs	20 eggs	48 eggs
Meat/Chicken	1 chicken @ ave. weight 500 gram = .5 kg plucked weight		.5 kg	3 chickens @ ave. weight 500 gram =1.5 kg plucked weight		1.5 kg

SOURCE OF INCOME						
	# sold	Selling Price	Total	# sold	Selling Price	Total
			20 birr			30 birr
Eggs	12 eggs x 4 clutches x 1 hen = 48 eggs @ .25/egg= 12 birr 12 eggs x 2 clutches x 1 hen = 24 eggs @ .35/egg= 8 birr (She focuses on eggs sales; hatching 1 x year only.) = 72 eggs total		20 birr	= 0 eggs total (She divides her eggs between those for hatching [for reproduction of flock and for sale] and those for food for her children)		0 birr
	72 eggs	.25-.35/egg		0 eggs		
Chicken	0 (Will likely have 5 new chickens after next hatching cycle).		0 birr	3 sold at @ 10 birr (= 30 birr). 3 chickens died of disease which would have been sold. = 3 sold in total		30 birr

Purchases				INTERVIEW # 2		
	Item /frequency	Price/kg (or other unit)	Total	Item /frequency	Price/kg (or other unit)	Total
(From sales of eggs)	Maize flour					
From sales of chickens				Clothes-wife, children		
	<b>TOTAL</b>			<b>TOTAL</b>		

## Shebedino Woreda

INTERVIEW # 1: TULU - "Better-off" HH Disease at Christmas wiped out 9 chickens (whole stock) Flock Size: 3 hens + 1 cockerel = 4 mature + chicks				INTERVIEW # 2: MORANCHO - "Middle Income HH" Flock Size: 2 hens + 3 cockerels = 5		
SOURCE OF FOOD						
Eggs	#eggs eaten/clutch/hen x x # of clutches p. year x # laying hens (2 eggs x 3 hens x 4 clutches = 24 eggs)		Total  24 eggs	#eggs eaten/clutch/hen x # of clutches p. year x # laying hens (5 eggs x 2 hens x 2 clutches = 20 eggs)		Total  20 eggs
	Peak 24 eggs	Low		Peak 20 eggs	Low	
Meat/Chicken	1 chicken x 4 holidays = 4 chickens @ ave. weight 500 gram = 2 kg plucked weight		2 kg	1 chicken @ ave. weight 500 gram = .5 kg plucked weight		.5 kg
SOURCE OF INCOME						
	# sold	Selling Price	Total 162 birr	# sold	Selling Price	Total 105 birr
Eggs	4 eggs x 4 clutches x 3 hens = 48 eggs 4 eggs x 2 clutches x 5 hens = 40 eggs (note: the hens later died) = 88 eggs total		30 birr	5 eggs x 2 hens x 2 clutches = 20 eggs (Note: 4 clutches p. year but half year eat 5 of 15 eggs/hen/clutch and other half year sell 5.)		10 birr
	88 eggs	.35/egg		20 eggs	.50/egg	
Chicken	4 sold at 2 x 15 birr, 1 x 25 birr; 1 x 10 birr, at Meskel (= 65 birr) 5 sold, 1 x 15birr, 4 x13 birr, at Fasika last year (= 67 birr) = 9 sold in total		132 birr	3 sold at 3 x 15 birr, at Fasika last year (=45 birr). 6 sold for 50 birr total at regular market (= 50 birr) = 9 sold in total		95 birr
	9 chickens	10-25 birr		9 chickens	9-15 birr	

Purchases				INTERVIEW # 2		
	Item /frequency	Price/kg (or other unit)	Total	Item /frequency	Price/kg (or other unit)	Total
(From sales of eggs)	Salt		65 birr	Salt, Spices		
	Vegetables			Vegetables		
	Water	.10/day/10 Litres		Oil		
From sales of chickens	Sheep (had twins)			Cooking Dish, Plates		
	<b>TOTAL</b>			<b>TOTAL</b>		

<b>INTERVIEW # 3: YIRGALEM - "Better-off" HH = 7 p. (4 children)</b> Flock Size: 3 hens + 3 cockerels = 6 mature + 8 chicks	<b>INTERVIEW # 4: MORANCHO - "Middle Income" HH = 5 p. (3 ch)</b> Flock Size: 2 hens + 1 cockerels = 3
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**SOURCE OF FOOD**

Eggs	#eggs eaten/clutch/hen x # of clutches p. year x # laying hens (20 eggs during holidays)		Total 20 eggs	#eggs eaten/clutch/hen x # of clutches p. year x # laying hens (1-2 eggs x 2 hens x 4 clutches) = 14 eggs/year		Total 14 eggs
	Peak 20 eggs	Low 20 eggs		Peak 8 eggs	Low 6 eggs	
<b>Meat/Chicken</b>	2-3 chickens x 4 holidays = 10 chickens @ ave. weight 500 gram = 5 kg plucked weight		5 kg	1 chicken x 4 holidays= 4 1 chicken after birth= 1 @ ave. weight 500 gram = 2.5 kg plucked weight		2.5 kg

**SOURCE OF INCOME**

	# sold	Selling Price	Total 108 birr	# sold	Selling Price	Total 49 birr
<b>Eggs</b>	10 eggs x 1 clutch x 3 hens = 30 eggs in HIGH season  = 30 eggs total		8 birr	2 eggs x 2 hens x 2 clutches = 8 eggs in LOW 3 eggs x 2 hens x 2 clutches = 12 eggs, HIGH  = 20 eggs total		7 birr
	30 eggs	.20/egg		20 eggs	.35/egg	
<b>Chicken</b>	4 sold @ 25 birr, at Fasika last year (= 100 birr)  = 4 sold in total		100 birr	2 sold at 2 x 15 birr, at Fasika (= 30 birr). 1 sold at 1 x 12 birr, at N.Years (= 12 birr) = 3 sold in total		42 birr
	4 chickens	25 birr/bird		3 chickens	12-15 birr	

Purchases				INTERVIEW # 2		
	Item /frequency	Price/kg (or other unit)	Total	Item /frequency	Price/kg (or other unit)	Total
(From sales of eggs)	Salt, Spices, Oil			Salt, Spices		
	Vegetables			Gas for lamp		
From sales of chickens	Clothes			Cooking Dish, Plates		
	HH Supplies					
	<b>TOTAL</b>			<b>TOTAL</b>		

**ANNEX 3**  
**THE SNNPR LIVELIHOOD BASELINE – AN EXAMPLE**

<b><u>Food Summary - Sidama Coffeese Zone</u></b>	V.Poor	Poor	Middle	B/Off
<b>Livestock products</b>				
cow's milk+butter	0%	2%	5%	7%
goat milk	0%	0%	0%	0%
own meat	0%	0%	0%	0%
<b>Crops</b>				
Green consumption maize: no of months	13%	13%	13%	8%
Maize: kg produced	0%	0%	7%	11%
Haricot beans: kg produced BELG	0%	0%	0%	0%
Sweet potatoes: BELG prod (local meas.)	1%	2%	4%	4%
Enset (kocho): no. local meas.	5%	12%	26%	26%
Green consumption others: no of months	3%	3%	2%	2%
Haricot beans: kg produced MEHER	0%	0%	0%	0%
Sweet potatoes: MEHER prod (local meas.)	1%	2%	4%	4%
Fruit & Vegetables	3%	4%	5%	5%
blank row	0%	0%	0%	0%
<b>Labour exchange</b>				
Labour: type	8%	5%	0%	0%
Labour: type	2%	1%	0%	0%
Labour: type	5%	2%	0%	0%
<b>Purchase</b>				
Maize grain: name of meas.	34%	34%	16%	18%
Wheat grain	0%	0%	0%	0%
other grain: item	0%	0%	3%	5%
Kocho purchase: name of meas	11%	11%	8%	6%
Haricot beans purchase: name of meas	3%	4%	5%	5%
Sweet potato purchase: name of meas	3%	0%	0%	0%
Sugar purchase: kg	0%	0%	0%	0%
Meat purchase: quantity (kg)	0%	0%	0%	0%
Oil purchase: quantity (kg)	0%	0%	1%	2%
Milk purchase: quantity (kg)	0%	0%	0%	0%
Other purchase: item	1%	2%	2%	3%
gifts	0%	0%	0%	0%
<b>total</b>	<b>92%</b>	<b>97%</b>	<b>101%</b>	<b>106%</b>

**ANNEX 4**  
**TERMS OF REFERENCE**

LETTER OF AGREEMENT

Provision of funds from the *Food and Agriculture  
Organization of the United Nations*  
to the  
*The Food Economy Group*

**Project Ref: OSRO/ETH/601/MUL**  
**FAO/EMR/MOU-06**

2. Purpose

- a) The activities for which the funds provided by FAO under this Agreement shall be used are the following:
- i) Desk analysis.
  - ii) Field study measuring the potential impact of income loss from Avian Influenza (AI) on rural households in high poultry density areas of SNNPR and Oromia.
    - Households will be grouped by wealth class defined primarily by poultry holding sizes but also by other assets (4 categories have been used for this purpose in S.E. Asia).
    - Market price dynamics will form one aspect of the impact study. Since rumours of AI entered the country, the market price for chickens has dropped dramatically. The RO will assess the impact of market price reductions on the different categories of poultry holders.
    - Poultry mortalities (from death or by culling) will form the other main aspect of the impact study. The RO will assess the household income loss for the different categories of poultry owners if their poultry die or are culled.
    - Rehabilitation mechanisms will be reviewed and a compensation package recommended based on the study findings. The RO will consider what type and level of compensation should be considered for different categories of poultry owners suffering direct (from culling of poultry) or indirect (from market collapse) losses as a result of avian influenza.
  - iii) Presentation of findings in Addis Ababa to an Avian Influenza stakeholder group.
  - iv) Report which describes the likely impacts of an Avian Influenza outbreak, recommends actions to prepare for the event, and recommends compensatory actions that may be required.