



Yookah Native Pig Breed Production and Management Protocols

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 14 Oct 2023	<p>The study aimed to develop Yookah Native Pig Breed Production and Management Protocols using a foundation stock of 25 females and five male Kalinga native pigs randomly selected from different villages in Kalinga. The study was conducted in the KSU Native Pig R&D Farm, covering a land area of 2 hectares, and utilized locally available feedstuffs within the community. The protocols that were developed and established include practical and cost-efficient native pig range management, feeding, and health care protocols and systems that align with the available resources in rural farming communities. These protocols were designed to match the capacity and capability of rural farmers in Kalinga. The study crafted a customized feeding strategy utilizing locally sourced feed ingredients. It also introduced healthcare management procedures aimed at enhancing the health and welfare of free-ranged native pigs. Furthermore, the research identified and documented the unique and specific characteristics of the Kalinga native pigs, known as Yookah, which has been officially registered as a trademark for KSU-produced native pigs. The development and implementation of these Production and Management Protocols led to a significant reduction in the cost of feeds to P12.10 per kilo, compared to the prevailing market price of commercial feeds, which averages P25.00 per kilo. The study also introduced an efficient feeding strategy based on locally available resources, established practical housing and range areas suitable for Kalinga native pigs, and implemented effective health care management and farm biosecurity measures. This research contributes valuable insights and practical solutions for sustainable pig farming in rural communities, promoting economic viability and improved pig husbandry practices</p>
CC License CC-BY-NC-SA 4.0	Keywords: Yookah Native Pig Breed, Pig Production and Management, Rural Farming Communities, Indigenous Pig Farming, Feeding Strategy

1. Introduction

The Philippine native pig (*Sus domesticus*) is an endemic animal genetic resource commonly grown under the smallhold-farming system. Their utility is anchored on economic, social, religious and/or cultural significance at specific segment of the Philippine society. The continued existence of native pig populations is anchored on these utilities and functions. Relative attributes favorable in the keeping native pigs are commonly based on their adaptation to the local environment (which includes climate, feed resources, disease challenges and management) that keeps the cost of maintaining them very low. Similar observations were also documented in Mexico (Scarpa, et al., 2003) and in Papua New Guinea (Ayalewet.al., 2011).

The contributions and roles of Philippine native pig are immensely valuable under the low input production system. The international community thru the Food and Agriculture Organization (FAO) of the United Nations recognized the utility of the native, indigenous, or endemic animal genetic resources for food and other functions related to agriculture. TheFAO noted that many unrecorded animal genetic resources are being lost before their characteristics are studied and evaluated. Deliberate efforts to understand, prioritize and protect the world's animal genetic resources for food and agriculture are

therefore required. Of the 7,616 breeds of domestic animal species in the world, 20% are on threatened status while 62 breeds are considered extinct (FAO, 2007).

Several breeds or strains of native pigs are observed to be present in the Philippines. These breeds, strains or genetic groups need to be documented, characterized and evaluated for these resources to be optimally utilized in the current and future markets. These strains or genetic groups are likely to possess adaptation traits that enhance their ability to survive and reproduce even in changing climatic and ecological conditions. The level of dominance among breeds or strains should be determined as well as this information are vital in developing strategies for genetic improvement. The phenotypic characteristics and potential genotypic performances have to be as success in genetic improvement programs that are aimed at ensuring future economic value of animal genetic resources are highly dependent on this information.

State of the Art

The brand name "Yookah" [juka] [yooka] [yuka] is used to native pigs that have undergone purification at the KSU Native Pig R&D Station. This was the outcome of the DOST-PCAARRD-funded experiment on the breeding of native pig populations that were true to type.

Twenty-five (25) female and five (5) male native pig foundation stocks totaling thirty (30) were chosen at random from villages in the Kalinga Province. These foundation stocks went through rigorous breeding and selection processes. Regular phenotypic characterization of the native pig herd at the KSU station has revealed a disproportionately large number of animals with black coats and white socks.

Pigs (local or not) are commonly referred to as "Borok [brk] or Forok [frk]" in Kalinga Province. However, the KSU Native Pig R&D Project picked this name due of the relationship between the term "Yookah" and Kalinga native pigs. As a result, it helps people recognize the Kalinga Native Pigs brand name and the term's historical context. The term "Yookah" is a symbol that denotes arrival or arrival and eating. For example, the Ikalingsas, particularly those from remote locations, use the free range approach rather than pig enclosures to raise their native pigs. As a result, they came up with a plan to cry out to their local pigs when it was feeding time.

Earlier in the day, before the pig raisers will cry "Yookah" in the dusk until all of their pigs come to them for feeding. Because of this, the Kalinga people began naming their indigenous pigs "Yookah".

Analysis of the Problem

Native pig production is one of the most common farming activities in these regions, hence the diminishing trend in native pig populations in key native producing regions signals a substantial threat to the livelihood chances of small pig raisers and, consequently, to the Regions' economy. Native pigs contribute to the social and cultural needs of rural residents in addition to their economic benefits.

The foregoing premises highlighted the urgent need to develop an organized community-based breeding and selection, free range management and marketing and distribution strategies to ensure conservation, improvement and profitable utilization of native pigs not only for the current small rural farmers but for the future generations of rural animal raisers as well.

Conceptual Framework

Table 1. R&D Conceptual Framework for Native Pig Development in Kalinga

R&D Focus	Technology and Products	Technology Transfer	Desired Outcomes and Impacts
A. Enhancement protocols for pig breeding and production	Kalinga-native pig range enhancement protocol	Promotion and adoption of Kalinga's Yookah native pig range protocol	Improved pig productivity and income.

B.Develop a local resource-based feeding system	Strategic feeding protocol for free-range native pigs	Promotion of feeding protocol for free-range native pigs.	Enhanced pig productivity and income.
C.Collection and characterization of local pig types	Acquisition of 25 sows and 5 boars from remote villages; Yookah pig characteristics	Promote awareness of desired Yookah pig traits; Establish Yookah breeder herd at KSU	Generate interest in Yookah pigs among local pig experts and farmers.
D.Purification and establishment of Yookah nucleus breeder herds in KSU	100 heads of purified lines of Yookah native pigs in KSU R&D station	Promote the creation of Yookah native pig nucleus herds by government and private sectors. Advocate for free-range pig breeding technology.	Establish institutional and private nucleus breeding herds for pure Yookah pigs. Raise public awareness and interest in improved Kalinga native pigs.

OBJECTIVES

The development and implementation of Yookah Native Pig Breed Production and Management Protocols were the subjects of the study. Its specific objectives were to:

- create feasible, affordable protocols and methods for native pig range management, feeding, and health care that are appropriate for the resources available in rural farming communities and the capacity and capability of rural farmers in Kalinga;
- create a tailored feeding plan utilizing meals that are readily available locally;
- create healthcare management practices (such as medication and deworming) that advance the welfare and health of free-range indigenous pigs; and
- Create and establish distinctive and special characteristics for the indigenous pigs of Kalinga.

2. Materials And Methods

The foundation stock for this study consisted of 25 female Kalinga native pigs and 5 male Kalinga native pigs who were randomly chosen from Kalinga's various remote villages.

The study was carried out at the KSU Native Pig R&D Farm, which has a 2 hectare plot of land, of which 6,000 square meters is an area with developed pig pens, numerous fruit trees, and a perimeter fence.

The tools and techniques employed in this study were useful and widely accessible in the neighborhood.

a) *Foundation stock*

This study used foundation stock of 25 females and 5 male Kalinga native pigs randomly selected from the different far-flung villages of the different municipalities and City in Kalinga.

b) *Housing and Range Management*

There were two types of housing built, the pure-confined and semi-confined housing. There is a perimeter fence installed around the 6,000sqm land area to secure the project site from stray animals coming from nearby households. Tethering and other types of housing management was applied depending on the situation and needs of the animal.

The total land area of the project site is 2 hectares wherein there are various fruit bearing trees, grasses, legumes, root crops as feed source for the animals. These feed sources are locally available feedstuff. As a good source of protein for the animals, intercropping *Trichanteragiantea* and other forages to establish a pasture area for the animals.

c) *Strategic Feeding*

Native pigs are fed twice a day, during morning and afternoon, and fed with trichantera leaves in between. Clean water is always available at all times. Old tires that are cut in halves are used as feeding and water troughs

Feeds with a mixture of commercial feed and various locally available feedstuff are fed to the animals.

d) Breeding and selection

There are 5 breeder families that were established to start with. Breeder animals per family of 5 females and 1 male were put in 1 pen. Through phenotypic characterization, the researchers conducted selections of dominant phenotype of the native pigs were done for the F1. All pigs with black coat with white stockings were selected as breeders. Unselected animals were sold.

e) Health care

Deworming and multivitamins supplementation is a regular health activity for the animals. When there are sick animals, treatment of antibiotic and other medicaments to treat the animals is done.

3. Results and Discussion

The History of YOOKAH

Establishment of Housing and Forage Area

a) Forage area

The 6,000sqm portions of the total 2 hectare project site were used for the establishment of forage area and housing of the native pigs. Initial land preparations like ploughing, harrowing and levelling the soil to provide the necessary soil conditions for planting locally available feedstuff for the animals. *Trichantera gigantea*

The total land area of the project site is 2 hectares wherein there are various fruit bearing trees, grasses, legumes, root crops as feed source for the animals. These feed sources are locally available feedstuff. As a good source of protein for the animals, intercropping *Trichantera gigantea* and other forages to establish a pasture area for the animals. Locally available plants like Papaya, sweet potato, cassava, gabi, banana, kangkong, legumes, etc. are planted to be used as source planting materials and feeds to the animals.

b) Housing and range area

Proper housing is provided to the animals. There are two type of housing commonly used in the project, these are the Confined and semi-confined housing. Confined housing is used for pregnant and nursing animals while semi confined type of housing is used for weaners, growers and breeder pigs.

The entire project site spans 2 hectares and features a variety of fruit-bearing trees, grasses, legumes, and root crops that serve as feed sources for the animals. These locally available feedstuffs are rich sources of protein for the animals. Additionally, *Trichantera gigantea* and other forage crops were intercropped to establish a dedicated pasture area for the animals, enhancing their nutritional resources

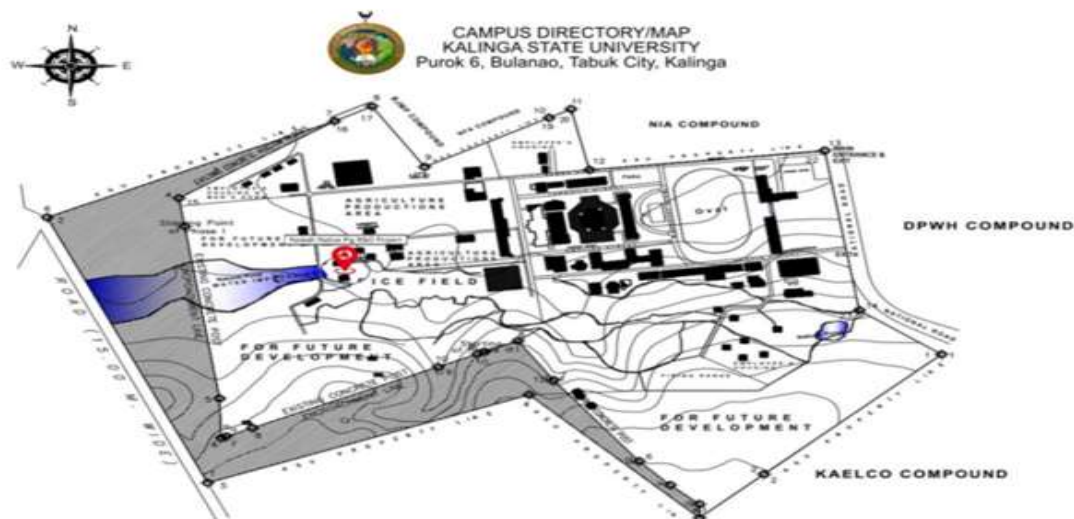


Figure 1: Location of the Study

The native pigs are allowed free access to the range area in a rotational grazing method. Native pigs per pen are allowed to graze around the forage area in a scheduled time. Tethering method is also practiced in the farm when aggressive pig displays cannibalism and boars that are in heat and keeps on going out of the pen and wanders to nearby households in search for female pig. These animals are separated from the pens and tied under the trees.

Each pen has 50sqm area and can accommodate 1 breeder family of 5 sows and 1 boar. The housing of growers with 200sqm and can accommodate 20-30 growers in 1 pen. All the materials used in this type of housing are practical, light and locally available materials. The confined housing is used by gestating and lactating sows. The house has an area of 5 meter width and 10 meter length with 10 compartment pens of 2sqm. Each pen can accommodate 1 nursing sow and its piglets. A combination rice husk and mountain sand are used for the flooring to keep dry and minimized odor.

Establishment of Foundation Herd and breeder herd

Initial foundation herd of 25sows and 5 boars (of about the same age) Kalinga native pig strains are acquired from the far-flung villages of the Province to represent the native pigs of Kalinga.

In a quarantine facility where they are housed for a month, recently bought pigs were preconditioned. The pigs are dewormed and treated for ectoparasites following the preconditioning phase before being moved to the designated ranging area.

The initial foundation herds were divided into 5 breeding families of 5 sows and 1 boar. Each of the pigs was properly identified using appropriate markers (e.g. ear notch, ear tags, etc.) that would ensure identity of individual pig to facilitate culling and selection.

Phenotypic Characterization

Three types of information are needed to characterize animal genetic resources (AnGR) for food and agriculture: phenotypic, genetic, and historical data. The process of identifying different breed populations and outlining their external and production features in a given setting and under a certain management, while taking into account the social and economic elements that influence them, is known as phenotypic characterisation of AnGR (FAO).


Each generation is phenotypically characterized in accordance with the Phil's standards to establish the distinctive and particular traits of the native pigs. Program for the Development of Native Animals, which is based on the FAO's.

Table 1 Characterization protocol

Phenotypic Characterization of Pigs (FAO, 2012)	
Quantitative Variables	
1. Body Size for Adult Boars and Sows (to the nearest 0.5 cm)	
- Body Length	
- Head Length	
- Tail Length	
- Ear Length: Measure length or classify into large, medium, or small	
- Chest Girth	
- Height at Withers	
- Teat Number: Number of normal and rudimentary teats counted on both boars and sows or gilts	
2. Liveweight (at specified age)	
Qualitative Variables	
- Hair: Curly, straight, short, long, dense, sparse	
- Tusks: Present, absent	
- Snout: Long and thin, short and cylindrical	
- Coat Color Type: White, black, dark red, light red, fawn, grey	
- Coat Color Pattern: Plain, patchy, spotted	
- Head Profile: Concave (dished), straight, convex	
- Ear Type: Droopy (pendulous), semi-lop, lop, prick (erect)	
- Ear Orientation: Project forwards, backwards, upwards	
- Skin: Smooth, wrinkled	
- Tail Type: Straight, curly (kinked)	
- Backline: Straight, swaybacked (i.e. markedly concave ventrally)	

The following tables show the result of phenotypic characterization were purification is done with 80-90% uniformity.

Table 2 & 3. Morphology of male and female Yookah at 6 months old

YOOKAH™ DESCRIPTION			
Morphology	Male	Female	
Hair type	Straight and long	Straight and long	
Coat color	Black	Black	
Color pattern	White socks	White socks	
Head shape	Straight	straight	
Skin type	Smooth	Smooth	
Ear type	Erect	Erect	
Tail type	Straight	Straight	
Backline	Straight	straight	

		
Morphology	Male	Female
Body weight at 6 mos, kg	14.90 kg	15.38 kg
Head length, cm	26.67 cm	23.27 cm
Body length, cm	57.83 cm	54.53 cm
Pelvic width, cm	12.83 cm	13.00 cm
Number of normal teats	10 teats	10 teats

Table 2 & 3 shows the morphology of male and female Yookah at 6 months of age as a result of regular phenotypic characterization of 16 females, 7 males of the 4th generation

Table 4. Average reproductive performance of Yookah sows

**YOOKAH™
DESCRIPTION**



SOW DESCRIPTION

Reproductive traits	Average
Birth weight, kg	400 grams
Litter size at birth	4
Number of males	2
Number of females	2
Weaning weight, kg	4.75 kg
Age at weaning, days	65 days
Litter size at weaning	3

Table 4 shows the average reproductive performance of 7 Yookah sows of the 3rd generation

Strategic feeding

This type of feeding is commonly practiced in Kalinga. Native pigs are fed twice a day, during morning and afternoon, and fed with trichanthera leaves in between. Clean water is always available at all times. Old tires that are cut in halves are used as feeding and water troughs. Feeds with a mixture of commercial feed and various locally available feedstuff are fed to the animals. These feed ingredients are the most common feedstuffs used for feeding native pigs in Kalinga. These are rice bran, cornbran, sweet potato, tubers, vines, legumes, etc. For weaners, the amount of feed given per day is 1kg, while

2kgs is given to growers and breeders. For the piglets, creep feeding is supplemented in their diet while still nursing from the sow.

STRATEGIC FEEDING



Ingredients	Amount	Cost (Php)
Commercial feed (Lactating)	150g	4.65
Rice bran	200g	4.5
Corn bran	100g	1.7
Trichantera	150g	.25
Banana (dried fruit, trunk & core)	150g	.25
Camote vines	100g	.25
Taro	100g	.25
Dried Casava root	50g	.25
TOTAL	1000g	Php 12.10
Additional Ingredients		
Water	3 liters	
Salt	15 g	

Table 5. This table shows the ingredients, quantity, and cost of feeds

The strategic feeding protocol established in the KSU R&D project is a combination of locally available feedstuffs and commercial feeds. Through this technology, the feed is cost P12.10 per kilo which is decreased by 48.4% with the existing price in the market for commercial feed of an average cost of P25.00 per kilo. The following table shows the combination of feed ingredients, quantity and amount per ingredient and the total price of per kilogram feed. Feeding practices in the KSU R&D farm is feeding the animals 2x a day during morning and afternoon, and feeding trichantera leaves in between meals. Clean water is available at all time. See Figs 5& 6 below, old tires are used as feed and water troughs so that pigs will not break and turn the feeders easily, and for practical and economical practical reasons.

STRATEGIC FEEDING



FEEDING= 2X a day (AM & PM)



WET OR DRY FEED

STRATEGIC FEEDING



Provide clean and adequate drinking water all the time



Fig. 5. Wet & dry feed fed to the animals

Fig. 6. Water

Health care and Biosecurity

A. Health care management

Farm Activities	Remarks
Deworming/ Treatment of internal parasites	<p>a. Breeder stocks Administration of dewormer for breeders is scheduled 7 days before breeding and after farrowing (sow). Boars are regularly dewormed every 3 months.</p> <p>b. Piglets are dewormed at day 14, while grower-finisher stocks are dewormed at 60 days old, and then repeated every three months thereafter.</p> <p>Dewormers are administered via water/feed or parenteral through intramuscular (IM) or subcutaneous (SC) injection.</p>
Treatment of external parasites	<p>a. Animals affected with mange and ticks are treated with commercial drugs parenteral through intramuscular (IM) or subcutaneous (SC) injection.</p> <p>b. Local remedies for mange and tick infestation are kakawati leaves applied all over the body of affected animals.</p>
Vaccination	Vaccination is not practiced in the farm

Isolation, treatment, and Vitamin and Mineral Supplementation	<p>Sick and debilitated animals are isolated and are treated accordingly.</p> <p>Antibiotics and vitamins are administered to sick animals.</p> <p>Iron supplementation is administered for piglets at 3rd day and repeated at 11th day. However, piglets with free access to the open are no longer supplemented with iron.</p> <p>Banana leaves are given freshly to pigs as local remedies for diarrhea.</p>
Fostering	Fostering of piglets/litters is provided if the need arises

B. Biosecurity

The KSU R&D farm closely complies with biosecurity regulations. All farm area entrances have biosecurity signs installed to deter unlawful entry. The entryway to the farm has strategically positioned footbaths, washing stations, and disinfecting stations. For caregivers and other approved individuals, there is a place where they can change their clothes and shoes.

Sick animals are isolated and treated in the quarantine facilities offered as part of the biosecurity procedures to stop the spread of illness. Animal bodies are treated carefully and interred in the farm's distant section's cemetery.

To stop the spread of infections, housing and other farm buildings are routinely cleaned and disinfected.

4. Conclusion

The Kalinga State University produced and purified a Yookah native pig breed and filed it with the IPOPhil as a trademark as one of the implementers of the DOST-PCAARRD supported multi-agency Native Pig R&D Program "Conservation, Improvement and Profitable Utilization of the Philippine Native Pigs".

Through the creation and implementation of the Yookah Production and Management Protocols: Compared to the average market price of commercial feeds, which is P25.00 per kilo, the cost of feed was lowered to P12.10; devised a feeding plan that utilized meals that were readily available in the area; created and established a suitable pig-friendly housing and range area in Kalinga; built a comprehensive and efficient farm biosecurity system; and, finally, developed and established a unique and specific characteristic of the Kalinga native pigs which is the Yookah and it is already a registered Trademark for KSU produced native pigs.

Significance Of Findings

The results of this research contributed to new knowledge/S&T advancement through the development and establishment of the Production and Management Protocols for Yookah pigs for technology adoption of farmers and the community for the betterment of native pig raising.

Through the development and establishment of the Production and Management Protocols for Yookah pigs, the study was anchored to the R&D thrusts of the Regional and National Research and Development by improvement of R&D approach and addressing the Sustainable and Development goals of the country specifically SDG 2., to end hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Implications And Recommendations

As a result, the study developed and established the Production and Management Protocols for Yookah,

- the researcher recommends that the findings in this study will be included in the DOST-PCAARRD Philippine Recommends Series for Native Pigs as practical technology recommendations for farmers;
- conduct seminars and trainings for adoption of these practical technologies
- use of broadcast and social media to disseminate information.

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