

REARING LOCAL CHICKEN FOR IMPROVED NUTRITION

**Technical Manual: Increasing
Egg Consumption in Rural
Communities in Malawi**



July 2024



Implemented by
giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Contents

Foreword.....	5
Introduction	7
2.0 Potential of the local chicken (why the local chicken?)	7
2.1 Benefits of the local chicken:.....	8
3.0 Managing the Malawi local chicken	9
3.1 Housing the local chicken.....	9
3.2 Feeding the local chicken	10
Readily available feed ingredients for feed compounding.....	11
Classification/groups of the feed ingredients.....	11
Energy feeds:	11
Protein feeds:	11
Vegetables & fruits/multivitamins:	12
Mineral supplements:.....	12
3.2.1 Preparation and Preservation of the feed ingredients.....	12
Compounding the feed - mixing procedure.....	13
The set-up:.....	13
Reasons for the set-up:.....	14

4.0 Selection and multiplication	15
Males (junior cocks).....	15
Females	15
<i>Unhatched eggs:</i>	15
<i>Mortality in young chicks:</i>	16
<i>Mortality in grower chicks:</i>	16
Nesting management:	16
5.0 Disease and parasite control in local chickens.....	17
Common parasites in local chickens:	17
Prevention and control/treatment of parasites in local chickens:.	17
Common diseases in local chickens:.....	17
Prevention and control of the common diseases:	18
6.0 Utilization of the local chicken products (meat and eggs).....	18
The consumption guideline:	18
7.0 Food Recipes.....	21
Further Reading	25

Foreword

The improvement of nutrition status among rural communities, particularly for women and children under 24 months in Malawi, is of paramount importance. The GIZ Food and Nutrition Security Programme (FNSP) is committed to promoting the consumption of diversified foods through its implementing partners, Care International in Salima and Self-Help Africa in Dedza. Achieving this objective requires enabling and motivating women of reproductive age and children under 24 months to consume diversified diets, including animal source foods (ASF) such as local chicken and eggs.

In 2022, FNSP conducted a comprehensive livestock study in Dedza and Salima districts. The study aimed to assess various aspects of the livestock pass-on schemes, including livestock procurement, selection criteria, pass-on rates, survival rates, and household capacities for livestock keeping. Additionally, it evaluated the schemes' effectiveness in improving local diets,

documented implementation challenges and barriers to ASF consumption, and identified best practices. Recommendations for further implementation under FNSP were also provided.

Key findings from the study indicated that a significant majority of both beneficiaries and non-beneficiaries seldom consumed pork and goat milk. Specifically, 59.6% of beneficiaries and 53.7% of non-beneficiaries never consumed pork, while 71.8% of beneficiaries and 81.5% of non-beneficiaries never consumed goat milk. However, 46.9% of beneficiaries and 42.6% of non-beneficiaries consumed poultry flesh 1-3 times a week. Fish consumption was similar among both groups, with approximately 40% consuming fish 3-4 times a week. Notably, beneficiaries reported higher consumption of organ meat and goat meat compared to non-beneficiaries, potentially due to increased purchasing power. With these results, FNSP concluded that the livestock pass-on program did not have a significant effect

on ASF consumption among beneficiaries. Delays in obtaining offspring, the prioritization of passing on livestock before selling or consuming, and the use of livestock as economic buffers have contributed to this outcome.

In response to these findings, FNSP held a learning series event with input from a livestock expert, leading to a strategic refocus of its livestock component. The program has shifted its emphasis from goat rearing to local chicken

production for egg and meat consumption.

This handbook is designed to provide comprehensive and practical guidance on local chicken management. It aims to equip households, extension officers, and stakeholders with the knowledge and tools necessary to improve local chicken management in Malawi for increased egg and meat consumption.

Sincerely,

Dr Martina Kress
FNSP Team Leader



Introduction

The Malawi local chicken is the only strain of chickens readily available across the country in all communities regardless of ethnicity. This strain has been raised alongside other agricultural farming systems. The priority of chicken rearing has largely been to cushion shortages of household income, use in traditional ceremonies, funerals and other community events with little priority in household nutrition.

This management handbook aims at documenting workable relevant aspects of management of the local chicken that will improve their multiplication, survivability and hence being able to be incorporated in the family diet. It also serves as a blueprint for knowledge and skills transfer for those intending to raise the local chicken beyond the traditional or indigenous ways.

Notably, the handbook includes a consumption guide designed to maximize the nutritional benefits of the local chicken by allocating some eggs for hatching to maintain the flock, while consuming others along with regular chicken meat

consumption. Incorporating eggs into family meals is encouraged through the inclusion of sample recipes for nutritious one-pot dishes and enriched porridges. By adopting these low-cost management practices, rural households can sustainably access a valuable source of high-quality protein and micronutrients from the local chicken.



2.0 Potential of the local chicken (why the local chicken?)

The Malawi local chicken has been around in the rural communities as old as the communities themselves. Its survival under poor or no management at all is based on its diverse genetic make-up that has remained unexploited

for many years. It survives both external and internal parasites without medication and only succumbs to the Newcastle virus when there is a combination of poor physical environment (housing), hot weather as well as unavailability of feed (grains and vegetable).

In the context of ecological sustainability, the Malawi local chicken offers several advantages. Its smaller ecological footprint, compared to larger livestock like cows or goats, is significant. Chicken droppings being used as organic manure further highlights their sustainability and usefulness in agricultural practices. This not only reduces waste but also enriches the soil naturally without relying on synthetic fertilizers.

2.1 Benefits of the local chicken:

- Increasing household dietary diversity:

The local chicken has the capacity to provide adequate meat and eggs for an average household in Malawi. Given adequate supplementary feed, the local chicken can increase the number of eggs laid per cycle; improve the egg size; improve growth rate in chicks as well as their survival and reduce the hatching interval. However, this aspect has not been the priority use of the local chicken amongst most rural households in Malawi.



- Household income security:

Most rural Malawi household keeping the chicken have seen it as "a living bank" whereby they only sell in times of need. However, in the months that the local chicken succumbs to Newcastle disease even the anticipated income is lost. With poor or no management for the local chicken, this household income is completely lost. With this in mind, rural Malawi households continue to replenish their local chicken flocks when lost to Newcastle disease. Nevertheless, with moderate management, local chicken can provide a readily available and sustained household income.

3.0 Managing the Malawi local chicken

3.1 Housing the local chicken

One of the most critical management aspects of the local chicken is housing as this determines to a larger extent the multiplication and survival of the chickens. Ideal housing for the

local chicken needs to have the following aspects:

- **Adequate ventilation in the house** (to minimize respiratory problems due to concentration of ammonia gas).
- **Adequate floor space** (to minimize congestion of the birds but also provide more room for multiplication as well as minimize fighting for space during roosting). Floor space for adult local chickens, a general rule is to provide at least 1 to 2 square feet (0.09 to 0.19 square meters) of floor space per bird in the coop or housing area.
- **Adequate lighting in the house** (to help minimize harboring of external parasites especially mites and fleas).
- **Solid flooring** (to minimize multiplication of most of the external parasites ~ leg mites, fleas and mites)

The chicken housing guideline to provide the above aspects therefore is that "***an adult person***

should enter the housing (just as they do in the kitchen); an adult person should be able clean the housing”

3.2 Feeding the local chicken

The Malawi local chicken has not yet been fully defined based on its nutritional requirements for all its physiological and reproductive functions, however, providing feeds that contain adequate levels of energy, protein, mineral and vitamins show some remarkable performance in the local chickens in terms of number of eggs laid

per cycle, growth rates in chicks, hatching interval as well as chick survival rates. A suggested formulation that grossly provide about 70% energy, 25% protein and 5% mineral+vitamin has shown to have remarkable improvement in the performance of the local chicken.

In the current local chicken production model, the feeds being promoted are basically household food and kitchen waste that is prepared, preserved and compounded for the local chicken.



Readily available feed ingredients for feed compounding

Classification/groups of the feed ingredients

Energy feeds:



Left over nsima preserved as energy ingredient for the local chicken feed compound

These are all those food wastes that are from macronutrients dense food like: Dried left over nsima, rice, cassava peels, potato peels, mkhoko (what remains in the pot upon cooking nsima, porridge, rice), all small sized potatoes and cassava.

Protein feeds:



These are all those wastes that come from legume crop products (soybean, cowpeas, pigeon peas, common beans); those from fish and feeds that can be generated from insects (eg cockroaches and termites)

These are all those wastes that come from legume crop products (soybean, cowpeas, pigeon peas, common beans); those from fish and feeds that can be generated from insects (eg cockroaches and termites).

Vegetables & fruits/ multivitamins:



**Green vegetable being processed
before being used in local chicken feed
compounding**

These are all those raw vegetable food wastes plus native vegetables (spine Amaranthus, Moringa, Blackjack, Sweet potato leaf); hydroponic planted sprouted sorghum and cynodon species (kapinga) and preserved fruit particularly waste tomato fruits.

Mineral supplements:

These are basically the kitchen ash and ash generated from burnt water or upland snail.

3.2.1 Preparation and Preservation of the feed ingredients

All the food wastes are dried as they are fed to the chickens in dry form. All the vegetable materials are dried in the sun for 2 to 3 days and completed in the shade to maintain their green colour and then ground using mortar and pestle and preserved in powder form. The waste tomato is pressed on a polythene bag to squeeze out the liquid from the tomato to leave the seed and fruit coat. This is then dried on the sun and ground in the mortar and preserved as powder of the dried tomato fruit. The energy ingredients are preserved dry and then ground to granular form before mixing using the same mortar and pestle. The kitchen ash is simply sieved to remove the charcoal and preserve as an ash powder just as the ash from the burnt snail shell.

Compounding the feed - mixing procedure



Various preserved feed ingredients before processing for compounding

The guideline for compounding is based on proportions made out of 10 parts (e.g. using a tea cup or any equal proportional measurement):

- 7 parts of the energy ingredients (contributions are based on availability).
- 2.5 parts of the protein ingredients (contributions are based on availability).
- 0.5 parts of all the vegetable powder, the ashes, and the fruit powder (contributions are based on availability, however the ash from the snails be regulated in its contributions).

Supply of the complete feed to the local chickens

The set-up:

The compounded feed should be offered in a trough that has to ensure that all the powder forms of the feed are not lost to the ground. Use of a plate or any material with leak proof base is most desirable. To minimize selective feeding and spillage through scratching, a half brick is put at the Centre to regulate feeding and minimize the spillage. Water is supplied using a plastic bottle inverted in a cut bottle that acts as a water trough.



Drinking water bottle set-up

The feed and water should be placed on a protected area to avoid access by other free ranging livestock like goats, sheep, and pigs within the community. An enclosure with a shed should be constructed so that only chickens can access it.

Reasons for the set-up:

This set up helps the chickens

to develop a routine of feed and water access that is associated with the structure made. Once the association is developed then the birds will always come to the structure for feed and water. Also, the set up helps minimize usage of feed i.e. one only feeds their intended class of livestock (chickens).



An example of a shade meant to exclusively allow the local chickens to access the feed and water other than other classes of livestock.

4.0 Selection and multiplication

Selection for parent stock (features and characteristics)

Males (junior cocks)

The following are the ideal features or characteristics for selection of local chicken cocks:



- Clean shanks (legs and toes)
- Glossy comb and wattles
- Bud spike
- Glossy feathers
- No wheezing sounds
- Stamina
- High score livability

Females

The following are the ideal features or characteristics for selection of local chicken pullets (point of lay):



- Clean shanks (legs and toes)
- Glossy comb and wattles
- Average broadness on back
- Glossy feathers
- No wheezing sounds
- Stamina
- High score livability

Troubleshooting in multiplication of local chickens:

Unhatched eggs:

An increase of unhatched eggs after full term brooding:

- More cocks than hens in the ranging zone (unbalanced sex ratio).
- Very old cocks running in a much younger flock of hens.
- More hens than cocks available in the ranging zone (unbalanced sex ratio).
- Poor nesting positioning.
- Very old hens.
- Unmatching body frame sizes between cocks and hens.

Mortality in young chicks:

An increase in chick mortalities within 3 weeks of age:

- Related parent stock.
- Poor nutrition of the hens during laying.
- Poor nesting materials.
- Poor nesting positioning.
- Poor mothering ability, common in first hatchers.

Mortality in grower chicks:

An increase in chick mortalities between 3 and 6 weeks of age:

- Related parent stock.
- Mutations especially affecting internal organs.
- High infestation by intestinal worms.

Nesting management:

Nesting location and nesting materials play a crucial role in hatchability and survivability of local chicks. Ensure the following:

The nest is located away from the corner to enable the chicken to rotate 3600 so that all eggs get adequate heat from the hen's body.

- The best nesting material is chopped dry soft grass (abundant enough to raise the nest above ground). This ensures that the grass traps enough air that helps maintain heat when the hen has temporarily moved out of the nest.



5.0 Disease and parasite control in local chickens

Common losses in local chickens are because of diseases and parasites. However, the Malawi local chicken has the capacity to tolerate most of the common diseases and parasites.

Common parasites in local chickens:

- Fleas
- Mites
- Leg mites
- Intestinal worms

Prevention and control/treatment of parasites in local chickens:

- Proper housing design and construction and good housing hygiene.
- Prophylactic treatment for the intestinal worms using available drugs e.g PiperazineTM.
- Paraffin for existing leg mites applied at three-day interval until the legs clear of the mites.
- Dusting the chickens as well as the cleaned chicken house with AkheriTM powder/actellicTM powder.

Common diseases in local chickens:

It is common knowledge to always think that the common disease in local chickens is Newcastle. However, Malawi local chickens are also prone to genetic disorders due to inbreeding (which is very common in most of the local chicken flocks), nutrition induced disorders, environmental induced disorders (that includes manifestation of coccidiosis) and parasite induced disorders. These are manifested in more or less similar ways, and they are simply grouped as Newcastle disease.

The generic signs include:

- General weakness.
- Dullness.
- Excessive water intake.
- White watery/greenish droppings.
- High mortality from 3 days of onset of the signs especially growing chickens.
- Anemia in growing chickens.

Prevention and control of the common diseases:

- Proper selection for parent stock and replacement stock especially cocks.
- Proper nutrition, i.e. compounded feed that includes especially fresh green feeds that ensure a sustained high functional immune system in the local chickens.
- Proper housing to ensure quality air circulation.
- Maintain dry conditions in housing (to minimize

multiplication of coccidia bacteria that cause coccidiosis).

6.0 Utilization of the local chicken products (meat and eggs)

The consumption guideline:

The model aims at production for consumption and the following guideline has been developed to help guide program participants to use the chicken products efficiently and effectively.

- For the initial eggs laid by the parent stock, the hens will be allowed to brood and hatch.

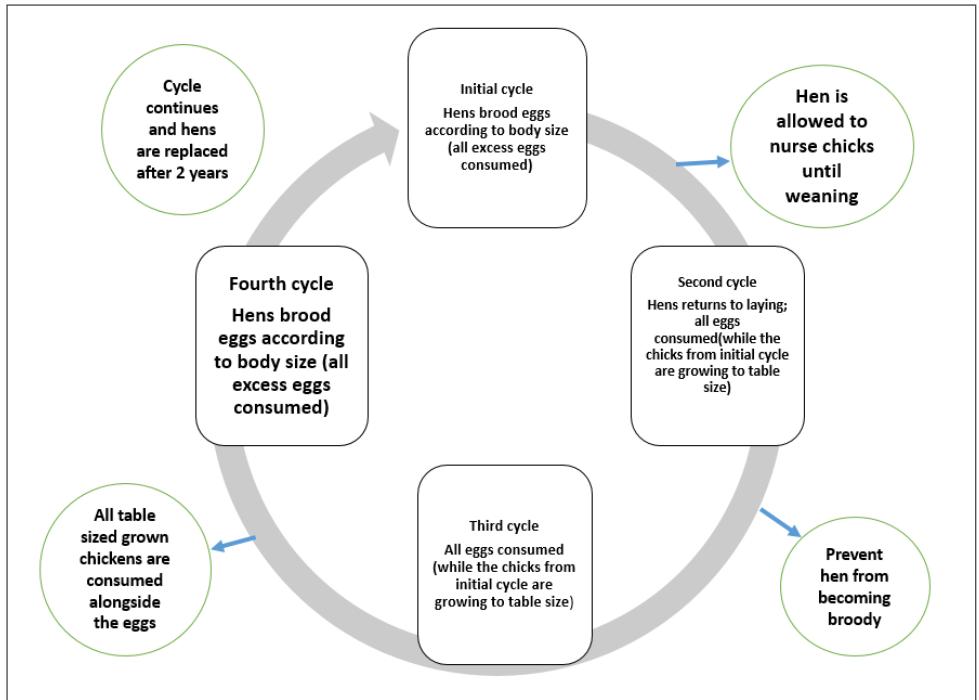


However the number of eggs given to the hen depends on the frame size of the hen thus: large framed will be given a maximum of 8 eggs out of the total laid. The excess eggs must be consumed. If the frame size of the hen is relatively small, it must be given between 5 and 6 eggs and the excess eggs be consumed. (Allow the chicken to nurse the chicks until weaning)

- The second cycle that the hen lays, all eggs must be consumed. When it lays the first egg do not remove until third egg is laid so that the nest is established by the hen. For every 3 eggs laid, remove 2 upon establishment of the nest so that 1 egg always remains to entice the hen to return to the nest. Remove and consume the eggs until the laying cycle is complete. When the hen wants to brood it has to be removed (normally for it to abandon the nest takes about three days) and the nest covered. When the nest is abandoned then remove the cover to allow the hen to come back to nest when it goes into the third laying cycle. This will be repeated for two to three successive cycles until the initial hatched chicks have reached table size chickens. When the

initial chicks are table size then the hen will be allowed to brood the next set of eggs, however how many eggs to be given to the hen remains as in the first cycle.

- When the initial chicks have reached table size, the participating household is advised to slaughter and consume at least a chicken meat meal once a week until all the table sized chickens from the initial hatch are completed. This will be repeated in other cycles when the hen has been allowed to brood and hatch.
- In both cases of consumption there must be evidence of consumption thus for eggs the shell shall be preserved and tendered as evidence of consumption to monitoring officers. For chicken meat consumption the shanks will be preserved and tendered as evidence of consumption. Upon monitoring the tendered evidence of either the egg consumption or chicken meat consumption shall be destroyed by the monitoring officer (to avoid same evidence being presented over and over).



Local Chicken egg and meat consumption guide



7.0 Food Recipes

The table below contains different recipes incorporating eggs to

promote egg consumption targeting women under reproductive age and children under 24 months.

Ingredients	Cooking Method
One Pot Dish 2 Eggs ½ Cup pounded vegetables ½ Kg Beans 2½ Sweet Potatoes 2 Table spoons Cooking oil 2 Medium size onion 2 Medium size tomatoes	<ol style="list-style-type: none">1. Have already boiled eggs, beans and Irish potatoes2. Chop onion, tomatoes3. Cut vegetables4. Fry tomato and onion in a pot until it is well cooked.5. Add boiled beans, eggs, fish Irish potatoes in the pot of fried tomatoes and let then boil for 5 minutes6. Add vegetable in the pot and stir it then let it boil for 2 minutes.7. Then the food its ready
Soya Mash 1 Cup cooked soybeans 2 Eggs 3 Green peppers 2 Tomatoes 1 Onion 1 Tablespoons cooking oil Salt to taste	<ol style="list-style-type: none">1. Mash the cooked soybeans and place in a frying pan.2. Place the pan on heat while turning continuously until the water dries out.3. Add cooking oil and continue frying until light brown.4. Chop tomatoes, onions, and green pepper.5. Add salt, chopped tomatoes, and green pepper to the fried mash.6. Cook for about 5 minutes.7. Break the egg in a cup to make sure it is fresh.8. Add the egg to the mixture and stir well.

Ingredients	Cooking Method
Banana Milk Custard Porridge <ul style="list-style-type: none"> 1 Cup cow or soy milk 1 Egg yolk only 2 Tables spoons sugar 2 Teaspoons cassava, wheat or sweet potato flour 1 Banana 	<ol style="list-style-type: none"> 1. Bring the milk to slow boiling over a low heat. 2. Mash the banana and add to the boiling milk. 3. Mix the yolks, sugar and cassava or sweet potato flour together in a bowl until well blended. 4. Add hot milk and banana to the eggs and sugar, mixing all the time 5. Return to the pan and over a low heat gently stir with a wooden spoon until thickened. 6. Pour the custard into a cup and serve at once 
One Pot Porridge <ul style="list-style-type: none"> Maize flour (mgaiwa) Eggs Groundnuts powder Raw Pounded vegetables Baobab powder Water Salt 	 <ol style="list-style-type: none"> 1. Mix the flour (mgaiwa) in a separate pot and groundnuts powder 2. Put the pot on a fire and stir until its thickened like porridge 3. Once it has started boiling reduce the heat and leave it to boil for not less than 15- 20 minutes

Ingredients	Cooking Method
	<ol style="list-style-type: none"> 4. Once the porridge it ready take It off from the fire and let it to cool a little 5. Baobab powder and scrabble egg little by little while stirring until the porridge is well mixed 6. Put the porridge pot back on the fire for 2 minutes. 7. Then add pounded vegetables in porridge, stir it until its well mixed and leave it for 5 minutes on the fire 8. Add salt 9. Now the porridge its ready take it off from the fire and feed the child while is warm.
<p>Rice, Egg Porridge</p> <p>1/2 cup short-grain rice (broken rice)</p> <ul style="list-style-type: none"> • 2 cups water • 2 eggs • 1/2 cup groundnut flour • Salt to taste 	<ol style="list-style-type: none"> 1. Bring the water to a boil in over high heat. 2. Wash rice and add the rice to the boiling water and cover with lid. 3. Bring the mixture to a boil, stirring occasionally. 4. Turn down the heat to medium-low and make sure the rice is not sticking to the bottom. 5. Slide the lid slightly to leave a small open space. Gently simmer for about 30 minutes or until the mixture is smooth and slightly thickened. More water can be added to a desired consitence. 6. Beat the eggs and drizzle into the rice and add salt to taste. Cover again and turn off the heat. Let rest for 1 - 2 minutes or until the egg is well cooked. 7. To serve, scoop into rice bowls. Serve with mashed pawpaw or pawpaw chunks

Ingredients	Cooking Method
<p>Likuni Phala with Egg and Vegetables</p> <ul style="list-style-type: none"> 1 Cup whole maize flour • 1/4 cup roasted soy flour • 3 Cups water • 1 Teaspoon pounded leafy vegetables • 1 Egg • Pinch of salt • Sugar to taste (optional) 	<ol style="list-style-type: none"> 1. Mix the maize and soy flour with the cold water in a pot. 2. Place the pot over heat and stir until the mixture starts boiling. 3. Allow the porridge to boil on low heat until cooked (about 10 minutes). 4. Add pounded vegetables and cook for 2 to 3 minutes. 5. Remove from the heat and slightly cool the porridge. 6. Add the egg, stir and cover the pot. Make sure the egg is well done. 7. Add salt and sugar. 8. Feed the child while mixture is still warm but not hot.



Further Reading

1. Damerow, G. (1995). *Storey's Guide to Raising Chickens*. Storey Publishing.
2. Damerow, G. (1994). *The Chicken Health Handbook*. Storey Publishing.
3. Heuser, G. F. (2008). *Feeding Poultry: The Classic Guide to Poultry Nutrition for Chickens, Turkeys, Ducks, Geese, Gamebirds, and Pigeons*. Norton Creek Press.
4. National Research Council. (1994). *Nutrient Requirements of Poultry: Ninth Revised Edition*. National Academies Press.
5. Ussery, H. (2011). *The Small-Scale Poultry Flock: An All-Natural Approach to Raising Chickens and Other Fowl for Home and Market Growers*. Chelsea Green Publishing.



