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### Overview of domestic poultry farming in Madagascar

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Razafindrafara Mirantsoa Suzanne <sup>1,2\*</sup>, Andriatsimahavandy Abel <sup>3</sup>, Koko <sup>4</sup>, Maminiana Olivier Fridolin <sup>1,2,4</sup>

<sup>1</sup> Centre National de Recherche - Institut Malgache des Vaccins Vétérinaires (IMVAVET), BP 04, Rue Farafaty, Antananarivo, Madagascar

<sup>2</sup> Centre National de Recherche -FOFIFA-Département de Recherches Zootechniques, Vétérinaires et Piscicoles (FOFIFA-DRZVP), BP 1690, Rue Farafaty, Antananarivo, Madagascar

<sup>3</sup> Domaine Sciences et Technologies, Université d'Antananarivo, BP 906 Antananarivo 101, Madagascar

<sup>4</sup> Département d'Enseignement des Sciences et Médecine Vétérinaires, Ambatobe Masinandriana Ilafy, BP 04 Antananarivo, Madagascar

#### Abstract

Poultry farming plays an important nutritional and economic role in developing countries. The purpose of this study is to provide an overview of domestic poultry production in Madagascar. The composition and distribution of livestock, the husbandry practices adopted by farmers and the limitations of the poultry system are discussed. It was found that the majority of the livestock is composed of chickens, ducks, geese and turkeys of various indigenous breeds. Then, a predominance of the traditional type of breeding is observed. Finally, the existence of constraints (sanitary and husbandry) limits the development of the sector. Thus, various support actions along the value chain will be necessary to improve the Malagasy poultry sector.

**Keywords:** Madagascar, poultry farming, domestic poultry, breeders, livestock, indigenous breeds

#### 1. Introduction

Village poultry farming, commonly called family poultry farming or traditional poultry farming, is an important activity in developing countries <sup>[1, 2]</sup>. It is based on the exploitation of small numbers of poultry, generally of local breed and marked by the mixing of species <sup>[3-6]</sup>. Village poultry farming is the leading form of poultry production in many developing countries <sup>[7]</sup>. In Africa, it accounts for more than 77% of the domestic poultry population <sup>[8]</sup>, although there are variations from one country to another: 30% in Zimbabwe, 53% in Côte d'Ivoire, 70% in Kenya, 80% in Nigeria, 86% in Tanzania, 99% in Ethiopia <sup>[9]</sup>, 90 to 95% in Mali <sup>[10]</sup>, 99% in Niger <sup>[11]</sup> and 95% in Madagascar <sup>[12]</sup>.

In Madagascar, village poultry farming is an activity within the reach of all farming families, even the poorest <sup>[13]</sup>. It is easy to practice without a large investment and does not require any particular attention <sup>[14]</sup>. This type of livestock farming contributes to the livelihoods of rural populations since it constitutes a source of regular and easily mobilized income for poultry farmers <sup>[15-17]</sup>. Poultry is used as a source of cash for the purchase of basic necessities and seeds <sup>[18]</sup> as well as to cover the family's cash needs in case of major problems <sup>[19]</sup>. It is also a high quality animal protein resource. In addition, poultry farming is closely linked to agriculture. Poultry manure provides organic fertilizer for agriculture. On the other hand, poultry find their food by wandering only between the places of the village to feed on

grass seeds, insects, grass, fallen seeds, remains of vegetables and fruits valorizing the remains of the harvest and kitchen waste <sup>[20]</sup>. Therefore, poultry farming contributes greatly to poverty alleviation and improvement of household food security and is an excellent means to fight poverty <sup>[21, 22]</sup>. Despite the importance of the village poultry sector, there is little accurate data on the activity in Madagascar. Hence the objective of this synthesis is to provide an overview of the sector in the country. In other words, it describes the species of domestic poultry raised, their geographical distribution, the way they are raised, and the factors that hinder the development of the poultry sector in Madagascar.

#### 2. Varieties of domestic poultry species and breeds in Madagascar

In the backyard in Madagascar, the livestock consists mainly of chickens, palmipeds (goose and duck) and turkeys. However, other species such as quail, guinea fowl, pigeon and ostrich also exist in small numbers.

##### 2.1 Chickens

The domestic chicken (*Gallus gallus domesticus*) is one of the most widely distributed domestic animal species in the world. Among the reasons for this global distribution are their easy portability, expansion through human migration and agricultural practices <sup>[23, 24]</sup>. They are also widely accepted by populations from diverse cultural and religious

backgrounds [25]. It is commonly accepted that chickens widespread in the world today originate mainly from the domestication of the red jungle fowl (*Gallus gallus* species) in Asia [26]. Native chicken is a species adapted to harsh environmental conditions and includes large-scale, small-scale, free-range village production systems [27]. Sometimes it is referred to as traditional, salvage, backyard, village, local or family chicken [28]. Around the world, many indigenous or local chickens have been reported [27]. In Madagascar, the local chicken is called "Akofo gasy"

(Figure 1). It consists of a multitude of varieties that is very little known. Consequently, the possibility of integrating it into a program to improve the productivity of the poultry industry based on endogenous genetic resources is limited [29]. On the other hand, some varieties of local breed ecotypes that have already been identified in other African countries, such as the naked neck and feathered tarsus [30, 31], are observed in Malagasy village poultry production. The local chickens are intended for local consumption for both meat and eggs.



Fig 1: Local Malagasy chickens

2.2 The ducks

The duck is robust, a very good fodder user and easy to flock, especially in wetlands [17]. Among domesticated poultry species in Madagascar, the duck was ranked second after the chicken [32]. Three types of duck are raised in Madagascar: common duck (*Anas platyrhynchos*), Muscovy duck (*Cavuna moschata*) and mule duck. The common duck and Muscovy duck are native to Southeast Asia and South America respectively [33]. On the other hand, the mulard duck is a hybrid resulting from the crossing between common duck and Muscovy duck [34].

In most tropical countries, local duck breeds have been selected to adapt to regional conditions [17]. In contrast, in Madagascar, the characteristics of local breeds are poorly known. However, the existence of ducks common to two varieties is noted, white and dark plumage. In the local language, the common duck (Figure 2a), the mulard duck (Figure 2b) and the Muscovy duck (Figure 2c) are respectively called "Gana", "Sarin-dokotra" and "Dokotra". The "Gana" and the "Dokotra" are raised for meat, eggs, feather and down production. On the other hand, the "Sarin-dokotra" is a sterile animal, but it grows rapidly and fattens up very quickly, producing good quality meat [35]. Thus, it is intended mainly for the production of foie gras.

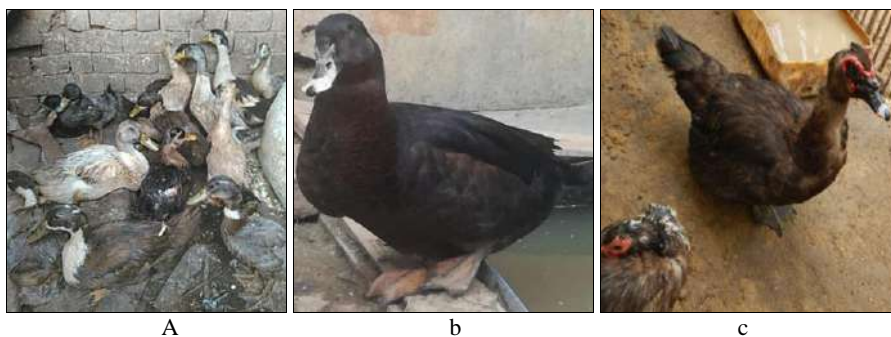


Fig 2: Local Malagasy ducks a) Common duck b) Mulard c) Muscovy duck

2.3 Geese

The goose was one of the first animals to be domesticated. Despite this, it has never been commercially exploited to the same extent as the chicken. In general, domesticated breeds of geese are much larger than their wild ancestors, although in many cases they have retained their ability to fly. Crosses between domestic breeds derived from two wild goose species (*Anser anser* and *Anser cygnoides*) are fertile and have in fact resulted in a number of recognized breeds [36].

The Malagasy domestic goose, originally from Asia and descended from the wild swan goose (*Anser cygnoides*), is exploited for its meat and for the production of feathers and down. It is called "Gisa" in the local language (Figure 3). Little is known about the characteristics of the local breeds. However, knowledge of the morphological characters of local ecotypes of goose species is important if they are to be fully exploited [37].



Fig 3: Local goose



Fig 4: Turkey flock in southern Madagascar

**2.5 The guinea fowl**

The Malagasy guinea fowl (*Numida meleagris*) is derived from a wild species from Africa and is locally called "Akanga", "Tomena" or "Tomendry" and "Vitro" (Figure 5).



Fig 5: Domestic guinea fowl

**2.6 Quail**

Originally, the quail was part of the wild fauna, but over time humans have domesticated it because of the quality of its meat and the exceptional virtues of its eggs, which are used for consumption, ornamental purposes and as a remedy [41]. There are various breeds of quail, but the common quail (*Coturnix Coturnix*) and the Japanese quail (*Coturnix japonica*) are those raised in Madagascar. In Madagascar, it is called in local language "Papelika".

**2.7 The ostrich**

The ostrich is a recently introduced species in Madagascar (Figure 6). Its production system requires a high level of

**2.4 Turkey**

The turkey (*Meleagris ocellata*), native to Latin America, was introduced to Europe in the 16th century and then to tropical Africa: Ghana, Ivory Coast and Madagascar. The breeds raised by rural producers have a black plumage, distinct from the white plumage breeds usually used in intensive breeding. In Madagascar, the turkey is known locally as "Vorontsilozza", "Kolokoloka" (Figure 4). It produces mainly meat and is raised only for meat production. Turkey meat has a high content of protein, vitamins and minerals [38]. On the other hand, it has a low content of fat and saturated fatty acids, making it a "healthy" meat [39, 40].

inputs with the objective of producing chicks, meat, skins and feathers [42].



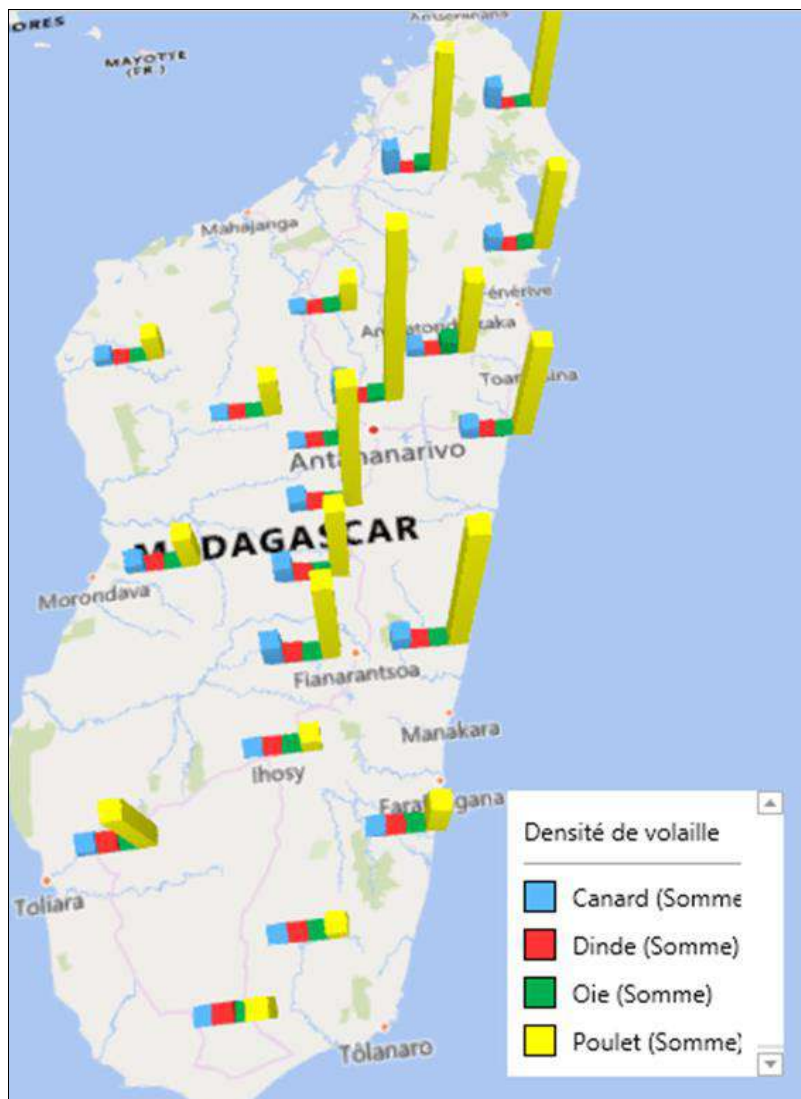
Fig 6: Ostrich [42].

**3. Poultry population in Madagascar and geographical distribution**

Poultry farming, all species combined, is practiced by 1,875,313 farmers, i.e., nearly 77.4%, and a farm raises, on average, about ten poultry, generally as a secondary activity, in addition to farming [32]. The density of poultry varies according to the region and is strongly associated with the distribution of the human population (Figure 7). The Analamanga region, which is the most populated, has the highest density of poultry (10%). According to the latest census of the Ministry of Agriculture (Table 1), Livestock and Fisheries [32], domestic poultry is estimated at 29 million head, of which chicken is in first place with 83% of the livestock (24,213,522 head), followed by ducks (13%, 3,774,515 head), geese (2%, 608,576 head) and turkey (2%, 553,834 head).

**Table 1:** Domestic poultry density by region in Madagascar <sup>[32]</sup>

Regions	Chicken	Duck	Goose	Turkey	Total
Alaotra Mangoro	1 067 469	119 541	184 731	6 731	1 378 472
Amoron'i Mania	1 331 256	302 106	8 074	23 993	1 665 429
Analamanga	2 421 130	382 029	72 110	17 010	2 892 279
Analanjirifo	1 066 806	212 182	48 487	7 594	1 335 069
Androy	722 482	15 723	2 621	152 084	892 910
Anosy	620 207	20 231	9 475	12 691	662 604
Atsimo Andrefana	1 347 132	144 637	7 776	84 063	1 583 608
Atsimo Atsinanana	977 614	87 347	6 689	17 634	1 089 284
Atsinanana	1 419 995	169 968	20 636	32 946	1 643 545
Betsiboka	412 058	54 839	35 618	4 709	507 224
Boeni	626 342	246 784	10 291	23 828	907 245
Bongolava	567 406	38 459	1 651	8 348	615 864
Diana	970 566	167 456	11 650	3 716	1 153 388
Ihorombe	329 938	32 273	10 989	7 988	381 188
Itasy	721 408	49 188	4 423	7 466	782 485
Matsiatra ambony	1 647 912	419 475	20 294	64 385	2 152 066
Melaky	344 930	102 605	1 640	7 066	456 241
Menabe	563 085	151 178	2 973	10 808	728 044
Sava	1 207 555	286 148	36 879	4 598	1 535 180
Sofia	1 465 851	323 849	90 332	2 489	1 882 521
Vakinankaratra	2 021 595	183 739	9 563	26 384	2 241 281
Vatovavy Fitovinany	2 360 784	264 760	11 673	27 304	2 664 521
Total	24 213 522	3 774 515	608 576	553 834	29 150 447



**Fig 7:** Distribution and density of poultry in Madagascar.

Poultry farming is present throughout the country [43]. However, their importance varies from one region to another. For chicken, three regions (Analamanga, Vakinankaratra and Vatovavy Fitovinany) each have a flock of over 2 million head, while eight regions (Matsiatra Ambony, Atsimo Andrefana, Amoron'i Mania, Alaotra Mangoro, Atsinanana, Analanjirofo, Sofia and Sava) have a flock of over 1 million head. The other regions have a small number of animals, with less than one million head (Table 1). In addition, duck farming is important in four regions

(Matsiatra Ambony, Amoron'i Mania, Analamanga, Sofia) with more than 300,000 head recorded [32]. Among domestic poultry, geese and turkeys appear to be less important except in the Alaotra Mangoro and Androy regions respectively [32]. Guinea fowl are raised in the south and west of the island in the wild, while quail are raised in the vicinity of the capital. Ostrich farming is located in the western and central parts of Madagascar, particularly in Morondava, Mahajanga and Antsirabe. Figure 8 shows the number of chickens, ducks, geese and turkeys by region.

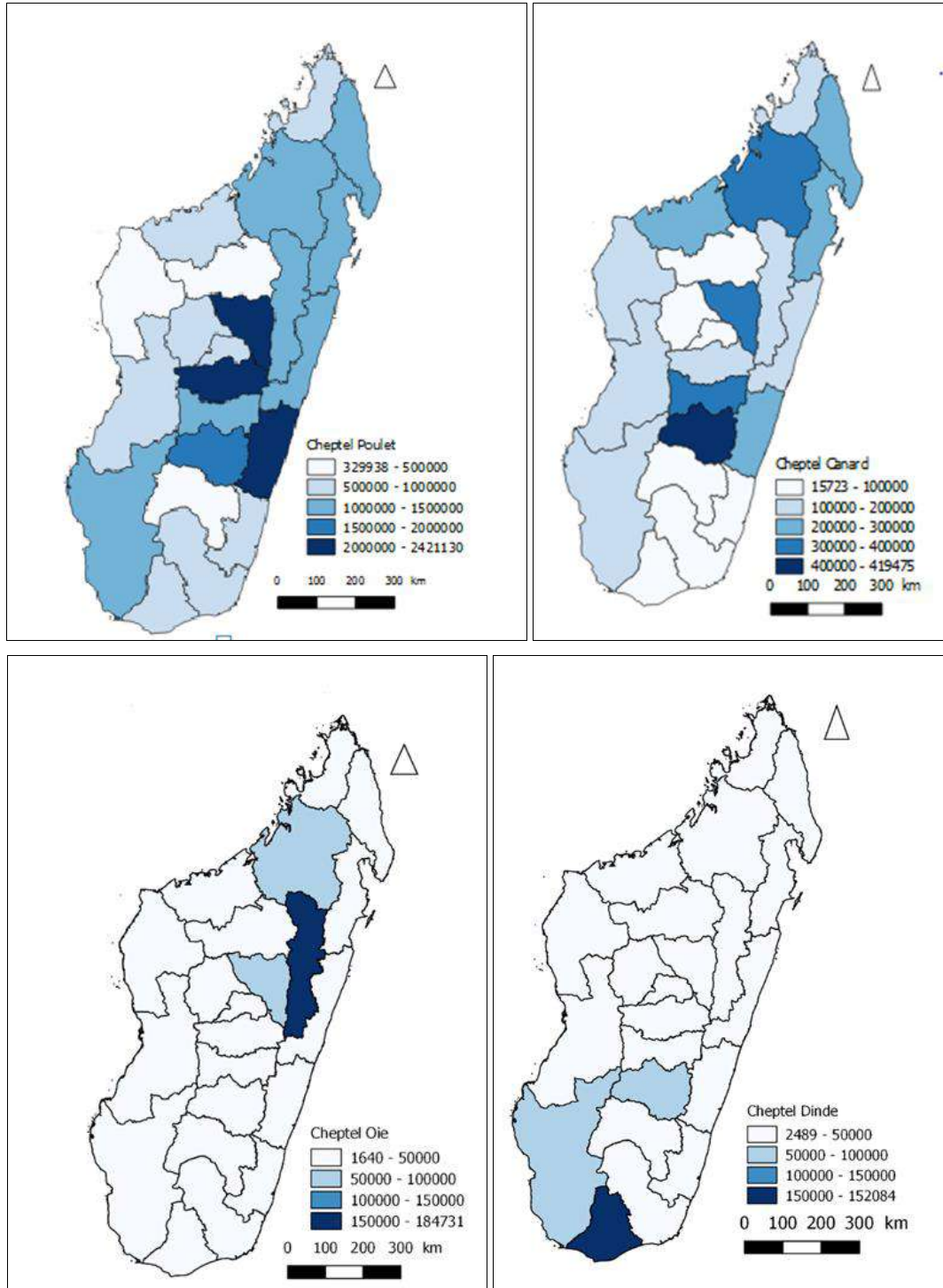


Fig 8: Poultry population and location by species.

#### 4. Conducting poultry farming in Madagascar

Malagasy poultry farming is conducted in both extensive and intensive modes. Village poultry farming generally follows the extensive mode, is marked by the exploitation of small numbers and by the mixing of species. Thus, it is easy to practice but not very profitable. On the other hand, commercial poultry farming is practiced according to an intensive system and oriented towards the production of a single product with the exploitation of flocks of a very large number of poultry. Since livestock are more concentrated and larger than in the village sector, commercial poultry farming is much more difficult to manage. Consequently, it

is located around urban and peri-urban areas (Table 2).

Village poultry farming is of the traditional type. However, it is further subdivided into three modes of production. Firstly, extensive free-range farming where the poultry roam without care or food supply with or without the presence of a habitat. Secondly, extensive backyard rearing where the birds are confined in a house at night and released during the day. A distribution of supplementary feed is made by the breeders. This is the practice adopted by the vast majority of producers. Third, improved extensive rearing where the birds are kept in a fenced area with access to housing, care and feed<sup>[44]</sup>.

**Table 2:** Characteristics of traditional and commercial poultry farming

Features	Village poultry farming	Commercial poultry farming
Breeding system	Extensive	Intensive
Importance	Very common (95%)	Restricted (about 5%)
Investment and profitability	Little or no investment but not very profitable	Very important investment but high profitability
Number of live stock	Low	Important
Work inputs	Minimal	Considerable
Actors	Restricted: breeders	Many: incubators, producers, transporters, processors.
Housing	Trees or hen houses made of local materials	Buildings using standard materials
Power supply	Household food scraps, leftover cereals from agriculture, no supplements	Balanced commercial rations
Water	Well water, waste water, natural springs	Drinking water supply
Veterinary inputs	None, occasional vaccinations	Prevention and control of many avian diseases through vaccination protocols and use of treatments
Production	Low but may increase if better nutrition and disease control are applied	High
Quality of the meat	Low fat and pleasant flavor	More fat and less flavor
Product destination	Self-consumed or sold live at markets	Sold live or processed into by-products
Genetic diversity	Important	Limited
Impact on the environment	Minimal: can be positive for organic fertilizer supply and pest control	Negative: intensive production of grain for rations and occasional abuse of antibiotics

#### 5. Limits of Malagasy village poultry farming: The case of local chicken farming

Village poultry farming is technically and production-wise very basic, with a lack of food supply and inadequate sanitary and medical prophylaxis. Moreover, it uses indigenous breeds that are never subjected to genetic improvement.

Neglect of sanitary aspects leads to vulnerability of poultry to various diseases<sup>[36]</sup>. Indeed, in village poultry farming, farmers do not follow vaccination programs against diseases that affect their poultry nor do they take measures to control parasitic infestations. This leads to massive mortality in the flock, resulting in low productivity. Several diseases such as fowl pox, fowl pasteurellosis and Newcastle disease threaten village poultry. However, the severity of Newcastle disease, which sometimes ravages the entire flock, results in significant losses to poultry farmers and makes Newcastle disease the main health constraint in chicken farming<sup>[45]</sup>. In Madagascar, vaccines are available to prevent the occurrence of fowl pox, fowl pasteurellosis and Newcastle disease. They are produced locally by IMVAVET and named respectively VARAVIA®, AVICHOL® and PESTAVIA®. Despite the existence of vaccines, Newcastle disease continues to strike Malagasy village poultry, particularly chicken, causing up to 44.3% of the mortality recorded annually<sup>[43]</sup>. On the other hand, decreases in the productivity of local chicken flocks in Madagascar could lead to increased poverty, degenerate household food

security and protein intake of rural communities. In addition, the breeding practices adopted lead to generally poor growth and reproductive performance compared to exotic breeds that are already improved. For example, indigenous Malagasy chickens are known to be small in size compared to commercial breeds. The female weighs only 1 to 1.5 kg and the male weighs only 2 kg to 2.5 kg<sup>[46]</sup>. From the point of view of feeding, the availability of Basic Palatable Food Resources (BPFR) is currently a limiting factor in increasing the size of the roaming poultry flock, unless regular supplementation is used.

#### 6. Conclusions

In conclusion, village poultry farming is spread throughout the national territory and occupies the first place among poultry productions in Madagascar. It includes various varieties of little-known local breeds that are really adapted to the climatic conditions of the island. But the neglect of the sanitary side and the type of breeding system adopted are brakes for the development of the sector. However, poverty alleviation and improvement of the nutritional situation of local communities could be effectively addressed, to a large extent, by strengthening family poultry farming. Thus, support actions along the entire value chain are needed to improve the sector. Upstream, innovations must be made in the breeding system for profitable productivity. Downstream, a better knowledge of the ecology of microbial agents responsible for poultry diseases

(bacteria, viruses, parasites) is necessary in order to develop strategies for health improvements.

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