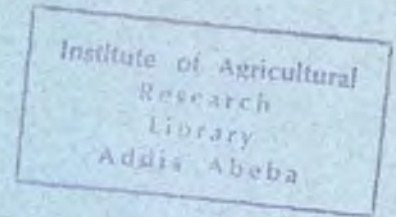


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FRP TECHNICAL PAMPHLET NO. 3



SMALL-SCALE POULTRY KEEPING IN WELAITA, NORTH OMO REGION

BY

EDWARD HOYLE
ROYAL AGRICULTURAL COLLEGE

FARMERS' RESEARCH PROJECT (FRP)
FARM AFRICA

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Addis Ababa
Ethiopia

DECEMBER 1992

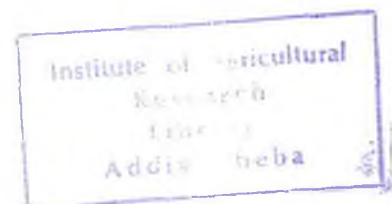
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PREFACE

FARM AFRICA is a non-government organisation, registered as a charity in Britain, and working on projects in Ethiopia, Kenya and Tanzania. One of the projects it is working on in Ethiopia is the Farmers' Research Project. The chief objective of this project is to increase the capacity of government and non-government agencies working on agricultural projects in the North Omo region to carry out farmer-oriented research in which farmers themselves participate.

Early in the life of this project it became clear that one of the problems hindering non-government organisations both in their agricultural extension as well as in their research activities is a shortage of basic information on many of the important crops, and other agricultural commodities and activities of the North Omo region. It was, therefore, decided that one of the early activities of the project should be to produce a number of technical pamphlets on important farming issues about which information is difficult to obtain from other sources.

This pamphlet on poultry is the third of these technical pamphlets to be produced. Its author is Edward Hoyle who spent part of a year while he was a student at the Royal Agricultural College, Cirencester, UK, working with the Farmers Research Project of Farm Africa in North Omo.

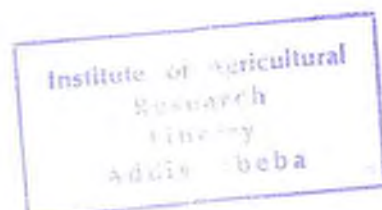
In the preparation of this pamphlet the author was greatly helped by a number of people, including: Stephen Sandford with his general guidance throughout the study and especially with his advice on how to gather information from Welaita farmers; Kefale Alemu and Erganie Ganome with their hospitality and the other kind ways in which they made my stay comfortable; and Messalech Shalamu, Eyassus Lemago, and Alemayehu Shanka who were my interpreters and without whose assistance nothing could have been done; and several other members of FARM's staff. I take this opportunity to express my gratitude and to acknowledge the significant contributions that they have made.

Comments on a draft of this pamphlet were received from Stephen Sandford, Christie Peacock, Teketel Forsiddo, Gebremariam Mekuria, and Helen Kassa. These comments were extremely useful to the author who has made appropriate amendments in the final version. However, the author alone is responsible for any remaining errors and omissions.

In the course of the work the author interviewed a large number of farmers in North Omo region either in groups or on their own. These farmers are too numerous to acknowledge individually. As will be apparent from what follows, they should be acknowledged as the real authors and I hope that I have correctly interpreted their views.

Edward Hoyle

23rd December 1992



SMALL-SCALE POULTRY KEEPING IN WELAITA

Summary

The report details the results obtained from two surveys carried out in mid to late October of 1992 (late Meskerem and early Tikemt of 1985 E.C.). It summarises and compares small-scale poultry production in Kokate (2000m above sea level) and Abele Sipa (1400m above sea level) Peasant Associations (PAs). Poultry production is described in both PAs by focussing on crucial factors such as flock sizes, trends in ownership, constraints on production, breeds, marketing and consumption. These issues are dealt with in a manner which also attempts to explain the reasons behind current situations and methods. The report also assesses the present importance of poultry to the farming communities of Kokate and Abele Sipa and gives an explanation of the factors preventing further advances.

CHAPTER 1. INTRODUCTION

This report is the result of interest stimulated by the abundance of people seen carrying live birds and eggs to markets. As far as is known it is the only such study to have been carried out in the Welaita region.

The decision to visit one highland and one lowland area was taken on the basis of a wider pilot survey which pointed to altitude as a factor of significance to poultry management. The complete findings of the pilot survey are included in Appendix I to the report.

The raw data were gathered by conducting qualitative interviews along with more formal questionnaires aimed at gathering information of a quantitative nature.

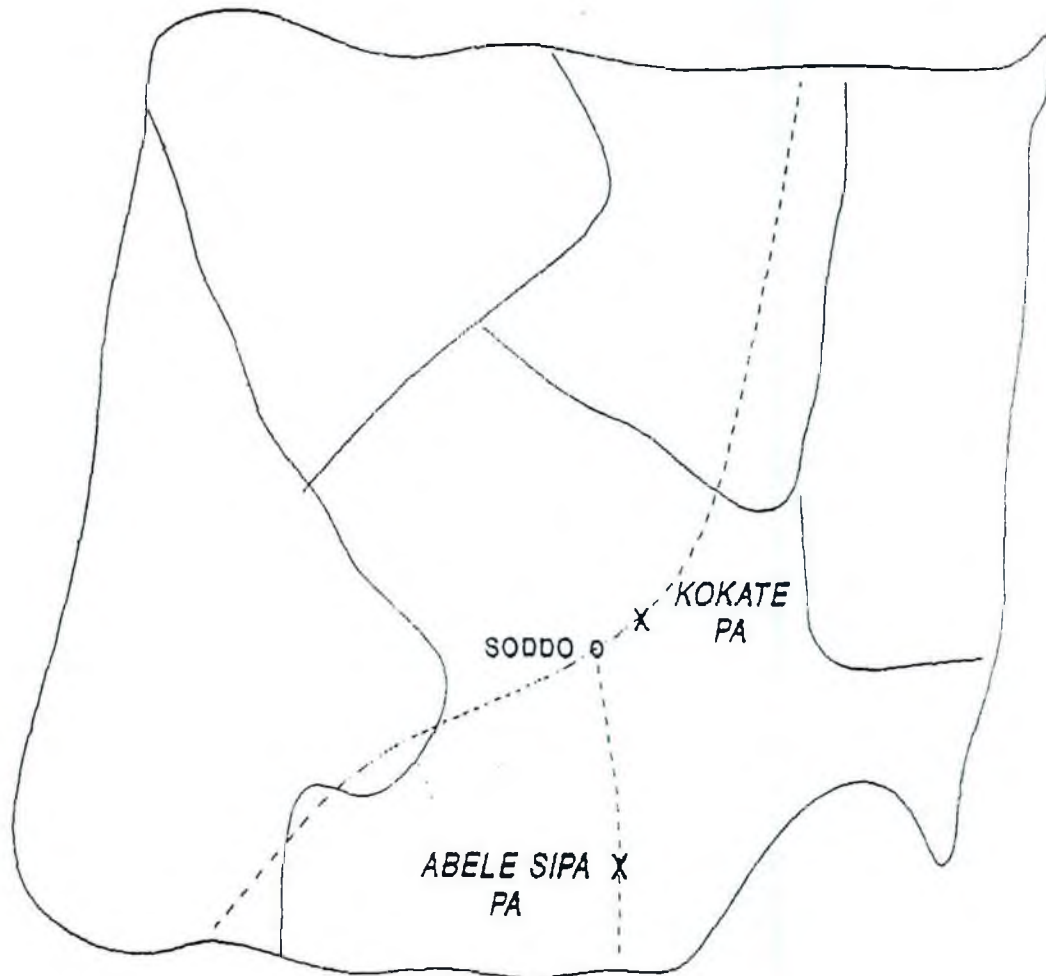
The report aims only to illustrate and assess, where possible, the answers given by the farmers. It is not a veterinary appraisal and contains no technical analysis of the diversity of breeds, physical conditions or management of Welaita's poultry.

The graphs, charts and averages included in the report have been produced from small data samples due to the limited amount of time which was available in each PA (thirty opportunistically but not purposively selected farmers answered a formal questionnaire in each of the PAs). Although attempts were made to limit the danger of exaggerations and distortions, obviously there is the possibility of some error. Consequently it is stressed that the quoted figures should be regarded more as illustrations of this text than as numerically conclusive evidence.

An informal survey was answered by five farmers in each PA who were deliberately selected to ensure a varied and comprehensive response.

Chickens are the only species of domestic poultry in Welaita. Mature chickens will be referred to as either poultry or birds to avoid confusion with immature chicks.

FIG. 1. MAP OF WELAITA SHOWING KOKATE AND ABELE SIPA



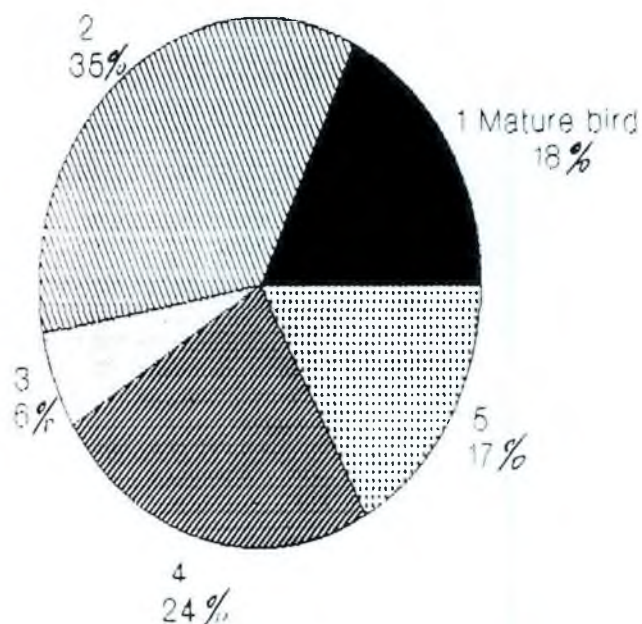
Area enclosed by thick lines is Welaita

CHAPTER 2. PATTERNS IN FLOCK SIZES

Of the farmers interviewed in the formal survey, 57% (Kokate) and 94% (Abele Sipa) said that they, or members of their households, kept at least one mature bird. For the purposes of this study a bird old enough to be sexed accurately, without expertise, is defined as mature (reproductive maturity is around seven months) while younger birds will be called chicks. This is a result of the interviewers being unable to consistently find farmers who could distinguish satisfactorily between immature hens and cocks and mature hens and cocks.

*

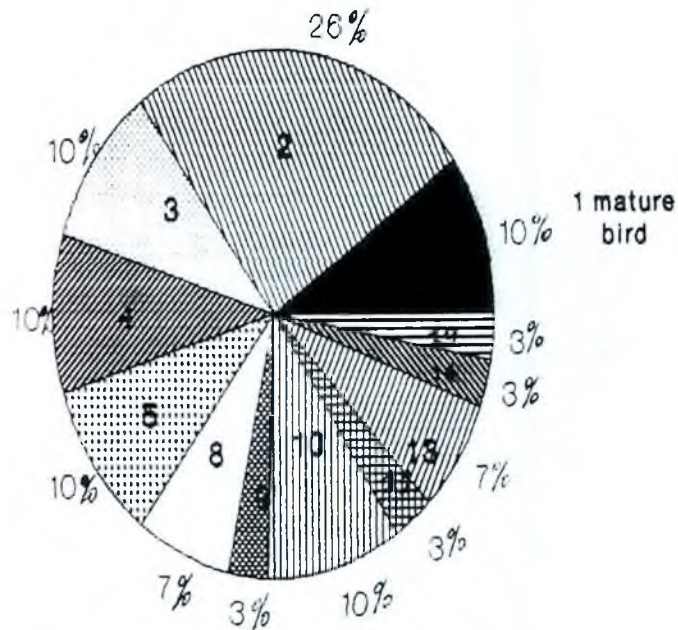
**FIG. 2. THE RANGE OF FLOCK SIZES AND THE DISTRIBUTION OF
POULTRY AMONG HOUSEHOLDS IN KOKATE**



*
*Flock size is measured in terms of number of mature birds.
The percentages indicate the proportion of households
with the size of flock*

In Kokate the mean number of mature birds is 2.9 (S.D=1.5) - see Figure 2 - despite the surprisingly low percentage of owners with three mature birds. It is important to note that while as many as 18% of this sample had five birds, nobody was able or willing to keep a larger flock during the time of the survey.

FIG. 3. THE RANGE OF FLOCK SIZES* AND THE DISTRIBUTION OF OF POULTRY AMONG HOUSEHOLDS IN ABELE SIPA



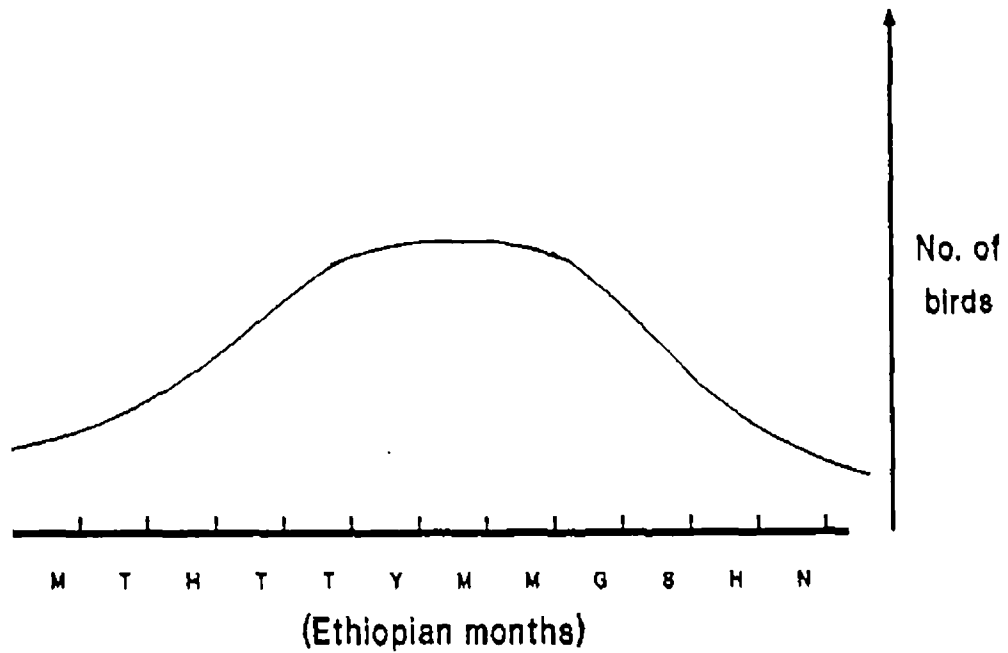
N.B. Figures do not add up to 100% due to rounding

* *Flock size is measured in terms of number of mature birds. The percentages indicate the proportion of households with the size of flock*

In Abele Sipa - see Figure 3 - the mean number of mature birds, per owner, is 5.8 (SD=4.7). Although this is significantly higher than in Kokate it can be observed that the modal number is again two mature birds. In Abele Sipa there was a small number of farmers owning flocks of much larger proportions than were found anywhere in Kokate.

All interviewees agreed that flock size and seasonality are inter-related. The general description of changes in flock size through the Ethiopian calendar is shown in Figure 4.

FIGURE 4. CHANGES IN FLOCK SIZES OVER THE ETHIOPIAN CALENDAR

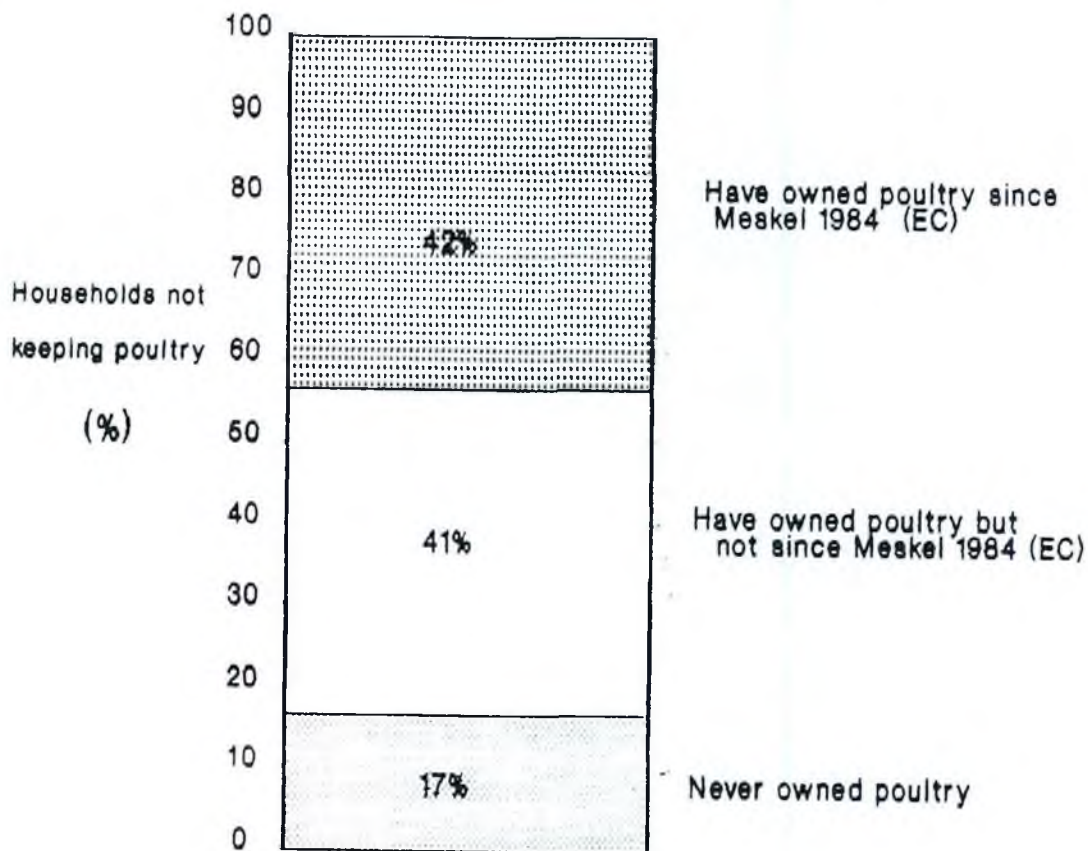


There is an apparent tendency for areas of high housing density to have, on average, smaller flocks than more spaced out locations (see chapter on constraints).

CHAPTER 3. PATTERNS OF FLOCK OWNERSHIP

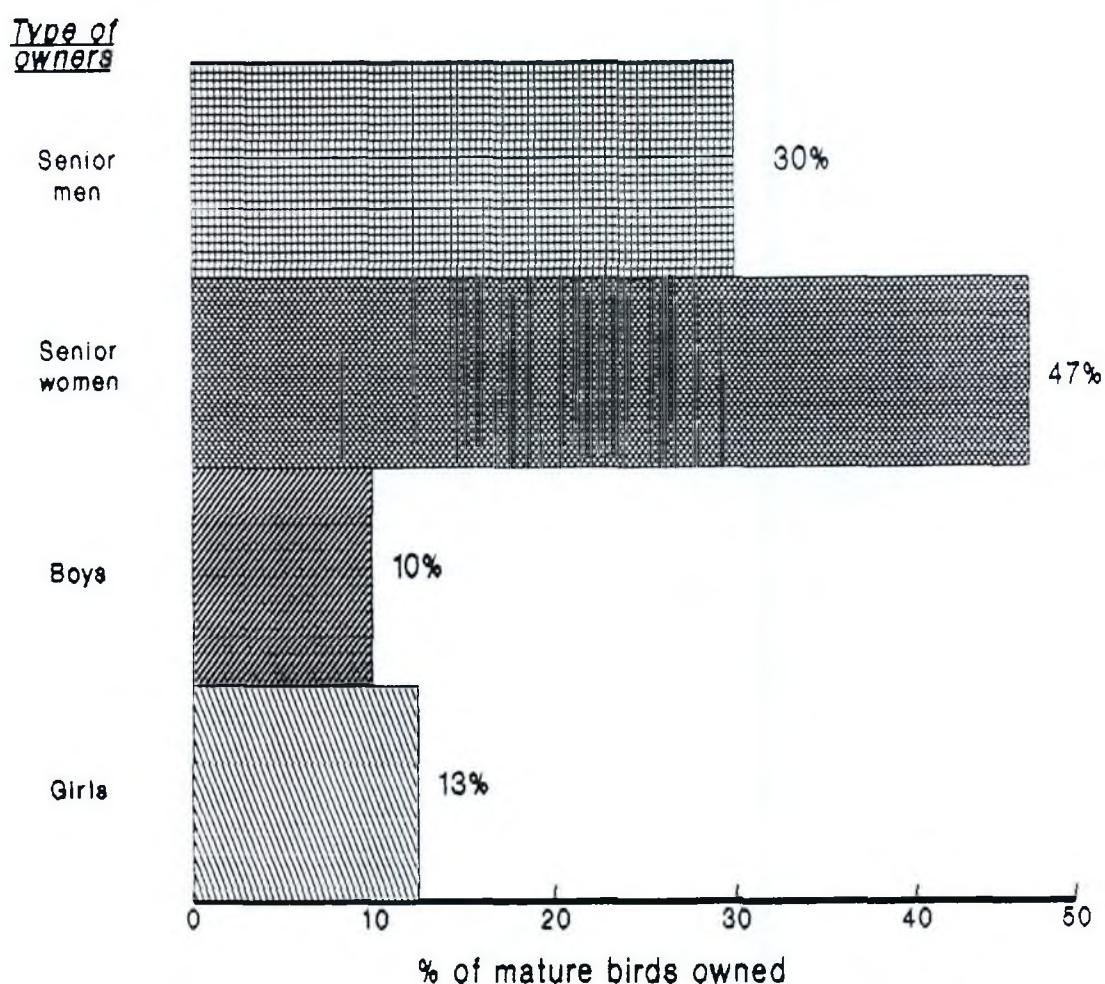
43% of sampled households in Kokate were not keeping poultry at the time of the survey. However, as Figure 5 shows, many of these have kept poultry in the past.

FIG. 5. HISTORY OF POULTRY KEEPING AMONG KOKATE HOUSEHOLDS WITHOUT POULTRY AT TIME OF SURVEY



In Abele Sipa only 6% (two households) of respondents to the formal survey were without poultry. Both had kept poultry over the past two years. While one cited disease as the cause (see constraints, disease) the other said that a discarded pesticide container had leaked resulting in his entire flock being poisoned.

FIG. 6. POULTRY OWNERSHIP BY AGE AND SEX IN KOKATE



The pattern of ownership differs to some extent according to the age and sex of the owner. Figure 6 shows the proportion of mature birds owned by different age and sex classes of owners in Kokate where it would appear that the women have a more active interest in poultry ownership than the men.

It can be seen that the large majority (77%) of the mature poultry in the survey were owned by senior members of each family (n=30). Despite the tendency for ownership by senior men and women there is no single social rule concerning ownership in Kokate. There were enough households deviating from the majority to show that anyone with an initial source of capital, and the ability to tend to their birds' needs, can keep poultry. [Note - throughout the report respondents are referred to as "farmers".

This might be seen to imply that senior men are the only owners of which is clearly not the case. Senior women and, on occasions, children also took part in the interviews providing valuable information. The term "farmer" is used solely for convenience.]

FIG. 7. POULTRY OWNERSHIP BY AGE AND SEX IN ABELE SIPA

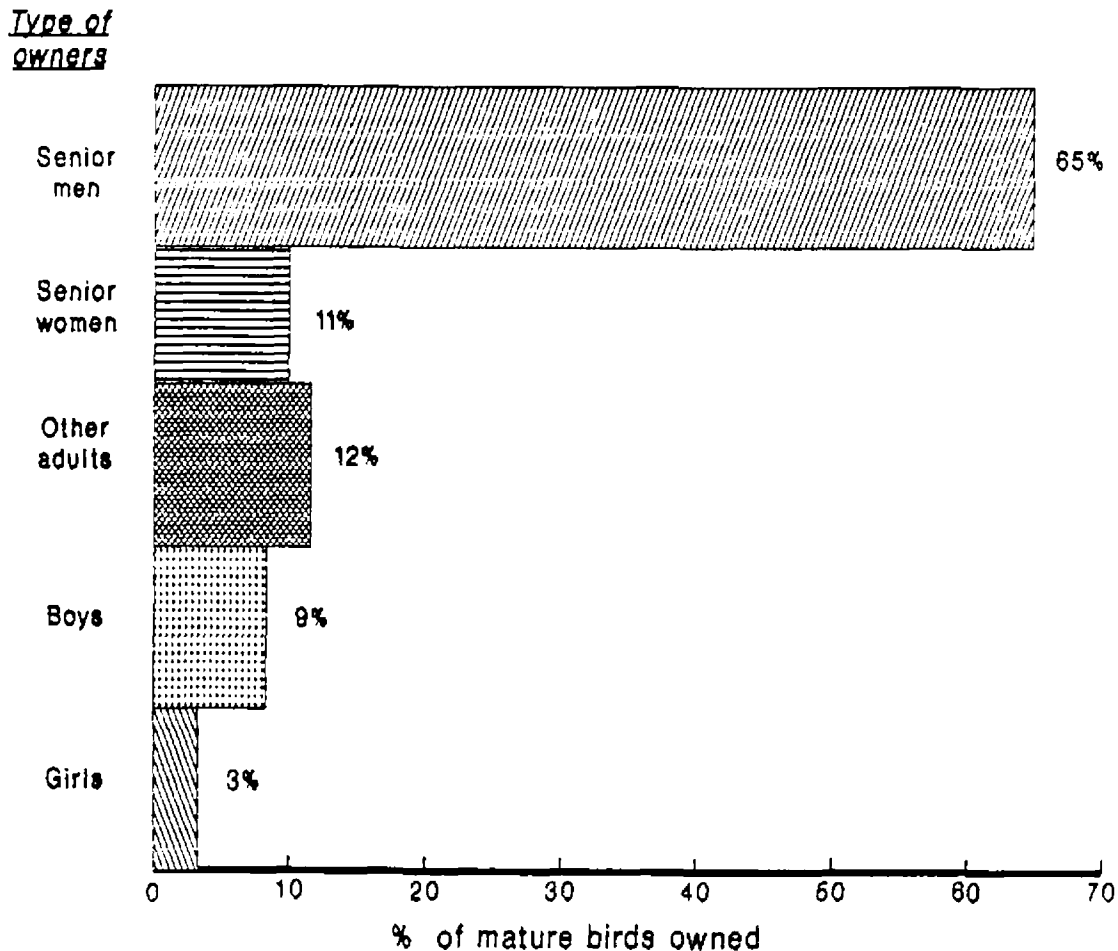
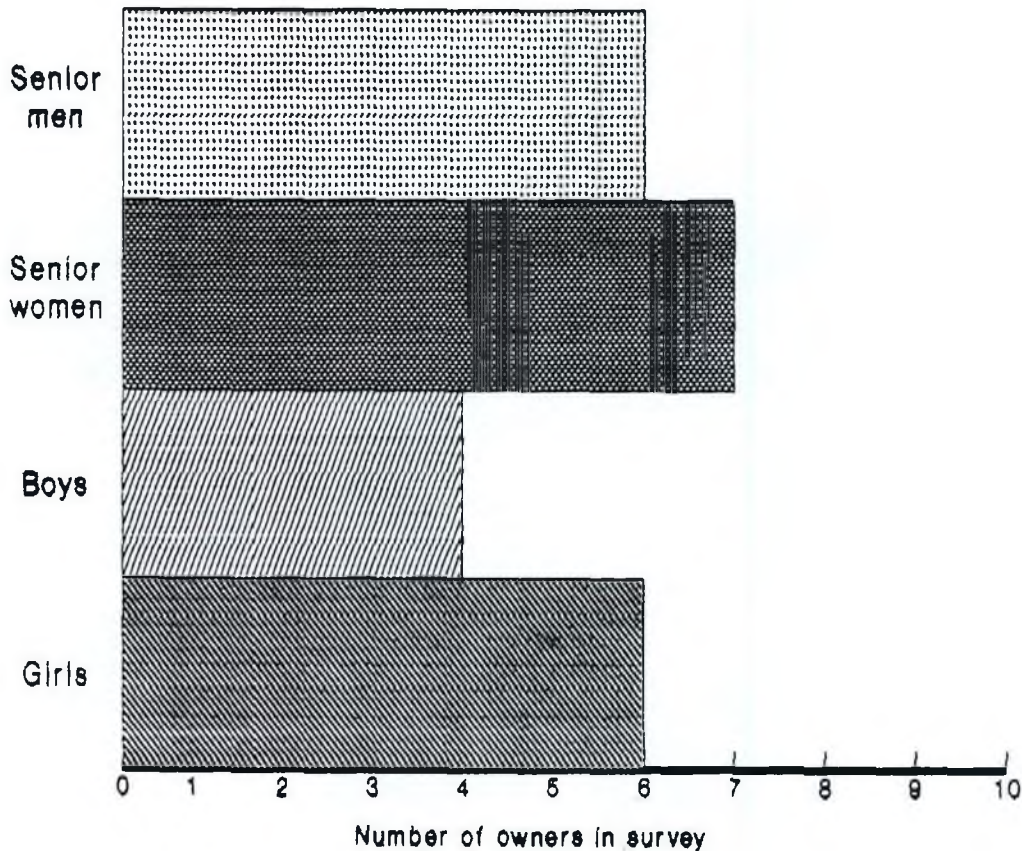


Figure 7 shows that in Abele Sipa the senior men own a large majority of the poultry. Senior women, the major owners in Kotate, came a distant third. A comment describing poultry as "womens' business" suggests that while the men own poultry, much of the work involved in keeping them and selling the produce is undertaken by the women.

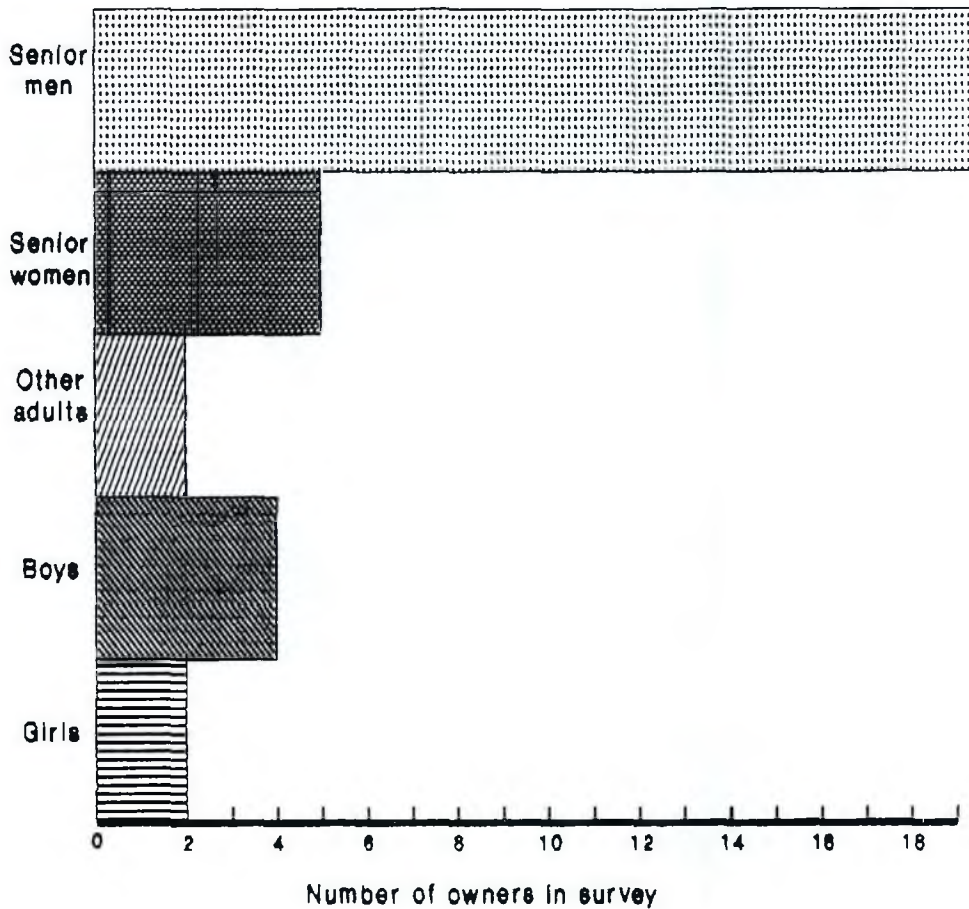
FIG. 8. SEX AND AGE STRUCTURE OF OWNERS IN KOKATE



Figures 8 and 9 show the number of owners falling into different age and sex classes in the samples of households (n=30) in Kokate and Abele Sipa respectively. It appears that the population of poultry owners is actually drawn fairly evenly from each grouping. It was observed that most senior owners had more than one mature bird while virtually none of the children had more than a single one (only one girl). This would imply that senior people are the major owners.

The mean number of owners in Kokate households keeping poultry is 1.4.

FIG. 9. SEX AND AGE STRUCTURE OF OWNERS IN ABELE SIPA



In Abele Sipa the population of poultry owners can be seen to be dominated by senior men. It is difficult to make any other valid observations. The mean number of owners in households keeping poultry was 1.0 in Abele Sipa despite larger flock sizes than in Kokate.

[Note - the person responsible for the up keep of a shared hen is recorded as it's owner in the above figures 8 and 9.]

CHAPTER 4. SHARING OF POULTRY

There were three examples, from a sample of thirty five households (n = 30 from formal survey + 5 from informal survey), of people keeping shared hens in Kokate. In all three cases the agreement involved one party handing over hens to a member of another household to look after in exchange for half the produce. One girl, who also owned a mature hen, shared another which was reportedly kept in her associate's house. The second instance involved a single woman keeping two hens given to her on the conditions described above. Another farmer said that he had returned to poultry management, after keeping no poultry for two years, by obtaining four hens in a sharing agreement.

19% of the households keeping poultry in Abele Sipa reported an involvement in sharing arrangements. The conditions of the agreements were the same as in Kokate. None of the households which were responsible for the keeping of the shared birds owned any others suggesting that sharing is a means of entering into poultry management. Those farmers who said they shared poultry kept in other households had flocks ranging from five to nineteen mature birds (mean=11.3). It seems likely that these households had reached or were approaching an upper limit (see chapter on constraints).

Most of the shared birds were hens. No one shared more than one cock. A shared cock was always accompanied by at least two hens in the same agreement.

CHAPTER 5. CONSTRAINTS IN POULTRY PRODUCTION

Virtually every farmer interviewed, even when not asked, complained of factors which they found to be limiting or preventing poultry production. The main factors mentioned were disease, predation, feed, hatching losses, money, lice, housing space and water, and each of these is treated separately below.

Disease

Disease was cited, in Kokate, as a problem by most people with whom it was discussed. For example a farmer who had apparently kept a stable flock of between six and eight mature birds, over the previous three years, had lost them to disease and none when interviewed and no intention of making any further investment. This seems to suggest an outbreak of considerable severity in a formerly prosperous concern. The farmer himself felt that a worsening disease problem (coupled with predation) meant that keeping poultry had become untenable. His opinion that disease is on the increase was echoed by other farmers throughout the PA.

This perceived upsurge in disease could be a result of a suspension in the activities of the Ministry of Agriculture's Soddo poultry unit. The unit, which once housed a constant population of above 1,000 birds of non-indigenous improved breeds, had been distributing three-month old birds amongst farmers at a price of 4 Birr each. These chickens were all immunised against the common and rapidly fatal poultry virus Newcastle disease. It is therefore possible that the absence of this influx of vaccinated chickens has led to a higher incidence of Newcastle disease. A PA in such close proximity to Soddo as Kokate might be expected to have been greatly influenced by the unit (and, perhaps become partially dependent on it - see later chapter on breeds) and, in turn, significantly affected by it's inactivity.

Disease appeared, from the accounts and actions of the farmers, to be particularly severe in a row of closely spaced houses situated on the roadside near the Soddo entrance gate in Kokate (not strictly speaking a village) resulting in some residents giving up keeping poultry. These houses displayed a clearly lower rate of poultry ownership than at more isolated places further into the countryside. Seven consecutive households all reported having no poultry, a figure not nearly repeated elsewhere in the PA. Although almost all farmers considered disease to be a serious affliction (a few solitary households seem to have so far evaded it) it has not led such a high proportion of those living in more secluded areas to decide that poultry husbandry was no longer worthwhile. A higher level of contact between birds in the more densely housed area may assist the spread of disease from flock to flock.

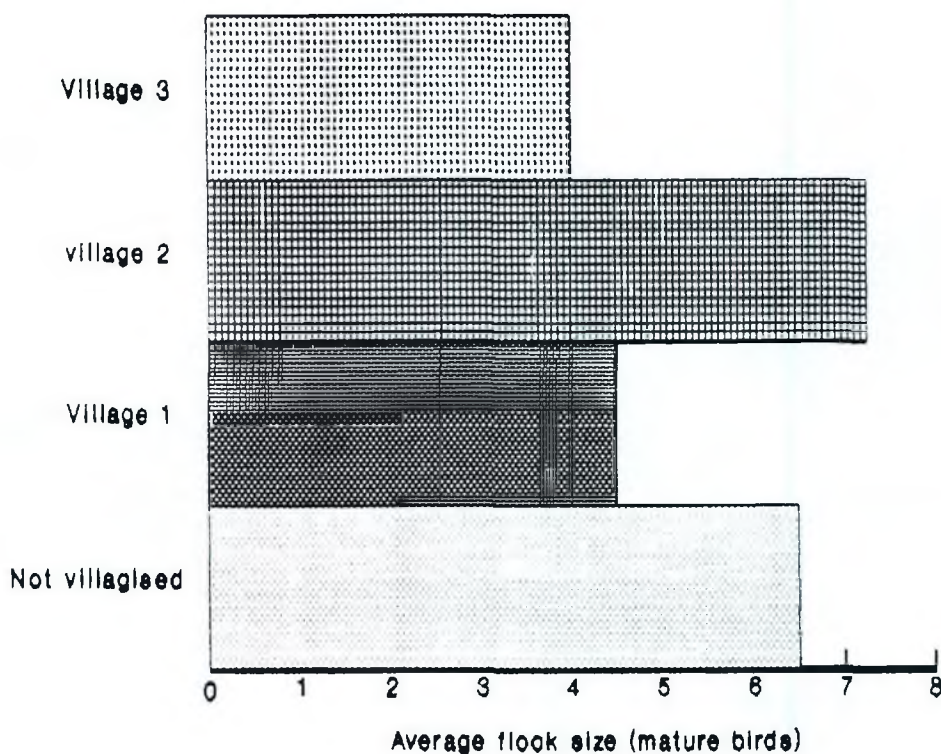
Note, however, that another possible explanation is that some of the residents have employment in Soddo detracting from their need or enthusiasm for poultry. One woman divulged that she was not engaged in farming at all as her husband provided their income from teaching. As this sequence of results were so obviously untypical of the PA as a whole, only every alternate house visited was added to the sample for analysis.

The relationship between disease and flock density may also be apparent in Abele Sipa which, unlike Kokate, is a PA of government-settled villages along with a number of more detached houses spread thinly over the countryside. The % ownership and mean number of mature birds per household were high in all the areas visited in Abele Sipa when compared with the results from Kokate.

Interviews, in Abele Sipa, were divided evenly between three individual villages and a selection of non-villagised homes. The mean number of mature birds per household, including those which had no poultry, is 5.5 when all the results are averaged together. However, when the figures collected from the three villages and their surrounding area are averaged separately a rather different picture emerges and is shown in Figure 10 (overleaf).

It should again be stressed that the averages used in Figure 10 have been calculated from small samples containing values of considerable variation. Nevertheless, the representation is consistent with the other evidence. Disease was cited as the most damaging constraint by the residents of two of the three villages (named villages 1 and 3) while often being relegated to third in village 2. Some farmers in village 2 said that disease was not a problem while others, not living in villages, had not experienced any outbreaks. As flocks in village 2 and non-villagised areas seem more vigorous than in villages 1 and 3 it may be proposed that this is due to high flock densities caused by villagisation in Abele Sipa. Villagisation was blamed as the sole cause of high disease levels in 1 and 3 although it is not clear why village 2 should escape a disease problem. The general feeling was that the problem was worsening. Many people said that they had encountered no such problems prior to their resettlement.

**FIG. 10. AVERAGE FLOCK SIZES IN ABELE SIPA
BY LOCATION OF FLOCK**



Symptoms displayed by sick birds in both PAs were described as diarrhoea and lethargy. Death often results within a day of illness being observed. Local veterinary opinion has offered the following accounts of the diversity and extent of poultry diseases in Welaita (it is quite possible that all three explanations are correct for different areas of the region).

- (i) Coccidiosis, caused by Eimeria protozoa, is the paramount disease afflicting Welaita's poultry. This theory is supported by literature stating wet litter as a cause of coccidiosis and poultry being primarily infested during the wet months of the year (see below). It would be difficult for farmers, especially those in highland Kokate to maintain a dry litter through these months.

(ii) Newcastle disease is an important disease in Welaita. This would seem obvious from the Ministry's attempt at suppressing or eradicating this disease. One farmer, in Abele Sipa, reported that his birds showed signs of breathing difficulties when they become ill. Respiratory problems are a symptom of Newcastle disease. Diarrhoea is a noted symptom of both coccidiosis and Newcastle disease.

(iii) Welaita is home to a wide range of poultry diseases.

It was unanimously agreed that disease was a seasonal problem absent, in Kokate, from Meskerem/Tikemt until the beginning of Ginbot while effecting a large impact during the months of Ginbot, Senne, Hamle and Nehassie. Although these stipulated dates varied slightly from house to house, the consensus was that epidemics generally arise during the "rainy season" (the term "rainy season" will from now represent these months). One farmer claimed to have lost 10-15 chickens (ages unstated) over the most recent "rainy season" in which Hamle and Nehassie were the most difficult months. He said that he had often found birds lying under their perches, having died in the night.

Instances of disease were said, by some farmers in Abele Sipa, to occur during the high season months of Tikemt to Yekatit. However, they generally agreed that the most damaging epidemics break out during the "rainy season".

A remedy suggested by farmers for curing diseased chickens was tetracycline tablets mixed with butter and sometimes ginger. Those who had experimented with this treatment reported no success.

Predation

Predators were listed alongside disease as a major cause of premature death among poultry in Kokate. A number of farmers said that they had ceased to keep poultry, or had at least suffered very serious losses, due to a combination of disease and predation. Predators fall into two categories:

(i) Those preying only on chicks.

Birds of prey were generally acknowledged as being the most damaging predators in Kokate. As they were only blamed for taking chicks it is probable that the greatest offenders are relatively small and common (e.g. Kites). Problems were said to result whenever chicks are available with some farmers reporting a higher rate of attack on broods hatched in the "rainy season". Rats were cited as less damaging predators than birds although they sometimes kill chicks inside the protection of the house.

- (ii) Those preying on mature birds as well as chicks. A wild animal, translated as a "cat", was held responsible, by some people, for killing both mature birds and chicks. The term "cat" may be misleading. Domestic cats were sighted inside and close to houses with residents making no obvious attempts to expel them. The "cat" in question was normally first described as a "bad" animal. Only on further enquiry did farmers specifically mention "cats". One Kokate farmer seemed to have suffered particularly badly with losses outstripping those resulting from disease and other predators. The "cat" was thought to be most dangerous during the rainy season when thick high grasses allow it to stalk poultry more easily.

A means of reducing losses by predation advocated by one farmer is to keep chicks and mature birds inside the house as much as possible. This presumably incurs a higher feed requirement as there is less opportunity for scavenging. Two households partly attributed having no poultry to there being no available children to protect them from predators.

In contrast to Kokate, farmers in Abele Sipa often ranked predators third in importance behind disease and lice. Only in areas where disease was absent did predators rise to being the second most damaging constraint. Nevertheless, all the predators reported in Kokate were also present with the addition of an animal interpreted as a "fox". Descriptions of seasonal variations in the impact of predators and their preferred prey were as given in Kokate.

Feed

All the farmers interviewed said that they deliberately fed their poultry. Most feed was given between the months of Tikemt to Yekatit due to the harvesting of maize, barley and wheat. Hidar, Tahsas and Tir were listed as the months in which feeding reached it's highest levels. Wheat was said to be the best feed while maize is more palatable when crushed (especially when it is fed to chicks).

The "rainy season" sees a reduction in the amount of feed given to poultry due to shortages which also affect the human population. Quantities gradually decrease until Hamle and Nehassie when many farmers are unable to spare any food. During this time scavenging replaces grain as the most important component of the poultry diet. Poultry spend a larger amount of time outside the house and wander further in their search for food. Farmers agree that scavenging does not provide the same high level of nutrition as fed grain. The absence of available feed to supplement the poultry diet leads to a sharp decline in the production of eggs.

Buying feed would appear to be common practice in Abele Sipa enabling more farmers there than in Kokate to continue feeding poultry throughout the "rainy season". All farmers who were asked said that they stop feeding their poultry maize when the family's store begins to run short and replace it with bought wheat. That people are more indulgent towards their poultry in Abele Sipa is supported by the case of one farmer who had saved enough maize to sustain feeding without the purchase of supplements. He felt that this diet, fed continuously, had been insufficient to maintain a high yield of eggs. In past years when he had owned a much larger flock wheat, cheese, eggs and injera had all formed part of a more balanced diet given all year round. As this farmer had previously kept his poultry in an enclosed coop, which he admitted had incurred a higher feed requirement, his answers may not bear much relevance to the more average owner who would not expect to achieve high production throughout the year.

Although it was agreed that the "rainy season" was a time of lower feeding levels and less production, farmers in Abele Sipa surprisingly insisted that feed availability was not a problem and that there are no shortages.

It is difficult to compare constraints such as disease and predation (direct causes of death) with feed shortages which, under normal conditions, affect only production (excluding any indirect consequences). Farmers appeared more philosophical towards their annual feed shortages, apparently accepting them as unavoidable at certain times of the year.

Hatching losses

Farmers reported brooding hens actively spoiling or/and allowing eggs to go rotten. Each farmer who could remember his most recent hatching was asked to state the number of eggs lost in this fashion.

In Kokate 19% (n=30 households) of the total number of eggs had failed to hatch. The mean % loss of each individual brood was almost identical at 20% (Standard Deviation=11%). In Abele Sipa 22% of the total number of eggs had failed to hatch. The mean % loss of each individual brood was also 22% (SD=16%). The closeness of the results suggests that hatching losses affect farmers on a fairly equal level. Location would appear to bear no significance. Details on hen breeds and hatching losses are discussed later.

Money

Money was cited as a factor which can limit the size of existing flocks and even prevent people from keeping poultry. Finance is required to buy the first birds when starting in poultry keeping. Also, the pattern of buying and selling poultry, common in Kokate (and described in the marketing section), involves the need to be able to set aside money to purchase new birds. One household whose lack of finances had resulted in them owning no poultry for two years had partially overcome this problem by obtaining four hens in a sharing deal.

There was only one example of an Abele Sipa farmer not keeping poultry due to a shortage of money. He agreed that more money would be realised in the long term than invested at the outset but explained that the initial capital was not available. Sharing might have been a solution but was not discussed.

Lice

Kokate farmers reported sporadic infestations of lice throughout the year. Lice did not appear to be causing great anxiety in relation to disease and predators and were only mentioned when farmers were pressed to state all the constraints of poultry keeping.

Conversely in Abele Sipa lice were listed as one of the two primary constraints. Furthermore, in households free from disease, they were usually listed as the most damaging factor. Lice attacks were said to occur at all times of the year, but in higher concentrations during the "rainy season". There is no evidence to suggest that villagisation is of significance to outbreaks, as lice were reported all over Abele Sipa. In one house a lice stricken chick was exhibited. The symptoms were loss of hair and a discolouration around the face. Its owner said that lice had killed three chicks the previous day. Unlike disease and predation lice are not always fatal although the chances of death seem to be much higher for infested chicks than mature birds.

Housing space

All the owners interviewed in Kokate housed their poultry inside their homes. During the pilot survey preceding this study, farmers sometimes mentioned an upper limit on the number of mature birds which could be conveniently kept in their houses. Beyond this number poultry were said to quickly exhaust their food allotment and generally become a nuisance. The limit probably

varies according to the amount of food and tolerance possessed by the farmer. In Kokate, at the time of the survey, there was no evidence of this constraint due to other limiting factors reducing flocks below the level of it's effect.

In Abele Sipa a number of farmers owning relatively large flocks had released birds to other households in sharing agreements. It seems probable that this was a result of the upper limit, as described above, being reached. As in Kokate, all the poultry in Abele Sipa were kept inside their owners' homes. One farmer, already mentioned in the passage discussing feed, recollected that he used to own a flock of over fifty mature birds which he had kept inside a purpose-built bamboo poultry house. The practice was discontinued after his flock was decimated by disease shortly after villagisation. There were no examples of farmers currently housing their poultry in this way.

Water

Water shortages were said to sometimes cause stress and ill health among poultry in Abele Sipa. White birds display greater sensitivity than dark birds.



CHAPTER 6. POSSIBLE INTERACTIONS BETWEEN CONSTRAINTS

It has been observed that disease and feed are most limiting to Kokate poultry husbandry during the "rainy season". High instances of predation have also been linked to this period. The prevalence of such problems account for the general decrease of flocks during this difficult time. The combined influence of these factors was often held responsible for the decline as opposed to any singly destructive cause. It also seems probable that while death or poor performance may be caused directly by only one of the described constraints, interactions between those constraints may indirectly attribute to that end. The following five are some of the possible interactions which may be proving detrimental during the "rainy season":

- (i) Insufficient feed and subsequent malnutrition weakens poultry both physically and mentally making them more vulnerable to predators than if they were healthy.
- (ii) Poultry suffering from malnutrition are less able to stave off the onset of disease (this was suggested by a farmer).
- (iii) The need to leave the farmer's house to scavenge for food makes poultry more vulnerable to predators than remaining inside. The further they go, the greater the danger.
- (iv) Scavenging for food away from the house results in birds coming into contact with a larger number of birds from other flocks than would otherwise be so, facilitating the spread of infection.
- (v) Scavenged food, or/and it's sources, are likely causes of disease among poultry.

CHAPTER 7. HATCHING AND SURVIVAL OF CHICKS

Poultry are at their most vulnerable, especially to predating birds and lice, when they are still chicks. Chicks account for by far the biggest numerical losses of poultry both in Kokate and Abele Sipa.

A sample of farmers were asked to state the number of eggs that were hatched in their most recent brood (see above, hatching losses) and to say how many of the chicks had survived to maturity (defined as three months old).

The mean survival rate obtained per farmer, in Kokate, was 47%, with an inter-flock Standard Deviation of 27% demonstrating a high level of variability. In Abele Sipa the mean survival rate, per farmer, was 53% (SD=29%).

Note however that all the hatching in the sample from Abele Sipa had taken place during the "rainy season" (as earlier defined) which has been found to be a disadvantage. None of the hatching in Kokate had taken place during this time.

Possible explanations for the variations within each PA and the higher survival rate in Abele Sipa could be found by researching the following:

- (i) Levels of protection afforded by farmers.
- (ii) The location of houses in relation to potential predators.
- (iii) The season when hatching takes place. Seasonality has already been described as a factor affecting poultry mortality. Although farmers stressed that no hatching take place during the dates of the previously defined "rainy season," several had been attempted in the opening days of Meskerem. The average percentage survival at seven weeks, in Kokate, was a disastrous 24.0% (n=5, SD=21.8%). It is possible that this exceptionally high rate of mortality may have been partly a result of the less than ideal conditions in a particularly wet Meskerem.
- (iv) Other environmental and management factors.

There was no evidence to suggest that brood size has an effect on mortality.

In Kokate, some farmers keeping poultry had hatched chicks in the four weeks previous to the survey. The survival rates of their chicks show an interesting pattern which is shown in Figure 11 (n.b. n=5).

FIG. 11. SURVIVAL RATES OF BROODS HATCHED IN KOKATE

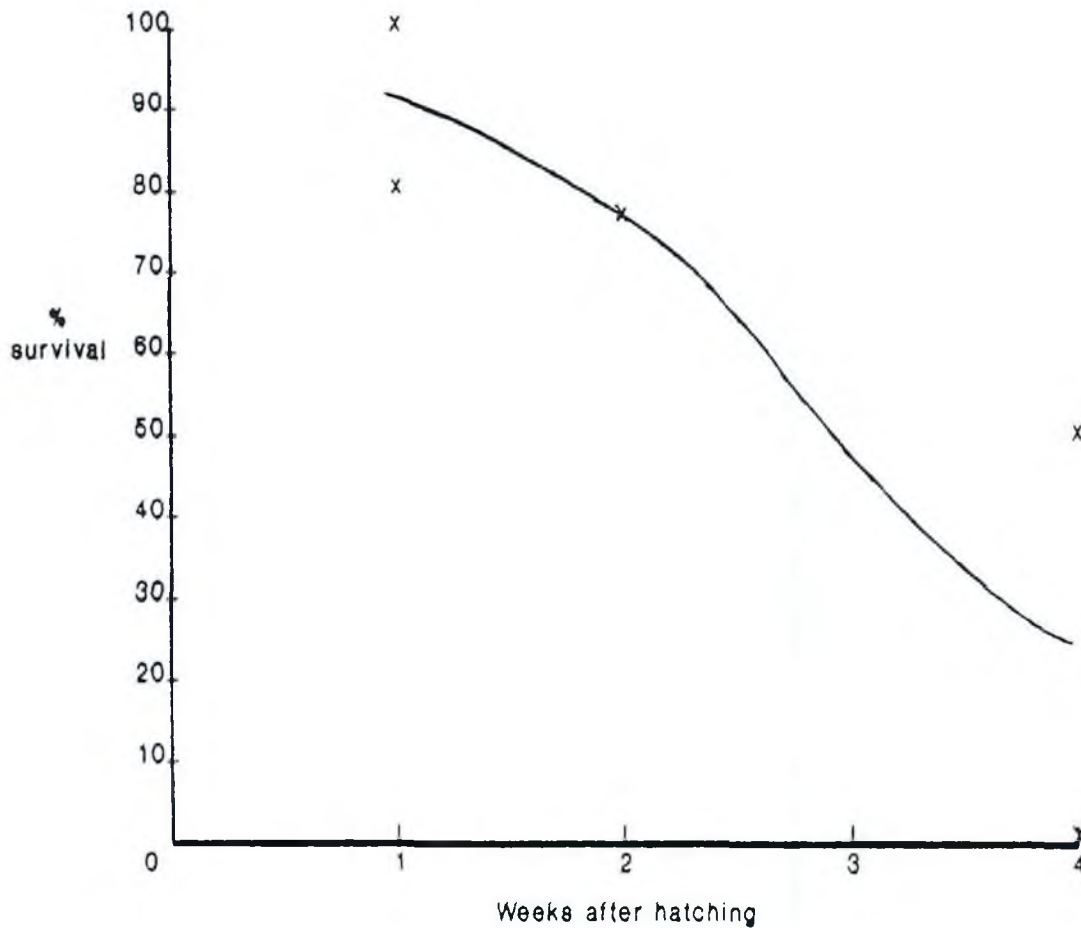


Figure 11 suggests that the most dangerous period for chicks is from two to four weeks after hatching. One farmer, who had 100% survival after one week, said that he had kept the chicks inside the house. Another had done the same losing only one chick after the first week (to a rat). It would appear that as chicks get older they venture outside the relative safety of the house becoming highly vulnerable to predation. What, if anything, farmers can do to check this behaviour is unclear. Difficulty in controlling the chicks' instinct is one possible explanation. There may also be a number of other problems arising from keeping chicks inside beyond a certain duration.

CHAPTER 8. COMPARISON OF INTRODUCED EXOTIC POULTRY WITH LOCAL BREEDS

Farmers differentiated between indigenous dark birds and "foreign" white birds which is the system followed here. One farmer informed us that the white breed (assuming a single breed) had arrived 23 years ago. White birds are regarded as superior to dark birds for the following reasons:

- (i) They are larger and higher yielding in both meat and eggs.
- (ii) White hens, if well fed, begin to lay eggs at the age of around six months. A dark hen would be expected to take seven to eight months before she lays her first egg.
- (iii) The eggs laid by white hens are of a higher quality being generally larger and lighter in colour. Both these features were said to be desirable although some farmers disputed the suggestion that colour was important.
- (iv) White birds, particularly cocks, are more pleasing to look at.

These attributes were said to result in a higher price for white birds (see marketing). However, farmers also stated several disadvantages characteristic of white birds. These are:

- (a) They are more susceptible to disease than dark birds.
- (b) They are highly attractive to predators and more likely to be caught than darker birds.
- (c) White hens spoil a larger proportion of their clutch than darker hens and are thus less suitable for hatching purposes. Consequently dark, local hens are used almost exclusively for hatching with the eggs of white hens being added to their brood with no perceived ill effect. This is doubly expedient as it allows white hens to continue laying.
- (d) To produce a high yield of eggs white hens require feeding. Their production plummets during shortages. According to one account it can fall below that of dark hens.
- (e) They are more sensitive to water shortages (Abele Sipa).

A cross between a white bird and a dark bird was said to be dark in colour but to otherwise display the characteristics of a white bird. This was the opinion of one farmer. It seems likely that cross-bred poultry vary according to their individual genetic inheritance.

One farmer in Abele Sipa pointed out that poultry which had been simply categorised as dark were either red or black. However, he felt that these breeds displayed similar characteristics in all but colour.

CHAPTER 9. PRODUCTION MARKETING AND CONSUMPTION OF POULTRY

Kokate farmers were found to be involved in both the buying and selling of poultry. The periods of high activity in Kokate poultry trading as well as domestic consumption are indicated below:

Ginbot - the opening month of the "rainy season" for poultry keeping sees many farmers selling all or, more usually, a high proportion of their flocks. It was said that they are forced to sell at Ginbot in order to buy food for their families. It was emphasised that the financial position of a household dictates whether this is necessary. Not everyone needs to sell at this time. Ginbot would appear to be a sensible time to sell poultry for those short of assets and in danger of running into hardship. The returns from keeping poultry into the "rainy season" do not, perhaps, justify the risks of keeping the birds longer. Unfortunately, the glut of poultry coming onto the market coupled with the oncoming low season result in prices falling to their lowest annual level which continues up to Nehassie/Meskerem. One farmer said that he ate chicken in Ginbot.

Meskerem - high demand for the Meskel feast (Meskerem 17, September 28) ensures a good price for those who manage to maintain their flocks through the low season to Meskerem. One farmer confirmed that this induces him to keep some birds through the "rainy season". Another had sold his entire flock of seven at the last Meskel.

Tikemt - some farmers, especially those who had sold in Ginbot and Meskerem, rebuy as the environment becomes more favourable for poultry. The source of birds in Tikemt is not known and it could come from another PA. The price is higher than in Ginbot but lower than at Meskel.

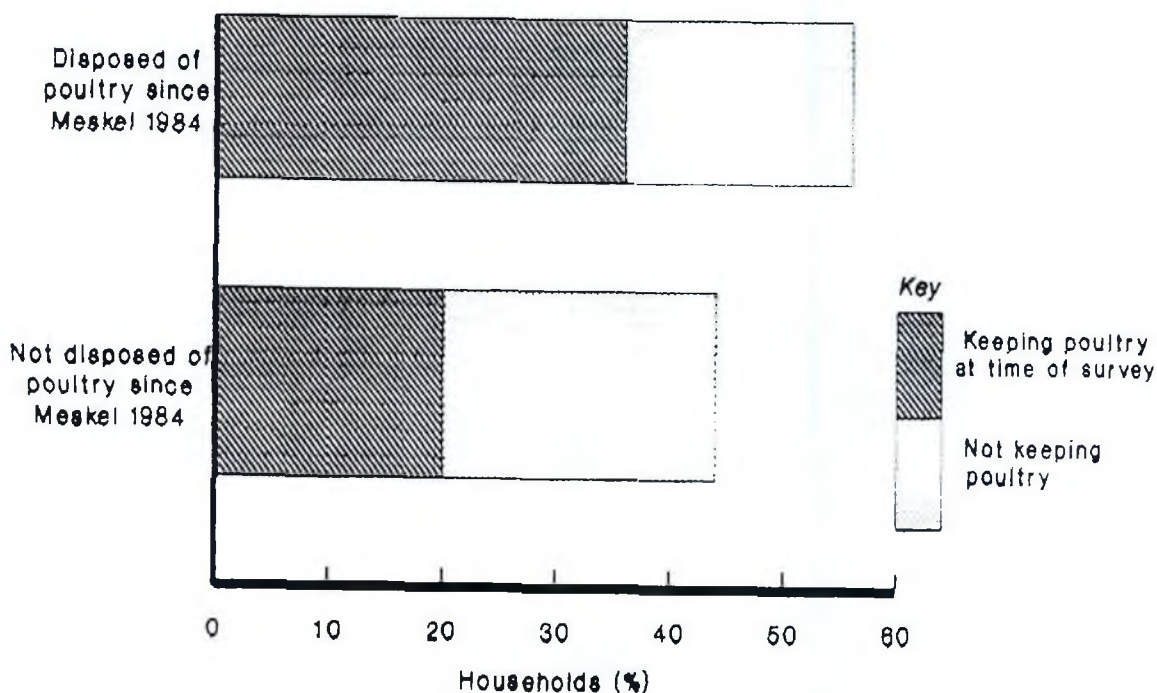
Although popular opinion would appear to support the above marketing trends it would be misleading to suggest that all or even most farmers routinely sell in Ginbot and then rebuy in the following Tikemt. In Tikemt 1985(E.C.) a significant number of people had just returned to poultry keeping after an absence of longer than one year. Others who had pulled out in the past year were not contemplating a quick return. It appears that a significant number of farmers in Kokate have a tendency to slip in and out of poultry production for periods governed by factors other than seasonality. The reasons for this are not totally clear although money would appear to have a large influence.

Tahsas and Miazia - the feasts which occur in these months lead to prices rising above those of Tikemt, Hidar, Tir, Yekatit and Megabit. Selling poultry at Tahsas entails the loss of potential production during the remainder of the high season. Eating chicken was said to be traditional at the Miazia (Easter) feast when the demand is highest. There were two examples of farmers who said they bought birds to eat at this feast. Contrary to this information, some other farmers said that the Tahsas (Christmas) feast is the time when they eat most poultry.

Farmers in Abele Sipa followed these trends up to a point with most saying that they also reduced their flocks in the "rainy season" when feed is scarce. However, selling during this time does not appear to be as widespread or as extensive as in Kokate. That there is greater continuity in poultry keeping among farmers in Abele Sipa is supported by the fact that such a large majority of households had maintained their flocks through the "rainy season".

Farmers answering the formal questionnaire were asked to state whether they had "disposed of" (i.e. eaten, sold or given away) any birds since the Meskel festival, which took place in Meskerem, of 1984 (E.C.).

FIG. 12. DISPOSAL OF POULTRY IN KOKATE



The tendency of farmers in Kokate to slip in and out of poultry production is displayed by the number of households who had disposed of birds but were no longer keeping them (see figure 12). There were also a significant number of households keeping poultry who had not disposed of any birds over the specified period.

In Abele Sipa 91% of households had disposed of birds since the Meskel of 1984 (E.C.).

FIG. 13. SHARE OF DIFFERENT SEXES AND METHODS IN TOTAL DISPOSALS OF POULTRY: KOKATE AND ABELE SIPA

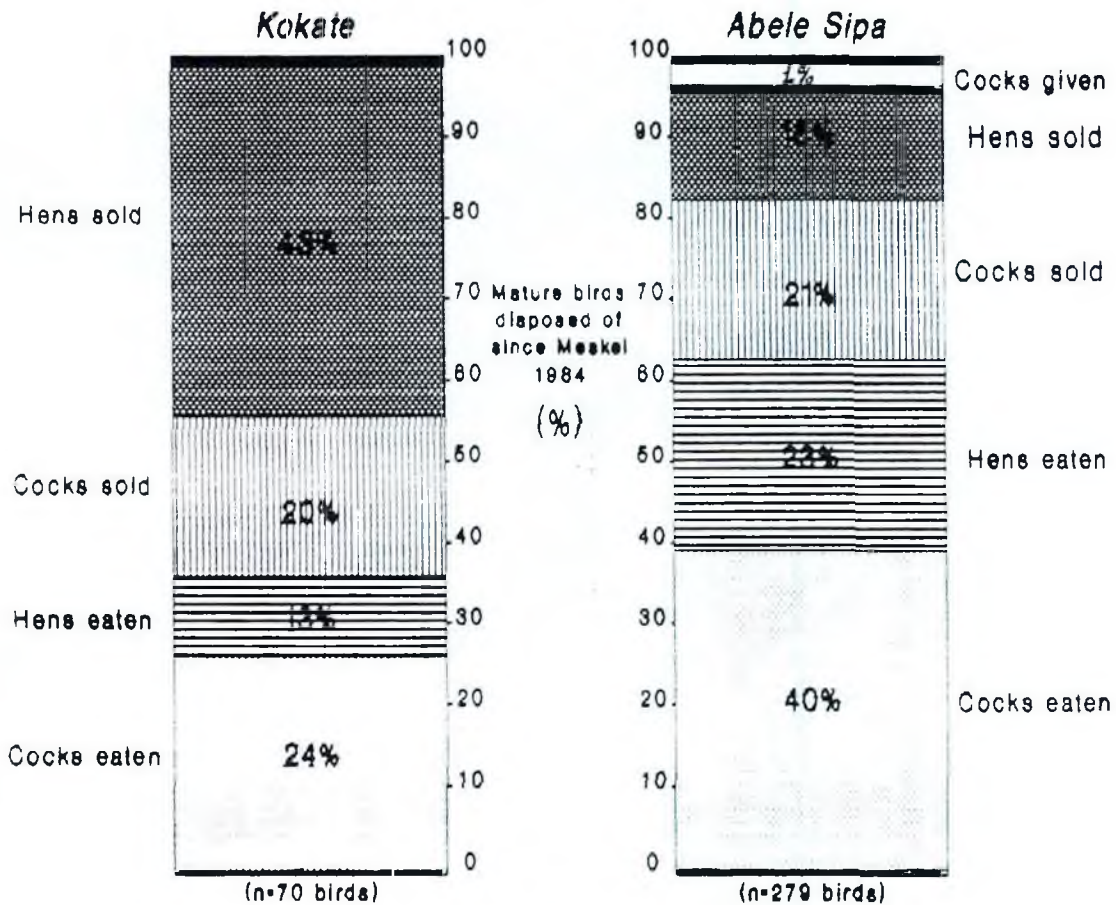


Fig.13 shows that hen sales account for a much larger proportion of poultry disposal in Kokate (43%) than in Abele Sipa (15%). This is consistent with Kokate farmers withdrawing from poultry keeping or reducing their flocks at certain times of the year.

The population is later replenished by new poultry ventures and rebuying. Farmers in Abele Sipa tend to keep hens in production more continuously, only selling or eating them when their output begins to fall. This is supported by only 38% of the birds disposed of in Abele Sipa being hens. Losses arise when hens are kept for longer periods.

Cock sales can be seen to account for a similar amount of disposal in both PAs. Only hens are sold with greater frequency by Kokate owners. Note that about half the farmers keeping poultry, in both PAs, did not own a single mature cock saying that their hens would attract one from elsewhere. Only at more isolated locations was a cock thought essential if eggs were to be hatched. Households with more than one mature cock were rare. Cocks are normally sold or eaten on reaching maturity.

Fig.13 shows that poultry farmers in Abele Sipa eat a higher proportion of the birds disposed of than those in Kokate. Their larger flocks, and presumably greater production, appear to allow a higher rate of consumption. Abele Sipa farmers choose to eat more birds rather than increasing sales.

More cocks than hens are eaten in both PAs. It was said that this is because cocks provide more meat. One farmer said that whenever his household eats chicken it is always a large, white cock which is slaughtered.

The price of poultry varies depending on sex colour/breed, size and age. Cocks are more valuable than hens while white cocks and hens fetch higher prices than dark cocks and hens respectively. A large bird, giving a high yield of meat, will normally be more expensive than a small bird of the same sex and colour.

The prices of poultry quoted in Table 1 are for the period between Meskerem (after feast) and Miazia (before feast) only. Increases and decreases can be expected due to the seasonality of prices, described earlier in this section.

Table 1. Quoted poultry prices for the period between Meskerem and Miazia

Cocks	Large white cock	20 Birr
	Small white cock	15 Birr
	Large dark cock	12-13 Birr
	Small dark cock	8-10 Birr
	Large cross-bred cock	17 Birr
	Small cross-bred cock	8 Birr
Hens	Large white hen	12 Birr
	Small white hen	8-10 Birr
	Large dark hen	10 Birr
	Small dark hen	4-5 Birr
	Large cross-bred hen	10 Birr
	Small cross-bred hen	5 Birr

A bird reaches its highest price on reaching maturity. A cock is generally sold at seven months (reproductive maturity) unless it is to be kept for reproduction. There were no reports of farmers keeping cocks longer than four years. Hens are sometimes sold as soon as they begin to lay when they command a high price. Laying hens can be kept as long as four or five years before their production begins to fall.

Poultry depreciate in value due to age as the meat of old birds is thought to be of a low quality. The rate of depreciation is not known. However, it was stated by one source that poultry are not greatly devalued unless very old.

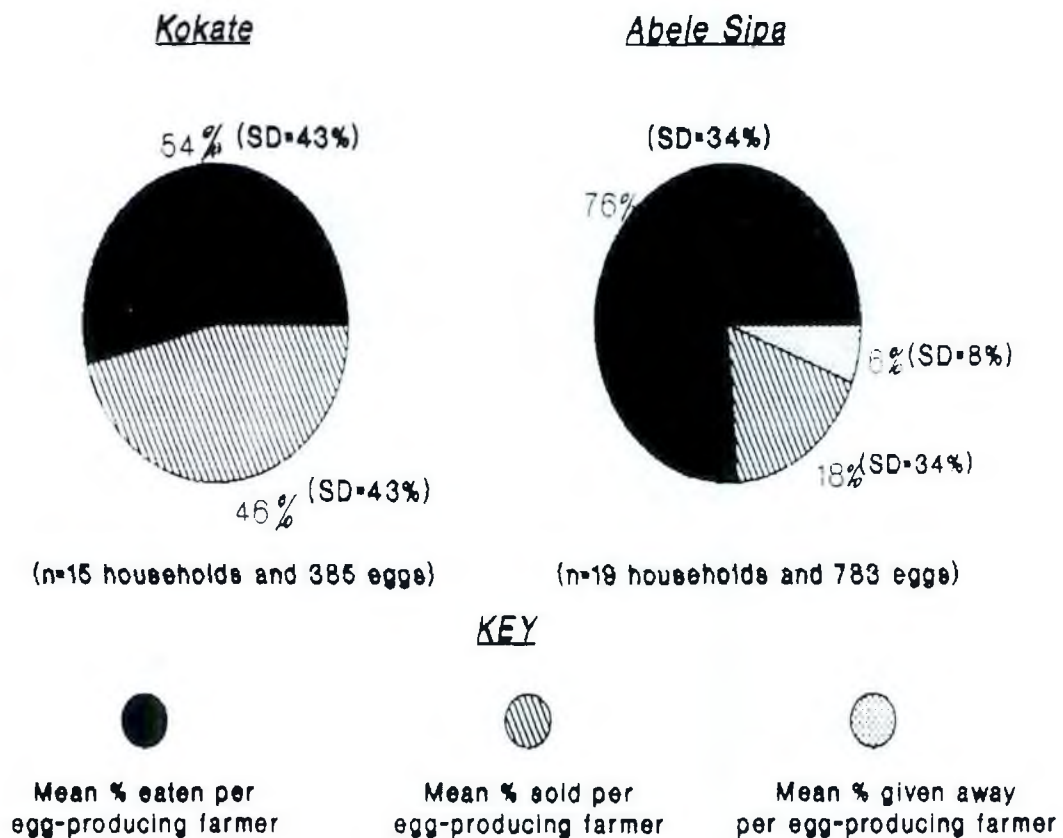
CHAPTER 10. PRODUCTION, MARKETING AND CONSUMPTION OF EGGS

Eggs are disposed of in the following ways:

- (i) Domestic consumption.
- (ii) Sale.
- (iii) As gifts.

Farmers were asked to state how they had disposed of their eggs since the New year of 1985 E.C (September 11th 1992 G.C.). Their answers are summarised in Figure 14.

FIG. 14. DISPOSAL OF EGGS IN KOKATE AND ABELE SIPA



Kokate farmers said that most eggs which are not used for hatching are sold and that eggs are usually eaten only at feasts and times of ill health. Miazia was cited as the month of highest egg sales due to high demand at the Easter feast. Some farmers in Abele Sipa agreed although others said that they eat eggs more regularly. Fig. 14 shows that Abele Sipa's farmers tend to eat a larger proportion of their eggs.

Despite assurances that domestic consumption accounts for less eggs than sales do the results of the survey (see fig. 14) indicate that from the New Year feast of 1985(E.C.) up to the time of the survey more eggs were eaten than sold in both PAs. It is unclear as to what extent the New Year holiday itself (which should not have been included in the response) and Meskel feasts account for this surprisingly high level of domestic consumption. It may be substantial.

The standard deviations (see Figure 14) show that distribution between the different uses was extremely variable in Kokate and Abele Sipa. For instance, some owners had eaten no eggs, some had eaten a proportion of their eggs and some had eaten all their eggs.

The period from Meskerem/Tikemt until the end of Yekatit is the high season for egg production. The ready availability of feed results in good yields of high quality eggs. The "rainy season", for reasons already described, is a time of very low output per hen. Sometimes hens were said to stop laying altogether. This is possibly the moulting period characteristic of the laying cycles of all hens and induced by low levels of feed. That no break in egg production was otherwise reported lends weight to this theory.

In Kokate, any eggs that are produced during the "rainy season" are sold or maybe eaten. No Kokate farmers had hatched eggs during the "rainy season" (ending in Nehassie) although the majority of those keeping poultry had done so since the beginning of Meskerem. In Abele Sipa, however, hatchings continue right through the "rainy season" despite farmers being aware that high losses are likely.

There is no reliable information on the proportion of eggs which are hatched. An estimation of the proportion hatched since the New Year is about 1/5 in each PA. The peak time for hatching was said to come later in the high season.

Some Kokate farmers stated that they do not hatch any eggs preferring to replenish their flocks only by buying reproductively mature hens (seven months). All poultry farmers interviewed in Abele Sipa said they did hatch broods.

The price of eggs stated in Kokate corresponded with those suggested in Abele Sipa. The price of eggs was said to normally be one birr for five or six. Large eggs sometimes cost one birr for four which is also the price of ordinary eggs at feasts. Eggs of a very light colour were said to sometimes command a higher price. An egg which emits a noise when shaken is of lower value and possibly rotten. There was a difference in opinion as to seasonal changes in egg prices. Some believed eggs to be more expensive during the "rainy season" when consumer demand is maintained despite low output. Others thought that eggs produced in the high season command a higher price due to their superior quality.

Farmers thought that a bad hen would lay six or seven eggs in every ten days of the high season with a good hen laying every day. This was presumably referring to white hens. Such prolific production was not expected, by the interviewer, from any of Welaita's hens.

That some farmers in Abele Sipa were found to give eggs and occasionally cocks (see Fig.13) away is, perhaps, an indication that poultry products are in better supply than in Kokate where no such gifts were reported.

CHAPTER 11. IMPORTANCE OF POULTRY

One of the original objectives of this study was to evaluate the importance of poultry to Welaita farmers. Poultry are used by farmers in order to generate cash income and as a source of food for domestic consumption. It is difficult to form an overall definition of importance in terms of money or food as farmers apportion poultry products to each use in different quantities.

Eleven farmers (five from Kokate and six from Abele Sipa) were asked to rank the importance of poultry against three other categories of foods which were:

- (i) Milk,
- (ii) Other meats,
- (iii) Beans/chick-peas/peas.

The farmers were also required to compare the sale of eggs and live birds against other sources of cash income. The outcome showed such variation that the replies of each respondent have been listed separately.

Kokate (K) 1

Egg sales were ranked as the most important source of income over the year as a whole despite no revenue being generated during the "rainy season". It was estimated that around 20 birr could be made per month of the high season by selling all the eggs laid by the household's four hens. The sale of live birds was not thought to come among the top five sources of cash income.

Poultry products were said to be of lesser importance to the family's diet than any of the other three foods.

K2

Eggs were said to be the seventh most important means of making money behind coffee, maize, teff, sweet potato, wheat and enset. The sale of live birds came eighth.

Poultry products were not thought to be as important a food source as milk or beans, chick-peas, peas. That they were said to be of greater importance than other meats is probably of minor significance as the family only eats meat at some feasts.

K3

Egg sales were listed as the fifth most important generator of cash throughout the year. Seven hens would be expected to lay eggs worth from 40 to 55 birr in each month of the high season. The exact amount depends on how many eggs are hatched and the number of hens occupied in brooding. The farmer is able to continue selling eggs through the "rainy season" realising between 8 and 15 birr per month.

The sale of live birds had come in the top five generators of cash in the last year when eight birds had been sold collectively for 115 birr. As the sale of poultry was said to be very irregular the farmer was unable to give an overall estimation of their financial importance. The decision to sell is normally taken to raise capital. In some years, when the need does not arise, no birds are sold.

Poultry products were said to rise above the other three foods in dietary importance only at some feasts. At no other time are they a significant food.

K4

All the eggs laid by the farmer's two hens are sold. Despite this, egg sales were said to be the least important source of income, coming behind crops which are also sold. The farmer said that he had never sold any chickens.

Poultry products are not eaten in this household.

K5

Although this farmer had recently owned a flock of ten mature birds, mostly lost to disease in the "rainy season", he insisted that the sale of eggs and live birds had never generated very much money. Also, poultry products were said to be of lesser importance than each of the other three categories of food. The reason given for keeping poultry was that he simply likes doing it.

Abele Sipa (AS) 1

(Village 1). Selling eggs and live birds together were said to be the fifth highest source of income at all times of the year. As food, poultry products were thought to be less important than the other categories.

AS 2

(Village 1):- Eggs were not in the top five generators of income at the time of the survey, but had been before an epidemic of disease had severely reduced the flock. The farmer believed that egg sales would again be among the top five if the disease was cured or prevented.

AS 3

(Village 1):- This farmer was among the small minority in Abele Sipa, who were not keeping poultry. Furthermore, he had apparently never done so. He explained that the reason was a lack of money. His interview is of interest as he acknowledged that more money would be realised from owning poultry than would be spent on buying and feeding birds. His problem was that he could not raise sufficient money to make an initial purchase.

Money is not the only cost of poultry keeping. To conclude that returns outweigh investment would be to ignore the domestically grown feed inputs which are annually the major source of nutrition. Feeding grain to poultry means there is less food for the farmer and his family. It may well be more worthwhile for a poorer family (i.e. one with less land and thus smaller harvests) to conserve grain for their own consumption rather than feeding it to poultry in order to obtain money or/and food.

AS 4

(Village 1):- Egg sales had never been among the top five generators of income as all eggs which are not hatched are eaten domestically. Chicken sales had only come among the top five in 1981(E.C.) when 50 birr had been made. This again shows the irregularity of income gained from the sale of live birds.

Eggs and poultry meat had been of greater importance as food than milk, other meats and beans/chick-peas/peas until disease had decimated a flock of once forty birds (an existing flock of this size was not found in Abele Sipa) to one cock and a single hen. Poultry products now form a lesser part of the family's diet than any of the other categories. It was not common to find farmers who eat poultry products more frequently than at feasts and times of sickness.

Each of the above four farmers lived in "village 1" which has already been shown to have suffered a severe outbreak of disease among it's poultry. The average number of birds per household was lower here than in any other part of Abele Sipa visited.

AS 5

(Not villagised):- Egg sales were said to be the fifth most important generator of cash income after cotton, maize, berberis and teff. The ranking sometimes rises higher during the high season but falls away in the low season. Each hen would be expected to lay eggs worth from 20-30 birr during the high season.

Fifteen to twenty birds had been sold in the previous year to raise money for another purpose. 200 birr had been realised of

which 30 birr had been reinvested in buying young hens. It was said that old hens are often sold so that money becomes available to buy young hens. As young hens are more expensive than old hens, there is usually a resulting cash deficit.

AS 6

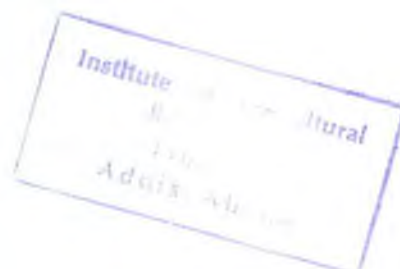
(Not villagised):- The sales of eggs and live birds was said to be the most important source of cash income during the high production season. 50-60 birr had been made from Tikemt to Yekattit 1984(E.C.). 190 birr had also been generated during that year by selling chickens. The sale had taken place to make possible the purchase of an ox. Chickens are not sold routinely every year.

Eggs were thought to provide a more important food source than either other meats or beans/chick-peas/peas. Milk, however, was said to be of greater significance.

These interviews would appear to indicate that poultry are of varying importance among the farmers of Kokate and Abele Sipa. The crucial factors which determine importance to each individual are the size of the flock, the degree of deliberate feeding, and the suitability of local conditions. The first two of these points are largely under the control of the farmers who may choose the amount of resources they wish to invest. Obviously, the freedom of individuals to expand their flocks and to increase feeding levels is restricted by personal financial considerations.

The determination of some farmers to persist in poultry management despite high losses was illustrated during an informal conversation in Abele Sipa (Village 1). The farmer concerned had lost his entire flock to disease over the recent "rainy season" but, despite this experience, had bought two hens as way of replacement. He had also bought three birds solely for consumption since the Meskel of 1984(E.C.). This account, along with those of farmers 3 and 4 (Abele Sipa) and farmer 5 (Kokate), raises the question of whether one of the main motives for keeping poultry is to provide occasional treats for the various feasts of the Ethiopian calendar.

From the earlier information on constraints the environment would appear to be more helpful towards poultry in Abele Sipa than in Kokate. That output and the general level of investment in feed are so much higher in Abele Sipa would indicate that poultry have a more important role in that PA's economy. The greater extent of all-year-round production would also suggest that poultry are more viable there. Finally, the facts that the percentage of households with poultry and the average flock size were both around double those in Kokate are further evidence testifying to the greater significance of poultry to the community of Abele Sipa.



CHAPTER 12. RECOMMENDATIONS FOR FURTHER RESEARCH

The intention of this report was to produce a comprehensive description of all aspects of Welaita poultry production leading to follow-up research and development of the system. Three important areas for possible future research are as follows:

- (i) The report details the various causes for the high mortality of poultry, especially chicks between the ages of two to four weeks. However, the exact nature of each cause has not been fully understood. In particular, more work is required to find the specific predators and diseases and to more accurately assess their individual impact.
- (ii) It has been observed that feed is a necessary input to achieve acceptable levels of production. Useful research could be carried out into the viability of imported feeds and the possibility of exploiting any existing local resources which are presently unused (e.g. termites).
- (iii) On average, hatching losses account for 20% of each clutch in both Kokate and Abele Sipa. The causes are unknown. The usual causes for such losses are;
 - (a) Calcium deficiency.
 - (b) A poor nest lacking grass or hay.
 - (c) A habit which may be picked up from other birds (habitual spoilers should be culled).
 - (d) Lack of humidity (can be averted by occasionally wetting the eggs).

Future research should be aimed at discovering the causes of hatching losses found in Welaita with a view to reducing their impact.

APPENDIX I. REPORT OF PILOT SURVEY ON POULTRY

This pilot survey took place from mid to late September 1992 (Meskerem 1985 E.C.). Farmers were interviewed at a series of locations, of varying altitudes, in the Welaita region of southern Ethiopia.

Interviews were held on an informal basis with farmers being encouraged to speak freely while answering only a small number of prepared questions.

Ownership

Poultry was present in every household visited. Anyone may own a chicken (the only species of domestic poultry in Welaita). Sometimes the farmer owns all the chickens in the house. Although there are examples of him owning none, he is usually the major owner. Most houses have more than one owner. Owners are completely responsible for their chickens.

Two ways of obtaining chickens, other than breeding them personally, have been mentioned. These are particularly applicable to people starting poultry production.

- i. Raising money for a purchase (e.g. a boy being given money by his father).
- ii. Sharing a chicken with a member of another household. One or more chickens are given away in exchange for half the produce (including chicks).

There is a limit on how many chickens can be satisfactorily kept by one household. The cut off point is around ten mature birds. If numbers are larger the available food sources may be inadequate leading to malnutrition and attempts to infiltrate human food stores. An excessively high population is thought to lead to fighting and pecking among chickens as well as irritating people whose houses become cluttered. A solution is to share in the manner described above.

Chicken ownership varies. One farmer emphasised there being no set procedure.

Housing

On every occasion chickens were housed inside the owners' homes. Wooden perches are provided along with pots or baskets for laying and hatching. Chickens seem to prefer to sleep and lay above ground level. One farmer said that this prevents some predators. Only in one house did I see a laying basket placed on the floor. Purpose-built poultry housing was reported by one interviewee who was unable to give any examples. Subsequently, none were found.

Feed

Chickens are allowed to wander freely inside and outside the house in their search for food. Farmers agree that food found outside constitutes the most important part of their diet. Cow dung and grass were both thought to be useful sources of nutrition.

Wheat, maize, barley and sorghum are used as feed. Wheat is universally regarded as the superior. Maize is better when fresh and ground (I noticed that chickens were ignoring whole, roasted grains which had fallen to the floor). The content of a feed depends on availability. Farmers do not buy additional feed to supplement any perceived shortfall. The extent to which farmers feed their chickens appears to vary considerably. Quantities range from one cup (a day per flock) to a sprinkling whenever there are plentiful supplies. When asked, a farmer acknowledged no upper limit where feeding goes beyond optimum efficiency. Chicks are fed intensively, inside the house until they are capable of finding their own food (after about three days). One farmer insisted that he never fed his chickens.

Predators, pests, diseases and other constraints

Everywhere the most severe problem was said to be predation, by wild animals, of chicks and immature chickens. Mature birds are not thought to be at risk. Cited offenders were cats, rats and birds of prey (eagle). There may be others. A preventative measure suggested was to keep chicks inside the house incurring a larger feed requirement. One family said they were getting a dog to protect the young birds. Birds of prey were generally accepted as representing the biggest threat. One farmer explained that they had taken all his chicks while another, who considered losses to be too great, preferred to buy and resell mature chickens to hatching them himself. The problem appears to be less acute in lowland areas.

Farmers said that chickens succumb to lice if perching and laying areas are not cleaned. Detrimental to poultry health, lice are also disliked by people. One hygiene system involves routine cleaning at least three times a year and at the first signs of lice.

Disease among poultry was reported in every instance. Descriptions correlated so closely as to suggest a single illness. The symptoms are diarrhoea and rapid weight loss usually resulting in death within a day. A member of the Institute of Agricultural Research (Veterinary Department) advised me that Coccidiosis was the only recognised poultry disease in the area. Literary research has shown that the symptoms found in Welaita's diseased chickens correspond to those of Coccidiosis.

Farmers did not attribute serious losses to accidents.

Cannibalism is an aspect of poultry behaviour which farmers regarded as damaging. Hens are said to actively spoil up to 1/4 of their own eggs. Opinion differed on how best to ensure a good hatching rate with a minimum of spoilage. One family removed eggs immediately after laying while conversely allowing a brooding hen to keep all of her's for hatching. They felt that handling some eggs caused hens to destroy the remainder. The practice of feeding eggshells back to chickens, recommended by some text books, was judged by a farmer to encourage cannibalism.

Poultry Products

The period over which a hen is kept depends largely on her productivity. A prolific bird may be retained for as long as five years.

Sale of eggs and chickens is often governed by immediate needs. For example, if a farmer feels he needs some ready money he may decide to sell a chicken he would have kept under different circumstances.

Most people said that the large proportion of their eggs are sold or hatched although there were significant exceptions. One farmer channelled eggs equally to each purpose while another sold two thirds.

Eggs are only eaten at special feasts (about twice a year) and occasionally when a farmer is ill. Medicinal qualities were attributed to eggs. Two relatively large scale producers, of which one was a lowland resident, deviated from the standard reply by asserting that they ate a high percentage of their eggs and sold none. One unmarried man, owner of a single hen, remarked that he ate all the eggs being unable to make the repeated journey to a market.

The price of eggs was quoted at 1 Birr for four at a big town market. Five eggs can be bought for 1 Birr in a village. Demand is higher in towns where most are sold.

Some of the motives for selling chickens have already been described. Seasonality is a factor affecting sales. Some farmers explained that they tended to sell on completion of a laying period when hens have stopped laying and begun moulting. One individual had just sold five birds in view of the approaching Meskel festival. It is unclear whether this was the result of a favourable market or a step taken to raise funds for the forthcoming celebrations.

The price of a chicken differs depending on sex, size and condition. A hen was quoted at 6 to 8 Birr with a cock fetching 10 to 15 Birr. One source claimed that chickens were sometimes sold for as little as 4 Birr. Poultry is sold live.

APPENDIX II. EQUIVALENCE OF ETHIOPIAN AND GREGORIAN CALENDARS

(i)	<u>E.C.</u>	<u>G.C.</u>
	Meskerem	September
	Tikemt	October
	Hidar	November
	Tahsas	December
	Tir	January
	Yekatit	February
	Megabit	March
	Miazia	April
	Ginbot	May
	Senne	June
	Hamle	July
	Nehassie	August

(ii) Ethiopian months start approximately on the 8th day of the equivalent Gregorian months.

(iii) 1st Meskerem 1985 (E.C.) = 11th September 1992 (G.C.).

FARMERS RESEARCH PROJECT

Introduction

This publication has been financed under the work programme of the Farmers Participatory Research Project. This project, which is designed and coordinated by FARM Africa, a British-registered charitable organisation, is focused on the North Omo Region in south-west Ethiopia. The project started in early 1991 and the first phase is expected to last four years.

Objectives of the Project

The overall aim of the project is to increase the capacity of NGOs and other organisations to contribute to farmer-oriented research in which farmers themselves participate. Under this overall aim, specific objectives are:

- * To build a channel of communications between NGOs and research institutions;
- * To make resource-poor farmers more aware of their need for research;
- * To help farmers realise their own ability to do research;
- * To assist farmers to do and to disseminate their own research;
- * To test techniques for encouraging community- and farmer-managed research;
- * To inform research scientists in Ethiopia of farmers' research priorities.

Further Information

Further information about this publication and the farmers research project can be obtained from:

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