

Snail Farming

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What is the problem/challenge that is being solved?

Snail farming holds immense potential to tackle the pressing issues of food insecurity and economic empowerment in West Africa. The demand for snail meat is considerably higher than the supply, resulting in high market prices. Snail meat is highly nutritious, rich in protein, iron, and essential amino acids, making it an excellent food source for improving dietary diversity and nutrition. Furthermore, snail farming is a sustainable agricultural practice. Snails have a low environmental footprint compared to other livestock; they require less land, water, and feed, and they produce minimal waste. These attributes make snail farming an attractive option for promoting sustainable agricultural practices. However, despite these benefits, several challenges hinder the advancement of snail farming. A significant barrier to snail farming is the lack of technical expertise among prospective snail farmers who often lack the necessary knowledge and skills to manage snail breeding, feeding, and health.

Snails are vulnerable to a range of predators, including birds, rodents, and insects. Protecting snails from these predators requires effective measures. Additionally, snails are susceptible to various pests and diseases, which can devastate snail populations if not properly managed. While snail farming generally requires less investment compared to other types of livestock farming, there are initial setup costs for housing and feeding systems.

What is the solution developed in our LL?

The ADC Snail Farming Initiative focuses on the rearing of *Achatina fulica* and *Archachatina marginata*. These species are known for their nutritional value and relatively simple rearing requirements, making them ideal for farming.

Implementation of snail farming

The Setup

Site selection and preparation

A site with optimal environmental conditions for snail farming needs to be selected. Choose a site that offers adequate shade that protects snails from direct sunlight, as they thrive in cool, moist environments. The ideal location should have high humidity and maintain a temperature range between 20-28°C

(68-82°F). The high humidity at the site helps to keep the snails' bodies moist. These environmental conditions support the snails' growth and well-being.

Once you've chosen the perfect spot, the next step is to prepare the soil. Sharp and loamy soil mix is ideal because of its excellent drainage properties, ensuring that excess water does not cause waterlogging, which could harm the snails. This type of soil also helps to prevent soil compaction, allowing the snails to move freely and burrow as needed. Moreover, this choice of soil aids in minimizing the growth of mold and fungi. The soil is prepared by combining equal quantities of sharp and loamy soil to create a well-draining mix. Sieve the soil to remove any debris, stones, or unwanted materials that could harm the snails. Sterilize the sieved soil by cooking it on high heat till the soil is properly heated up. This process eliminates potential pathogens and pests, ensuring a clean and safe environment for your snails.



Fig 1: Site and soil preparation in snail farming

Housing and Enclosure

The housing for the snails was crafted utilizing repurposed car tires and Styrofoam, incorporating a mesh lid to facilitate adequate airflow, deter pests from intrusion, and securely confine the snails within their habitat. The tires were painted to reduce heat absorption.

Car tires were properly washed and stacked on top of each other without fastening them together. This allows for easy rearrangement and maintenance. The lid of the snail house was fabricated using a net with a mesh size appropriate for preventing snail escape, deterring pests and ensuring adequate airflow (e.g., mesh size of 1-2 cm). The net was fastened around a circular iron frame to provide structural support.



Fig 2: Snail chambers constructed with used car tires and Styrofoam

Biology of *Achatina fulica* and *Archachatina marginata*

Achatina fulica and *Archachatina marginata* were chosen due to their exceptional suitability for both small-scale and commercial operations, and their widespread acceptability in Nigeria. *Achatina fulica*, commonly found in the environment, is renowned for its rapid growth and prolific breeding. It reaches maturity in six months, allowing for a fast turnover in production. Its ability to reproduce in large numbers ensures a steady and abundant supply of snails, which is crucial for meeting market demand and ensuring the sustainability of the farming venture. On the other hand, *Archachatina marginata*, also known as the giant West African snail, is larger in size and of robust nature with lower reproduction capacity. This species not only yields more meat per individual snail but is also more resistant to diseases.

The hardiness of *Archachatina marginata* makes it a reliable option for farmers who want to maintain a healthy and productive snail population with fewer health-related challenges. *Archachatina marginata* is usually sourced from breeders. The combination of these two species offers a balanced approach to snail farming, providing both high productivity and marketability. Their presence in the farming operation ensures a diverse and continuous output of snails, catering to various market needs and preferences.

Moreover, the adaptability of *Achatina fulica* and *Archachatina marginata* to diverse farming conditions makes them ideal for different farming scales and environments. Whether in a controlled indoor setting or an outdoor farm, these snails can thrive, making them versatile choices for snail farmers. This adaptability also means that they can be farmed in various regions and climates, expanding the potential for successful snail farming ventures.



Fig. 3 Reared snail species; *Archachatina marginata* (left) and *Achatina fulica* (right).

Stocking the Snail

There are some factors to consider when stocking your pen, opt for snail species that are widely consumed in your area. Chosen species should be resistant to pests and diseases, grow fast and reproduce well in captive rearing. Be sure you buy snails from reputable breeders to guarantee you start with healthy stock. Healthy snails should be active and exhibit normal feeding behavior have undamaged shells, move freely, and have normal secretion. Therefore, ensure to inspect shells for any damage or deformities, and ensure secretions are clear and regular. When transporting the snail to the farm ensure you package the snails

properly to ensure safety and prevent losing your snails in transit. Choose a sturdy container, such as a bowl, that is large enough to comfortably hold the snails without overcrowding. Line the inside of the container with fresh banana leaves. This mimics their natural habitat and provides a soft, moist surface for the snails. Gently place the snails on the banana leaves, ensuring they are not stacked on top of each other. Leave enough space between the snails to prevent crushing and to allow them to move slightly. Cover the container with a breathable net or mesh cover. This ensures adequate airflow while keeping the snails secure inside. Ensure the cover is securely fastened to prevent the snails from escaping during transit. Keep the container in a cool area during transport to prevent overheating. Upon arrival, monitor the snails for some period before transferring them to the snail pen. Bathe new snails in clean water to remove any dirt or parasites also immerse snails in moringa water to eliminate potential pathogens. Gradually introduce the snails to their new habitat to minimize stress. Provide a light meal of fresh vegetables and fruit peels to help them acclimate. Closely observe the snails during the first few days to ensure they are settling in well. Look for signs of normal activity, feeding, and interaction with the environment

Feeding and Nutrition

Proper feeding and nutrition are crucial for the health and growth of snails. Feed snails once daily. Provide a mix of fruit peels such as watermelon peels, banana peels, and pineapple peels. These are not only nutritious but also help keep feeding costs low by utilizing commonly discarded items. Also, offer nutrient-dense vegetables such as waterleaf, spinach, and lettuce. These provide essential vitamins and minerals necessary for snail growth. Provide calcium supplementation by grinding eggshells and place these supplements at strategic locations within the snail pen to ensure all snails have access to it.

Distribute the food items evenly throughout the pen to encourage movement and natural foraging behavior. Use shallow dishes or directly place the food on the soil to make it easily accessible for the snails. Remove leftover food items daily to prevent mold and pest infestations. Clean the feeding areas regularly to maintain a hygienic environment. To avoid overfeeding and minimize wastage keep an eye on how much food your snails consume and adjust portions accordingly. Do not feed snails' kitchen waste that contains salt and pepper.

Fig 4: Snails feeding on fruits and vegetables



Water and Moisture Management

Proper water and moisture management are essential for maintaining a healthy snail population. Provide your snails with constant access to clean, fresh water. Use shallow dishes or trays filled with water to prevent drowning, and place them at various locations within the pen. Also mist the habitat or water the habitat to maintain the necessary humidity levels. Use a spray bottle to evenly distribute water over the soil and enclosure walls. Avoid overwatering, as excess moisture can lead to respiratory problems and mold growth. Aim for a balance where the soil is moist but not waterlogged. Thus, striking a balance between hydration and moisture control is key to ensuring the overall health and well-being of the snails. Increase misting during dry periods. Ensure the water provided is clean.

Reproduction and Breeding

Ensuring proper nutrition and a suitable environment for the snails will create ideal conditions for mating and egg-laying. Look for mating behaviors such as snails following each other closely and touching tentacles. They may also remain attached to each other for extended periods during mating.

When the snails lay eggs you need to separate eggs from adult snails to prevent cannibalism. Before removing the eggs or hatchlings, ensure an incubator is ready. Incubators can be crafted using recycled materials such as Styrofoam and disposable plates and bowls.

Line a box or bowl with a mixture of loamy and sandy soil. Create a perforated cover to allow airflow. Keep the incubation chamber in an area with a stable temperature of around 25°C (77°F) to ensure successful hatching. Monitor the incubator daily to check the condition of the eggs and ensure the environmental conditions remains optimal. Look for signs of hatching and note the development progress.

Hatchlings should not be fed immediately. Wait for about 2-3 days after hatching before introducing a light meal of fresh vegetables and fruit peels. Gradually increase the amount of food as they grow.

Leave the hatchlings in the incubator for approximately two weeks to ensure they are strong enough to be transferred. After two weeks, carefully transfer the hatchlings to a prepared snail pen.

Ensure the new habitat meets all the conditions required for their growth, including proper nutrition, hydration, and environmental control.

Fig 5: Incubation chamber made of styrofoam.



Health and Disease Management

Maintaining a healthy snail population requires continuous monitoring and proper care. Inspect your snails daily for signs of illness, injury, or stress. Look for symptoms such as loss of appetite, damaged shells, limited mobility, or abnormal secretions. Regularly check for any unusual changes in behavior or appearance.

To effectively mitigate the spread of diseases, strict standards of hygiene and sanitation are necessary. This involves bathing newly acquired snails before their integration into the habitat and cleaning of their habitat. Immediately isolate any snails showing signs of illness to prevent the spread of disease. Place them in a separate enclosure with the same care conditions. Use moringa treatment by immersing the sick snails in moringa water for a few minutes daily until they show signs of recovery.

For proper hygiene and disease prevention ensure to clean the housing facilities every morning. Use wet clothes or towels to wipe down the tires and remove visible dirt. Remove leftover feed daily to prevent mold and pest infestations. Maintain proper environmental conditions, including humidity, temperature, and cleanliness, to reduce stress and prevent diseases.

Furthermore, snails are immersed periodically in moringa water, recognized for its natural antibiotic properties. Moringa water is prepared by smashing or squeezing some quantity of *Moringa olifera* in enough water enough to cover the snails, the snails are then submerged for 5 to 10 minutes. By promptly addressing any health concerns and maintaining optimal hygiene levels, risk of disease outbreaks are minimized, and the overall productivity is maximized.



Fig 6: Snail bath in Moringa water before stocking.



Fig 7: Moringa olifera