“Right to Livelihoods in Haiti”
FINN **CHURCH AID (FCA)**

Final Report Phase #1

Focus on egg production and rural household livelihood strategies

Submitted
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Map of Haiti and the Department of the South

Contents

TABLES

CHARTS

Executive Summary

- This report focuses on egg production in Haiti with an emphasis on popular class rural household livelihood strategies.
- Data is drawn from a review of the literature and contact with farmers, entrepreneurs, merchants, cooperative leaders, and two surveys: a 382 household "Chicken Survey" and a follow-up telephone sub-survey of 91 of the original respondents.
- Current value of the Haitian egg market is 36 million USD per annum (MARNDR 2014). That translates to 41.2 million eggs per month; 6.45 million are produced in agro-industrial facilities in Haiti; several hundred thousand are produced on small farms, where reside some 50% of the Haitian population, and in peri-urban environs where ~30% of the population lives; all the remainder are imported from the Dominican Republic (more than 90% in 2012) and, to a far lesser extent, from the United States (~4% in 2012).
- Egg production in Haiti fell in the 1980s and 1990s, all but completely disappearing in 1998. During the same time Dominican egg production and imports grew dramatically.
- Alleging a breakout of bird flu, the Haitian government embargoed Dominican eggs in 2012, something that it had done in 2008 and in fact never formally rescinded. There was, and still is, a massive effort to take advantage of the break in imports to promote national production. Nevertheless, imports have once again informally resurged.
- The prospect of Haiti becoming self-sufficient in egg production is still remote. Poor transport, expensive and unreliable electricity, and extremely poor extension service and government support are significant impediments. But the greatest constraint is feed, which is 80% of the cost of egg production. Taking into consideration feed-to-egg conversion ratios, the cost of feed for an egg in Haiti is currently 11 US cents, about the same as the cost of an egg purchased at the border.
- For those investors interested in poultry, a far more attractive investment is production of broilers. However, eggs have an advantage over production of chickens for meat in that they can be stored more easily, at no cost in feed, and they are far more marketable in rural areas.
- Constraints to egg production at the level of rural household has to do first with the strategies that farmers utilize to survive. Most depend on a mixture of technologically simple livelihood strategies exercised under the tenet of "minimum investment and minimum risk." For poultry this means free ranging the birds, feeding them only enough that they stay near the homestead, not vaccinating, providing any supplements or treating the birds when ill. Consequently disease and predators take a heavy toll on flocks: 81% had lost their flock within the past year.
- A limitation on flock size inherent in free-ranging in ecological carrying capacity, i.e. the limited number of bugs and edible plants per unit area.
- Constraints on egg production within the free ranging system include the pecking order. Chickens do not readily accept other birds not reared with the flock and protected by a mother hen. This puts a premium on "brooding," 77% of respondents preferred hens that are broody vs good layers. When hens brood they stop laying eggs. Because of these constraints, free-ranged chickens annually produce only 14 eggs per hen per year in Haiti, most of which are not destined for the market. In comparison, an industrial layer can produce 300 eggs per year.
- Only 13% of farmers cited egg production as a primary reason for raising chickens.
- Most poultry and egg projects in rural Haiti have failed. Those that succeed appear to be heavily subsidized by NGOs, church congregations, or obscure state investors. Others are arguably more about getting donations and support than about producing for the market.

Recommendations

A business plan should made that includes two approaches: one for the poorest farmers practicing free-ranging strategies, the other for small entrepreneurs interested in managing 200 to 1,000 laying hens using modern industrial techniques. The plan should,

1) Recognize that no one yet has developed a sound strategy for cost effective production of eggs in Haiti
2) Recognize that any successful strategy must be modified for Haitian context of poor infrastructure, high feed costs, and difficult access to imported technologies.
3) Be designed to nurture the development of profitable egg production strategies adapted to the local context.
4) Should emphasize, not simply egg production, but a local economy of egg production. Examples of niches within a local egg economy would include,
    a. Suppliers of alternative feeds: chickens are omnivorous, which means alternative feeds can be developed, including a mixture from sources such as special trees, shrubs, perennials, grasses, legume hay, and herbs. For protein, duckweed and moringa. Unused food byproducts such as banana and plantain peels can be turned into feed. Household and urban wastes that cannot be turned into feed can used in compost for vermiculture, i.e. to produce worms and other bugs useful as feed.
    b. Micro-hatchlings: inexpensive incubators ($50 to $200) readily available in the US and that could be adapted to run on solar power and batteries making the business of hatchling a possibility for local entrepreneurs
    c. Supply of coups: a small hen houses constructed of local materials, likely candidate being bamboo using the same weaving techniques and weavers that make fish traps throughout Haiti.
5) The traditional vs. the entrepreneurial strategies should be distinct. For example, it should be recognized that scavenging strategies may be best exploited using local chickens or imported stock that are not necessarily good layers but known to be efficient scavengers. Highlighting the advantage of this is the fact that Haiti hens tend to provide only 14 eggs per year, exotic breeds as many as 300, but when the exotic breeds are used as layers within the traditional Haitian free-ranging strategy they apparently do so much as double local egg production.
6) Use of local institutional partners, in the Les Cayes area and with demonstrated capacity and disposition to contribute this includes four agricultural Universities in the area (most notably the American University of the Caribbean and SEED), Heifer International, FONKOZE, Jardin Meridional. Significant is that Ferme Des Antilles, the state of the art egg production facility in Cavaillon has expressed interest in working with partners or franchising to smaller entrepreneurs.

Introduction

This report focuses on egg production in Haiti with an emphasis on popular class rural household livelihood strategies. The study ultimately addresses the question, if equipped with the proper technological resources and financial support, could these households provide significantly more eggs to the national population? Special attention is given to production operations in Department of the South.

The conclusion is that increased egg production is incompatible with the prevailing livelihood strategies of the poorest Haitian farmers. For those middling level entrepreneurs it is also extremely difficult in view of the sophisticated state of the art technology used in modern laying operations, the poor infrastructure in Haiti, difficulties in accessing any technology from developing countries (given complications with customs and shipping), and the high cost of feed in Haiti. A successful egg production campaign must be compatible with conditions in Haiti but it must draw on the wealth of recent information about free ranged chickens and producing eggs to create new, economically and technologically sustainable strategies. Use of cooperatives and associations is only recommended with respect to training farmers in poultry care techniques.[i] [ii]

Data is drawn from a review of the literature and contact with farmers, entrepreneurs, merchants, and cooperative leaders. The consultant visited eight production facilities in the Department of the South and one in Department of the West (Gressier) and interviewed staff and technicians. Four surveyors conducted a supplemental 382 household "Chicken Survey" and a follow-up telephone sub-survey of 91 of the original respondents.

Background

Current Haiti Egg Market

The total value of the Haitian egg market is currently estimated at 36 million USD per annum (MARNDR 2014). That translates to 41.2 million eggs per month; 6.45 million are produced in agro-industrial facilities in Haiti; several hundred thousand are produced on small farms, where reside some 50% of the Haitian population, and in peri-urban environs where ~30% of the population lives; all the remainder are imported from the Dominican Republic (more than 90% in 2012) and, to a far lesser extent, from the United States (~4% in 2012).

Declining National Production

Haiti went from a country that in 1981 produced 80% of what it consumes to a country where more than 50% of the national diet is imported (AFC 2014). Poultry and eggs are an extreme example of the economic decline. In 1980 Haiti had four hatcheries with a total capacity of 1 million chicks per month and producing at 40% capacity. At the end of the 1991 to 1994 international embargo against Haiti the country had a single hatchery capable of producing 500,000 chicks per month but operating at 50% capacity. With the end of the embargo and a new 5% tariff on imported eggs, the sector experienced a slight resurgence, but in 1998 national production all but completely ceased. In year 2000 Haiti's only hatchery had dropped to a capacity of 400,000 chicks while producing a mere 48,000 hatchlings per month, 10% of capacity and 20% of what was being produced 6 years earlier (see Chatelain 2012). As seen in Table 1 below, the poultry sector has still not recovered.

Table 1: Change in Hatchery Capacity vs. Actual Production 1980 - 2012				
Year	Number of hatcheries	Total hatchling capacity per month	Hatchlings produced per month	Ratio production/capacity
1980	4	1,000,000	400,000	40%
1990	1	500,000	250,000	50%
2000	1	400,000	40,000	10%
2012	3	558,000	150,000	21%

Source Chatelain 2012:21

Urbanization

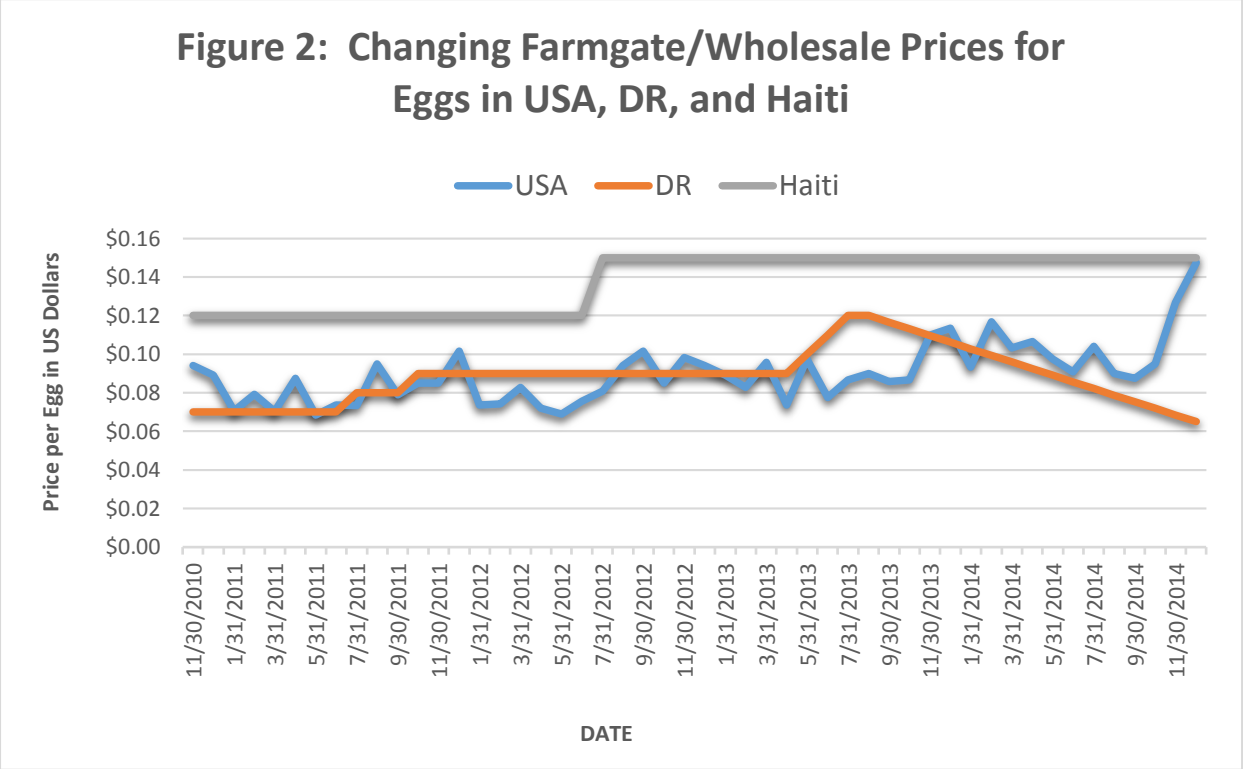
The decline in agricultural production was not only in the industrial sector. It occurred in the context of a high rate of urbanization. During the same period that production fell, Haiti went from a country where 70% of the population of lived in rural areas or villages and produced food for household or local consumption—such as eggs-- to one where 50% of the population is urban and produce little to no food at all. [iii]

Dominican Eggs

While Haiti was rapidly urbanizing and the economy was contracting in terms of both agriculture and non-food production, the economy of Haiti's already heavily urbanized neighbor, the Dominican Republic, was experiencing dramatic growth. Between 1991 and 2013 the Dominican economy grew at an average annual rate of 5.5%, among the fastest in the world. Growth in egg production was among the most vibrant aspects of that growth. Dominican egg production doubled in the years 2004 to 2011. A major outlet for Dominican production was Haiti. In the past 15 years alone the amount of Dominican products entering Haiti have increased 20 fold: official Haiti-Dominican cross border trade went from $71.9 million 2001 to $802 million in 2010. At least 90% of the trade was in favor of the Dominicans. Since the 2010 earthquake trade has doubled again, reaching an estimated USD $1.5 billion. Only $50 million of the current total is in favor of Haiti. Eggs became one symbol of Dominican market success and its domination

of Haiti. The significance of access to the Haitian market—illegal since 2008—cannot be gainsaid. Because of the presence of New Castle Disease on the Island, the Dominicans cannot export to any other neighboring islands. Yet, with only Haiti as a trade partner, by 2012 egg exports to Haiti had made the Dominican Republic the third largest exporter of eggs in Latin America and the Caribbean.[iv]

Dominican egg producers have advantages over their Haitian counterparts. They have better roads and transport. But they also suffered the major disadvantage of high feed cost. As will be seen shortly, 80% of egg production costs are from feed and, just as in Haiti, the Dominicans must import feed from the US. But they have reduced cost of feed with government subsidized state of the art processing facilities and they have the strong support directly to the egg producers in the form of technical assistance and government subsidies. Not least of all, the Dominican producers are enjoy a market protected by tariffs that very from 22 to 99 percent. In doing all this the Dominicans are producing eggs on par and sometimes cheaper than US producers (see Figure 2). [v] [vi] [vii] [viii] [ix] [x]



*Note that the December 2014 divergence in USA vs DR egg prices is the result of a new animal rights law in California doubling the space required for laying hens. The law applies to eggs imported from other states and thus, with some 30% of all US eggs sold in California, impacts the entire market. See endnote **xviii** for sources

Renewed Efforts at National Production

In 2007, the Preval administration launched initiatives aimed at encouraging investment in the poultry sector (CNSA 2007). Notwithstanding the Ministry of Agriculture's "Politique de Développement Agricole 2010-2020" (MARNDR 2009) which included a reduction of the tariff on eggs from 5.0% to 3.5%, the 2010 Plan National d'Investissement Agricole and Plan d'Action pour le Relèvement et le Développement d'Haïti, and its plan for the "Développement de l'Aviculture" was designed to facilitate growth in poulty

industry. Chicks were permitted to be imported with only a total of 7% surcharge for taxes, verification and accounting costs. [xi] [xii]

The five years since the 2010 earthquake have brought more changes. An avalanche of low interest funding programs and that came about after the earthquake, helped galvanize entrepreneur interest in the sector. Projects launched include,

- USAID/ WINNER dans la région des Gonaïves (50.000 pondeuses)
- PDLH/OXFAM in Paillant (with AFAP)
- USAID/ HI FIVE dans la région des Cayes avec ASSAVIS.
- Pro-Huerta in the North (Argentina)
- Core's projects at Christian Ville in Gressier
- Christian Aid in the Sudest[xiii]
- EcoWorks International (EWI) in Ganthier

Not least of all, in 2011 the Martelly administration renewed the government's commitment to increased national production on all fronts, especially in the agricultural sector and, more than anything else, in egg production. By 2012 Haiti had 721 facilities producing broilers and 25 producing eggs.

Making the growth possible were three significant hatcheries: Haiti Broilers (capacity = 400,000 chicks per month), JAVEC (100,000 chicks per month) and FACN (50,000 chicks per month). With a total capacity for these three operations of 550,000 chicks per month, if all the chicks were destined to become laying hens, they could, in one year, enable Haiti to produce 6 million eggs per day, significantly more than market demand. It seemed in 2012 that Haiti could become self-sufficient in egg production. It also seems that the Haitian government was keen to take advantage of the opportunity.[xiv]

The Egg Embargo

In June 2013, claiming that the Dominican poultry industry was experiencing an outbreak of aviary, flu the Haitian government prohibited the importation of eggs from the other side of the island.[1] It was not the first time. A spate of H5N1 bird flu cases in 2008 resulted in a Haitian embargo against Dominican eggs something that was imposed for the period 2008 – 2013 and never formally lifted. Instead the import deficit was made up for in 2008 and 2009 by importations from the US and thereafter the Dominican imports informally resurged in the wake of the 2010 earthquake. Notwithstanding, within four days of the ban on Dominican eggs the PAHO (Pan American Health Organization) had investigated the 2012 case and rejected the claim.[xv] [xvi]

The new embargo nevertheless remained in place, helping to promote national production through an increase in prices and giving the Haitian government—which due to its weak economic and trading status has the most liberal import tariffs in the Caribbean--a mechanism to restrict Dominican egg importation at will—i.e. through tightening and loosening control over smuggling. By 2014 heavily capitalized industrial Haitian egg entrepreneurs were producing 6.45 million eggs per month. This was six times the 1 million produced per month in 2006. The most promising encountered during the course of this research is that of Ferme des Antilles, a modern state of the art facility in Cavaillon, Department of the South.

[1] It was not the first time that the Haitian Government had embargoed Dominican poultry products. It had done the same thing in December 2008, after 115 cases of the bird flu were reported. Then too smuggling quickly regulated supplies.

According to staff at the facilities, two coups have the capacity to house 20,000 layers and produce 20,000 eggs per day. The corporation has begun to incorporate hatcheries in their operations. According to Kiko Verdier, manager of the Caviallon operation, they have similar facilities built in thre other Departments (North, Plateau Central, and on the border with the Grand Anse) and plan on opening at least on facility 10 of Haiti's departments. If they succeed, the project will certainly lead to additional investments. However, at the moment the Cavaillon facility operates at less only 25% capacity (5,280 layers), they are able to typically sell eggs at 420 Haitian dollars per case (360 eggs), 13% higher than what eggs can be purchased for wholesale at the border (365 per case). It is also not clear how independent the operation. The owner, Jean Claude Verdier is closely linked to the Martelly administration. Whether Ferme des Antilles will succeed remains to be seen. The analysis below is not encouraging. [xvii]

Continuing Under-production

Despite increased production, Haitian national production of 6.45 million eggs per month is still far below the 41.5 million eggs per month that Haitians consume. Moreover, new poultry businesses are producing far below capacity. In mid 2014 Haiti Broilers was producing chicks at less than 50% of its capacity. The other two major hatcheries—JAVEC and FACN--were operating below 25% capacity. Nor should it be overlooked that 70% of Haiti's hatchery capacity and more than 50% of the feed for chickens comes from a single corporation, Haiti Broilers, without which resurgence in the poultry sector would not have hitherto been possible. Moreover, most of the chicks being produced are destined, not to lay eggs, but rather to get broiled in Haitian cooking pots.

In short, Haiti's egg production status continues to be discouraging, particularly when juxtaposed with that of the Dominican Republic. Both countries have the same size populations, about 10 million each. But by comparison to Haiti's 6.45 million eggs produced per month, the Dominican Republic produces 115 to 124 million eggs per month. And whereas Haiti is producing less than 20% of the eggs it consumes and importing the remainder, the Dominican Republic is consuming 80% of the eggs it produces (translating to twice the per capita consumption in Haiti) and exporting the remaining 20%, more than 97% of them to Haiti. The Dominicans are able to wholesale their eggs at 365 Haitian Dollars per case, while the Haitian producers sell 400 to 420 per case, 10% to 13% difference.

Constraints on Intensive Egg Production

The bottom line is that the prospects of egg self-sufficiency through industrial production are still remote. Poor transport and expensive electricity are the first constraints. Any production facility in Haiti must provide all of its own infrastructure. It must import at exorbitant prices all technology, not just that directly necessary for production but everything from tires and motor parts to basic tools. This is to say nothing of the entrepreneurs own needs for maintaining a residence, taking care of a family and meeting the cost of living in a highly underdeveloped economy. All of this makes head to head competition with the Dominicans and even the US difficult if not impossible using the prevailing, state of the art technologies and feed resources.

The greatest constraint of all is feed, which accounts for 80% or more of production costs. Layers must be fed a sophisticated balance of feed enriched with nutrients and vitamins. If the feed is not adequate the hens do not lay. Haiti has three major sources of for balanced chicken feed, all are located in the same 10 square mile area North of Port-au-Prince, distributions networks are weak (see Concluding Complexities, p 20), with Haiti Broilers having the best distribution systems. If an egg producer feeds Haiti Broiler feed then at the current price of USD $16.00 per 55 lb. sack of feed and the optimum conversion ratio of 1

dozen eggs for 4.6 lbs. of feed, the sack of feed will yield 144 eggs; USD $0.11 per egg. Meaning that feed alone makes the Haitian egg more expensive than the Dominican egg.

Making the situation worse, some entrepreneurs interviewed in the course of the field work complained about the Haiti Broiler feed, saying that the hens do not develop well. Others complained about price fluctuations and monopoly control they saw as an impediment to their own success. Mixing feeds on premises is a risky option. It must be done to exact proportions and according to entrepreneurs interviewed during the course of field work it still requires special supplements. As seen, the Dominican Republic has managed the problem with through vertical integration with a high tech agro-industrial feed sector heavily supported by the government. Several Haitian producers reported traveling to the Dominican Republic to purchase the feed supplement. Even staple feed is a major problem. At the best of times, corn costs more in Haiti than the US and the Dominican Republic, which also imports most feed from the US (The Poulrty Site 2008). Rural domestic corn prices fluctuate throughout the year by as much 300%, making investing in corn far more attractive than eggs or even meat production.

Even if the Haitian entrepreneur is able to overcome all the preceding obstacles, to manage a flock he or she must understand and master lighting, molting, special feeds, temperature, humidity, water availability, disease, hygiene and waste disposal, all of which, if not properly managed, will decimate a flock. Salaries for competent management and technology experts are high, something due to massive emigration of college and technical graduates—many of whom head to the Dominican Republic--and grossly inflated wages in Haiti's robust NGO sector--which pays 2 to 4 times the local wage (see Annex 2). Indeed, pay scales and the cost of living in the Dominican Republic are significantly less than in Haiti for every job from a motorcycle taxi to a policeman to an agronomist. Transport is also cheaper and more efficient; food is cheaper and of a higher quality; and living accommodations are cheaper, more hygienic and more comfortable. What all this means is that by the time the average Haitian agro-industrial egg producer has hired competent management, paid them, figured out how to manage an egg-laying operation and fed the chickens the right food, he or she may have lost her proverbial shirt.

Opportunity Costs

Perhaps most discouraging of all in terms of egg production is that, from the perspective of an investor, it is an unnecessary risk. For those Haitian entrepreneurs interested in poultry, meat production is a far better bet, one with less risk, higher profits, and faster turn-around. A meat producer can purchase a flock of 1 day old chicks from Haiti Broilers at US$0.80 per chick. At the same time they can buy all the feed necessary to nourish the chicks to 45 days of age at which time they can sell the 3.0-3.5 pounds birds for slaughter. In contrast, a layer is not mature until 126 days of age, by which time the meat producer could have cycled through three flocks. The cost of a mature layer is USD $11.00-$12.00. If all goes as planned—there are no epidemics, the feed is balanced, the hens do not get overstressed by heat, and thus the hens lay the anticipated quantity of eggs, and assuming that feed is free-- the egg entrepreneur still will not break even until at least 150 days after purchasing the mature layers. Once again, the meat producer would have already completed three investment cycles. And this does not account for investments in infrastructure and labor. The life of the egg investment cycle is about 14 months—the length of time that layers produce the most eggs-- which means either purchasing and storing an entire year of feed or running the risk of being bankrupted by fluctuating feed prices.

The overwhelming advantages of investing in poultry for meat versus eggs is manifest in the figures. Of the 746 poultry operations in Haiti in 2012, only 25 produced eggs. In the Department of the South,

agronomists working with the major feed and veterinary supply store estimated that less than 10% of all poultry operations produce eggs. But even these figures do not adequately illustrate the risks involved; the same agronomists estimated that more than 75% of the broiler operations South fail.

All that is being described means unnecessarily tying up large amounts of capital for extended periods of time, taking on risk and management of technologically complex operations, doing so in an environment unique in the hemisphere for being radically unsuitable to maintenance of anything high tech, plagued by political and economic instability, all while there are abundant alternatives opportunities to put the capital to work, not least of smuggling eggs from the Dominican Republic.

Continuing Dominican Egg Imports

Although the ban on Dominican eggs was never lifted and the prices remain relatively high, importations through illegal channels have resurged. Eggs are smuggled in disguise, often in Tampico juice boxes, or they are routed through remote border markets such as Pedernales, Ti Roli, and more important than any other for eggs, the border post in the Northern town of Ouanaminthe. Importers as far away from the border as Les Cayes, report making greater profits traveling to Ouanaminthe and returning with eggs than paying local producers. Today, raw eggs sold in the small stores throughout the cities and rural areas of Haiti and boiled eggs sold by street vendors.

Changing Prices

For the 10 years prior to the ban on Dominican Egg imports, prices for eggs remained generally stable, largely due to the stability of prices in the Dominican Republic (see Figure 2 above). Since the ban, wholesale prices at the border have increased from 100 to 150 Haitian Gourdes per carton of 30 eggs (3.3 Htg to 5 Htg per egg). As one moves into the country, for example from the border post of Ouanaminth to Cape Haitian, the price has increase from 125 Htg. Before the ban to a contemporary price of 175 Htg per carton of 30 eggs. As one moves even farther inland and to more remote markets the prices increased from 150 before the ban to the contemporary price of 200 Htg. In even more remote markets the prices have gone from 175 to 225 and 250 Htg. In the most remote market towns, such as Bombardopolis in the North West, the current prices is 300 Htg for 30 eggs.

The impact on retail prices, has meant that whereas before the ban ordinary Haitians could buy eggs at in retail stores throughout the country for ~5 Htg per raw egg and 7 Htg for a boiled egg, the current prices is ~8.3 Htg (3 for 25 Htg) for a raw egg and 10 Htg for a boiled egg.

The price of Haitian eggs, those from small farms and although smaller, widely considered of better quality and better taste, have remained stable in rural areas at 7 to 8 Htg per egg and 15 Htg for a boiled egg. In effect, in rural areas and towns raw local eggs are now the same price as imported or industrial produced eggs and in some cases less expensive. For example in North West market town of Mare Rouge local eggs sell for 7 Htg versus 8.3 Htg for imported eggs. The trouble, for those who want local eggs, is that there are very few available. The scarcity is manifest in Port-au-Prince prices where local eggs sell for 15 Htg per raw egg and 20 to 25 Htg for a boiled egg.[xviii]

Table 2: Comparison of Prices in Haiti Before and After June 6th 2012 Ban on Imported Eggs										
	Before					After				
LOCATION	Carton of 30 import eggs	Single Raw import Egg	Single Boiled import egg	Raw local egg	Boiled local egg	Carton of 30 import eggs	Single Raw import Egg	Single Boiled import egg	Raw local egg	Boiled local egg
Ouanaminth	100	5	5	8	n/a	125-50	5	5	10	n/a
Cape Haitian	135	5	7	8	10	175	8	10	10	15
Port Margot	135	5	7	7	10	200	8	10	10	15
Port-de-Paix	175	7	10	8	15	250	9	10	10	15
Gonaive	125	5	8	8	10	225	9	10	10	15
Gros Morne	125	5	8	8	10	225	9	10	10	15
Jean Rabel	150	5	8	8	10	250-75	10	10	10	15
Mare Rouge	150	5	n/a	n/a	n/a	250	10	n/a	10	n/a
Bombardopolis	150	5	n/a	n/a	n/a	300	10	n/a	10	n/a
Port-au-Prince	125	5	7.5	10	15	200	10	10	10	20
Jeremie	175	7	10	8	12	230	10	10	10	15
Dame-marie	200	7	8	8	10	300	10	10	10	15
Les Cayes	150	6	8	7	10	200	10	10	10	15
Jacmel	125	5	8	8	10	200	10	10	15	20
Mirabalais	125	5	5	8	10	225	10	10	10	15

As disparaging as the prospects for egg production may be, Dominican imports have their problems too. They must get the eggs to the border. The eggs must cross the border and be transported throughout Haiti, typically in dilapidated vehicles without refrigeration and across rough roads. This means broken eggs, lost time, and spoilage. Having said that, producers in Les Cayes region are getting close to being competitive, sometimes selling eggs for 5.5-6.0 Htg per egg versus the price at the border in Ouanaminthe of 5 Htg. Yet, the 10-13% difference is still enough for major entrepreneurs in the South to travel to the farthest point in Haiti from Les Cayes—Ouanaminth—buy illegal eggs, and then transport them all the back to Les Cayes, risking spoilage, broken eggs, and having to pay bribes at two inspection stations.

The Prospect for Small Scale Egg Production in Haiti

Despite unfavorable tariffs, a lack of government subsidies and technical programs, and a paucity of feed processing facilities there is a very real opportunity for increased egg production in Haiti. There is an enormous demand for eggs throughout Haiti. Even if Dominican imports were to be frozen at the current level, producers can expect market growth. Haitians annually consume only 45 eggs per person—compared to 258 per person in the USA and 200 in the Dominican Republic, the latter figure up from 124 ten years ago. The Haitian government, having restricted Dominican importation, has a mechanism to increase and restrict the importation of eggs at will, artificially raising and lowering prices of imported eggs when needed and giving an advantage to local producers. Eggs produced throughout the country would be closer to markets, meaning less spoilage and fewer broken eggs, another advantage to domestic production. Moreover, eggs have an advantage over production of chickens for meat in that they can be stored more easily, at no cost in feed, and they are far more marketable in rural areas. There may also be alternative means to promote egg production in Haiti, one more in line with the semi-subsistence farming

strategies and poor infrastructure that prevails in the country. The major objective of the present research is to figure out how include the poorest and even peri–urban farmers in such an endeavor. We turn now to this topic. The conclusion, as seen below, is that it is difficult to include this segment of the population without introducing new strategies and technologies. In the traditional and prevailing rural households livelihood strategies, rearing chickens has little to with eggs, typically thought of as by product of raising chickens, useful for occasionally consumption, as gifts, and for petty cash.[xix]

Understanding Eggs and Rural Household Livelihood Strategies

Chickens and Eggs on the Family Farm

Ninety percent of Haitian national livestock production comes from some 800,000 small family farms. With an average holding of only 1 hectare, in 2012 MARNDR estimated that together they owned 1 million pigs, 1.5 million cattle, 2.5 million goats and 4.8 million foul, the vast majority of which are chickens. Another 1.6 million chickens are raised in urban environments (Politique de Développement Agricole 2010-2015; LAREHDO).[xx]

According to MARNDR (2012) the average rural household has 5 hens and produces 70 eggs per year (14 per hen).[2] This translates to 5.5 million eggs per month; 70% of the eggs are destined to hatch and the remaining 30% destined for consumption. Of those eggs consumed, ~75% will go to the market and ~25% will be consumed by the household. Elsewhere it is estimated that some 30% are given away as gifts to neighbors and friends. Three of every 12 eggs is of unacceptable quality, either because it has spoiled, is vitamin and mineral deficient, or because the hen is old and beyond the age of laying eggs that have consistent yolk and white.

The chickens are typically free ranged, fed only enough to keep them from abandoning the homestead and becoming someone else's chickens. Typically few supplements or vitamins are provided. Sparse availability and Resistance to paying the USD 0.10 for vaccinations against New Castle and coccidiosis—the most common diseases that afflict poultry-- takes a heavy toll). Epidemics can and often do wipe out the entire poultry stock in a region. In the Chicken Survey, to be discussed in greater detail below, 73% of respondents said that they do not invest more in chickens because of disease (see Table 10, p 17). Other problems include predation by feral cats, mongoose, snakes, and dogs. Valentine (2010) reported farmers in the Department of the South annually lose 30% of their flocks to predators (n = 155). In the Follow-up Telephone Egg Survey, discussed in more detail below, 55% of respondents reported that the primary reason for lost or spoiled eggs was predators (Table 4), the most problematic if which is the Mongoose, followed by feral cats and then dogs and rats (Table 5). Other explanations for why eggs are lost include stress on chickens from weather, dust, and eggs getting washed away or simply laid where the farmer cannot find them (Table 6). All of the preceding suggests that there is much room for improvement in traditional rural Haitian household level egg production. But there are significant constraints that must be understood within the context of the traditional Haitian livelihood strategies and the premises and objectives underlying those strategies.[xxi]

Table 3: Care of Chickens (N=209)

Only Supplemental Feeding	Vaccinates chickens	Cares for the birds when they are when ill
77%	29%	28%

[2] By comparison layers on poultry farms produce 285 eggs per hen per year

Table 4: Biggest Reason For Eggs Losses		
Reason	Count	Percent
Animals/predators	50	55%
Cannot find them	11	12%
Stolen	5	5%
Other	25	27%

Table 5: Animals that Eat Eggs (n=50)		
Type of Predator	Count	Percent
Mongoose	21	42%
Dog	13	26%
Cat	9	18%
Rat	4	8%
Chicken hawk	3	6%

Table 6 Explanation for "other reasons" respondent loses eggs (n=25)	
Explanation	Number of Respondents
Heat/sun spoils them	8
Hen doesn't care for them	4
Cold spoils them	2
Noise of thunder	2
Disease	1
Dust spoils them	1
They break	1
They wash away in storms	1
We do not put them in a coup	1
I don't lose any	4

The Fundamental Tenet of Survival in Rural Haiti: Low Cost & Low Risk

Constraints to egg production at the level of rural household has to do with the strategies that farmers utilize to survive. Few if any households in rural Haiti depend on a single production strategy. Rather, they depend on an array of productive endeavors (agriculture, livestock rearing, fishing, charcoal production, fruit trees, artisanship). Technology is alarmingly simple. The tools used in performing agriculture strategies are, for the vast bulk of the population, no more complex than picks, hoes, and machetes. Animals are free ranged in dry areas but in humid areas where agriculture is more common they are tethered to bushes with rope. One seldom sees barbed wire; rather, gardens, homesteads, and the rare corral are enclosed with wooden stick barricades or living fences made of fast growing and malicious vegetation such a dagger-like sisal, cacti, and poison oak *(katoch, kandelab, pit, pigwen* and *bawonet*). Fishing technology is largely rowboats, bamboo fishing traps, and string nets. With the exception of the South, tractors are rare. Only in a few regions do farmers use ox as traction to plow fields. There are few pumps; farmers with gardens plots near to springs and rivers sometimes manually haul buckets of water to irrigate crops, particularly vegetables in cool highland areas. The use of chemical or processed fertilizers and pesticides is almost entirely confined to highland vegetable gardens and, to a lesser degree, beans (also considered a cash crop). The most important crops in the region are highly drought resistance, intercropped and offer the advantage of providing year round harvests.xxii At least another 16 fruits trees add to the adaptability and subsistence security of the strategy. When all fails due to drought on catastrophic hurricane, crops fail and livestock dies, many rural households turn to charcoal production for sale in the city, the single most important economic backstop in times of crisis. In summary, the strategy described is emphatically focused on risk avoidance and long-term survival within a regional economy; it is just as emphatically not focused on entrepreneurialism, maximizing profits, and short term exploitation of distant economies.

Relations of Production and Gender

In the harsh environmental and economic conditions described above people in the region organize labor around the household. With only the rarest exception, everyone living in rural Haiti belongs to a multimember household. Mutual efforts of household members are what make the integrated livelihood strategies described above possible: garden plots tend to be scattered across multiple ecological zones

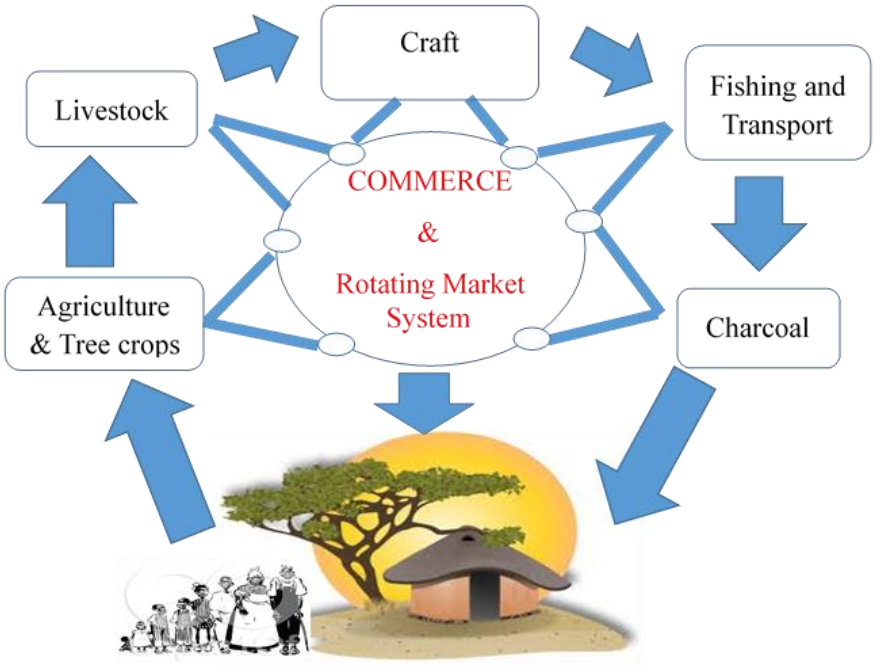
and animals tied at great distances from the household. Water sources in many regions are distant from the homestead, requiring members to retrieve water on foot. Children are critical contributors to the endeavor to maintain productive household strategies and begin making significant contributions at the age of about 6 or 7 years. Sexual division of labor is also a conspicuous feature of the household organized labor strategies. Women are thought of as the managers of households if not the household heads. They direct the labor activities of children, are the primary disciplinarians and, in the absence of men, they care for livestock and tend gardens.

The market System and Commerce

The rural Haitian household and their livelihood security strategies described above are linked through a vibrant and intensely integrated Internal Rotating Market system. Open air markets occur on alternating days of the week such that people living in any given region have walking distance access to at least two markets per week. The opportunities presented in the regional rotating market system has facilitated the evolution of intense interregional trade dominated almost entirely by women. All adult women in the rural areas trade. It is the primary female career opportunity in the region. Regarding domestic production, there are two types of traders: the *madan sara* (trader) and the *revande* (resellers).

As with production, the character of marketing in the region emphasizes subsistence, reduction of risk and survival of the household. It is a system based on cash and not barter; it is emphatically oriented towards subsistence and local production. The overwhelming bulk of products sold are inexpensive, locally produced. With respect to the profits that a trader earns, the bulk of the money is destined for reinvestment in commerce, other income generating enterprises – such as fish traps – subsistence foods and necessities for the household and, ultimately, the growing *'mama lajan'* (literally "mother money," or more technically, the principal or capital) preserved for economic recuperation during times of crisis.

Figure 3: Integrated Household Subsistence Strategies and the Market



Importance of Understand the Adaptability of Rural Haitian Livelihood Strategies

What we see in household livelihood strategies and the rural market system described above are patterns and relationships sometimes difficult for development practitioners who have not lived and worked in the region to fully grasp. An examination of local livelihood strategies among the majority of farmers in rural Haiti, particularly those who do not have access to illicit business opportunities or relatives in Miami, suggests they differ little from those practiced during the pre-Columbian and buccaneer eras 350 to 500 years in the past and are far less technologically and organizationally complex than those that prevailed during the colonial epoch. The anachronistic character and tenacity with which people all over Haiti cling to these strategies and their resistance to adopting or maintaining new material and organizational technologies is a major impediment to the success of most programs financed by international development agencies. It confounds foreign development workers and corporate investors who come to Haiti. Yet, from the perspective of adaptation to crisis the system is eminently logical.

Adapted over the past 209 years of independence to periodic droughts that occur on average one in every eight years; the 25 wars and uprisings and 60 years of international trade embargoes that occurred during the 1800s, a trend that continued through the 20th century with an equal number of violent conflagrations, civil unrest, revolution, and more embargoes to the first tumultuous 15 years of the 21st century, Haitians are stuck on an island surrounded on three sides by water and one side by a neighbor (the Dominicans) who 78 years ago, under the influence of a despotic dictator dispatched convicts to massacre, with blades and in the space of three days, 25,000 of those ethnic Haitians living on their side of the border. The rural population has had little choice but to adapt. They have done so by cultivating dependency on those forces they can control: the technologically simple, integrated production, processing, and marketing strategies seen above. [xxiii]

In this way rural Haitian household livelihoods can be conceptualized as survival-oriented strategies that link household, communities and ecological zones through the rotating market system, and in doing so averages the impact of crisis out across the landscape. Part of the reason that it has been so effective is that Haiti's mountainous terrain and corresponding micro climates have meant that environmental crises that would impede production at the household level rarely impacts an entire region. When it does, such as with Hurricane Sandy of 2012, the people are able to turn for food to their garden and artisanal fishing or to cash reserves of their *mama lajan* (market money); for new cash, they turn to the sale of livestock and charcoal production for the urban market. It should also be understood that up until the previous decade, all that is being described occurred, and has been occurring for 2 centuries, in the near total absence of State services. With the exception of taxing animal sales and market vendors, providing security in the form of police, and assistance with education, the State has been largely absent. The vast bulk of road work, investment in irrigation, and agricultural extensions services have come from NGOs, missionaries, and international agencies. Even here, many times over the past 50 years “development” and “relief” organizations have not helped but rather pulled out when the people in the region were faced with crises such as the political crises of 1991-1994 and 2002-2004. Thus, in formulating new strategies to assist rural Haitians we should keep in mind that, while not perfect in terms of business and maximizing profits, the strategies they practice made it possible for them survive extreme hardships, in an extreme environment and with very little outside help for over two centuries.

Returning to eggs, the most important point to understand in the previous summary of rural livelihood strategies in Haiti is that whatever the exact configuration of these livelihood strategies, the guiding

principal is minimal investment and minimal risks. It is with this all-important premise in mind that we can best understand the features of rural Haitian poultry raising and egg production as discussed below.

Farmer Priorities in Raising Chickens

From the Surveys we know that egg production has little to do with the objectives of rural Haitians who raise chickens. When asked in the Egg Survey for the most important reason they raise chickens, 80% cited reasons related to the value of the birds themselves: 43% of respondents said to sell the adult birds and another 37% said to eat them. Only 13% cited anything to do with eggs, 8% saying to eat eggs and 5% to sell them (see Figure 4). When asked about the second most important reason for raising chickens, 59% of respondents referred to adult birds, 38% saying to eat them and 21% to sell them. Only 21% said anything to do with eggs (see Figure 5). Insightful are the responses for those who chose "other" category (Table 7). Four of the five respondents who cited "other" explained that they raised chickens so they could have more of them. Of the 20% that cited "other" for the second most important reason why they raise chickens, typical responses were, "because I like chickens," "they make the yard beautiful," and "it's a tradition."

FIGURE 4: MOST IMPORTANT REASON FOR RAISING CHICKENS (N=91)

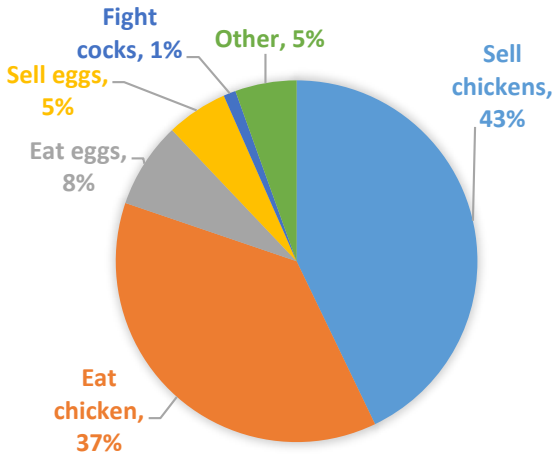


FIGURE 5: SECOND MOST IMPORTANT REASON FOR RAISING CHICKENS (N=91)

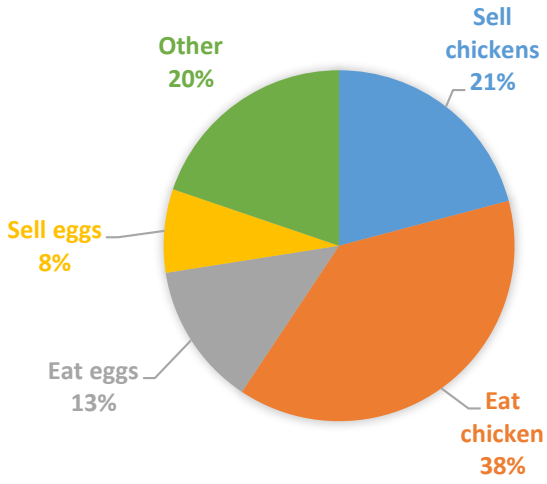


Table 7: Explanations Give for "Other" Reasons to Raise Chickens (n=18)		
Variable	Response	Number of Respondents
First list of "other"	To have more of them	4
	It's a type of wealth	1
Second list of "other"	To give away	5
	Likes Chickens	3
	A yard has to have chickens	1
	It's a culture	1
	Like to feed animals	1
	Make the yard beautiful	1
	To save money	1

Constraints to Producing Eggs

Feed

The first and most important limitation on egg production on rural homesteads is the same as that encountered at the industrial level seen earlier, the cost of feed. As seen, not any feed will do. A laying chicken requires very carefully balanced feed that includes the right salts, calcium and vitamins. One has to buy that feed, not easy to find in rural Haiti (see Constraints on Intensive Egg Production, p 5). If the farmer can get it from Haiti Broilers then he or she can produce an egg for USD $0.11 cents. And that is basically the only hope the farmer has because even if the farmer can concoct the appropriate feed ratios—a feat for the most sophisticated farmer -- currently retail corn prices (100 Htg for 1 mamit = approximately 5.5 lbs) mean that at a conversion ratio of 4.6 pounds of feed one 1 dozen egg, the feed for an egg would cost exactly what it is worth on the retail market (7 to 8 Htg). And that is assuming that the farmer could get optimum industrial yield for the egg, something he or she could not hope to come close to. But that is not the worst of it. Corn in rural Haiti can vary seasonally by factors as great as 300%, so it at times it could cost 200% to 300% percent the given figure. If the farmers grows his or her own corn then, as seen earlier, it would make much more sense to forget about chickens and sell the corn. The only hope the farmer has, the only hope, is that when all is done he or she can sell the hens for slaughter and recuperate more than was lost. All of this makes feeding chickens highly inauspicious undertaking within the 'low risk, low cost' livelihood strategies that have enabled Haitian peasants to survive for two centuries. With the price of grain in mind, it is easy to understand why poultry production in rural Haiti is typically based on scavenging strategy, which leads to a whole series of additional constraints [xxiv] [xxv] [xxvi] [xxvii]

Constrains that Derive from the Scavenging Strategy

Because free ranging chickens will heartily scarf up any seeds they find means that they must be confined during planting and harvest seasons. If they are not confined and they invade a newly planted garden or help themselves to the neighbors drying corn, the neighbors have a right and often do kill them, often baiting them with rat poison. Because an effective chicken coup costs money--and as seen rural Haitians employ low risk and low investment strategies--the vast majority do not have coups. Rather they tether the chickens, which means tending them, moving them, watering them, all of which puts a limitation during planting and harvest seasons on the number that can be reasonably be looked after before they start dying from neglect. Indeed, the more chickens one has the more all the prior problems mentioned, the greater the costs, the risks, and the losses, all directly anathema to the major logical tenet underlying rural Haitian subsistence strategies: lost investment and low risk.

Disease and Supplements

To adequately care for a chick they should be given vaccines against Newcastle disease, and cocsidosis. They should be wormed and given vitamin supplements and preventative antibiotic, all of which is difficult to purchase for few birds and so much be bought in bulk at the cost of USD$20 to 30, more than half of what most rural farmers earn annually on chickens. Meds and nutrition will not stop predators, which as seen annually take 30% of the flock. Moreover, it is not as simple as vaccinating a chicken for life. To effectively deal with epidemics and new chicks, FAO recommends farmers vaccinate their entire flock of free-ranging birds monthly, making it a frequent cost and inconvenient chore not acceptable to most farmers. On top of all this, in most areas the vaccines simply are not available. In the best cases, supplies from the Ministry of Agricultural (MARNDR) are sporadic. In the other cases, such as Les Cayes, there is a functioning and well stocked store, but farmers must travel to get to it. [xxviii]

Chicken Carrying Capacity in the Context of Scavenging

Free-ranging introduces another limitation, that of ecological carrying capacity. Without supplemental feeding—as seen, too costly to make economic sense--carrying capacity is limited to the number worms, insects and small vertebrates available per unit land. Too many chicken's means that supply of roaches, caterpillars and lizards gets exhausted and the chickens start to roam, increasing the likelihood of conflicts with the neighbors chickens, the neighbors, and a greater likelihood that chickens will be killed, poisoned or stolen. While we could find no reference to chicken carrying capacity under pure scavenging strategy, it is certainly far less than the maximum number of 120 chickens per hectare, that developed world farmers estimate *with* feeding, and may well hover around the 10 to 20 chickens that farmers in the Egg Survey cited as being the median sized flock.[xxix]

The Pecking Order

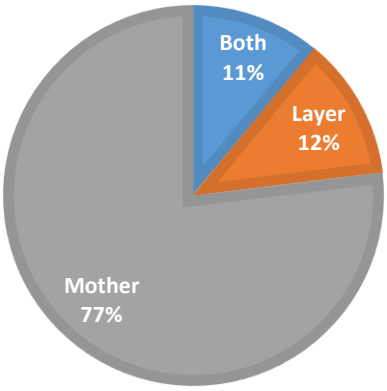
Chickens have their own rigid and strictly enforced pecking order. They are territorial and do not readily accept strange birds. Even if Haitian farmers could purchase chicks --and the vast majority cannot—or if farmers could incubate them—and they cannot do that either (see below)—chicks and even adolescent birds cannot be simply turned out with the flock. Older birds will peck hatchlings to death. They have to be carefully protected and slowly integrated into the flock. The best way to accomplish that is under the protection of a broody mother hen, making an emphasis on brooding vs laying a logical strategy for peasant farmers. [xxx]

Brooding vs. Laying

Brooding: being in a state of readiness to brood eggs that is characterized by cessation of laying and by marked changes in behavior and physiology." Webster's Dictionary

The most adaptive hen in the scavenging strategy described above is not the good egg layer but the good mother. What in chicken farming parlance is 'broodiness," the tendency to nest, to protect, young. Broodiness is precisely what rural Haitian prize in a hen (see Figure 6). Laying and broodiness are incompatible. The very definition broodiness means no more eggs: in other words, good mother = fewer eggs, explaining why a layer can yield 200 eggs per year while the typical rural Haitian chickens only lays 14 eggs per year.[xxxi]

FIGURE 6: GOOD MOTHER VS. GOOD LAYER (N=91)



Cockfighting

A final but important aspect of raising chickens in rural Haiti is cockfighting, a national past time revered most among precisely the rural population in question and around which an entire economy circulates. Similar to markets, regions have their own circuits of gage (fighting rings). Specific rings have cock fights on a specific day of day of the week. Each year particular regions have their championships, known as *dezafi*. During this period the rings charge an entry fee. Betting on a single fight sometimes reaches as high USD $500 and even $1,000.

The importance of cockfighting places a premium on rearing cocks. Cocks sell for almost twice the price of hens (217 vs 371 Htg; see Table 8). Smaller birds are better for fighting—introducing a counter intuitive

aversion to raising larger birds. Being proven in scraps with other cocks over a diet of coach roaches and lizards helps as well. Cockfighting aficionados keep their eyes open for young fighters demonstrating their prowess in bouts with other males in the yard. A young yard fighter that shows promise will be purchased for a much higher fee than other cocks. In the Egg Survey, 45 of 91 had sold a bird for fighting; the average highest cost was 1,324 Htg, about half the annual income from a flock in the IFAD funded "Smallholder Poultry Development Project" discussed below. The bird is then "prepared." The trainer feeds his potential champion him a special diet, tethers him out of harm's way, every morning gives him a bath, puts a hood on him and carries him affectionately under his arm when traveling or visiting cockfights. If the cock excels in the ring the trainer can earn 100s of dollars. A good cock can sell for 100 to 200 dollars, two to four times the annual value of the IFAD funded flocks.

Table 8: Average cost of Birds

Currency	Hen	Cock	Fighting cock
Htg	216.76	371.43	1,323.89
USD	$ 4.71	$ 8.07	$ 28.78

Just How Many Chickens Do Farmers Raise

In the random sample of 382 households, what we are calling the Chicken Survey, 45% of rural households had no chickens at all. Moreover, while the average number of chickens per farming household was 4.8 chickens--similar to the national statistics and surveys cited above—the Chicken Survey yielded a median of 2 chickens per farming households (22% or 47 of the 209 farmers interviewed reported owning exactly 2 chickens). More than half all the chickens in the sample (544 of 1,015) were owned by only 25% of the farming households (51 of 209 respondents); 12% of the farmers (25 of 209) owned 36% of the chickens (363 of 1,015 chickens); a single farmer owned 5% of the chickens (see Figure 8 and Table).[xxxii]

Figure 7: Proportion of Farmer Respondents that Have vs. Do Not Have any Chickens (N = 382)

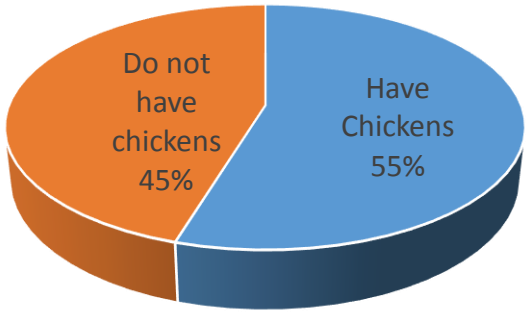
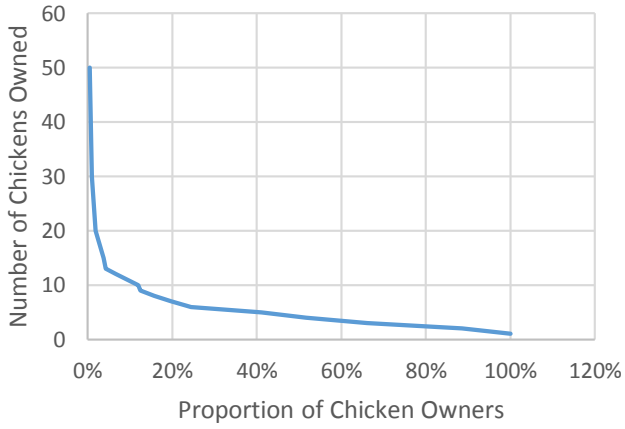


Figure 8: Number of Chickens Owned per Farming Household



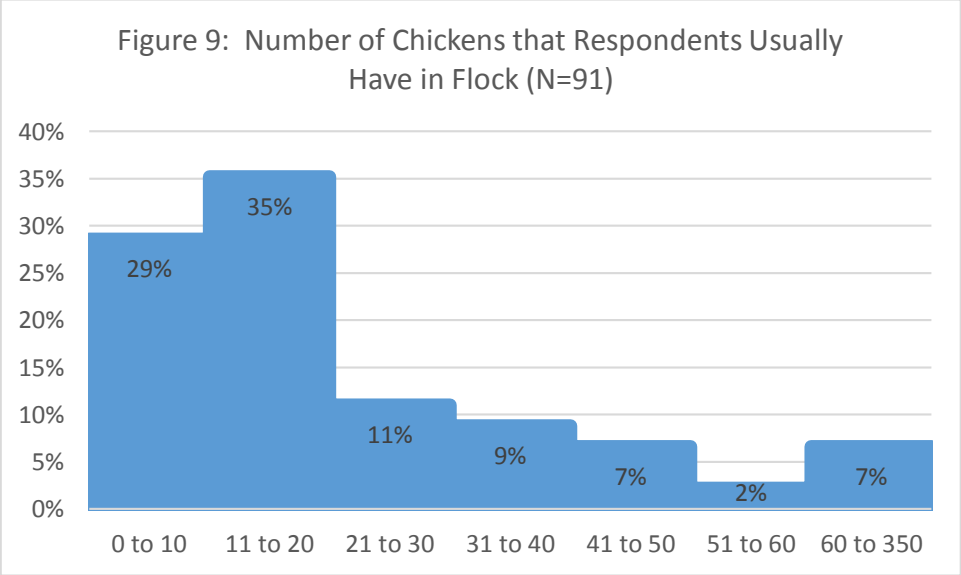
It is not clear if the figures differ because of reporting error or if more than 50% of rural Haitian households are indeed without chickens. But as mentioned earlier, we know that household chicken flocks get periodically wiped out, particularly by disease (see Table N3, p 33). From the 91 household telephone follow-up subsample survey it can be seen that 79% reported having lost their entire flock within the past six months (see Table 10). Because farmers do not have ready access to hatchlings, repopulation of the flock generally takes at least 6 months to 1 year (ibid). Moreover when we asked how many chickens respondents *usually* have, instead of the median of 5 birds seen in the Chicken Survey, we get a median of 11 to 20 birds. All the preceding suggests that the national data does not account for the periodic impact of disease. Nevertheless, the basic tenets of production built on low cost and los risk remain the same and help us understand the complexities of promoting egg production in rural Haiti.

Table 9: Main Reason Farmers Gave for not Investing in More Chickens

Main Reason	Count	Percent
Disease	152	73%
No money	18	9%
predators	14	7%
No space for them	6	3%
Thieves	2	1%
cost of food	2	1%
labor	1	0%
Neighbor kills them	1	0%
Not enough profit	1	0%
They die	1	0%
Do not know why	9	5%

Table 10: Time to Recuperate Chicken

Last time they lost all chickens	Time to recuperate				
	6 months or less	6 months to 1 year	More than 1 year	Not yet recuperated	Total
Less than 6 months	7	2	1	62	72 (79%)
6 months to 1 year	1	-	-	8	9 (10%)
1 to 2 years	-	2	-	1	3 (3%)
2 to 3 years	-	-	-	3	3 (3%)
More than 3 years	-	-	-	4	4 (5%)
Total	8	4	1	78	91 (100%)



Learning From the Past

Failed Projects

With the interest in national production and the post-earthquake spike in foreign financial assistance, Haiti has been awash in social enterprises targeting poultry and, to a much lesser extent, egg production. There have been the multimillion dollar ventures, seen earlier. But there have been numerous egg production projects focused at the level of cooperative and household. In the Les Cayes area the consultant visited projects including a defunct broiler project in Cite Delmas for which Terre de l'Homme built the coup and supplied chickens. A thriving 500-700 egg per day production operation in Parc Avicole de Mont-Ville, Torbeck for which MARNDR supplied the coups. Institut François d'Assise produces 400 eggs per day. AgriTropical's egg 150 eggs per day operation in Camp Perrin. The consultant also visited Christian Ville's 600 egg per day operation in Leogane and 6 other broiler operations.

Most have failed. Those that have not may be thriving not so much on profits as donations. All those successful operations visited during the course of the research were underwritten by an NGO or Church. Indicative of the lack of precise accounting and perhaps lack of consideration for profits at all, the nun who is currently in charge of the Institut François d'Assise egg production shrugged when asked about feasibility saying, "it's good for the community." The Mayor of Torbeck who runs a 300 woman cooperative on her property is very satisfied with the operation. MARNDR provided the coups, enough to house 11,000 chickens. But they only have 750 layers and the mayor is not willing to borrow money to invest in more, not if she has to borrow it and the profit from the operation is apparently not enough, after two years, to grow. Ferme des l'Antilles, the largest and most high tech operation in the country, present itself as private enterprise but it is notable that the owner, Jean Claude Vertier is, so they say, the architect of the new National Palace and hence we can infer well connected and perhaps supported by the current presidency, the same one intent on breaking the Dominican monopoly on the Haitian egg market. The "aid" has impacts beyond simply wasting money. Independent entrepreneurs complain about the unfair competition from cooperatives or self-styled entrepreneurs who are underwritten by NGOS. In any case, much can be learned from past operations and interventions. Useful in understanding problems with trying to promote egg production is an eight year IFAD funded project that targeted household level production.

The "Smallholder Poultry Development Project"

The IFAD funded FAO "Smallholder Poultry Development Project" began in September 2002 and extended through three phases until December 2010. Geographic Areas of intervention were the Artibonite and the Department of the South. Interventions included training farmers in poultry care and flock management, supporting veterinary agents in providing extension services, conducting vaccination campaigns and, most significantly, introduction of exotic cock species with high live-weight and egg yields per feed inputs.

Despite average flock size of 35—seven times the reputed size of the average household flock—long time participants only netted an estimated USD $8.50 per year on eggs and $52.70 from sales of adult chickens. Putting that in perspective, this was just $3.00 more than control group producers reported earning on eggs ($5.50) and a mere $21.20 more than new participants reported earning annually on live adults ($31.50). After eight years of intervention, the project evaluator reported the "context, performance and sustainability of the intervention is questionable" and summed up in a single passage most of the points

discussed above regarding the incompatibility of increased egg production and the prevailing rural Haitian household poultry rearing strategy and objectives,

> … it must be noted that farmers are conscious that the exotic and local hen crosses have a rapid growth and maturity history, better body weight, sales at better prices and lays more eggs than the rustic chicken. These benefits do not convince the farmers in adopting the innovation fully. They still have a preference to rearing local hens because they resist to disease, pests and rains, have a better taste, eats everything, good at brooding and raising chicks, lays nutritive eggs with far reaching longevity than the exotic and local hen crosses. Another reason is that the local cocks are small in size and smarter hence better *combat cocks.* *Valentine 2010*

Bureaucratic and Infrastructural Constraints

In addition to all the constraints mentioned above, when the Haitian farmer or the cooperative to which the farmer belongs has tried to become a small scale industrial egg producer he or she encounters the same obstacles that encumber the modern entrepreneur. Cost and availability of feed is be the biggest constraint. Technology is another. Without dependable electricity the farmer must improvise. In the place of electric heat lamps, he or she burns charcoal in barrels to warm the chicks. None of it is encouraging. Without an NGO underwriter, most farmers will not invest in vaccinations and feed supplements. Even the task of obtaining vaccinations is often not a matter of simply buying them, but finding them. Corruption, appalling inefficiencies, and apathy in both the civil sector as well as the NGO agricultural outreach programs means they are often not available. On top of these constraints, to have a profitable egg operation, the rule of thumb in Les Cayes area-- according to agronomists and entrepreneurs who have tried to succeed at laying operations-- is that there must be at least 200 hens, an investment of USD $4,200 to 4,400, far beyond the resources of most households. Moreover, for those who would invest, a far more lucrative and less risky endeavor is producing poultry for the meat. In approaching a conclusion and formulating recommendations, a series of additional challenges inherent in poultry production and aggravated by economic and infrastructural conditions in Haiti should be recognized.

- Chicken eggs must be incubated or sat on for 21 days, temperature must be maintained at 102.5^0 humidity must be 45 – 50% for the first 18 days and then raised to 65% for the last three days before hatching, objectives that mother hen is magnificently adept at accomplishing but not so easy for humans unassisted by sophisticated modern technologies. Eggs must also be turned three times per day. Without an incubator—or a mother hen--it is essentially impossible to hatch eggs. To use a hen is complex in itself because, as seen earlier one, chicks unprotected by a broody mother hen must be separated from the flock until they are able to defend themselves. What all this means is that farmers do not have a ready supply of chicks. As seen, 70% of Haitian hatchery capacity comes from the relatively new Enterprise, Haiti Broilers, an offshoot of Jamaica Broilers. Chicks purchased from Haiti broilers must be shipped in bulk to distributors, of which there essentially are none outside of Port-au-Prince, thereby eliminating the possibility of a rural farmer purchasing them. [xxxiii]
- To produce a prime egg laying hen, the bird must be optimally cared for early in life. To achieve this they must receive vitamins and supplements. Lighting has to be manipulated. Their beaks must be trimmed during their first three weeks of life in the pullet to minimize cannibalism. What this means is that the surest source of prime laying hens is, again, Haiti Broilers, one of the other

two outlets in Haiti (mentioned earlier on), or importing. The cost per layer from Haiti broilers is a moderate $11.00 to 12.00 per hen—essentially the same price as a creole hen on the local market. But this translates to $4,200 to $4,400 investment for the magical profitable minimum of 200 layers. [xxxiv]

- To take maximum advantage of laying hens, the producer should exploit the molting reflex. Molting occurs naturally in the wild. Responding to seasonal daylight hours the bird stops laying, sheds her feathers and regenerates new feathers. She soon begins laying again at a reinvigorated rate. Chickens can be molted once or twice in the course of a lifecycle. But to induce molting means, again, controlling light exposure.
- Additional technological factors that must be controlled are temperature, humidity and ventilation, all of which affect laying output.
- Waste disposal is an issue, especially regarding stench associated with laying operations, which stink to the point of being a nuisance, far more so than broiler operations—which raise small chicks and then slaughter them before they become adults, i.e. the waste output is far less.
- Once again, feed is the greatest constraint. Imported and expensive in Haiti, high protein feed is only currently available from a handful of distributers. the most important and least expensive is Les Moulins D'Haïti, which up until 2010 was getting from the US Government an annual average of USD $5 million worth of US wheat at 70% of cost. Haiti Broilers has higher prices, and gets its raw material from the US, and a third—and untenable option--is the Purina licensed facility Ti Moulin which gets feed from the Dominican Republic, much of which originates in the USA. All three of these facilities are within several miles of one another, on the North side of Port-au-Prince. Only Haiti Broilers has best distribution network with more than 57 distributors throughout the country but the increased cost of getting food to producers means that the cost per egg for feed alone is 11 US cents (Chatelain 2012).
- The final issue with egg production is that Haitian Government itself, which has done little to ease the burden of starting a egg production business for those entrepreneurs who are interested in doing so. In contrast, on the other side of the border, Dominican Government subsidies to producers, monopoly control of their own market, reliable agricultural extension services, and far better roads and infrastructure give the Dominican producers an insurmountable advantage. They are able to manage their market in ways unthinkable in Haiti. For example during 2011 the average price of producing an egg in the Dominican Republic was $0.09; but the farm gate price was US 7 cents. In July 2013 the costs were unchanged but the farm gate price was almost double at USD 0.12. A porous border assures the Dominican produce will keep coming, while political instability and corruption assures the largest businessmen will pay little to no taxes. As seen earlier on in this report, staples such as cooking oil--and even eggs--come into the country far below the actual tax rates.

Having said all that, there are encouraging examples of production at the local and community level and we have encountered high-tech agro-industrial farmers who are interested in working with household and community level enterprises to promote local production (see Annexes).

Conclusion: Toward a Business Model for Egg Production in Haiti

In summary the findings most relevant to the potential for egg production in Haiti and those that point the way toward a model for promoting successful egg production enterprises are,

Price

- At current feed prices and feed to egg conversion ratios: the feed to make one egg is 11 cents
- An egg costs slightly less than 10 cents at the Haitian/Dominican border.
- Because of the Haitian government's current crack down on Dominican egg imports—an enforcement of a ban that has, as seen, existed since 2008—the wholesale price in Haiti for a single ranges from 13 to 20 cents--depending on the distance from the border.
- With loosening restrictions and smuggling strategies—such as bribery--adapting to the those wholesale prices are coming down. Nevertheless, for the reasons explained below, there is good reason to expect retail prices to stick.
- The retail price on the street for a boiled egg is currently ~ 20 US cents. Because of peculiarities of the Haitian market, there is a great deal of inertia for this any lowering of the price:
    - Haitian consumers expect uniformity of price among vendors. A vendor cannot charge a price higher than other vendors in the area, or city without being shunned for dishonesty. Nor will they readily charge a lower price without inviting suspicion.
    - The scarcity of less than 5 *goud* currency means that vendors must change price in units of 5 goud (~10 US cents). This creates an additional inertia to price adjustments, whether up or down.
- What the preceding means for the egg market is that the spread of sales price from producer/importer to end-retail is approximately %100.

Costs and Constraints

- Feed is the most significant cost (~80%) and a significant constraint because of availability of high protein feed necessary for maximum laying output, i.e. current feed distribution networks outside of Port-au-Prince are weak, the source being Haiti Broilers.
- Another major cost and constraint are layers. Occasional import projects aside, the only significant source for layers in Haiti is, similar to high protein feed, Haiti Broilers.
- Other costs and constraints include vaccines and antibiotics, both limited primarily by poor distribution networks i.e. corruption and inefficiencies in the State and NGO agricultural extension sectors.
- The cost and availability of cages is another factor that should be considered (see below).

Advantages

- All the above costs and obstacles can be thought of as 'opportunity points' where farmers can earn profits.

- The best way to turn these opportunity points into profits is through and program that emphasizes local technology and improved access to new, low cost technologies from abroad, i.e. a decentralization of the technologies necessary for chicken production (see 'Strategies' below)
- A major advantage is that Haitians are so poor: 80% of the population depend on flexible household strategies where family labor is readily available and labor costs in terms of money are extremely low. This means that if we can find ways to allow Haitians to incorporate egg production strategies into their ongoing household livelihood strategies then cost of labor and even cages and maintenance can be considered close to zero.
- Another important advantage not emphasized in this report is that the big payback for the producers comes with selling the layers. Unlike in developed markets, an old hen that no longer produces eggs has a value for meat equal to that of any other hen. This means that an producer who has 200 layers, succeeds in covering costs through egg production but does not make a profit at that stage, can sell the layers after a 1 year laying cycle and make US $2,000, a figure almost triple the Haitian per capita GDP.

Strategy

- A strategy that may effectively help the industry overcome constraints should focus on access to the raw materials, the chickens, feed, cages, availability and distribution of those materials.
    - Feed: the biggest point of entry in terms of a new 'economy of egg' production is promoting local feed specialists who produce high protein worms and bugs (vermiculture) as well as planting, harvesting and processing hi-pro weeds that chickens like to eat. This would help resolve the problem of the distribution and availability of high protein feed. Indeed, everything that can be done to reduce costs of imported feed will increase profits. To support micro-producers of feed, the initial program would purchase the products straight from the new feed producers, assuring them a profit for their efforts and kick-starting the production process.
    - Cages: The most obvious local option to imported wire coups are local bamboo cages. A read technology found throughout Haiti that could be used for chicken coups are bamboo fish traps. Fish traps are sold in the markets as kits. The buyer puts them together. The same could be done for chicken coups. What this means is that some one who wanted to invest in eggs could buy the cage in the market, take it home and put it together. Those cages are inexpensive, US $2 to $5, depending on the size. The fish traps themselves will hold 5 to 20 chickens, again, depending on the size.

Fisherman putting together a fish trap that could just as effectively hold 20 to 30 hens

    - Hatchlings: A promising new development that has occurred in the US and Europe are s a kind of is a revolution in hobby egg incubators. The availability of solar or battery powered incubators could put a new class of Haitian small entrepreneurs into the business of micro-hatcheries, helping to resolve the problem of the distribution and availability of layers outside of Port-au-Prince.

- Layers: Entrepreneurs hatching the chicks could either raise them to laying age and use them in their own egg production operations, or sell them to others who raise them to laying age and then sell them as layers. From the perspective of purchasers or prospective entrepreneurs this would mean that a person could buy a single hen.
- Veterinary supplies: Necessary to make the preceding work is the widespread availability of vaccines and antibiotics. The seemingly simple solution is to create poultry "entrant boutque" or coordinate with organizations that have them. A look at similar—failed-- endeavors attempted by the Ministry of Agriculture and NGOs suggest this is far more complex than it sees. Indeed, this may be the most challenging component of any poultry project: how to make a steady and dependable supply of veterinary resources available to rural small farmers throughout Haiti. The issue should be examined more closely. However, one tentative suggestion is to not reinvent the wheel, so to speak, but to use the local system of boutique (convenience stores) that already exists

In short, the most effective approach to promoting poultry production among small producers in Haiti is to use a mixture of local and new international technologies to create a sustainable micro-enterprise poultry economy: feed producers, cage makes, micro-hatcheries, specialists in raising hens, all of whom would make the feasibility of micro-egg production enterprises logical within the context low investment and low risk Haitian peasant livelihood strategies. From the perspective of the small farmer someone who saves US115, can buy 10 chickens at $100, 1 cage at $5 and a bag of local feed mixed with imported supplements for $10. They could then go home and expect to earn every day $1.40, enough to cover 25 to 50% of cost of sustaining the household. Reinforcing the strategy is that it is compatible with preferring investment strategies in rural Haiti that act as a savings that can be liquidated at any time to pay for school tuitions or unforeseen household crises, such medical costs in the event of an illness.

ANNEXES

Annex 1: Summary of Characteristics, Rules, Patterns and Implications of Subsistence Strategies

Any intervention must take these points into account. A summary of the outstanding features follows,

1) Haitian farmers are best described not as *subsistence producers*, but *subsistence oriented* producers who sell surplus

2) The market oriented economy they depend on and is made possible by,

a) microclimates that allow for complementary harvest seasons (the microclimates themselves are caused by

- altitude differences-- as between mountain and plain--and
- the fact that Haiti is located at the interface point between different continental climate systems)

b) a vigorous regional system based on rotating open air markets that are held in different locals on different days of the week giving families access to at least 2 markets per week within walking distance of their homestead,

c) rural women who make careers of medium and long-distance itinerate trade; they purchase local produce in one area and transport it to regional markets or urban markets and, not least of all,

d) an array of diversified cropping strategies adapted not so much to production for income but also production for survival and security (i.e. planting of hardy drought and hurricane resistant crops that tend to have maximum harvest durations, providing near continual harvest of crops throughout the year)--see Section 7.5 Follow).

3) And important features of the peasant livelihood strategy that derives from the type of market economy described and the microclimates are that the most efficient means of storage is money,

4) Dependence on money, scarcity of money, and the lack of storage means that most farmers purchase seed for planting rather than storing it, something that often gives way to wide fluctuations in price between harvests when markets are glutted and planting time when seed is scarce and must be sought elsewhere.

5) Production and income strategies are organized around the household rather than the workplace,

6) It is the household and not the State that provides a safety net for individuals.

7) Household service strategies--providing water, cooking food, cleaning cloths, and maintaining hygienic sleeping and food space--are low cost but labor intensive,

8) Gender based division of labor and the household livelihood strategies: As a cultural rule, the household is the domain of women. In the rural areas men plant gardens on behalf of women and in

the name of the children they have together. Women are regarded as the owners of the produce. They do the harvesting, sell the harvest and manage the money. Moreover, in many cases, especially true in rural Haiti, it is also around the household that labor and production are organized. Household members participate in a wide range of productive income or food generating activities, such as agricultural production, livestock rearing, and fishing. And again this is true for all members of the household, even young children.

9) Child labor: Even very young members of the household may contribute to livelihood security by fetching fire wood and water, running errands, washing clothes, preparing meals, and selling goods. The point being that whether UNICEF, World Vision, CARE, or donors would like to see children playing rather than working we should respect the importance they have to food security and livelihood, keep programs realistic and perhaps even target some programs to help children deal with their labor tasks rather than unrealistically insisting they should not work or, worse, pretend that they do not. Perhaps more importantly than anything else in understanding the household as the basis for livelihood strategies and the role that children play is that for both urban and rural areas children stay home and perform basic domestic tasks and care for younger siblings thereby freeing adult women (mothers, sisters, aunts and cousins) to pursue income generating activities outside the homestead (itinerate trade, and to migrate to villages, towns and urban centres where they work for months and sometimes years as domestics servants). [xxxv]

10) Response to Crisis: The greatest threat to livelihood security is, as seen, droughts and hurricanes—both called *siklons* by locals. Hurricanes are not as severe because mountains protect the region from the Southeast to Northwest moving storms, breaking up the winds and usually leaving only heavy rains as a threat. Many crops, such as manioc, sweet potatoes, and arrowroot survive and even benefit from the abundant rainfall. Prolonged droughts are more devastating. Only the hardiest crops and livestock survive. When a drought strikes, demands on household labor increase precipitously. The principal feature that determines the success with which a household can cope with the drought is not how few mouths it has to feed but how many able bodies it can put to work. Crop failure turns many households to charcoal production and, as a consequence, local wood supplies dwindle and household members must travel farther and farther to find wood for fuel. But most problematic is the water supply. Water sources dry up and people have to travel farther to fill their buckets. In the Far-West, the temporal distance to and from the nearest secondary water source goes from 70 to 120 minutes. Springs are packed with crowds of pushing, shoving and cursing women and children. People get up at midnight so they can arrive at a distant spring before it becomes too crowded and they spend hours waiting to fill a single water jug. Some people, particularly young children, return to the house teary eyed, trodden and bruised, having failed to procure any water at all. During a drought washing clothes becomes problematic as well. Women must travel great distances to find clean water and a vacant place to sit and scrub. Animals have to be watered more frequently since the desiccated fodder dehydrates them. Fodder itself becomes scarce. So farmers are traveling farther and farther into remote areas to graze their animals or to cut grass for them, and then they must lead the animals more frequently in the other direction, into more peopled areas where adequate water sources are more common and tend not to dry up. All of this additional effort translates into more labor and the need for more workers, because rain or no rain, people must eat and they must drink. Food still must be cooked, water found, clothes washed, and at least some animals must be kept alive so that when the drought finally ends there will be something with which to start producing again.

11) High fertility and the demand for children: An important consequence of the high labor demands and need to adapt to crisis seen above is that, despite what many development practitioners and healthcare workers believe, having many children is economically logical from farmers in the region. Congruently, they tend to be radically pronatal; they want children, and at 6.0 to 7.1 births per woman fertility in the rural areas is perhaps the highest rate biologically possible given the prevalence of infectious diseases, low-calorie diets, high rates of female malnutrition, high female labor demands, and high rates of male absenteeism. Despite all these limiting factors, fertility in the rural areas is equivalent to the second-highest country birth rate in the world and almost as high as 19th and early 20th century Hutterites, who had the highest sustained fertility levels ever documented.

ANNEX 2: Informal vs. Formal Wage in Haiti

Data in Table A2.1 is from DeMattee 2012 is based on 876 observations from 79 formal sector employees, including the banking, airline, construction, petrol, hotel, manufacturing, medical, telecom, IT, and humanitarian sectors. Table A2.2 and A2.3 come from 15 independent studies conducted by Haitian students and CARE (2013) researchers who interviewed friends, family and neighbors engaged mostly in informal sector occupations. (all data is in US dollars annual wage; daily wage earnings are based on 25 working days per month).

Table A2.1: Formal Sector Employment (USD) (Demattee 2012)			Table A2.2: Informal Sector Employment		
Occupation	(USD/year)	USD/Day	Occupation	(USD/year)	USD/Day
Security Guard	$1,734.00	$5.78	Guard/home	$1,012.50	$3.38
	-	-	Guard/business	$1,710.00	$5.70
Domestic	$2,177.00	$7.26	Domestic	$1,170.00	$3.90
Cook	$2,855.00	$9.52	Cook	$1,200.00	$4.00
Handyman	$3,430.00	$11.43	Labor	$2,419.00	$8.06
Messenger	$3,796.00	$12.65	Messenger	$1,800.00	$6.00
Driver	$5,347.00	$17.82	Driver	$3,150.00	$10.50
Office Staff	$6,548.00	$21.83	Receptionist	$2,500.00	$8.33
Secretary	$8,090.00	$26.97	Secretary	$4,500.00	$15.00
Nurse	$10,150.00	$33.83	Apprentice	$2,250.00	$7.50
Mechanic	$10,801.00	$36.00	Nurse	$2,790.00	$9.30
Engineer	$12,777.00	$42.59	Foreman	$3,750.00	$12.50
Acct	$15,379.00	$51.26	-	-	-
IT Professional	$20,310.00	$67.70	Analyst	$11,250.00	$37.50
Office Manager	$21,267.00	$70.89	Supervisor	$5,750.00	$19.17
Doctor	$28,306.00	$94.35	Doctor	$10,350.00	$34.50
Program Mng	$31,672.00	$105.57	Director bank	$18,000.00	$60.00
Executive	$35,646.00	$118.82	Director business	$18,500.00	$61.67

Table A2.3 Entrepreneurial Sector		
Occupation	Year	Day
Minimum wage	$1,500.00	$5.00
Agricultural labor	n/a	$2.50
Construction labor	$2.635.00	$8.75
Mason	$3,750.00	$12.50
Moto Taxi	$4,125.00	$13.75
Vendor	$4,500.00	$15.00
Tap tap driver	$7,500.00	$25.00

ANNEX 3: Case Studies

OPDCD
Organization pour le Developpment de Cite Delmas
The "president" was Nounous
Latillade 3 706 20 57, Boduy 3 778 75 25

Began in 2011. Currently defunct.

Was originally supported by Terre de l'Homme TdH

Unknown number of members but ostensibly the entire community of Delmar, about 50 households, 100 adults.

TdH built the 100 m2 coup. Totally enclosed with wire.

He started with 500 chicks, at 36 goud per chick, all a gift from Terre de l'Homme to get them started.

They were very excited. They slept with the chickens.

Had to keep them warm for 12 days

At 45 days they would have been ready to eat. Some even at 35 days

Terre de l'Homme gave them food for 45 days.

The first problem was heating. They lit two barrels when they should have lit one. They lost 70 chicks (15% of the flock).

They lost some more for other reasons but on the up side, they coup and sleeping with the chickens meant they lost none to rats, cats, dogs, snakes, mongoose or thieves.

The next problem was that they couldn't sell them all at 45 days, which is when the food ran about.

When they ran out of food at 45 days and had not sold the chickens they bought 'san de ble' -- pig food supplement—and fed that to the chickens. That caused them to defecate blood and become dehydrated. So they lost more…

They didn't buy any more food because it's too expensive.

In the end, all these losses and for something that was free.

It was not worth buying more chickens.

Notes: A telling aspect of all this and typical of all the other operations examined is that the operation, meant to be a community 'cooperative', is that it was dominated by Nounous and his family. Nounous was the local Azek and Les Cayes body builder. The coup was built in the center of his family property. The situation is such that when MINISTAH came with more chickens and feed but Nounous was in prison the chicks were rejected, i.e. no one in the community felt they had the right to accept the chickens as it was Nounous' operation. Today Nounous keeps pigs in the coup, his pigs. Similarly, as part of the same project, UNICEF and TdH built OPDCD a community center. It's massive and with a ten foot wall around it. It too was built it on the land of Nounous's father. When the TdH and UNICEF came with a second program the mother refused to allow them to use the center. So TdH and Unicef had to build a new center, on Nounous family property.

Nounous in his chicken coup with his pigs

UFPDM

Union Femme pour le Developpment de Mont-Ville (2eme Section of Torbeck)

Mme Dorival Gaston is the president. 3 761 14-87

Parc Avicole de Mont-Ville, Torbeck

300 members

2 years in operation

MARNDR built the coups

They have 55 cages and they can keep 200 hens per cage = 11,000 hens

At the moment they have 750 Le Breun brown (they have whites too…).

They lay for 9 to 10 months. 1 egg per day (so she says. But this is wrong).

Some layers lay for 15 months

They sell a carton of 30 eggs for 200 = US$0.145 per egg

Mayor Gaston at her cooperative

They sell them all, even those not to the Cantine

They have a contract with Cantine Scholair for 40 cases of eggs per month. That's 360 eggs per case = 14,400

They get everything from Haiti Broilers: Chickens and the feed

One 55lb sack of feed from Jamaican Broilers cost 785 gdes right now.

Chickens cost $11 to 12 per hen. What this means is that if Mme Gaston were to get the maximum expected from her chickens, about 250 eggs per year, and she lost no chickens (unlikely) and she got the her price of 14 cents per egg, then she would need 79 eggs to pay for each layer. Add to this the 11 cents of Haiti Broiler feed that it takes to make one egg and, if each bird lay eggs for 12 months, what you have deficit of USD $3.00 per bird. If she then sold the birds at 470 gourdes each, USD $10, she could make a USD $7 per bird profit. That would mean that on $38.50 investment—not counting any of the other costs- Problems: If they do not vaccinate they lose their chickens.

They tried to make their own food. Bought mill. They milled and mixed. But they could not get "Premix" a necessary supplement. They sent to the Dominican Republic but still couldn't get it. With the food they made the hens wouldn't lay…

They can't get cartons of 1 dozen eggs, which is necessary to sell to the supermarket. They can get for 30 eggs. Come from St Doming,

Notes: Like Nounous, she has a political position, a high one, Mayor. Her husband is a school director. She owns much land. She would not say how much but the cooperative and all the infrastructure is on her land. It's not clear what the other 300 women get for their participation.

Martelly visited.

Ferme des Antilles
Jean-Claude Vertier and his son Kiko = 3 642 60 81
Markviarde@gmail.com
Cavaillon, Department du Sud

They opened May 24th 2014

They have Beaubreun White. They lay 1 egg per day for 18 months (which we know cannot be true).

They have a capacity of 20,000 layers; They currently have 5,280 layers.

And then they have a hatchery that is just beginning to function. They just hatched 3,600 themselves.

They will be increasing capacity to 7 – 8,000 in january

Mortality of less than 2%

They used Haiti Broilers at first but are going independent.

They say they make their own food

They sell the eggs for H$400 to 420. per case. 1 case = 360 eggs (30 dozen) = 5.5 gd = US$0.12

From Oanaminthe H$365 per case = 5 gd = US$0.11

Per carton of 30 – $US3.30

They pay $10-11 per layer

They are putting a facility in every department.

They have operating facilities in Cavaillon, Mirabalais, Cape Haitian

Notes: This is supposed to be a private investment but it is notable that Vertiers is, so they say, the architect of the new National Palace and hence we can infer a Martelly insider.

Ferme des Antilles state-of-the-art operation

Jardin Meridional, Farmer Supply Store
Lagaudray, Les Cayes, Haiti,
Agronomist Chery junior Getrau 3 668 31 84, 3 369 71 54
Jardinmeridional107@yahoo.fr

He calls Haiti Broilers "Haiiti Voleurs."

Elsewhere he calls them "Hi Pro" and that seems to be a name that everyone has given them. Possibly from the feed.

He buys also from Javek. They have chickens from Venezuela. They are located in Martissant. (Owners: Paul Déodel JULMISSE.)

Medicines: ASCORBOL Plus has vitamins, good for fighting cocks

Oxytetra: An antibiotic given by injection

Calcio B12, good for calcium

Complejo B_K, Vitamin

11 syringe is good for 15 or 25 chickens

His own Investment

60,000 Htg;

600 hens from Haiti Broilers

50 died

Jardin Meridional, Farmer Supply Store

It costs 740 Htg per 55 lb sack of feed.

16 sack for 100 chickens to reach harvestable 45 days of age

2 bottles of antibiotic = 150 Htg x 2 = (if liquid it's 400 per bottle)

2 bottles of vitamin = 150 Htg x 2 = 300

If they get sick it's more…

He got a return of 47,000 Htg.

Loss of 13,000 Htg

Problems: As soon as it takes more than 45 days the chickens start to cost money, you lose. You have to be able to kill them…

For a layer the cost is $11-12 per poussin. So that's 1,200 to 1,300 US investment for 100. But you have to buy at least 200 to be profitable

The food from Haiti Broilers was not good, he says. The birds took too much time to develop. Chickens too small. Machann do not readily buy the chickens at 45 days. They, haggle, wait… They know that you must sell.

Generally a chicken sells for 45 to 50 H dollars. His were, 4-5 lbs and so small at 45 days. The machann want them bigger. They should be 6-7 lbs.

He is talking mostly about chicken for meat. 75% or even 90% of all operations are for meat. And 75% or even 90% fail. He starts naming them all over the place: 75% to 90% of investors abandon the endeavor.

Farm of Axel Simon
In Gorge, Torbeck
Rep. Agronom Wilson Nordesty, 4 369 3134, 3 927 4224
NordestyWilson@gmail.com, Winordesty@yahoo.fr

Simon has 35 hectare. He was in the States for a long time and then came back. He's 63 years old. 4 daughters, all in the States. Place is beautiful. Has old plantation with original mill.

Tractors litter the place…

Vast fields of rice, beans… workers… looks like something in the US south (I would like to buy this place)

Wilson has been with him for 7 months.

He shows us two large chicken houses (~500 m). Built in 2008. Look ancient. Says they functioned in 2010. Problem, Wilson says, was the workers (Wilson is new manager; questionable claim).

They had to go to Dominican Republic to buy feed.

This is a guy who can produce all the feed he wants. All 35 hectares are contiguous, impressive fertility,

irrigated. Most planted in rice.

They bought three mills so they could make their own food. At the moment none work. Sent two to PaP to be fixed. That was 2 months ago and they are still not ready. Perfect example of the problems with technology. If they depended on the mills they would be dead in the water.

Note that Axel fixes his own tractors, one of which is 40 years old.

USAID paid to fix the canals…

Axel's defunct chicken operation

Axel's broken mills

Institut François d'Assise
Béraud, Les Cayes, Department du Sud
Souer Marise Denise 32890347,3474 8763

They have been producing for half a century.

A Canadian set it up

But they may be operating at a loss, doesn't matter…. See below.

They have 280 Breun at the moment'

They usually produce 9-10,000 eggs per month

They sell 1 dozen for 60 Htg and 30 eggs for 175 Htg

= 6 gd per egg

= US$0.13

The Catholic nuns' operation

Biggest problem is to get the Layers

They gave Haiti Broiler their order and their money and they never got their hens…. She has some coming from the US.

When asked if they make a profit she shrugs. It's important to work with the community. But she does seem very concerned about Cavaillon and says they crashed the local prices.

But then Agronomist Abraham starts to discuss how it's good for the Haitian economy, before long she's interested…

Inside the nuns' operation

At some point they are talking about the quality of the egg once it's boiled. If the bird lacks calcium then the shell can stick. Agro Ab is saying that some people say that's a problem with eggs from DR

They buy the feed from PaP

When they get to 3-4 lbs they sell the meat chickens, suggesting that is indeed the weight they reach—in contrast to the guy at the intrant boutik

Dr. Paul,
Paul Rudenberg
3 703 - 5286
Paulhaiit@yahoo.fr

American Veterinarian who first came to Haiti from US in 1985 as missionary. Stayed for 1.5 years. Then 3 years back in states before returning again. Worked for IICA for several years. Has worked as USAID consultant.

Now has his own little practice in the back of a type of barn outside of Les Cayes.

He says that the biggest thing is food. By far.

Next, people have to be acutely aware of the accounting.

The diseases are manageable.

But it is tough to compete with US enterprise… or agro industrialists from anywhere.

After that the only really good information he gives is the 3 diseases.

BUT, he suggests demonstration operation open to farmers and that brings them in for several days of training. And he talks about Okay having 4 Universities. SEED we visited and they are not interested but the American University surely would be. It may be in the end that the best thing FCA can do is set up a program inside one of these institutions. Perhaps a chicken institute that works with farmers…

AgriTropical
Engineer Louis Jeannel Junior
3 781 7141
LouisJeannelJunior781@gmail.com

Louis Jeanne is middle class, lives in a middle class house, expensive vehicles. Pure entrepreneur. No NGO assistance. Terrific insight and analysis of the situation.

Has laying operation in his back yard.

The problem with the eggs is that the cycle is 14 months. No vacation… anything can happen. It takes about 150 days to maybe break even…. 200 to make a profit.

The meat is a 45 day cycle; and more profit

There is more risk, greater care, have to collect the eggs, sell them constantly. For meat, you can buy all the food you need for the next 45 days…. With the layers, feed price can go up.

The only advantage is that the eggs store longer.

Engineer Louis Jeana's intriguing backy yard operation

Increase in prices just since May

36 gd – 40 gd pousin

750 – 785 sack feed

"The producer loses that money"

With the meat, they are staggering their purchases for every 15 days so they have chickens to sell all the time…

He says that Haiti Broilers chickens are no good. Some are "handicapped." Quality of the chics are low, they don't develop. 4 -5 lbs is not big enough. Hard to sell with the machann.

He talks about how the cost of chicken is lower in PaP than in the rural areas. This means they buy all the raw materials for PaP and they produce. But if they send it back to PaP the price is less than in the rural areas. A typically chicken, plucked and prepared, selling for 552 goud in PaP. Sells for higher price in rural areas

He's frustrated with Hi Pro and says they have to detach themselves from them. "It's not possible that the same company that sells you the chicks sells you the food." They can take your profit at any time just by raising the cost of feed.

He goes on about the volitle cost of corn. And that's a huge point. With prices rising and falling 300% it would be far better to invest in corn…

There are feeds for multiple stages of chicken's development. They bought from another outlet. Hi Pro only sells one feed

2 Biggest Problems

Type of chics, Type of food

If you don't have 200 layers you cannot be profitable

In best case scenarios, you will only get 90% of potential output because of illness, defects…

Talks about all the problems with eggs from DR. They spoil a lot. Takes days to get them to the border. Then they come across. Sit in the sun. Move down bad roads…. A major disadvantage for the Dominicans and a major problem for people consuming the eggs here.

To be successful, a producer must be in control of the feed. Silo, moulen. BUT I would add, land and production because of the swings in cost of corn. And if you have silo then you can make 300% on the corn, why bother with chickens.

Christian Ville, KORE
Robenson Desir 3 111-5846
robenson@korefoundation.org

For Layers they usually have 950 Bovine Whites. They have always had Whites but are getting ready to try browns. They buy from Haiti Broilers

Robenson talks about how when you cut their food they drop to 60% of production, molt… but never return to 90% …They collect the eggs by hand.

They always bought food from Haiti Broilers but are now going to Agro Mackness, a local who makes his own food.

Haiti Broilers only has one type of food. Macknes has three types for 3 stages…Comes if they have a problem…

Mackness is in Gressier

Their Chicken Program: "No gifts." They only do broilers but would be very interested in developing a egg laying program. They run it through a regional *notab* or group but for individual owners. They train the group and they train a local technician who is within walking distance of the others. The ideal is one technician per 25 chicken farms. The technician must be able to visit every day. They pay a salary, give a telephone, and a small pharmacy. But there is no moto. They must walk.

Cost of setting up an operation is US$4,000/ 8% annual interest/ 3 year payback period

The investor or a sponsor has to put up 50%. KORE loans them the other 50%. Here's what they get,

- Training: For the group…
- Chicken coup: 100 sq yards built by C'ville team
- Food: Now it is from Macknes
- Chics – 400 chics from Hi Pro (cost them 38 gds each (delivery is 2 to 5 gouds)
- Technical Assistance: every day for 3 years
- Insurance: Thru C'Ville. It is for flood, fire, epidemic. But if individual was negligent, no.

A Christian Ville chicken coup

Process:

- The Chicken coup is 100 meters^2 it has 2 inches of rip
- When the chics come in they have to keep them warm with barrel for 3 days.
- The rate of mortality is 0 – 9%.
- 5% is considered acceptable.
- They make a minimum of US$150-250 per 45 day cycle, after interest and costs. Some make as much as US$500
- C'Ville has it's own outlet for chickens. They purchase about 60% of all their partners chickens. They have a slaughter and packaging facility but they sell 90% of live.

Problems with laying operation, according to Robenson, is they stink more.

He says layer need good care when little but after that they're fine.

Hens For Haiti

Christie Lamour 240-418-0089.

info@hensforhaiti.org

Founded in 2010

Lanmour is has a degree in animal science from Virginia Tech.

She first came to Haiti in 2007 as a missionary. Returned after the earthquake and founded Hens for Haiti.

Clinton Global Initiative University gave them an Outstanding Commitment Award in 2010.

She's set up operations for missionaries. She and her group do technical advice….

They are basically the only type of NGO development organization that specializes specifically in eggs.

Eggs are much easier to sell in rural areas than the broilers. No problems with market.

They have a strong internet presence.

Problems:

She is not long in the country, appears to never have had a long and deep presence. Married a Haitian in US military, has new baby and is very unlikely that she will be returning to Haiti. But her activity on the internet and the organization and funds go on…. With, as she says, "poor communication" with those in the field.

Reading their reports and 'between the lines' the organization is getting heavily exploited by its own staff and to date all field projects but GRos Morne and St Michel are failures. Even the latter two, from reading her reports, have had 'ggovernance' issues and may be surviving because they are buoyed up by mission donations. An inescapable fact in all this is that any egg operation will be great bait for donations.

Nevertheless, they are a technological resource that could be drawn on and incorporated into a business plan.

ANNEX 4: Contacts

ANNEX 5: Questionnaires

Chicken_Survey

Name of surveyor

Department?

Commune

How many chickens do you own.

Do you ever give them food?

Do you ever vaccinate them or give them preventative antibody treatment.

Of one of you chickens gets sick do you treat it?

If you had money to invest in chickens, what would be the biggest impediment to you investing?

Egg_Survey

ID of respondent

Name of surveyor

Department?

Commune

In the following list, what is the major reason that you raise chickens?

- eat eggs
- sell eggs
- eat chicken
- sell chicken
- other

In the following list, what is the second most important reason that you raise chickens?

- eat eggs
- sell eggs
- eat chicken
- sell chicken
- other

What is more important to you, a chicken that lays many eggs or a good mother that raises lots of babies?

What's the greatest risk to eggs?

When was the last time you lost all your chickens?

How many chickens do you usually raise?

How long did it take to rebuild your flock to the same size that it was?

How much does a hen usually sell for?

How much does a cock usually sell for?

Has anyone ever bought a cock from you to fight?

How much was the most anyone ever paid you for a cock they were going to train to fight?

ENDNOTES

[i] CNSA - Bulletin de Conjoncture, juillet / septembre 2007

[ii] Etude de caractérisation de la filière avicole en Haïti Poulets chair et pondeuses IICA/ SYFAAH Henry Chatelain Révisé par Rachelle Pierre Louis et Antoine Ladouceur IICA

[iii] According to McKinley and DeWitt, one billion USD World Bank loan to Haiti's then richest family—the Brandts--would have made Haiti an exporter of eggs. Instead, political instability from 1981 until 2006 was associated with a failure of the Brandt project. In 1998 all closed their doors.

[iv] AlterPresse 2006. Développement durableHaïti- République Dominicaine : Redynamiser la production avicole à l'ouest de l'île http://www.alterpresse.org/article.php3?id_article=5030#.VIuJsjHF9qo
Laboratoire des Relations Haïtiano-Dominicaines (LAREHDO)

[v] This does not include an additional estimation of $300 million per year in illicit trade, also mostly in favor of the Dominicans.

[vi] For trade see The Business Year, Strength in Solidarity 2013
http://www.thebusinessyear.com/publication/article/14/1632/dominican-republic-2013/strength-in-solidarity

Haiti Grass Roots Watch Haiti-Dominican Republic Trade: Exports or Exploits? Inter Press Service

http://www.ipsnews.net/2013/02/haiti-dominican-republic-trade-exports-or-exploits/

For growth in Dominican economy see, http://www.worldbank.org/en/country/dominicanrepublic/overview

[vii] Fieser, Ezra And Jacqueline Charles 2013 Haiti, Dominican Republic chicken war highlights trade inequitieshttp://www.miamiherald.com/2013/07/07/3489665/haiti-dominican-republic-chicken.html

[viii] For export restrictions because of New Castle disease see The Poultry Site Dominican Republic - Poultry and Poultry Products Report – 2008 Thursday, December 11, 2008

[ix] For taxes see The Poultry Site, http://www.thepoultrysite.com/articles/1261/dominican-republic-poultry-and-poultry-products-report-2008

[x] For feed costs and importation in the Dominican Republic see The Poultry Site, http://www.thepoultrysite.com/articles/1261/dominican-republic-poultry-and-poultry-products-report-2008

[xi] While the causes of the decline in Haiti's domestic production, it has been widely argued to have come about as a result of political instability and structural readjustment programs (see Schwartz 2012)

[xii] From Chatllain 2012: "Depuis l'an 2008, suite à la découverte du virus H5N1 en République Dominicaine, tous les poussins importés proviennent d'une entreprise basée en Floride dans la région de Miami dénommée MORRIS HATCHERY. Le poussin coute U$ 33 cts /l'unité au USA, le transport aérien U$ 68 cts/livre, représentant à peu près U$ 28 cts /poussin. Comme intrants agricoles, ils sont exonérés de droit de douane et de TCA. Ils ne paient que les frais de vérification 4%, l'acompte 2%, les taxes pour les collectivités territoriales 1%. Les importateurs revendent les poussins à un prix variant entre 30 et 32 gourdes.

Les importateurs de poussins les plus connus sont :

1. M&M

2. GERMALOT
3. VIDRO TRADING
4. AHPEL

[xiii] http://www.christianaid.org.uk/emergencies/past/haiti-earthquake-appeal/eggs-story.aspx

[xiv] On Haiti Broilers, from Chatelain 2012,

“Deux ans après le démarrage de leur opération, 95% des poussins sont produits localement, et tous les importateurs ont été convertis en distributeurs de poussins. Il faudrait que des investissements se réalisent en aval dans les fermes pour justifier le fonctionnement de deux couvoirs et les rendre rentables.

Haïti Broilers dispose d’un réseau commercial de 57 distributeurs répartis sur 8 départements géographiques du pays, dont 47% se trouvent dans le département de l’Ouest avec 27 points de distribution de leur produit dans l’Ouest.

D’une capacité de production de 120 tonnes /jour, l’entreprise développe une stratégie de proximité en allant à la recherche de ses clients. En plus de ses 57 distributeurs, elle déploie sur le terrain 22 médecins vétérinaires pour encadrer les éleveurs. Une particularité de cette entreprise, elle n’offre à ses éleveurs de poulet de chair qu’un seul type d’aliment, une ration unique du premier jour jusqu'à la vente. Bien que ses prix de vente soient plus élevés que ceux de son voisin (IMBA), HAITI BROILERS contrôle environ près de 50 % du marché de l’aliment. Ses matières premières arrivent de Jamaïque et des USA.”

[xv] Intense negotiations and a backlash from the DR retroactively deprived of citizenship all immigrants from Haiti going back to 1929—an almost comical reaction that would take citizenship away from about half of the greatest Dominican athletes, a sizeable portion of their military, and many notable politicians.

[xvi] Did Haitian Government Lie Over Chicken And Eggs From Dominican Republic?

[xvii] La Ferme des Antilles produira par milliers des oeufs et des poulets à Cavaillon Le Nouvelliste | Publié le : 30 juin 2014

[xviii] For USA Egg Prices see, Ycharts which depends on US Department of Agriculture for data, https://ycharts.com/indicators/us_egg_price

For Dominican Egg Prices see,
Diagnóstico situacional sobreEl comercio de pollos y huevos entre república dominicana-haití Acciones en cursoJulio 2, 2013 el Centro de Exportación e Inversión de la República Dominicana (CEIRD)
http://www.ceird.gov.do/ceird/pdf/directorio_exportadores/ESTUDIO_SOBRE_EL_MERCADO_DE_POLLOS_Y_HUEVOS.pdf

Hoy Digital Por EVARISTO RUBENS 12 marzo, 2012 12:54 am
http://hoy.com.do/suben-precio-de-huevos-pero-en-granjas-su-costo-es-estable/

Hoy Digital Precio de huevos alto a pesar de exceso de producción 10 julio 2013
http://www.elsitioavicola.com/poultrynews/26677/precio-de-huevos-alto-a-pesar-de-exceso-de-produccian#sthash.EbnPaKX7.dpuf

Asohuevos

[xix] For US egg consumption see, US egg consumption highest it's been in 7 years: ‘Protein is where there is a big opportunity right now.’ By Elaine Watson+, 24-Oct-2014. http://www.foodnavigator-usa.com/Markets/US-egg-consumption-highest-it-s-been-in-7-years

For Dominican consumption statistics see Estudio Sobre El Mercado de Pollos y Haiti, (http://www.cei-rd.gov.do/ceird/pdf/directorio_exportadores/ESTUDIO_SOBRE_EL_MERCADO_DE_POLLOS_Y_HUEVOS.pdf), and then do the math, 2 billion eggs divided by 10 million people

Also see The Poultry Site for past statistics Dominican Republic - Poultry and Poultry Products Report – 2008 Thursday, December 11, 2008

For Haiti, the math is 42 million eggs divided by a population of 10 million

[xx] Laboratoire des Relations Haïtiano-Dominicaines (LAREHDO) financed by EU http://www.forumhaiti.com/t294-haiticapacites-dans-la-production-des-oeufs

[xxi] Here are the 8 major diseases likely to affect free ranging chickens (IFAS 2014)

Table N1: Poultry Diseases	
Disease	**Signs**
Fowl pox	- scab-like lesions on the unfeathered body parts (especially face and comb)
Coccidiosis	- characteristic gross lesions in the intestinal tract - higher mortality in some cases - bloody droppings
Infectious bronchitis	- coughing, sneezing, and rales - egg production drops markedly (by as much as 50%). - soft-shelled or misshapen eggs - watery egg white - poor pigmentation of brown-shelled eggs
Newcastle disease	Mild form:Acute form: - reduction in feed and water consumption- respiratory distress - dramatic drop in egg production- twisted neck - decreased shell quality - increased mortality
Avian influenza	Mildly pathogenic form:Highly pathogenic form: - listlessness- facial swelling - sneezing, coughing- dark red/white spots on legs and combs - diarrhea- respiratory distress
Avian encephalomyelitis	- seldom show clinical signs - slight, transient drop in egg production
Mycoplasma gallisepticum	- coughing, sneezing, snicks, rales, nasal and ocular discharge - decrease in feed consumption and egg production
Fowl cholera	- sudden unexpected deaths - reduction in feed consumption - swollen wattles - nasal and ocular discharge - cyanosis of head - white water or green mucoid diarrhea
Infectious coryza	- swelling and puffiness around the face and wattles - thick, foul-smelling nasal discharge - labored breathing - decrease in feed and water consumption

[xxii] **Adaptive Cropping Strategies** To understand the security situation and how it articulates with peasant livelihoods it is important to understand the crops Haitian farmers plant and the extent to which they are adapted to drought.

Sweet potato go into a state of dormancy during drought and then come back vigorously at first rain and may yield as much as twelve metric tons per acre on as little as four inches of rainfall. The more it rains, the more the vine produces (see Bouwkamp 1985; Onwueme 1978).

Manioc is one of the most productive tropical food plants on earth in terms of calories produced per square meter, surpassed only by sugar cane and sugar beets. It needs more rain than sweet potatoes to grow, but it is more tolerant of drought, easily surviving dry periods longer than six months and it grows in marginal soils. Unlike sweet potatoes, cassava has the unique ability to be stored in the ground and is hurricane proof because it can lose all its leaves and its branches may break but the root, which is where the food is, will not die. After drought or hurricanes the plant draws on carbohydrate reserves in the roots to rejuvenate itself (see Toro and Atlee 1980; Cock 1985).

Pigeon peas are a bush-like plant with roots reaching six to seven feet beneath the surface, deeper than cassava, making the plant highly drought resistant. When drought does strike, pigeon peas shed all their leaves and go into a state of dormancy just like cassava, coming back to life when the rains return (see Nene et al. 1990). Moreover, its stalks provide an excellent fodder for livestock.

Millet is another wonder crop that yields with minimum rainfall. The roots reach more than eight feet beneath the surface, enabling the plant to withstand over two months of drought. When the crop is entirely lost to drought or has been harvested, the stalks can be cut back and with the first rains the plant will begin growing again; it can potentially yield 10,000 seeds for every seed planted, it grows on land otherwise lost to salinizatoin, and it's hard kernels store as well or better than wheat (see Nzeza 1988).

Peanuts are even more drought resistant than millet, and in NW and Upper Artibonite they are planted in sandy soil and in the chaparral where only cacti and xerophytic plants are found. It is also the premier high yield cash crop in the mountains, taking over the role that corn and beans fill on the plains (see Nzeza 1988).

The other lesser but still important crops all fit into an agricultural strategy that is clearly selected more for eking out a living in the face of an unpredictable market and natural environment than for participating in the world economy: **Lima beans,** which are inter-cropped with corn, are nitrogen fixing and begin to yield two to three months after harvest and continue to yield for as long as there is sufficient rainfall. **Pumpkins** and **squash** also yield continually as long as there is rain. The most popular **yam** in the mountains of the North West (*yam reyal*) can be planted during dry spells and will begin to grow with the first rains. Like cassava, it can be stored in the ground indefinitely, serving as an important food during droughts and other crises. Sugarcane endures for years, propagates itself without human intervention, can be harvested at any time after it is mature, and will grow back after being cut. Perhaps most importantly with regard to **sugarcane,** the hard fibrous exterior locks in water while the roots extend some eighteen feet underground, making it a completely drought-resistant source of water and high-energy food for both people and animals.

[xxiii] At least 8 major earthquakes have hit the island in the past 250 years and probably more; the most destructive were one in 1751, destroying Port-au-Prince; another in 1842, estimated at an equivalent of 8.5 on the richter scale it destroyed both Cape Haitian and the Dominican city of Santiago some 150 miles away; and one in1935 that created a tsunami, swamped sections of the North coast and killed thousands.

[xxiv] FAO FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS 2003 Egg marketing A guide for the production and sale of eggs ISBN 92-5-104932

[xxv] For the Corn to Calorie calculation I used Google Calculator based on United States Department of Agriculture Agricultural Research Service National Nutrient Database for Standard Reference Release 27. https://www.google.ht/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=calories%20in%201%20cup%20of%20corn

[xxvi] For the American Heart Association caloric intake recommendations see, http://www.heart.org/HEARTORG/GettingHealthy/Dietary-Recommendations-for-Healthy-Children_UCM_303886_Article.jsp

[xxvii] Chickens are extremely efficient at converting feed to protein in the form of meat. It takes 2 pounds of grain to obtain 1 pound of live chicken.

Table N2: Pounds of feed to produce 1 pound Live weight or Eggs	
Broiler Chicken	1.9
Egg	2.0
Pork	3.0
Beef	6.5

http://www.epa.gov/agriculture/ag101/printpoultry.html

[xxviii] Testament to fact is that many farmers want to treat their birds and are disposed to purchase the medicine and take the time to do so is that widespread use of Ampicillin, a locally available antibiotic for humans, that farmers mix with lime juice and coffee to treat 'colds.'

[xxix] See BackYard Chickens, how many chickens per acre?
http://www.backyardchickens.com/t/288496/how-many-chickens-per-acre

[xxx] For example, see A Guide To Understanding The Chicken Pecking Order at BackYard Chickens

http://www.backyardchickens.com/a/a-guide-to-understanding-the-chicken-pecking-order

[xxxi] "Being in a state of readiness to brood eggs that is characterized by cessation of laying and by marked changes in behavior and physiology" "Merriam-Webster definition". Retrieved18 September 2012.

It's useful to also note that it is much easier to induce broodiness than to induce egg laying qualities which also are dependent on selective breeding regimes. But once you have lost the broodiness, it takes time and breeding to get it back This from, http://www.backyardchickens.com/a/encouraging-or-discouraging-broodiness-in-your-hens

"For those who are strictly interested in getting the most eggs out of their flock as possible, broodiness would not be a desirable trait. For the 2-3 months that the hen is broody, she won't lay any eggs. The good news is that most of the modern high production breeds have been selectively bred and rarely "go broody", including the Leghorns, Sex Links, Production Reds, & Rhode Island Reds. Many of the other breeds rarely go broody, but there are always a few exceptions."

And from http://www.hobbyfarms.com/livestock-and-pets/broodiness-in-chickens.aspx

"For example, breeds that have been developed for high egg production have also been bred to not be broody; they are least likely to set on a clutch of eggs and brood it naturally."

This from, http://www.backyardchickens.com/a/encouraging-or-discouraging-broodiness-in-your-hens

"For those who are looking to be more self-sufficient in terms of raising replacements in their flock, broody hens are a very useful asset."

One of the other reasons it's recommended to separate the broody hen is that other flock members might view the chicks as "intruders". Especially when they rest of the eggs are hatching, and the mother hen can't be there to protect a wandering chick. You also want to make sure they can't squeeze through any fencing separating the broody hen and the rest of the flock. The general consensus is to wait until the chicks are at least 1 or 2 weeks old, before letting the broody hen and the chicks intermingle during the day with the rest of the flock. Some people, including myself, have been successful in allowing the broody hen and chicks forage during the day with the rest of the flock from only a day or two old, but I would be cautious, as it may not work for everyone.

"There are many benefits to having a broody hen raise the chicks, rather than by a human. Even if the eggs are hatched via incubator or the chicks are from a hatchery, I personally think that the broody hen does a great job raising them. Not only do you save money by not having to use a heat lamp, but you can also save a little food cost. The mother hen teaches the chicks from a very early age how to forage their own food, often much sooner than if we humans were raising the chicks. She has a food call very similar to a rooster, which she uses to call the chicks to her when she's found a tasty morsel. Plus, a broody hen will gradually integrate the young chickens into the rest of the flock, causing less pecking and commotion. Some broody hens will even teach the chicks to roost with the other birds inside the coop. I personally love watching the interaction between the mother hen and chicks, and how they learn to copy her every movement. For each hen, it will vary how long she stays with the chicks, but most will stay with them for around 6-8 weeks. She will gradually let the chicks wander around on their own, and leave them for a few minutes at a time. Even after the chicks have "graduated" into independence, the broody hen may once in awhile "check" on them."

And here, http://www.backyardchickens.com/t/457488/old-fashioned-broody-hen-hatch-a-long-and-informational-thread
"They are great on farms that want to be self-sustainable or in case of a power outage when you can't use an electrical incubator. The broody hen will also protect and teach the young chicks. They do however stop laying eggs while being broody and this is a problem for some."

[xxxii]

Table N3: Number of Chickens Owned, for Farmers who Own Chickens (n =209)					
Number of Chickens Owned	Number of Farmers Responding	Cumulative Number of Farmers Responding	Cum chick farmers	% chick farmers	Cumulative % chick farms
1	24	197	24	11%	11%
2	47	244	71	22%	34%
3	30	274	101	14%	48%
4	22	296	123	11%	59%
5	35	331	158	17%	76%
6	10	341	168	5%	80%
7	8	349	176	4%	84%
8	7/	356	183	3%	88%
9	1	357	184	0%	88%
10	11	368	195	5%	93%
12	5	373	200	2%	96%
13	1	374	201	0%	96%
15	4	378	205	2%	98%
20	2	380	207	1%	99%
30	1	381	208	0%	100%
50	1	382	209	0%	100%

[xxxiii] "Lighting plays a very important role in bird growth, development, and maturity. Most commercial poultry specie are photosensitive animals. For example, a constant or decreasing amount of daily light (as occurs during the fall and winter months) will delay sexual maturity in growing birds. An increasing amount of light (as occurs in the spring) will stimulate sexual maturity. Since lighting plays such an important role in the development of sexual maturity, adolescent birds are generally reared in black-out houses. This allows the producer to have complete control over the lighting cycle of the birds by providing artificial light." http://www.epa.gov/agriculture/ag101/printpoultry.html

[xxxiv] The prime egg producing hen begins laying eggs at ~18 weeks of age and reaches maximum laying capacity—approximately .5 to 1 egg per day 4 to 6 weeks after she begins laying.

[xxxv] To drive the point about he importance of children home. The labor of children is so important in making households productive entities that without them the household does not exist. In a 1,586 randomly selected sample of rural households in the North West. only 53 households did not have children, and these were overwhelming households in the yards of our households that did have children (Schwartz 2000). When asked, rural respondents repeatedly drove the point home explaining why they want children with references to work and the chores they perform. Typical were comments such as, "If you don't have children, dogs will eat you," "you need children," "children are the wealth of the poor," and,

> If I did not have them, things would be worse for me. You need a little water, they go to the water. You need a little fire wood, they go get wood. The boys work in the garden for you. They look after the animals.xxxv (thirty-three-year-old mother of eight)