

# Indigenous and Exotic Chicken of Ethiopia: Selecting the Best Breed for Farmers

Lucy Lagoze



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## **Personal Background**

I've always been a small-town girl, spending the entirety of my life in Ithaca, New York, a small city ruled by its three surrounding colleges - Cornell University, Ithaca College and Tompkins Cortland Community College - and skirted with gorges giving way to striking waterfalls and miles and miles of rolling hills. Seated in Upstate New York on the southern shores of Cayuga Lake, Ithaca has always been glaringly unique and manifests a prominent sense of community and individuality. It's the kind of place from which you want to run as fast as you can while you're there, but to which you long to return after a period of running. Growing up in Ithaca has not only shaped who I am today, but also who I aspire to be in the future.

Because I did spend my education just down the road from an Ivy League institution, I constantly had a world of opportunities at my fingertips. At the close of my junior year at Ithaca High School, I took advantage of a rare opportunity for an alternative senior year in the T-S-T New Visions Life Sciences program, housed at Cornell University and in which I was able to focus on veterinary science, a topic that had recently intrigued me. Throughout my year in New Visions, I was able to participate in rotations in the areas of oncology, large animal surgery, ambulatory, exotics, anesthesia, radiology, parasitology, ophthalmology, cardiology, clinical pathology, small animal surgery, and community practice service at the Cornell University Hospital for Animals. New Visions has presented me with countless opportunities that I couldn't have attained anywhere else. I was able to grasp academic and personal independence, and established more confidence in my abilities as an individual through conversing with various veterinary professionals and developing a personal obligation to ask questions and take action rather than wait for direct guidance or assistance.

Before the program began, as a summer assignment we were required to read both *Enough* by Roger Thurow and Scott Kilman, and *The End of Poverty* by Jeffrey Sachs in preparation for writing a research paper on international food insecurity, for the World Food Prize New York Youth Institute. Although this was a topic that I had not previously had the chance to explore, I was intrigued and in the process of expanding my research on water harvesting techniques in India, realized

that it was something about which I could potentially become very passionate. Following my presentation at the New York Youth Institute, I was chosen as an alternate to represent New York State at the 2011 Global Youth Institute in the coming month. However, just a few days later, the World Food Prize Foundation revealed that it had found the funding for a fourth New Yorker to participate and had chosen me. Thrilled, I soon made the traverse to the Midwest and had a genuinely unprecedented experience, complete with presentations from and discussions with world leaders and experts in the field of food security. Inspired, I felt a strong obligation as a member of the upcoming generation fighting against food insecurity to apply for the Borlaug-Ruan International Internship. After mailing in the last of my papers and uttering the last words in my campaign for the position, the wait began. When the confirmation that I had been hoping for finally arrived, I felt like I had just won the presidential campaign but admittedly had no idea what I was getting myself into and the level to which the experience would change me and the way I perceive the world, forever.

### **ILRI Background**

The International Livestock Research Institute's (ILRI) East African headquarters operates in Nairobi, Kenya with an additional principal research center in Addis Ababa, Ethiopia, a sprawling, accommodating over two million residents of more than 70 various ethnicities and tongues (Geography). Outside of ILRI Ethiopia are thousands of people making their way in and around thousands of cars, shadowed by towering malls, apartments, and buildings in the process of being constructed. In comparison, the research center grounds seem like a sort of sanctuary, acting as the home to a plethora of trees, flowers, and animals, completely carpeted in the greenest grass and constantly patrolled by suited security guards who return your smiles with army-worthy salutes.

ILRI serves as the host for 11 additional international organizations, mainly affiliated with the Consultative Group on International Agricultural Research (CGIAR). These organizations include the Bill & Melinda Gates Foundation, Biodiversity International, the Center for International Forestry Research (CIFOR), the International Fertilizer Development Center (IFDC), the International Maize and Wheat Improvement Center (CIMMYT), the International Potato Center (CIP), the International Water Management Institute (IWMI), the International Center for Agricultural Research in Dry Areas (ICARDA), the International Food Policy Research Institute (IFPRI), The International Centre for Insect Physiology and Ecology (ICIPE), and the International Fund for Agricultural Development (IFAD). Together, these organizations collaborate with ILRI to help the financially lacking properly and efficiently manage their livestock while attaining significant market access for their products (Hosted).

## **Chicken Health for Development Project Background**

Chicken Health for Development (CH4D) brings together researchers, professors, and scholars from England, Scotland, and Ethiopia to ultimately assist in "reducing the impact of infectious diseases on poultry production in Ethiopia." The final objectives of the project include to:

1. "Identify and prioritise infectious diseases of Ethiopian village poultry that impact on production and productivity and hence livelihood;
2. Define the prevalence and distribution of genetic markers of resistance within and between well-defined local Ethiopian poultry ecotypes and between local ecotypes and commercial lines;
3. Assess the social and economic factors underpinning Ethiopian village poultry production, particularly the impact of infectious diseases and identification of impediments to development of acceptable disease control programmes (including selective breeding);
4. Develop strategies for enhancing genetic resistance against the priority poultry diseases for incorporation into programmes for improved poultry production and productivity whilst recognising social, cultural and economic factors;
5. Develop capacity and inform policy for control of priority avian diseases in East Africa" (Objectives).

## **Background of Contributors**

Although there are a number of international contributors working on the CH4D project, I did not have the opportunity to work with all 15 of them, however, the four that I did have the chance with whom to work, as well as a PhD student from Wageningen University, were key factors in the initiation and completion of my research.

*Dr. Tadelle Dessie*, my mentor, is the Research Officer/Team Leader for CH4D. He holds a BSc in Animal Sciences, a MSc in Tropical Animal Production and a PhD in Animal Science with a specialization in Animal Genetics and Breeding. Additionally, he is a Group Leader of Biotech Addis.

*Mr. Wondmeneh Esatu* is a PhD student at Wageningen University. His PhD topic is "Defining Economic Weights for Goal Traits and Breeding Strategy," supervised by Dr. Tadelle Dessie. He helped me to develop a research topic relating more significantly to food security, and during my first visit to the Debre Zeit Agricultural Research Center (DZARC), Wondmeneh assisted me in collecting data about five selected breeds of chicken. He has been the primary, grass-root contributor in providing me with essential information concerning my research topic and assisting me in carrying out the study.

*Ms. Kasech Meles* is a laboratory technician at DZARC, belonging to the Ethiopian Institute of Agricultural Research (EIAR). She was the key benefactor and interpreter in the administration of my survey.

*Mr. Eshetu Zerihun* holds a high school diploma and 3rd grade Driver License. He works as a Field Assistant and driver and assisted in my transportation to various survey locations, as well as some survey administration.

*Mr. Alemayehu Tadesse* is a junior researcher at DZARC, belonging to EIAR. During my first visit to Debre Zeit, he demonstrated the functionality of the poultry portion of the research center, and provided me with additional information about the housed breeds (Who).

### **Developing a Research Topic**

Initially, I started off simply familiarizing myself with different species and breeds of selected indigenous livestock in areas of Africa and Asia, documented in Domestic Animal Genetic Resources Information System (DAGRIS). The objectives of this database are to "compile and organize information on farm animal genetic resources from all available sources, maintain the integrity and validity of the information, and disseminate the information in a readily accessible way to all key stakeholders" (Welcome).

After using DAGRIS to establish a general background on select breeds of livestock from different species including cattle, sheep, goat, and chicken, I was assigned to connect my primary research to CH4D in some way, and began brainstorming hypotheses. Originally, my research began as an attempt to understand phenotypic variation between various breeds of exotic and indigenous chicken, but anxious to expand my research in a manner that would link my work to food security issues, I worked with Wondmeneh to further develop my hypothesis.

At DZARC, Wondmeneh is conducting a project of which he is the Project Leader, to establish food security in Ethiopia through the production of poultry, which has been identified by the government and other development agencies as a pro-poor intervention that can help in the alleviation of food insecurity. By distributing broiler and layer chickens of various breeds created through the process of careful selective breeding to analyze and isolate desirable characteristics, he hopes to create more food-secure population. Wondmeneh invited me to base my studies off of his project and consequently, my research became an effort not only to differentiate between different breeds of chicken based on phenotypic characteristics, but also to compare different factors such as demand for vaccination and susceptibility to disease, feed availability, hardiness and adaptability, and productivity and efficiency. Using these comparisons along with data collected from surveying locals presently raising poultry, I was able to develop a more realistic idea of a breed suitable for farmers based on their available resources and facilities.

## DZARC Visit 1 - Breed Evaluation

### Introduction

During my first visit to DZARC, I collected data on five selected breeds of local and exotic chicken including Hubbard JV, Koekoek, Local Horro, and two breeds produced through selective breeding referred to below as DZ<sub>1</sub> and DZ<sub>2</sub>. Using data collected daily over the course of a month concerning the number of birds, feed offered (g), feed refused (g), number of eggs collected, and average egg weight (g), I was able to evaluate each selected breed's feed consumption and overall productivity and efficiency in the form of the Feed Conversion Ratio (FCR). The FCR is a calculation of approximately how many grams of feed one bird of a particular breed needs to intake in order to produce one gram of egg. By calculating the average monthly FCR for each of the five selected breeds, it became evident which breeds have higher and lower levels of efficiency in terms of productivity. I also observed each selected breed's demand for vaccination and susceptibility to disease, and hardiness and adaptability.

### General Overview of Selected Breeds

#### HUBBARD JV



Hubbard JV is an exotic breed of broiler chicken imported to DZARC from France. Broiler refers to its use in meat production and sale.

## KOEKOEK



Koekoek is an exotic breed of dual-purpose chicken imported to DZARC from South Africa. Dual-purpose refers to its use in both meat and egg production and sale.

## LOCAL HORRO



Local Horro is an indigenous breed of dual-purpose chicken. It originates in the Horro region of Ethiopia, northwest of Addis Ababa.

## DZ<sub>1</sub>



DZ<sub>1</sub> is a breed of chicken produced at DZARC through selective breeding. The bird is a combination of Lohmann Silver, Koekoek, and Red and White.

DZ<sub>2</sub>



DZ<sub>2</sub> is a breed of chicken produced at DZARC through selective breeding. The bird is a combination of BV, Lohmann Silver and Red and White.

#### Demand for Vaccination/Disease Susceptibility

A breed's demand for vaccination and disease susceptibility depend largely on its origin. For example, indigenous chicken like Local Horro "have better natural immunity against common poultry diseases," while exotic chicken like Hubbard JV and Koekoek do not, and therefore have a higher demand for vaccination and susceptibility to disease (Dana). In terms of selective breeding, exotic chicken with higher levels of productivity are bred with indigenous chicken with better natural disease immunities to create a chicken with both desirable characteristics, resulting in breeds with only a moderate demand for vaccination and disease susceptibility. This would be the case with both DZ<sub>1</sub> and DZ<sub>2</sub>.

#### Feed Consumption

	Hubbard JV	Koekoek	Local Horro	DZ <sub>1</sub>	DZ <sub>2</sub>
average weekly feed intake (g/bird)	144.1	109.9	105.9	111	104.4
approximate monthly feed intake (g/bird)	576.3	439.6	423.6	443.8	417.4
approximate yearly feed intake (g/bird)	6915.6	5275.2	5083.2	5325.6	5008.8

## Hardiness/Adaptability

Similar to a breed's demand for vaccination and susceptibility to disease, hardiness and adaptability also rely on origin. Local Horro and other indigenous breeds are known to possess various adaptive traits and genes that result in characteristics such as minimal feathers, and black bones and meat, making them more thermo-tolerant. Additionally, indigenous chicken are characterized as taking very good care of their young, having good scavenging abilities, and being very hardy (Dana). The aforementioned concept concerning selective breeding also applies to hardiness and adaptability, making both DZ<sub>1</sub> and DZ<sub>2</sub> highly hardy and adaptable. Consequently, Hubbard JV and Koekoek only have moderate and low levels of each, respectively.

## Productivity/Efficiency

	Hubbard JV	Koekoek	Local Horro	DZ <sub>1</sub>	DZ <sub>2</sub>
average egg weight (g)	63.3	57.5	47.5	58.5	53.8
approximate monthly production (g egg/bird)	1088.7	875.8	583	663	827.7
FCR	3.71	3.47	5.09	4.50	3.53

## Summary

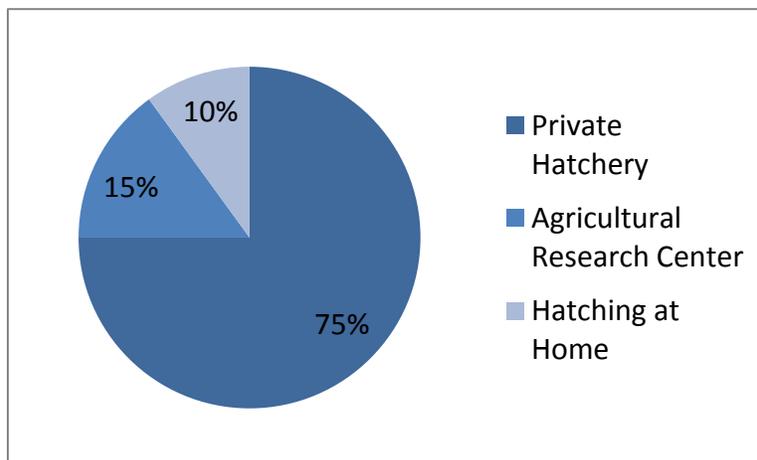
	Hubbard JV	Koekoek	Local Horro	DZ <sub>1</sub>	DZ <sub>2</sub>
Description (color, confirmation)	white, heavy	barred, medium	mixed, light	white, medium	brown, medium
Demand for Vaccination/Disease Susceptibility	very high	high	low	moderate	moderate
Feed Consumption	high	moderate	low	moderate	low
Hardiness/Adaptability	low	moderate	very high	high	high
Productivity (eggs produced)	high	moderate	low	low	moderate
Efficiency (based on FCR)	moderate	high	low	moderate	high

## DZARC Visit 2 - Survey

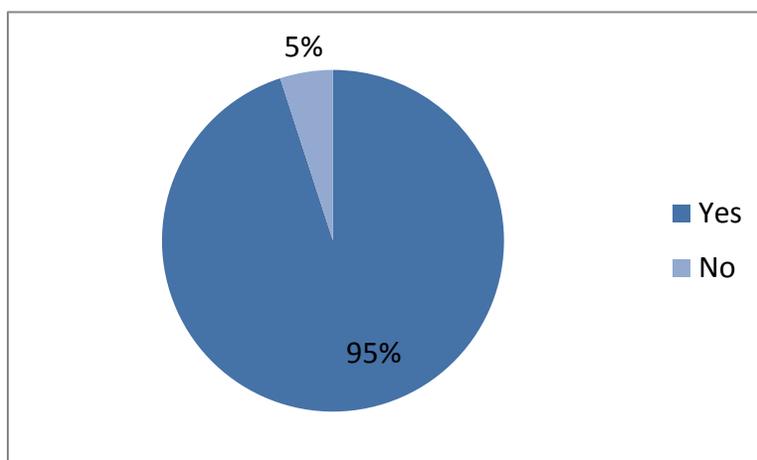
### Introduction

During my second visit to DZARC, I administered a survey to 20 local poultry farmers of both sexes between the ages of 29 and 70 years old in Beyoo, Biyo Bisike, Debre Zeit, Gode, Mojo, and Serba and Ude. The objective of this survey was to evaluate the management practices of local poultry farmers as well as consumer breed preferences concerning both meat and eggs. The survey included questions meant to observe the source of poultry, meat and egg type preferred by consumers, vaccination practices, feed availability, and housing conditions.

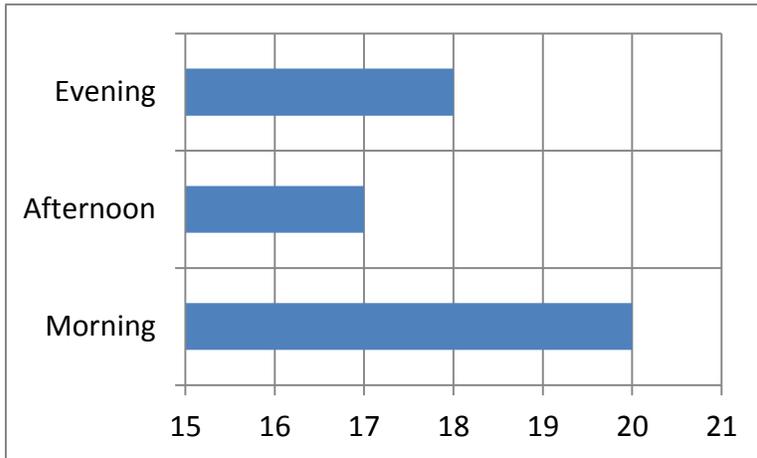
### Breed Sources



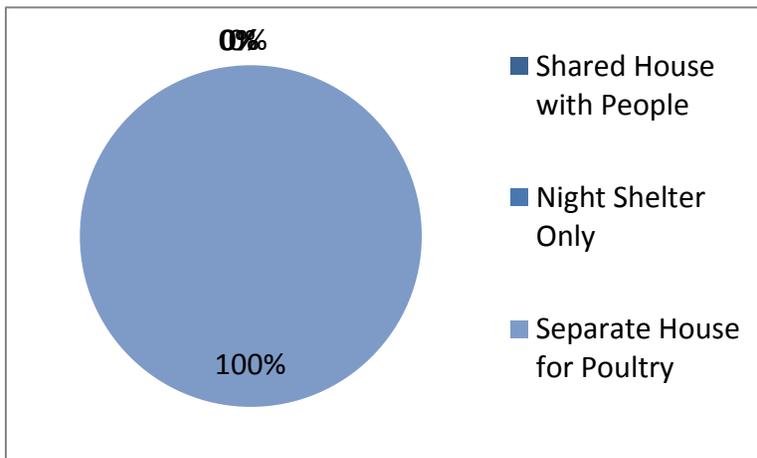
### Vaccination Practices



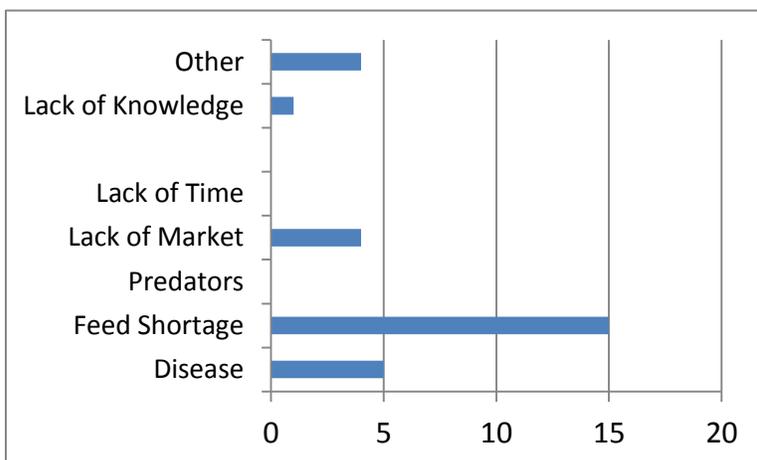
### Feed Availability



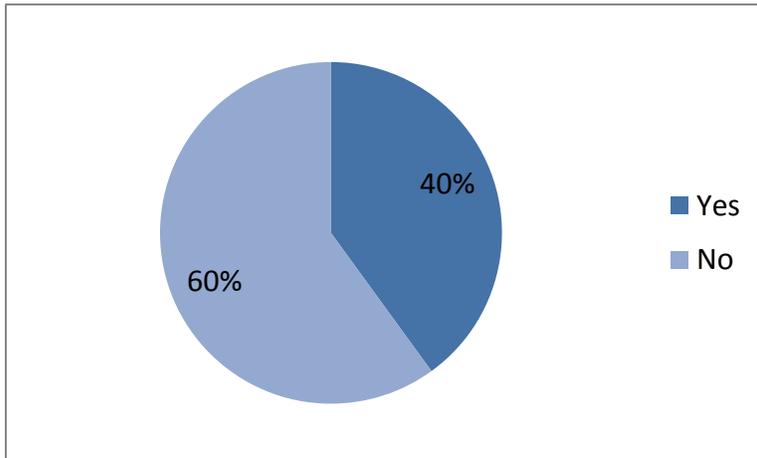
### Available Housing Conditions



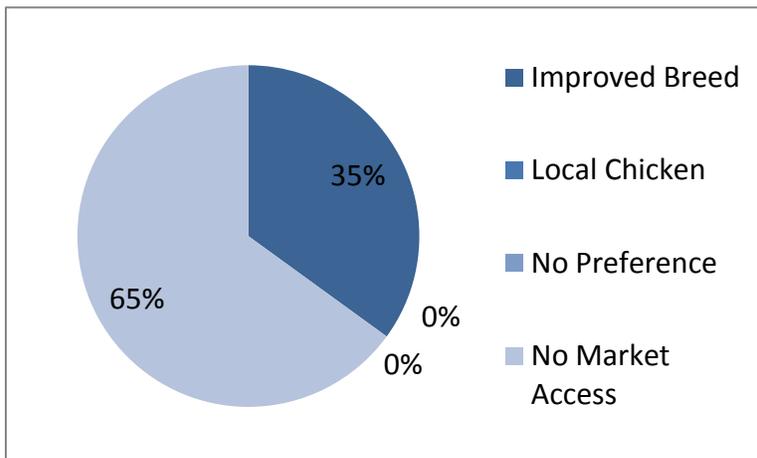
### Constraints of Improved Breeds



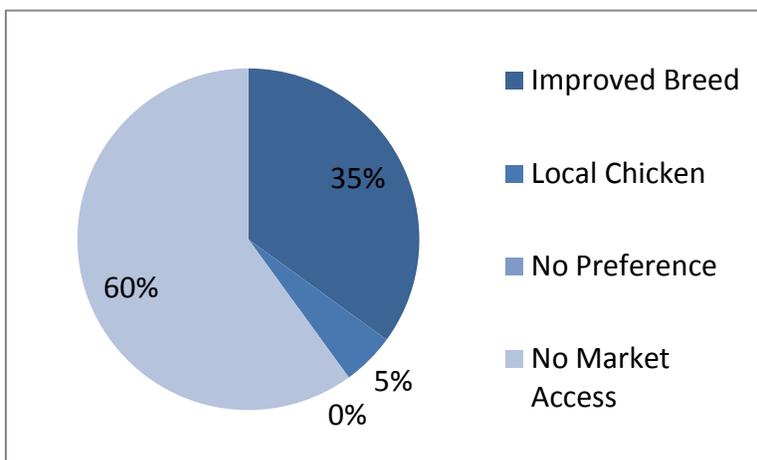
### Market Accessibility



### Meat Type Preferred by Consumers



### Egg Type Preferred by Consumers



## Summary

Most local poultry farmers obtain their chickens from private hatcheries and do practice vaccination but still face problems concerning the high disease susceptibility of improved breeds. Initially, feed availability did not appear to be an issue, as most of the farmers claimed to provide their chickens with feed at least twice and sometimes even up to four times a day. However, when asked about the constraints of improved breeds, farmers revealed that the main constraint, ruling far more common than any of the others, is indeed feed shortage. Every one of the surveyed farmers claimed to house their poultry in entirely separate facilities. As over half of the surveyed farmers do not have market access, profiting off local poultry farming seems to be a considerable struggle. The farmers that do have access to markets and selling their poultry products affirmed that in the case of both meat and eggs, consumers prefer to buy poultry products from improved breeds to those from local breeds.

## Conclusions

### Selecting the Best Breed for Farmers

Selecting the best breed for farmers involves evaluating all the previously mentioned factors, including color and confirmation, demand for vaccination and susceptibility to disease, consumption of feed, hardiness and adaptability, productivity, and efficiency. To successfully draw an accurate conclusion, the evaluation process must include a comparison between the characteristics of each breed to the preferred and most appropriate characteristics for local poultry farmers, based on the results of the administered survey.

First, we will go through each factor separately, individually selecting the most and least appropriate breeds. Because none of the surveyed farmers reported predators as being a constraint of improved breeds, color does not play a role in deciding the most suitable breed out of the selected five, for local poultry farmers. If predation did prove to be a common problem, the white birds, Hubbard JV and DZ<sub>1</sub>, would both be eliminated as advisable choices because of their high levels of visibility. Although the majority of surveyed local poultry farmers do reportedly vaccinate their birds, disease stands as the second leading constraint of improved breeds according to the results of the survey. Taking this into consideration and solely based on each selected breed's susceptibility to disease, Hubbard JV would be the least appropriate option for local farmers and Local Horro would be the most appropriate. However, taking into account the prominent issue of feed shortage for these farmers, Koekoek or DZ<sub>2</sub> would be the best options, singly based on the breeds' FCR's and overall efficiency showing high levels of production versus low levels of feed intake. Again, because management practices for Hubbard JV involve providing large amounts of feed, the breed would be difficult for local farmers to properly care for due to constant feed shortages, and would be one of the least appropriate choices. Although Local Horro would be appropriate in its low amount

of feed consumption, its low production and efficiency levels make it somewhat undesirable. In terms of adaptability and hardiness, since 100 percent of surveyed farmers reported having a separate house entirely constructed for poultry, the nature of both features for each selected breed become largely irrelevant.

Looking at the various factors collectively, rather than as individual concerns, DZ<sub>2</sub> claims the top spot as the overall, best option for local farmers. It only has moderate susceptibility to disease, resulting in a lower rate of mortality in the case that a farmer could not provide vaccination services, or more commonly, that the vaccinations weren't entirely effective. Because DZ<sub>2</sub> qualifies as having the lowest level of feed consumption at an average of 104.4 g weekly, compared to Hubbard JV's weekly feed consumption of 144.1 g, taking frequent feed shortages into account, it is a good choice for the majority of farmers, who are constantly struggling with that particular issue. Looking at the ratio of monthly production in g egg/bird to the FCR (g feed/g egg), DZ<sub>2</sub> produces a ratio of 234.5 g egg<sup>2</sup>/bird • g feed. With the same units, the ratios for Hubbard JV, Koekoek, Local Horro, and DZ<sub>1</sub> are 293.5, 252.4, 114.5, and 147.3 respectively. Because we are looking for the highest value for monthly production and the lowest value for the FCR, the overall most efficient bird would have the highest ratio. Although the ratio for Hubbard JV is significantly higher than that of DZ<sub>2</sub>, it is automatically eliminated from being the most appropriate breed for farmers because of its high demand for vaccination and susceptibility to disease, and uppermost level of feed consumption. The ratio for Koekoek is also higher, although not by much (17.9 g egg<sup>2</sup>/bird • g feed), but compared to DZ<sub>2</sub>, it consumes a larger amount of feed (approximately 5.5 additional grams, weekly), is more susceptible to disease, and has a lower level of hardiness and adaptability. Conclusively, out of the five selected breeds, DZ<sub>2</sub> remains standing as the best breed for local Ethiopian poultry farmers.

### Improving Food Security

Poultry play an extremely significant role in providing both food and income to smallholder farmers and countless communities in the majority of developing countries. In rural Africa, chickens are more abundant than any other species of livestock, mainly existing as a plentiful source of meat and eggs for home consumption. In comparison to red meat, chicken meat has a higher biological value, meaning that a higher percentage of protein is absorbed from the meat and then retained in the body of the consumer, becoming readily available for access and use in protein synthesis. Both the meat and eggs of the chicken provide the consumer with a significant amount of protein and energy, as well as substantial vitamins and minerals. Additionally, because the meat of a chicken has the ability to cook more rapidly than both red meat and any kind of pulse, less fuel wood is necessary, cutting down on the amount of required energy in the form of labor and resources, and allowing the resulting excess energy to be used in other activities (Kitalyi).

Although poultry production has the potential to play a major role in the alleviation of food insecurity, it first must be improved, starting with the nature of

the village breeds. Presently in rural Ethiopia, local chickens such as Local Horro, which make up over 90 percent of the 38.3 million in the country, have low levels of productivity resulting from poor genetic makeup (Esatu). Using selective breeding to isolate and utilize the most desirable traits of select breeds will ideally result in a breed more suitable for local poultry farmers, providing them with a chicken that is less susceptible to disease, and more hardy and adaptable much like the current local breeds, but also much more productive and efficient, with a higher output to complement its low input. By evaluating the presently used breeds, management practices of the farmers, and preferences of the consumers, we will be more aware of the specific characteristics of the bird needed to fill this position, and eventually be able to create it. Conclusively, the ideal breed would provide these farmers with more product for the same input, and therefore, more food and market resources, resulting in additional profit and a higher level of food security.

## **Ambience**

The final month of my senior year at Ithaca High School went by quickly, leaving me zero time to develop absolutely any expectations about my impending voyage halfway across the world. It was all studying, test taking, graduating, saying goodbye, and before I knew it, I was on a plane sipping on cranberry juice, eating some kind of unidentifiable European version of trail mix, and wondering what on earth I had gotten myself into. Without any predetermined expectations to refute, you could say I was in good shape but nevertheless, it is impossible to prepare oneself for a culture completely different from their own. Although in retrospect, I recall meeting the now, quite familiar question of, "Is it what you expected?" with the no expectations argument, even without any conscience presumptions, I'm sure that somewhat unknowingly I created a very Americanized mental image of Ethiopia. At the end of my journey, I would now meet the same question with a very different response. No, Ethiopia is absolutely not, in every sense, anything like what I expected.

*Visual.* Replacing the sunflowers, cattails, Queen Anne's lace, bluebells, and wildflowers of Upstate New York were endless displays of bougainvillea, calla lilies, hibiscus, scarlet bottlebrush and columbine. Gone were the squirrels, chipmunks, groundhogs, and ridiculous amount of deer. A sprawling city of millions of people took the place of the quaint, little town walled with hills of quaint, little houses to which I'm accustomed. However, no matter how different, the trees, flowers, and buildings, they did nothing to prepare me for the people. Have you ever opened a can of kidney beans to find that somehow, a sole navy bean has snuck into the mix? To say the least, being that lonely navy bean has taken a bit of getting used to. Of course at first, the staring, pointing, and yelling made me want to crawl into a hole and I couldn't honestly say that it still doesn't rattle me a little, but at the very minimum, I have gained understanding. Some rural Ethiopians have only once or twice seen someone with my skin, hair, and eyes. After careful consideration, I have concluded that if put in the same circumstances, I too would be staring, pointing, and yelling.

*Auditory.* I have always wanted to go back in time to when I couldn't speak, read, or write. Not being able to comprehend the messages of the signs going by through the car window, or understand my mother's words seems like such a foreign and impossible concept. In some ways, coming to Ethiopia is like going back in time. I have spent countless hours listening to passionate debates in which I don't have the option of partaking, and hearing the endless laughter of my tablemates, about which I have no idea. Although language has the ability to create insurmountable barriers, the flash of a contagious smile or the sight of tearstained cheeks will always be forms of communication shared by every human being on this earth.

*Kinesthetic.* Cold. Central Ethiopia has three seasons, Kiremt, Belg, Bega: wet, wet, dry. The big "kiremt" rains stretch from mid-June to mid-September and lucky for me, I arrived just in time for the show. In contrast to the sunshine and 80 to 90 degree weather being enjoyed back home, Addis Ababa usually peaks around 65, and for the majority of the day, is shrouded in a sky almost screaming out in warning of an impending rain. Warm. Much unlike Americans, Ethiopians are always on the lookout for socialization, whether it be with a close friend or a complete stranger. There is no such thing as passing a companion without stopping to properly greet them, a process involving handshakes, hugs, kisses, and lengthy conversations. While we Americans are often too busy jumping from one task to the next to stop and properly acknowledge our acquaintances, colleagues, friends and even family, an Ethiopian will never hesitate to strike up a dialogue with a stranger at the next table, or spontaneously sit down and enjoy coffee and conversation with a friend. Their carefree outlook on life and habitual necessity to cherish moments with loved ones could open our eyes to the more important things in life.

*Olfactory.* The combined smell of heavy rain and good coffee will always be unique to Addis. Even when the sun creeps out, and the pavement has returned to its former, lighter shade of gray, distinguishable whiffs of precipitation still dance around your nose and you can sense a slight pressure on your shoulders. Constant coffee consumption carries its own benefits, filling every restaurant, cafe and kitchen with its own full-bodied perfume.

*Gustatory.* Ethiopian-American cuisine has taught me, if anything, to stick to what you're good at. Despite possible initial hesitations concerning national dishes, I can honestly say that in the end, my experience with traditional, Ethiopian cuisine has never been one to disappoint. I wish I could say the same for the Ethiopian interpretation of the American diet, which includes burgers, fries, fried chicken, fried steak, fried fish and fried sandwiches. Teff, a small cereal grain, is the staple of the Ethiopian diet. Made into a spongy, sourdough flatbread called injera, teff is the basis of almost every meal and acts as a handheld carrier for meat, vegetables, pulses, and other food items. Combining the somewhat sour flavor of injera with mildly spicy stews referred to as wats, creates a unique taste that once acquired, is impossible to rival.

My experience of the unique ambience of Ethiopia has taught me that no amount of reading books, watching documentaries, or even looking at pictures can begin to hint at the actual nature of a firsthand experience in a place so different from your own. It has bestowed upon me a hungry desire to pull away from those books, documentaries and pictures, and replace them with experiences. I want to immerse myself in these diverse cultures with their foreign sights, sounds, feelings, smells and tastes, and come back knowing that there are so many different ways to enjoy the one life that you are given.

## **Conclusions**

### Veterinary Medicine

It's amazing how the same professions in different locations can stand a world apart. Practicing veterinary medicine in the United States is all about helping animals. At the Cornell University Hospital for Animals, I have stood in operation rooms for countless hours watching complex and lifesaving operations on cows, horses, alpacas, dogs, cats, and even snakes. I've seen animals receiving expensive radiation and chemotherapy for lymphoma, squamous carcinoma, and osteosarcoma, and dogs with amputated limbs and pacemakers. There is not a single doubt that the vets performing these services are there to save the lives of animals and help them live a life of happiness and fulfillment to the greatest extent. If an animal dies, it's not the loss of profit, but the loss of a friend. We can afford to spend more money on our animals' health than our own, and often, we choose to. Because we have the money and the resources to provide our animals with nothing but the best food, shelter, and care, it is our responsibility to do just that and nothing less. If our animals are suffering, it is our duty to stop that suffering to the best of our ability and the extent of our resources. If one doesn't have those resources, one shouldn't have an animal.

Practicing veterinary medicine in Ethiopia is all about helping people. Vaccinating a cow, sheep, goat, or chicken, preventing possible suffering, is preventing possible suffering of a man, a woman, a child, a family. That animal is not a friend, but a means of survival. Without the protein from that meat and eggs, or the vitamins and minerals from that milk, or the money from that sale, people wouldn't be able to live. Killing or abandoning an animal because it's sick or disabled, or because you simply need the food or money isn't cruel if you lack the resources to care for it and your own survival depends on it. In the United States, it would be a crime to do such a thing as we have animal adoption centers and others who are capable and willing to care for such animals but here, where no such things exist, it is simply a way of life.

## Food Security

I have always been fascinated with any and all forms of science: constellations, the digestive system, rocks and minerals, frog dissection, biomes, chemical bonds, animal behavior, plant breeding, you name it. Throughout the course of my education, I have snatched up every opportunity to take a more challenging science course, or do an extra credit project on a scientific subject. For me, it has always been about individually gaining more knowledge through science because it's something that I enjoy, and often, explains phenomenons that I have previously found largely inexplicable. None of these explanations really did anything to change how the world functions or how a person goes through their life, but for me, it didn't matter; it was simply fascinating.

Working at ILRI was different. Differentiating between various breeds of chicken just wasn't enough for me, and I wanted to partake in something that would help to change someone's life, not just my own. Throughout my research, I constantly found myself asking the same questions: "How will this impact food security?" and "What more can I do to ensure that I'm making a difference?" Suddenly, something had changed and simply enriching my knowledge of science wasn't all that satisfying without a purpose behind it. Sure, it was interesting, but all the while I was painfully aware of an absence, a huge hole waiting to be filled.

Once I was aware of the path that my research would take in terms of helping to alleviate food insecurity, that hole began to disappear. I met people who truly cared about the livelihoods of those less fortunate and I fed off their passion. Throughout this process, I realized not only how easy it is to get involved, but also how difficult it is to make a difference. Stepping off of that plane, for the first time on African soil, on the night of June 23rd, 2012, I was sure that after two months of rigorous research, when I finally set foot back on American soil, a significant improvement would have been made. Now, I am fully aware that alleviating food security is a process that will surely take years, decades, centuries, millenniums; and two months of hard work won't even begin to make a dent, no matter how driven or determined you are. However, despite this, it is important to realize that 12 months make one year, and ten years make one decade, and every minute of fighting, no matter how seemingly insignificant, makes a world of difference in combination with genuine perseverance. If passionate people continue to adopt this sense of genuine perseverance, in the end, a change will surely be made.

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**Photos**



**Columbine**



**Injera**



**Traditional Coffee Ceremony**



**Holy Savior Orthodox Church**



**Girls in Rural Ethiopia**



**Thank you ILRI!**