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# SELLING INDUSTRIAL «GALLINA CRIOLLA» PRODUCTS IN GUATEMALA

IMPLICATIONS FOR CONSUMERS,  
PRODUCERS, HERITAGE,  
AND BIODIVERSITY



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## DISCLAIMER

Every effort has been made to ensure the accuracy of this text and the inclusion of all available information on the topics it addresses. We express our eternal gratitude to the efforts of the many reviewers who commented on the drafts that led to this document. Any errors within it, as well as the conclusions and opinions expressed, are the responsibility of the authors and do not represent the official views of our affiliated organizations and institutions.

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## LINGUISTIC NOTE

Throughout the report, **when gallina criolla [pronounced ga-yee-nah cree-oyah] is mentioned, it refers to chickens that are the heritage of the peasant and indigenous peoples of Guatemala.** For the most part, throughout the Latin American continent, gallinas criollas have been maintained in backyard, integrated, agroecological production systems, especially by women. The text distinguishes gallina criolla chickens from birds raised indoors in factory farms by the poultry industry, which it refers to as broiler, industrial, or factory-farmed chickens or meat.

Consumer knowledge about and experience of eating gallina criolla varies in the Guatemalan population. Many people who live in the urban capital, Guatemala City, have had less exposure to gallina criolla than people living in rural areas and indigenous-majority cities and towns of the Western Highlands. However, the terms gallina criolla and pollo criollo are commonly used interchangeably by indigenous and peasant people and those otherwise involved in or close to agricultural production.

The latter parts of the text describe industrial chicken food products that nevertheless use the words criolla or criollo and images associated with backyard production in their advertising. Such differentiated marketing appears to target consumers who have eaten true gallina criolla, or who are at least aware of it, rather than the general population. **The report consistently differentiates gallina criolla from industrial chicken** to make clear the distinction between the two extremes of chicken production in Guatemala and to highlight the problematic use of certain words and images in food marketing in the country.

This report does not attempt to translate the term gallina criolla partly because no English-language phrase exists that adequately captures the meaning of gallina criolla as chickens that are intimately intertwined with the nutritional, ecological, economic, and cultural sustainability of peasant and indigenous peoples. Using the Spanish-language term also intentionally centers within the report the lived experiences of many Guatemalans and people throughout Latin America.



## SUMMARY

Guatemala has seen a transformation in the population's consumption of chicken. Although poultry consumption is unevenly distributed across the population, many Guatemalans have transitioned from occasionally eating gallina criolla from agroecological production to regularly consuming broiler chickens from industrial farms.

The pace of this change has been fast. Gallinas first arrived on the continent some time between 700 and 1493 CE, when women first integrated them into the agroecological systems, diets, and economies of indigenous and rural peoples. In total, **gallinas criollas have been a part of the heritage of the peoples of present-day Guatemala for 529 to 1,322 years.**

On the other hand, the domestic chicken industry is only 63 years old. Guatemala's first poultry plant opened in 1964, and national chicken consumption grew steadily from about 4 pounds per person per year to 22 pounds in 1995. Chicken's new status as a staple in the Guatemalan diet was cemented after the signing of the Peace Accords in 1996 that officially ended the 36-year civil war and genocide against indigenous civilians. The postwar decades saw rapid growth in domestic production and in imports, resulting in average per person consumption of 66.5 pounds of chicken in 2019.

This change has not been random. Politicians have for decades promoted increasing the country's production and consumption of various meats as a way to improve the health and nutrition of Guatemala's citizens, and the economic prospects of the country. Meanwhile, Guatemalan poultry businesses have vigorously advertised the nutritional, safety, and nationalistic virtues of their products. According to industry experts, Guatemalans buy industrial chicken because they believe it to be a relatively nutritious, healthy, and cheap animal protein.

**The chicken industry's main competitor in Guatemala has always been and continues to be gallina criolla.** Getting Guatemalans to eat industrial chicken more and more each day has required changing their prior consumption patterns of far less frequently consuming gallina criolla. As we showed in the February 2020 Guidance Memo, "Changing Chicken in Guatemala," one of the ways that the industry has achieved success is through advertising messages that have subtly promoted factory-farmed chicken as superior to agroecological gallina criolla.

Yet, while gallina criolla's share of domestic chicken consumption and presence in municipal markets has reduced over time, many Guatemalans, especially indigenous and peasant people, continue to consume gallina criolla. As a result, **global food companies have begun offering their own industrial product lines of "gallina criolla" fresh chicken, consommés, and instant soups.**

“Selling Industrial ‘Gallina Criolla’ Products in Guatemala” details **these new corporate marketing tactics of competing with gallina criolla economies of indigenous and peasant peoples.** The report begins by summarizing the latest science on the economic, ecological, social, nutritional, and taste differences between gallina criolla and industrial chicken. It shows that the gallinas criollas that emerge from campesina systems of production are different animals than the industrial chickens that emerge from industrial systems of production. The methods of rearing involved, the ecological and economic functions the birds perform, and the nutritional value and taste of the chicken meat from the two systems are not the same. At the same time, while gallina criolla production is one part of agroecological systems that tend towards diversity, industrial production of commercial chickens tends towards homogeneity.

Recent company efforts to sell industrial “gallina criolla” products using words and images associated with the production systems of indigenous and peasant peoples **are misleading because the products contain only industrial chicken.** By claiming to be “gallina criolla,” the commercial products may misleadingly convince consumers to eat unlike industrial substitutes. The more that Guatemalans switch to eating products containing the less nutritious industrial chicken meat, the more money is diverted away from the economies of indigenous and peasant peoples and their more biodiverse agricultural systems.

The case of industrial “gallina criolla” products in Guatemala is one example of how global food businesses expand into local markets around the world. The report ends by detailing how people in other countries have resisted similar corporate appropriation of existing agrarian and cultural symbols to sell unlike industrial products. Possible actions that could be taken in Guatemala include the brands voluntarily revising their marketing practices, consumers boycotting the products, or legal defenders challenging the companies in courts using the country’s misleading advertising laws.

We hope that this report sparks more than conversation. We hope it **invites others to continue to research Guatemala’s food systems.** We also hope it contributes to real change that redresses the balance of power between people and profit in Guatemala and around the world.

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## I. Gallina criolla of indigenous and peasant peoples

The original inhabitants of the historic region of Mesoamerica—which today includes Belize, northern Costa Rica, El Salvador, Guatemala, Honduras, central and southern Mexico, and Nicaragua—domesticated various bird species approximately 2,000 years ago<sup>1</sup>. The Mayas of southern Mexico domesticated turkeys sometime between 100 BCE and 100 CE, while the Mochica people of southern Peru domesticated Muscovy ducks around 50 CE. These birds appeared in Central America between 750 and 950 CE<sup>2,3</sup>, and it was not until the 15th century that European colonists spread around the world the turkeys and ducks that were domesticated by the peoples of the Americas.

Chickens, on the other hand, were first domesticated in Southeast Asia some 5,400 years ago. Archaeologists still debate when chickens first arrived in the Americas, with some arguing

that they probably first came through trade with Polynesian seafarers sometime between 700 and 1390<sup>4</sup>. However, others suggest that they first arrived in 1493 during the European conquest<sup>5</sup>.

Regardless of when chickens appeared on the continent, the small birds fit easily into existing forms of food production in Mesoamerica<sup>6</sup>. Over time, the adapted chickens replaced the native turkey as the bird of choice in many parts of the region, becoming commonly known as gallinas criollas<sup>7</sup>. **In total, Guatemala has had between 529 and 1,322 years of gallina criolla heritage sustained by peasant and indigenous people.**

For their part, European colonists brought pigs and cows to Mesoamerica to reproduce important elements of their native diets. However, these larger animals did not fit easily into local subsistence systems because they trampled

maize fields. Thus, pig and cattle production in the Americas remained largely under the control of Europeans and mestizos until well into the 19th century<sup>8</sup>. Cattle ranching has represented an important part of 19th, 20th, and 21st century agricultural-capitalist development around the world. In Guatemala, during the second half of the 20th century, livestock production was concentrated on the southern coast. At the beginning of the 21st century, export-oriented cattle ranching was directed by the military in the northern region of Petén<sup>9</sup>.

The numerous types of gallina criolla that farmers have propagated have become an **integral part of indigenous and non-indigenous families throughout the Americas** for subsistence consumption and income generation<sup>10,11,12</sup>. They are called gallinas criollas because they are not indigenous to the region like turkeys. Instead, farmers have, over centuries, integrated and adapted the chickens to hundreds of climatic, topographic, and social niches that characterize different areas of Guatemala and its diverse communities. Nevertheless, adapted gallinas criollas behave like native birds and are

understood to be indistinguishable from them. Gallinas criollas are one part of the agroecological production system in Guatemala, which generally operates as an ecosystem composed of animals and plants of different species<sup>13</sup>. Through their participation in the agroecological ecosystem, **gallinas criollas contribute to Guatemala's biodiversity and to the food security and nutrition of families**, especially rural and indigenous populations<sup>14,15</sup>.

For the most part, it is women who continue to integrate gallinas criollas as important members of agroecological production and as food<sup>16</sup>. The different styles and dishes of women's cooking, such as gallina criolla soups and stews, like *caldos*, *pepiánes*, and *jocónes*, and others that make up peasant and indigenous gastronomy, are as diverse as the birds themselves and are part of the knowledge systems of peasant and indigenous peoples of Guatemala. Gallina criolla meat from peasant women still accounts for about a third of national chicken consumption; the rest now comes from broiler chicken produced on factory farms<sup>17</sup>.



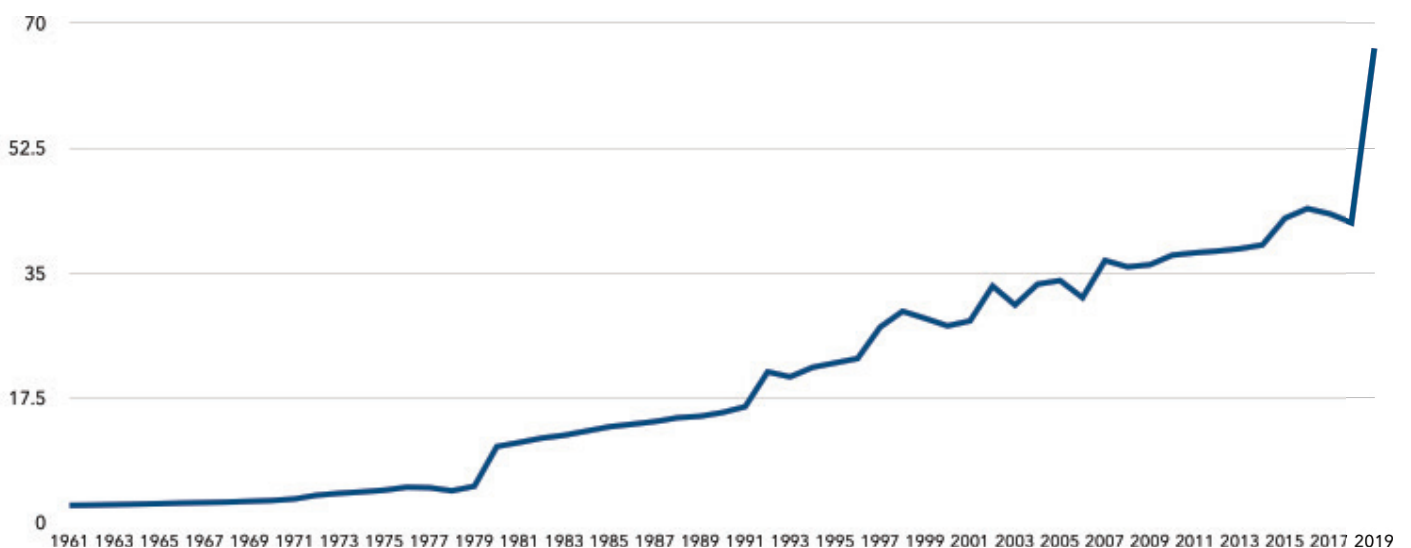
Gallinas Criollas in Guatemala. Image Source: Ronnie Palacios.

## II. Industrial broiler chicken

In recent decades, industrial broiler chicken has overtaken gallina criolla in Guatemala. **Chicken consumption in Guatemala increased steadily** from just over 4 lbs in 1961 to 22 lbs in 1995. After the 1996 Peace Accords, an event that officially ended, after almost four decades, the Civil War and genocide against indigenous peoples, consumption of domestic chicken increased to 36 lbs per person in 2005. It then remained stable for a decade until 2015. However, in recent years it has again grown significantly. Between 2016 and 2017, national chicken consumption increased by 13%, rising from 37.5 to 42.6 lbs per person<sup>18</sup>. Then, it rose 60% from 2018 to 2019, increasing from 41.45 to 66.5 lbs per person<sup>19</sup>. During the onset of the COVID-19 pandemic, national chicken consumption reduced by around 20% due to contractions in the hotel, restaurant, and catering sectors (Figure 1)<sup>20</sup>. **Overall, about 65% of the animal protein consumed in the country comes from chicken**, which makes chicken Guatemala's favorite meat<sup>21</sup>.



Figure 1: Growth of chicken consumption in Guatemala 1961-2020 (lbs per person)



Data Source: Helgi Library<sup>22</sup>

# III. Causes of the increase in chicken consumption

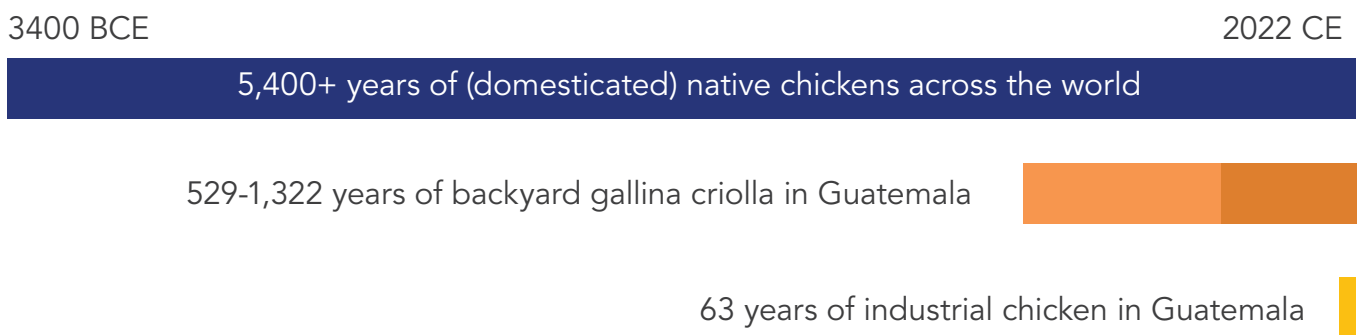
There are two drivers of the increase in chicken consumption in Guatemala: supply and demand. The poultry industry has stimulated both through simultaneous political and commercial activities.

The supply side of the domestic poultry industry was established in 1959, when politicians and businessmen passed the Poultry Promotion Law, which exempted chicken companies from almost all taxes and protected them from foreign competition through import quotas and tariffs<sup>23</sup>. **This makes Guatemala's chicken industry 63 years old**, and thus somewhere between one twentieth and one tenth of the length of time that gallina criolla has been produced in the country (Figure 2). To kick-start the industry in the 1960s,

**some Guatemalan entrepreneurs traveled to the United States to learn the processing and cooking techniques** of industrial chicken production and brought back foreign machinery and poultry breeds<sup>24</sup>.

Guatemala's first chicken processing plant opened in 1964 and by 1973 there were enough industrial producers to unite to promote and protect their interests by forming the National Association of Poultry Farmers (ANAVI). In 1997, Guatemalan factory farms produced 130,000 metric tons of chicken, with only 7,000 metric tons coming from the United States due to continued legal protections of the domestic industry.

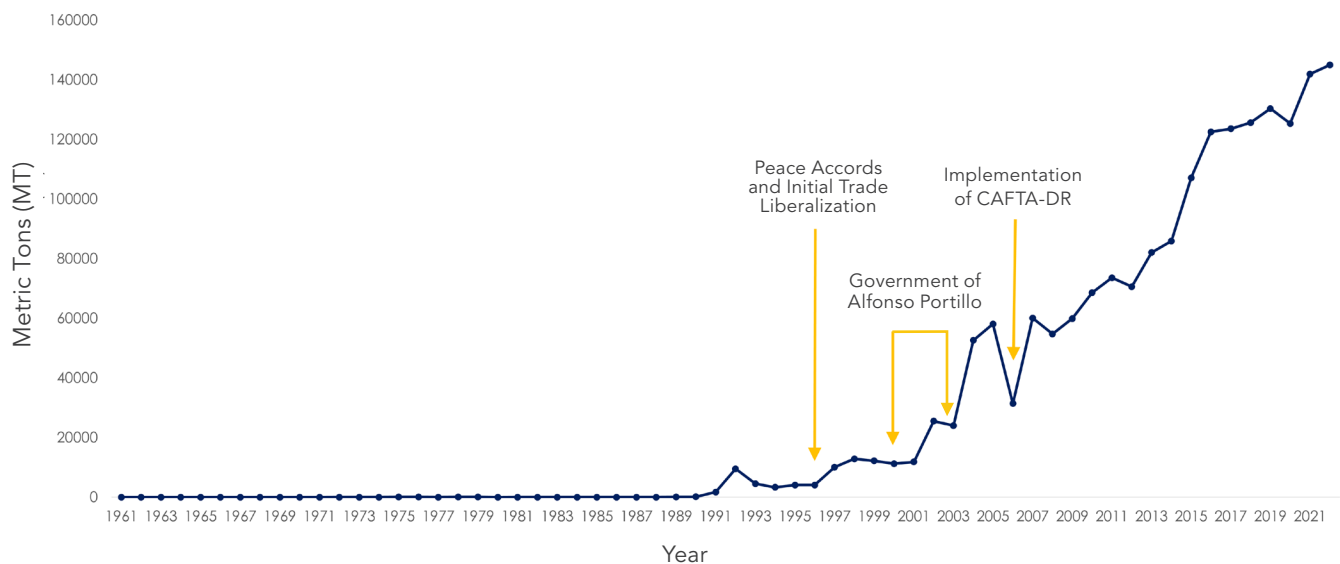
Figure 2: Timeline of Gallina Criolla vs Industrial Chicken in Guatemala



After the signing of the Peace Accords, several rounds of trade liberalization occurred that **greatly increased broiler imports from the United States into Guatemala**<sup>25</sup>. The initial post-war liberalization roughly doubled imports, but domestic poultry companies maintained a quasi-monopoly in domestic markets, raising prices considerably. In the early 2000s, President Alfonso Portillo authorized new imports from U.S. companies, Tyson and Hudson, hoping to use foreign competition to reduce the rising cost of chicken for Guatemalan consumers<sup>26</sup>. Imports increased and prices fell, although chicken in Guatemala continued to cost more than in the

United States<sup>27</sup>, as it still does today. The following year, the Dominican Republic-Central America-United States Free Trade Agreement (CAFTA-DR) between the United States and Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua was implemented. CAFTA-DR significantly increased chicken imports from the United States, specifically chicken thighs, by eventually eliminating tariffs and import quotas. In 2019, Guatemala imported more than 123,000 metric tons of chicken meat, 93% of which came from the United States<sup>28</sup>; **in 2022, Guatemala imported 145,000 metric tons of chicken meat** (Figure 3).

Figure 3: Imports of chicken into Guatemala 1961-2019 (metric tons)



Data Sources: FAOSTAT<sup>29</sup> and Index Mundi<sup>30</sup>

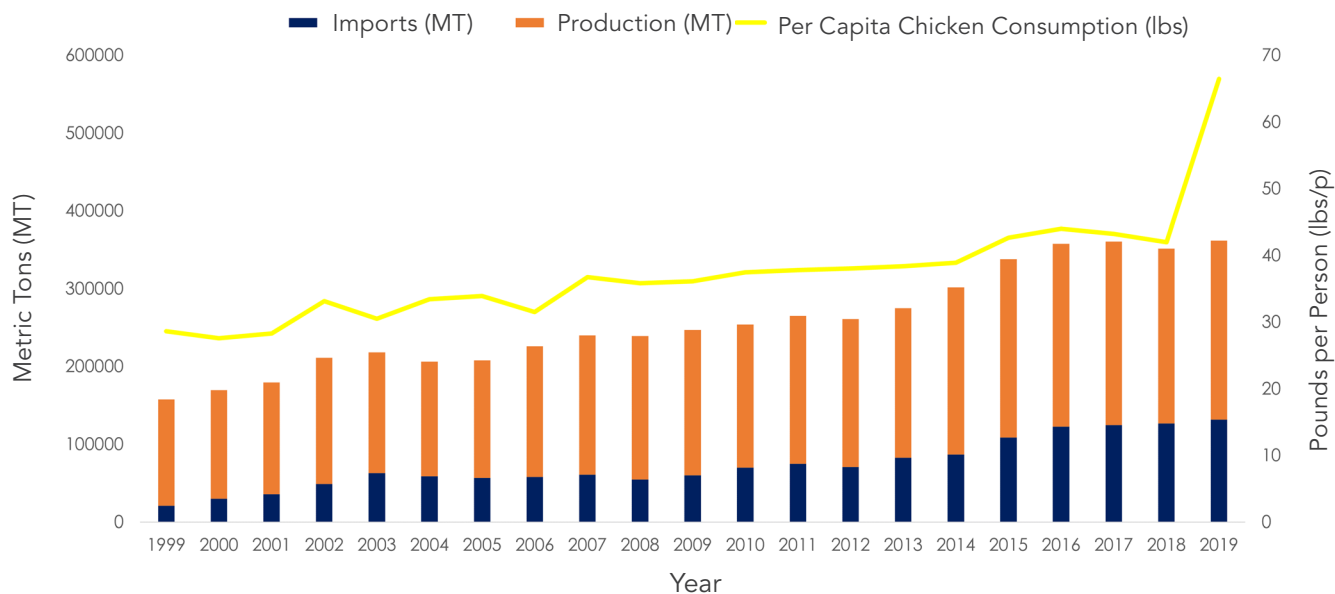


While Guatemala imported more and more chicken from the US, domestic production also continued to grow and dominated the national market. Guatemalan chicken production increased 50% in 20 years, reaching 200,000 metric tons in 2017, and another 33% in just two more years, reaching 266,000 metric tons of chicken in 2019<sup>31</sup>. **In 2019, domestic production accounted for 65% of the 388,000 metric tons of chicken consumed in Guatemala** (Figure 4)<sup>32</sup>.

To increase consumer demand for the produced chicken, the poultry industry has aggressively marketed processed industrial chicken, restaurant brands, and industrial chicken products, such as consommés and instant soups. ANAVI, for example, launched and maintained several advertising campaigns to promote chicken

consumption through banners in municipal markets, billboards throughout Guatemala, and radio spots using jingles<sup>33</sup>. María del Rosario de Falla, president of ANAVI, attributed **the big jump in chicken consumption between 2018 and 2019 to the lower price of chicken compared to other meats and to “the stimulus of chicken meat consumption campaigns** in the local market, where health virtues and meat protein are strong arguments”<sup>34</sup>. Meanwhile, food brands have extensively marketed their poultry products and fast chicken chains on radio, television, and social networks. Nevertheless, although industrial chicken products and chicken restaurant chains have been attractive to Guatemalan consumers for many reasons, broiler chicken continues to be very different from gallina criolla.

Figure 4: Increase in production, importation, and consumption of chicken in Guatemala (1999-2019)



Data Sources: FAOSTAT<sup>35</sup>, Index Mundi<sup>36</sup>, and Helgi Library<sup>37</sup>

# IV. Two extremes of chicken production in Guatemala: diverse gallina criolla

Gallina criolla and industrial chicken represent two extreme poles of agricultural production. On the one hand, peasant households throughout Latin America have collectively produced a highly diverse stock of gallina criolla by transmitting agroecological knowledge and practices through generations. **Researchers have found hundreds of phenotypic and morphological differences in gallinas criollas** living in the communities of Colombia, Cuba, Ecuador, Guatemala, Mexico, and Venezuela<sup>38,39,40,41,42,43,44,45,46,47</sup>. While more research is needed to determine the genetic diversity (not only phenotypic and morphological) of gallina criolla specifically in Guatemala, the scientific community has demonstrated great genetic diversity in gallina criolla in Colombia, Ecuador, and Mexico<sup>48,49,50,51</sup>.

In 2010, the Food and Agriculture Organization of the United Nations (FAO) reported **1,077 local hen “breeds” and 101 international transboundary “breeds” registered worldwide, although half were in danger of extinction** at the time<sup>52</sup>. Currently, the scientific community does not refer to “breeds” when talking about gallinas criollas or indigenous hens, precisely because of the great diversity of these birds.

Instead, native and criolla gallina communities are described as biotypes<sup>53</sup>, and the process by which they are integrated into balanced agroecological systems as ethnocenosis<sup>54</sup>.

Gallinas criollas are diverse also because they are valued individually by farming households. **Indigenous and farming families in Guatemala and around the world value each bird for its unique skills and abilities**, such as for being good mothers, good foragers, or exceptional egg layers<sup>55,56,57</sup>. Gallinas criollas play many roles and are not restricted to being valued solely for their ability to produce meat and eggs for human consumption. In fact, hens and roosters were first domesticated exclusively as revered creatures, for religious rituals, and for cockfighting<sup>58,59,60</sup>, not for food, and continue to play important roles in indigenous ceremonial events to this day<sup>61</sup>.

**Gallinas criollas are also diverse because women farmers from all over the country exchange them with each other.** In addition, some women keep small flocks, sometimes of more than 50 gallinas, which they sell as live birds in interconnected markets throughout Guatemala, especially in the Western Highlands<sup>62</sup>. This trade has prevented inbreeding in local areas, helping to maintain and increase the agrobiodiversity of gallina criolla populations throughout the country.



An indigenous woman selling a criollo rooster in a Guatemalan market. Image Source: Charles Lee.

This trade has also traditionally stimulated local peasant economies, as many women are able to sell birds from their own flocks. **Gallinas criollas also contribute to the financial health of farm households** by being sold to neighbors when cash is needed<sup>63</sup>. In other words, the raising of gallinas criollas offers opportunities for food production, employment generation, and increased economic and in-kind (exchange) income.

Diverse flocks of gallina criolla play several important roles in maintaining the physical health and resilience of agroecological systems. Diverse flocks are less susceptible to infectious diseases than more homogeneous flocks, making them collectively healthier and more resilient<sup>64</sup>. The gallinas remain healthy by foraging freely for at least some of their own food, including earthworms and herbs, eating native medicinal plants to combat disease, and swallowing small stones to aid their own digestion.

Farmers use medicines derived from native plants, such as *apazote* and *achiote*, and non-native ones, like garlic, to prevent and treat diseases in their gallinas criollas and other animals (ethnoveterinary) and in humans (ethnomedicine), the knowledge of which has been passed down from generation to generation<sup>65,66</sup>. For example, indigenous farming communities in Guatemala

have for centuries used nearly 400 native medicinal plants from 95 families to treat gastrointestinal complaints<sup>67</sup>. One study found that 41% of 84 of the most common plants inhibit one or more strains of *E. coli*, *Salmonella*, and *Shigella*<sup>68</sup>.

**Gallinas criollas help keep other inhabitants of the agroecological system healthy too** by eating maggots, flies, and other insects that can transmit diseases<sup>69</sup>. In the United States, this role has earned heritage chickens the nickname “sanitation crews” on some commercial pasture farms, which rotate flocks of the birds in grass fields to pick off insects from feces deposited by livestock<sup>70</sup>. Gallinas criollas also increase crop production by fertilizing the soil with nitrogen from their fecal waste, which they spread around and which farmers collect, process, and apply to their land as chicken manure that is locally known as *gallinaza*.

**The diversity of gallina criolla contributes to the diversity of dishes and culinary practices** that make up the peasant and indigenous gastronomy of Guatemala. Because of the thousands of biotypes of gallinas criollas that peasant women integrate into agroecological systems under diverse conditions, each bird likely differs in the flavor it contributes to the soups, broths, and stews, like *pepianes*, *jocónes*, and



An indigenous peasant woman gives garlic to a gallina criolla to boost her immune system. Image Source: Ronnie Palacios.



Gallinas criollas live with other backyard animals like roosters and ducks. Image Source: Crisanta Rodríguez

other gallina criolla dishes that women make from native seeds, plants, and spices, such as sesame, miltomates, and chiles. The recipes and flavors of these dishes vary greatly throughout the country, from house to house, from village to village, from ecological zone to ecological zone, and from season to season<sup>71</sup>. Each dish is likely also unique because **each cook adds her own knowledge**



Women combine traditional and new ingredients. One example is this gallina criolla soup with pasta shells cooked by a woman in the community of Casa Blanca, Tonicapan.  
Image Source: Miguel Cuj.

**and techniques**, which have been passed down for centuries and innovated from generation to generation. Taken together, the agroecological and culinary practices involving gallina criolla constitute a part of the collective knowledge systems of the country's indigenous and peasant peoples.



The dishes of indigenous and peasant gastronomy use meats from chickens, pigs, or cows, like this *caldo de res* (beef soup)  
Image source: Yulia Chuvileva.





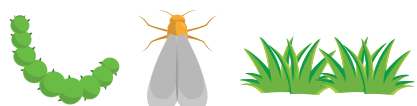

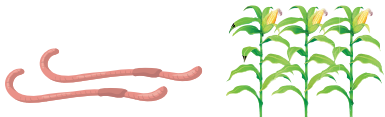

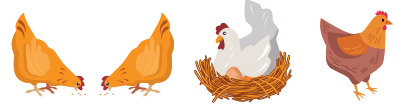

# V. Two extremes of chicken production in Guatemala: homogeneous broiler chicken

At the other end of the production spectrum is factory-farmed chicken. While domestic peasant systems raise diverse flocks of bird populations, industrial production systems tend toward homogeneity. In contrast to the great diversity of gallina criolla in Guatemala, and almost 1,200 local and international transboundary hen biotypes in the world<sup>72</sup>, the country's entire poultry industry uses only 17 broiler breeds

and 4 laying breeds<sup>73</sup>. While gallinas criollas live among many other types of birds and animals, industrial chicken on any given farm is usually raised in a single-species flock<sup>74</sup>. On the other hand, gallinas criollas come in many different shapes and sizes, whereas factory farms prefer uniformly sized birds with few phenotypic differences to facilitate their housing in and processing by standardized equipment<sup>75</sup>.

**The life of the gallina criolla differs radically from her industrial counterpart** (Figure 4). While gallinas criollas are physically active outdoors throughout their lives and independently forage for much of their food and medicine, industrial birds lead sedentary, crowded, indoor lives with no access to the outdoors. Industrial chickens can barely move due to crowded conditions in warehouses or restriction in individual cages, and **are unable to express healthy natural behaviors, causing them to show signs of chronic stress**. Another difference is that while

Figure 4: Differences between Gallina Criolla and Industrial Chicken

	Gallina Criolla	Industrial Chicken
<b>Biodiversity</b>	 <p>Diverse flocks</p>	 <p>Avicultural monocultures</p>
<b>Life</b>	 <p>Live among other animals</p>	 <p>Live only with other chickens</p>
<b>Nutrition</b>	 <p>Find own food, stones, and medicinal plants</p>	 <p>Fed grains and growth-promoting medicines</p>
<b>Roles</b>	 <p>"Sanitation crews"; fertilize soils</p>	 <p>Grow as large as quickly as possible</p>
<b>Value to Producers</b>	 <p>Multiple values: e.g. good mother, skilled food finder, companion, food</p>	 <p>Single value: to be sold as food for profit</p>

free-range hens are self-fed for much of their food and medicines, industrial chickens are fed grain and administered medicines designed to make them grow faster and to prevent or treat disease outbreaks that are more likely in large, confined, homogenous flocks. Thus, gallinas criollas thrive without much support from people, but industrial chickens are completely dependent on human intervention for their survival, to the point where women farmers who receive industrial chicken breeds from NGOs have complained that “these chickens don’t know how to eat!”<sup>76</sup>.

Maintaining the health, diversity, and resilience of agroecological systems are some of the numerous functions performed by gallinas criollas, while industrial chickens have the sole function of being sold as food for profit. **Indoor-raised birds are unable to keep themselves and other inhabitants healthy** the way that free-ranging, independent gallinas criollas do. And while the nitrogen-rich feces of gallinas criollas are reintegrated into the soil, there are reports of industrial chicken businesses in Guatemala dumping untreated waste from their facilities into local waterways, polluting them and endangering the health of neighboring communities<sup>77</sup>.

While gallinas criollas are valued by farmers for many different individual characteristics and behaviors that often have nothing to do with the amount of food their bodies produce for humans, commercial **birds are bred to grow as fast as possible, as large as possible, with as little food as possible.**

Likewise, while peasant farmers use natural medicines to prevent and treat diseases in their animals, the industry uses industrial medicines to promote growth, leading to potentially dangerous effects. **The animal-food industry overuses antibiotics to stimulate growth**, including Guatemalan poultry producers who use tetracyclines which are banned in Europe<sup>78</sup>, and Guatemalan beef producers who use Clenbuterol, which is banned in the United States<sup>79</sup>. This puts all Guatemalans at risk because it causes pathogenic bacteria to develop resistance to antibiotics, a problem that the World Health

Organization (WHO) has called “one of the top 10 public health threats facing humanity”<sup>80</sup>.

In addition, industrial chicken drives customers away from gallina criolla, leading to **a reduction in agroecological biodiversity in the country’s markets.** In 2015, 43% of domestic chicken came from agroecological farms<sup>81</sup>; in 2018, that figure dropped to 32%<sup>82</sup>. Likewise, the diversity of gallina criolla biotypes sold in municipal markets has been drastically reduced as vendors shift to selling broiler chicken<sup>83</sup>.

At the same time, local exchange of gallina criolla has economically supported tens of thousands of female vendors, who sell live birds, meat, and eggs from their own stock. **The global poultry industry, on the other hand, tends toward economic concentration.** In Guatemala, only two companies, Pollo Rey and Piolindo, for example, control 90% of the national processed chicken market (Figure 5).



Figure 5: Concentration in Guatemala’s Chicken Processing Industry<sup>84</sup>

## VI. Eating gallina criolla vs. eating industrial chicken

Ultimately, the differences in their purposes, functions, and environments mean that industrial chickens are not the same animals as gallinas criollas. In general, “the skeletal morphology, pathology, bone geochemistry, and genetics of modern broilers are very different from those of their ancestors”<sup>85</sup>. On a global scale, the industrial broiler chicken has been so altered in its appearance, habits, and numbers that it has become a marker of human effects on the global ecosystem<sup>86</sup>.

Even within the poultry industry, **today’s industrial chickens are very different from those raised in the mid-20th century**. One study compared industrial birds raised in Canada in the 1950s, 1970s, and 2000s<sup>87</sup>. The researchers found that because the poultry industry has systematically selected birds that grow as large and fast as possible on as little feed as possible, an adult broiler chicken today is 4.6 times larger than in 1950, increasing in weight from 2 lbs/905g to 9.26 lbs/4,202g (Figure 6).

One of the results of this faster growth, larger size, and inability to move, is that **the nutritional composition of factory-farmed chicken meat is different from meat from gallinas raised in extensive free-range systems**. Physical activity and healthier diets produce smaller birds with denser musculature<sup>89</sup>. This is not the case with industrial chickens that cannot move and which are larger and fatter. Chickens in free-range and commercial grazing systems are also able to forage for a range of wild grasses that become the source of healthy long-chain fatty acids in the chicken meat that people consume<sup>90</sup>. Currently, **the breasts of industrial chickens studied in some parts of the world contain more total energy from fat than from protein**<sup>91</sup>.

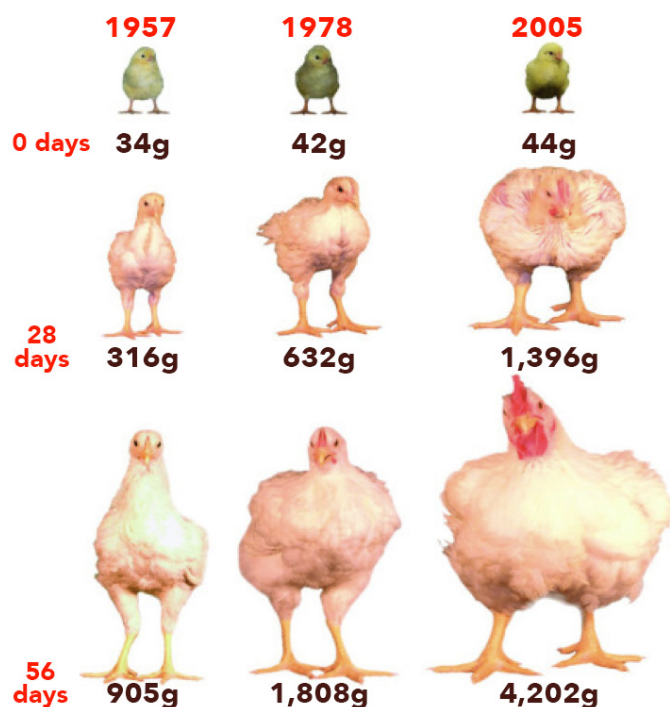


Figure 6: Changes in broiler size and weight since the 1970s. Source: Zuidhof et al. (2014)<sup>88</sup>.

In addition, up to 90% of industrial poultry in some countries now suffer from muscle diseases and deformities, which are visible as white stripes in the flesh, that cause their meat to have more fat and less protein<sup>92</sup>.

No studies currently exist comparing the nutritional value of meat from Guatemalan gallinas criollas against that of Guatemalan industrial broilers. However, several individual studies and meta-analyses (large-scale reviews of existing research) from around the world confirm that, compared to industrial systems (intensive and indoor), breast meat from poultry raised in free-range systems (extensive and outdoor) tends to have higher protein and lower fat content, lower cholesterol, higher Omega 3 content, and a healthier ratio of Omega 6 to Omega 3<sup>93,94,95,96,97,98</sup>. **Meat from indigenous** (aka native) **hens** in Asia, which are the most comparable to Guatemala’s gallina criolla, has also been found to be of **higher nutritional quality than that of commercial chickens**<sup>99,100,101,102,103,104</sup>. Some of these studies additionally look at the appearance,



White stripes on chicken breasts sold in a supermarket in Atlanta, Georgia, USA in July 2022. Image Source: Yulia Chuvileva.



White stripes on chicken breasts sold at a supermarket in Guatemala City in July 2022. Image Source: S phia D vila.

texture, and taste of, and consumer preference for, chicken meat from different breeds and production systems, although the findings vary across study contexts.

More research is needed to systematically compare the nutritional value and taste of meat from gallinas criollas versus industrial chickens specifically in Guatemala. However, it is clear that many Guatemalans, especially but not exclusively indigenous and peasant people and others who maintain personal or professional connections to backyard chicken production, continue to differentiate gallina criolla meat and eggs. In one

ethnographic study, for example, **two Mayan-K'iche' women interviewed in Quetzaltenango described "the taste of the white [industrial] chicken as completely different.** It doesn't have the same taste as gallina criolla. The meat of gallina criolla is firmer. On the other hand, the white chicken meat is softer, so the gallina criolla is richer... the flavor... is tastier"<sup>105,106</sup>.

In summary, Guatemalan people and the poultry industry raise chickens very differently and for different purposes, resulting in incomparable end-consumer food products. In contrast to industrial chickens, gallinas criollas are much more diverse, have many more functions in human and ecological systems, most likely have healthier nutritional profiles, and, for a portion of the population, look, feel, and taste differently.



Gallina criolla has dense muscles and its meat has a firm texture with little fat. Image Source: Crisanta Rodr guez.



# VII. Industrial “gallina criolla” products

Enough Guatemalans continue to consume gallina criolla meat, as well as peasant and indigenous dishes in general, for Guatemalan and global food companies to have begun to market their own industrial lines of “criolla” chicken products. These include processed chicken, consommés, and instant soups.

In 2017, Guatemala’s leading processed chicken company, Pollo Rey, launched a new product called “Pollo Rey Criollo” promising a “great taste of our own” (Figure 7). At the product launch, the company’s marketing manager, Michelle Roldan, explained that **the goal of this new line is to compete directly with the existing market for “yellow chicken,”** the common Guatemalan name for the meat of gallina criolla. She said, “We know that in Guatemala a lot of yellow chicken is consumed and that there are many housewives cooking with yellow chicken. Pollo Rey today wants to imbue yellow chicken with the trust of our brand’s endorsement”<sup>107,108</sup>. Pollo Rey’s 2022 social media campaign provides ideas for multiple ways in which the Criollo de Pollo Rey chicken



Figure 7: Criollo de Pollo Rey Advertisement<sup>109</sup>



Figure 8: Company Suggestions to Substitute Criollo de Pollo Rey into Dishes from the Peasant and Indigenous Gastronomy<sup>110,111,112</sup>

could be substituted into dishes from indigenous and peasant gastronomy, including *caldo*, *jocón*, and *pepian* (Figure 8). These marketing materials suggest that **the company is positioning Criollo de Pollo Rey as an equivalent product to gallina criolla in the Guatemalan market.**

Global food companies have also recognized the opportunity to take a share of the criolla market in Guatemala. In August 2018, the Malher brand, which belongs to Nestlé, the world’s largest food and beverage company based in Switzerland, announced that “a taste of the countryside” was coming to Guatemala. It advertised its “gallina criolla” consommé (Figure 9) with images of birds in the wild, fed by a woman, against the backdrop of Guatemala’s volcanoes and hillsides (Figure 10). The lyrics of its accompanying catchy song say: “...in my Guatemala there are flavors and aromas of the countryside that you knew from the past, from backyard chickens; on all your plates you will again have [those smells and tastes]”<sup>113</sup>.



Figure 9: Malher’s “Gallina Criolla Consomme”<sup>114</sup>

**These images and lyrics suggest that the consommé contains meat from chicken raised outdoors by women in their countryside backyards.**



Figure 10: A Scene from the Advertisement for Malher’s “Gallina Criolla Consomme.”<sup>115</sup>

Knorr, a brand of Unilever, the world’s fourth largest food and beverage company based in England, has also entered the industrial “gallina criolla” market with a line of instant “criolla soups” in Guatemala. These include “Criolla Soup: Gallina Criolla with Pasta Shells,” “Criolla Soup: Gallina Criolla with Noodles,” and “Criolla Soup: Gallina Criolla with Rice and Chipilín” (Figure 11). **The phrase “gallina criolla with” in the titles of these products suggests that the soups contain gallina criolla.**



Figure 11: Some of Knorr’s Gallina Criolla Soups<sup>116,117</sup>

Other global food companies have launched criolla product lines in Guatemala and other countries, but without suggesting that they contain real gallina criolla. Maggi, another subsidiary of Nestlé, for example, sells a line of chicken-based criolla consomme and soup products. It includes less problematic product names, such as “Seasoning for Making Gallina Criolla Consomme” and “Criolla Soup: Chicken with Pasta Shells” (Figure 12)<sup>118,119</sup>.



Figure 12: Maggi’s Less Problematic “Criollo” Product Lines<sup>120,121</sup>

Similarly, Ajinomoto Co, a Japanese biotechnology company, sells “Instant Soup With Gallina Criolla Flavor Noodles” in Colombia and Peru by promising only the flavor of gallina criolla, not the meat from the actual bird. The company also does not utilize images of outdoor reared birds in its video advertisements (Figure 13)<sup>122</sup>. However, it does use the shorthand “Aji-no-men® Gallina Criolla” to refer to the product, a name that could lead consumers into believing the product contains real gallina criolla.



Figure 13: Ad for Ajinomoto Co’s Instant Soup with Gallina Criolla Flavor Noodles<sup>123</sup>



## VIII. Do corporations sell real gallina criolla?

The food industry cannot claim to sell criolla chicken, gallina criolla consommé, or dishes like “criolla soup: gallina criolla” because these foods do not contain any gallina criolla; they only contain industrial chicken. Pollo Rey’s “criolla chicken,” for example, differs from Pollo Rey’s white chicken in the color of the skin and meat, but the yellow “criollo” chicken is still raised on factory farms. Likewise, **industrial soups and consommés claiming to be “gallina criolla” contain only small amounts of dehydrated chicken** meat from industrial birds. The packaging does not specify the exact origin of the chicken it contains, but it does sometimes indicate that the food was produced in other countries. For example, Knorr’s “Criolla Soup: Gallina Criolla with Pasta Shells” is manufactured in El Salvador.

Despite their products containing only industrial chicken, some brands frequently use advertising videos and packaging that show images of the countryside and free-range birds. This makes it appear that the meat in the products comes from free-range chickens raised in extensive, agroecological production systems in Guatemala. In reality, the products contain meat from broiler chickens raised in intensive, crowded, industrial



“Gallina Criolla” Packets. Image Source: Sópia Dávila.

plants throughout Latin America and, probably, around the world.

Industrial food companies misrepresent their products when they label them as “criolla chicken,” “gallina criolla consommé,” or “criolla soup: gallina criolla,” and when they feature the countryside and free-range poultry in their advertising campaigns. When companies use images and words associated with indigenous and peasant peoples to sell industrial products, they **compete directly with local gallina criolla economies and peasant and indigenous gastronomy**, which, in turn, reduces the country’s agroecological and culinary diversity. This misleading advertising thus has implications for Guatemala’s consumers, producers, patrimony, and biodiversity.

# IX. Legal protection for consumers

Most countries in the world have laws that attempt to protect people from misleading advertising. Organizations around the world use these laws to sue companies and governments to change their practices, such as stopping usage of misleading words or images that falsely represent the ingredients in or production processes of food products. For example, on June 8, 2021, the Animal Legal Defense Fund, a U.S. non-profit organization, filed a lawsuit against the United States Department of Agriculture (USDA) for approving Perdue Farms' "Fresh Line" labels. The organization argued that the labels "depict chickens and turkeys grazing outdoors on green grass in bright sunshine, when, in reality, the

birds used in these products spend their entire lives confined to factory farm warehouses"<sup>124</sup>.

**Guatemala also has a law prohibiting misleading advertising. The Consumer and User Protection Law of Guatemala** (Governmental Agreement Number 777-2003) defines misleading advertising as "any advertising message, by any written, visual, auditory, or electronic means, that induces the consumer or user to error through trickery or deception"<sup>125</sup>. The use of words and images that mislead the consumer about the production conditions of chicken used in industrial food products could be challenged under this law.



Using consumer protection laws could guarantee that instant soup brands do not falsely claim to contain gallina criolla. Image Source: S phia D vila

# X. Legal protection for producers

Advocates in other countries use misleading advertising laws to protect not only consumers from being misled in the marketplace, but also producers from being cheated through unfair competition. The Organic Consumers Association (OCA) in the United States, for example, is suing a company called Happy Eggs on the grounds that “by falsely claiming that the eggs it sells are pasture-raised, ‘Happy Eggs’ misleads consumers and diverts consumers’ spending from competitors whose eggs come from hens that are actually pasture-raised”<sup>126</sup>.

**Guatemala’s 777-2003 agreement, which protects consumers, also protects producers** from the unfair competition they face due to misleading advertising. The law prohibits advertising that is “misleading by deceptive

comparison, by comparing items that are not similar or go against the basic principles of fair competition”. It is possible that, under this law, passing off industrial products as criolla or as peasant and indigenous cuisine could be seen to create unfair advantages for food companies that, in the process, disadvantage peasant economies.

And there is a lot of money at stake. **Global companies make significant profits from their “gallina criolla” product lines.** Pollo Rey’s “criolla chicken” is one part of a national processed chicken market worth nearly Q11 billion/US\$1.5 billion annually<sup>127</sup>. Industrial, dehydrated “gallina criolla” seasonings and soups are part of an annual national market for instant soups and consommés worth more than Q300 million/US\$40 million<sup>128</sup>. The sale of industrial “gallina criolla” not only cheats consumers, but also redirects money away from local producers, especially women, who for centuries have integrated real gallina criolla into the agroecological systems, homes, and markets, and the gastronomy of indigenous and peasant peoples.



Making use of producer protection laws could ensure that producers and sellers of real gallina criolla, like this comedor in Xela, face fair market competition. Image source: Yulia Chuvileva.

# XI. Other possible protections for producers

Protected Designation of Origin (PDO) laws in many countries further protect artisanal producers by granting PDO labels only to those who meet specific standards and follow specific processes to produce the products, although who has benefited from these laws has varied<sup>129</sup>. The PDO designation of Comté cheese in France, for example, defined the artisanal methods and materials that can be used in its production, with small-scale producers of traditional cheese benefiting the most. In Mexico, on the other hand, tequila production methods were not well defined and were diluted over time, so that large-scale industrial producers benefited the most<sup>130</sup>.



The PDO mechanism has to date been used for commercial producers. Two Guatemalan products enjoy PDO status and protection in export markets: Guatemalan Rum and Antigua Coffee. However, a participatory PDO-style mechanism could be carefully developed in Guatemala to **ensure that only peasants who use agroecological farming methods to raise diverse biotypes of gallina criolla can claim that their birds and dishes are "criolla."** This could be a unique PDO mechanism aiming to provide protections for products developed by integrated households of indigenous and peasant peoples that are sold and traded inside the country, not outside it.



**PDO**

Protected  
Designation of  
Origin



A well-designed PDO mechanism could create market differentiation that protects sellers of real gallina criolla products.

## XII. Legal protection for cultural heritage

The knowledge systems and cultural heritage of Guatemala's indigenous and peasant peoples include agroecological, ethnoveterinary, ethnomedical, and culinary practices. These practices integrate a wide variety of objects, from native seeds and criolla animals to traditional medicines and dishes from the country's peasant and indigenous gastronomy. In other countries there are movements that claim these practices and products as national heritage. In Panama, for example, advocates are fighting for the legal declaration of criollo cows as part of the genetic, cultural, and historical heritage of the country<sup>131</sup>.

Guatemala already has a law that seeks to recognize and protect national heritage<sup>132</sup>. Guatemala's Law for the Protection of the Cultural Heritage of the Nation (**Decree Number 26-97**) **already considers gastronomy and culinary "establishments, traditions and customs" as national heritage**. The decree stipulates that this "patrimony cannot be destroyed, altered, or

deteriorated" and allows for the imposition of fines and prison sentences on those who break the law (article 44).

Although the law is primarily intended to restrict the unauthorized movement of physical cultural objects out of the country, it could be applied internally within Guatemala and to images and words as representations of culture. **The use by companies of words and images associated with peasant agroecological and culinary systems could be considered harmful** because companies use, move in packaging and through radio and visual media advertisements, and profit from symbols of cultural heritage. It could be possible to argue that these actions damage Guatemala's cultural heritage because industrial "criolla" products drive people away from the production and consumption of truly criolla foods and towards the consumption of fake industrial substitutes.



Gallina Criolla



Tikal

### Guatemala's Cultural Patrimony Day

In the future, gallina criolla could be one part of the heritage celebrated during Guatemala's Cultural Patrimony Day.



Antigua Guatemala



# XIII. Legal protection for biodiversity and indigenous and peasant knowledge systems

The misleading marketing of gallina criolla increases the production and sale of industrial chicken and chicken products, such as instant soups, a system that tends towards homogeneity. Just as the diversity of gallina criolla cannot be reproduced under industrial farming methods, the diversity of gallina criolla dishes cannot be reproduced in a standardized package of dehydrated instant soup. The consumption by more Guatemalans of industrial criolla substitutes reduces agroecological production of gallina criolla and the ancestral knowledge on which it is based, systems that tend toward diversity.

**Several national and international conventions and legislation around the world seek to protect biodiversity** in its own right because of its essential role in maintaining the planet's vital systems. Indeed, on the global scale, some researchers warn that biodiversity loss poses a greater risk to humanity than climate change<sup>133</sup>. Recognizing the crucial role that animals play in biodiversity, in 2012, the governments of many countries around the world, including Guatemala, signed up to protect zoonotic (i.e. of animal origin) genetic resources through the FAO Interlaken Declaration<sup>134</sup>.

**Laws and initiatives also seek to protect biodiversity as part of the rights of indigenous and peasant peoples** who depend most directly on it for their physical and cultural survival. Commercial "criolla" products aim to take market share from agroecological production and consumption of gallina criolla and other foods that promote ecological and cultural diversity, resilience, and sustainability. The sale and marketing of industrial "gallina criolla" products arguably runs counter to the progress of at least two of the United Nations Sustainable Development Goals: responsible production and consumption (#12) and life of terrestrial ecosystems (#15)<sup>135</sup>.

The proposed *Ley de Los Pueblos* 2021, also called the Biodiversity and Traditional Knowledge Law, similarly will protect biodiversity in Guatemala if the legislation is successfully passed in 2022. The initiative also includes stipulations for the "respect for knowledge and knowledge systems as collective inheritances of the grandmothers and grandfathers of peasants and indigenous people." **Gallina criolla, other criolla animals, and the dishes that make up indigenous and peasant gastronomy are examples of this heritage.** They do not belong to individual people, nor to global businesses.

The initiative further stipulates that "the use for commercial purposes of traditional knowledge associated with biodiversity must be carried out with the free, prior, and informed consent of indigenous and peasant peoples." The sale of "gallina criolla" products by companies has occurred without such participation of the people. In addition, the global poultry industry crosses commercial chickens with native and adapted chickens found in agroecological systems around the world to benefit from their desirable qualities, such as natural disease resistance, also without the prior consent of indigenous and peasant peoples.

# XIV. Suggestions for action

- **Food companies** that sell industrial “gallina criolla” products in Guatemala and around Latin America could voluntarily revise their marketing practices to reduce the chances of misleading consumers.
- **Guatemalan consumers** can stop buying industrial criolla products and pressure their local politicians and community representatives to use existing Guatemalan law to hold companies accountable for misleading advertising and other harmful practices.
- **Activists and advocates** could follow in the footsteps of other countries, such as Panama<sup>136</sup>, in the struggle for the legal declaration of criolla animals, such as gallinas criollas, to officially recognize them as part of Guatemala’s genetic, cultural, and historical heritage.
- **Activists and advocates** could explore the application of Guatemala’s Consumer and User Protection Law, the Law for the Protection of the Cultural Heritage of the Nation, and the proposed Biodiversity and Traditional Knowledge Law, to the sale of “criolla” industrial products. Legal pressure could push the companies to change their marketing practices to comply with fair competition and consumer protection laws, as well as to respect biodiversity and ancestral knowledge.
- **Lawyers and community leaders** could establish participatory mechanisms, such as the PDO, to grant rights only to agroecological producers, especially women, to call their food “criolla”.
- **Geneticists** could conduct analyses to determine the level of genetic diversity of gallina criolla populations specifically in Guatemala.
- **Biologists and nutritionists** could conduct analyses to establish the nutritional differences between gallina criolla and industrial chicken sold in Guatemala and make the results widely known.
- **Indigenous and non-indigenous social scientists** could document the ancestral knowledge and practices that help keep agroecological systems nutritious, healthy, diverse, resilient, and sustainable, and help disseminate that knowledge, peasant to peasant, especially in areas where practices are being lost due to the expansion of industrial foods.
- **Educators** could promote widespread education around the cultural, ecological, and nutritional value of traditional agroecological and culinary practices through the Law for the Protection of the Cultural Heritage of the Nation that allows for “strengthening the knowledge and value of Cultural Heritage in our inhabitants through formal and informal education and the reinforcement of in situ surveillance”. This can help attract national and international recognition, financial resources, and other supports that recognize and reward the ecological, cultural, and health values of peasant and indigenous agricultural and culinary practices.



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- <sup>118</sup> The companies also claim to sell other “criolla” soups, meats, and traditional dishes, such as Maggi’s Criolla Rib Soup and Malher’s Jocón and Pepian style sauces.
- <sup>119</sup> Guatemala is not the only country where industrial food companies market “criolla” products because criolla animals, meats, and dishes are the heritage of indigenous and peasant peoples throughout Latin America and the Caribbean. Doña Gallina, for example, is the number one selling brand of chicken broth in the Dominican Republic. It sells a line of “criollo” condiments in containers decorated with images of the countryside and a free-range chicken.
- <sup>120</sup> Maggi: *Sazonador Para Hacer Consomé de Gallina Criolla*. (n.d.). MaggiCentroAmerica.com. <https://www.maggi centroamerica.com/es-HN/products/maggi-r-gallina-criolla/>
- <sup>121</sup> Maggi: *Sopa Criolla: Gallina con Caracolutos*. (n.d.). www.nestleagustoconlavida.com. <https://www.nestleagustoconlavida.com/es/marcas/maggi/sopa-criolla-gallina-con-caracolutos-60g>
- <sup>122</sup> Aji-no-men® *Gallina Criolla* (2018, May 28). YouTube. Ajinomoto Colombia. [https://www.youtube.com/watch?v=T\\_otKDjNjDc](https://www.youtube.com/watch?v=T_otKDjNjDc)
- <sup>123</sup> *Sopa Casera en 3 Minutos*. (2018). Facebook.com/SopasAjinomenColombia. <https://www.facebook.com/SopasAjinomenColombia/photos/a.1837747863173170/2249884958626123/>
- <sup>124</sup> Animal Defense Legal Fund (2021). *Lawsuit Alleges USDA Fails to Protect Consumers from Deceptive Chicken and Turkey Product Labeling*. <https://aldf.org/> <https://aldf.org/article/lawsuit-alleges-usda-fails-to-protect-consumers-from-deceptive-chicken-and-turkey-product-labeling/>
- <sup>125</sup> Gobierno de Guatemala (2003). *Ley de Protección al Consumidor y Usuario Decreto 006-2003*. <https://www.diacogob.gt/index.php/marco-legal>
- <sup>126</sup> Organic Consumers Association (2020). *Organic Consumers Assoc. Sues Happy Egg Co, Says ‘Pasture Raised’ Claims are False and Deceptive*. <https://www.organicconsumers.org/> <https://www.organicconsumers.org/press/organic-consumers-assoc-sues-happy-egg-co-says-pasture-raised-claims-are-false-and-deceptive>
- <sup>127</sup> With 16.5 million Guatemalans consuming on average 66.5 pounds of chicken each in 2019 with a conservative price of Q10 per pound, that year the market was worth Q10.97 billion /\$1.46 billion.
- <sup>128</sup> Gobierno de Guatemala (2018). *Industria De Sopas Y Consomé De Guatemala*. [http://www.mineco.gob.gt/sites/default/files/meta\\_industria\\_de\\_sopas\\_y\\_consomes\\_version\\_final.pdf](http://www.mineco.gob.gt/sites/default/files/meta_industria_de_sopas_y_consomes_version_final.pdf)
- <sup>129</sup> WIPO (n.d.). *Indicaciones geográficas*. [https://www.wipo.int/geo\\_indications/es/index.html](https://www.wipo.int/geo_indications/es/index.html)
- <sup>130</sup> Bowen, S. (2015). *Divided Spirits Tequila, Mezcal, and the Politics of Production*. University of California Press. <https://www.ucpress.edu/book/9780520281059/divided-spirits>
- <sup>131</sup> Rosas, A. & Concepcion, E. (2021). *Que declara a las razas bovinas criollas de la República de Panamá como parte de su patrimonio genético, cultural e histórico nacional, y se dictan otras disposiciones*. Anteproyecto de ley N° 172. Trámite Legislativo 2021-2022, Asamblea Nacional Secretaría General de Panamá. [https://www.asamblea.gob.pa/APPS/SEG\\_LEGIS/PDF\\_SEG/PDF\\_SEG\\_2020/PDF\\_SEG\\_2021/2021\\_A\\_172.pdf](https://www.asamblea.gob.pa/APPS/SEG_LEGIS/PDF_SEG/PDF_SEG_2020/PDF_SEG_2021/2021_A_172.pdf)
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<sup>134</sup>FAO (2012). *Aplicación del plan de acción mundial sobre los recursos zoogenéticos y de la declaración de Interlaken*. <https://www.fao.org/>. <https://www.fao.org/publications/card/en/c/fc362e5a-0164-5e09-ad0a-a51abe91a1b2/>

<sup>135</sup>United Nations. (n. d.). *The 17 Goals*. <https://sdgs.un.org/>. <https://sdgs.un.org/es/goals>

<sup>136</sup>Rosas & Concepción (2021)

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