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Ethnozoological Study of Animal Consumption by the Sasak Tribe: Implications for Biodiversity Conservation in Lombok, Indonesia

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ABSTRACT

The Sasak tribe still maintains its unique culture in everyday life. The Sasak people in Sigerongan Village have traditional knowledge of the use of animals. Food (consumption) is one of the primary needs that must be met. This study aims to determine the diversity of animal species used for consumption by the Sasak tribe and to assess their role in animal conservation. The research was conducted in Sigerongan Village in May 2024. The research was carried out by combining the methods of direct observation, participatory observation, and interviews. The informants in this study numbered 37 people who were local residents. Animals that have been identified are then tabulated according to family, species, vernacular name, conservation status, and habitat. The various data were then analyzed using descriptive and qualitative approaches. In this way, understanding animal diversity, their use as food (consumption), and conservation efforts can be comprehensive. It was found that 13 families and 24 species of animals are used for consumption (79% are native species and 21% are exotic species). The Sasak tribe cultivates various animal species in various habitats, such as irrigation canals, fishponds, ricefields, pastures, and home gardens. These various habitats represent the ecological and ethnozoological knowledge of the Sasak tribe in landscape management. Traditional knowledge plays an important role in animal conservation. Therefore, it is necessary to involve the local community of Sigerongan Village, Lombok Island, in participatory management as an effort to protect and conserve animal diversity used for consumption.

1. INTRODUCTION

Since the beginning of human history, people have made extensive use of the resources that nature provides. These resources include plants and animals. Old paintings on cave walls depicting bison, deer, and horses being hunted by people are one way to identify the interaction between humans and nature [1]. According to Alves and Souto [2], humans utilize animals based on inherited local knowledge that has been passed down over the years. The interaction between traditional communities and nature, as well as the past and present, can be reflected in local knowledge, which is an integral aspect of cultural heritage [3]. The goal of local wisdom is to improve human-nature relationships, foster emotional ties, and raise public awareness of the need for environmental protection. If people preserve local knowledge and transmit it to the following generation, it will endure forever [4].

Since the beginning of human history, animals have been an integral part of human life [5]. Animals provide ecosystem services and help local communities survive [6]. Interactions between humans and animals include social and natural sciences, basic and practical knowledge, as well as integrating anthropological information into a social-ecological approach [7]. As part of ethnobiology, ethnozoology provides a way to connect local knowledge about animals with scientific knowledge [8]. The study of the interactions between animals in their environments and human cultures, both past and contemporary, is the focus of ethnozoology. The fundamental concepts of ethnozoology are derived from the ancient relationships that humans have had with animals in various forms of engagement with local fauna in civilizations all over the world [9]. However, currently this knowledge has been reduced or degraded by developments over time and has never had written documents [10]. Ethnozoological studies are an important approach in predicting knowledge about local biodiversity [11].

Indonesia is an archipelagic nation with abundant biodiversity and a diverse range of cultures. In Indonesia, there are roughly 370 different ethnic groups [12-14], one of which is Sasak. Sasak is a native tribe of Lombok Island, West Nusa Tenggara, Indonesia [15]. Lombok Island is inhabited by approximately 3 million people, 80% of whom are Sasak [16]. Ecologically, Lombok is a tropical island that experiences

seasonal drought [17]. This island is geographically situated in the Lesser Sunda Islands chain, located between Bali and Sumbawa. Administratively, Lombok is included in West Nusa Tenggara Province [18]. The Sasak people in Sigerongan Village have traditional knowledge of the use of animals. Chaudhury et al. [19] stated that products generated from fauna have been utilized for a variety of reasons since ancient times, including food, tools, ethnomedicine, and magico-religious uses.

Most ethnozoological research focuses on the use of animals in traditional medicine [10, 20-27]. There are eleven animals used in the treatment of malaria in Ethiopia, Africa, namely: cow, goat, olive baboon, serval cat, wild boar, common warthog, camel, sheep, porcupine, snake, bumblebee [28]. In Ethiopia, Africa, there are 38 animal species that are used as medicine to treat more than 35 different types of human diseases, including anatomical, physiological, psychological, and spiritual diseases, as well as animal medicine [21]. There are 14 species of animals used as traditional medicine in Tanzania, Africa [29].

Sigerongan is one of the villages in Lombok Island with geographical conditions in the form of mountains and hills. This causes isolation so that the community still holds fast to culture in everyday life, including in the use of animals. The Sasak tribe in Lombok has a unique characteristic in the form of a close relationship with the use of animals in various aspects of life, from livelihoods, traditions, to medicine.

Research on the use of animals for consumption is still very limited. Even though this is an important thing, because food (consumption) is one of the primary needs that must be met. Animals can be used for consumption. Prasetyo [30] stated that due to their need for physical energy for everyday activities, people also take into consideration the necessity of animal protein in addition to vegetable protein in order to maintain a healthy and hygienic lifestyle. To prevent the loss of local wisdom among the Sasak people, it is necessary to conduct research on the use of animals for consumption. This study aims to determine the diversity of animal species used for consumption by the Sasak tribe and to assess its role in biodiversity conservation.

2. MATERIAL AND METHODS

2.1 Research location

This research was conducted in May 2024 in Sigerongan Village, Lingsar District, West Lombok Regency, West Nusa Tenggara Province, Indonesia (Figure 1). Sigerongan Village has an area of 4.70km^2 and a population density of 1,319 people/km^2 [31]. West Lombok Regency has beautiful natural scenery, fertile soil, and abundant water reserves [32].

Figure 1. Map of the study area at Sigerongan Village, Lingsar sub-district, West Lombok district, West Nusa Tenggara Province, Indonesia

2.2 Data collection procedures

Information was obtained through in-depth and semi-structured interviews. The selection of key informants was based on purposive sampling [33]. All 37 informants are local people who were born and live in Sigerongan Village (Table 1) and have knowledge about various animal species that are used for consumption (food). The information collected includes: vernacular names, habitats, and the use of species by local communities.

Identification of species morphology, including: characteristics of physical form or external body structure, body color (skin or feathers, or hair), and means of movement (fins or legs). Animal identification refers to several books [34-36]. Tracking plant conservation status at the International Union for Conservation of Nature and Natural Resources [37].

Table 1. The characteristics of informants in this study

Informant Category	Total	Percentage
Sex		
Male	12	32%
Female	25	68%
Age		
17-30	5	14%
31-44	10	27%
45-60	19	51%
> 60	3	8%
Occupation		
Housewife	21	57%
Farmer	12	32%
Community Leader	4	11%

2.3 Data analysis

Animals that have been identified are then tabulated according to family, species, vernacular name, conservation status, and habitat. Data was tabulated using Microsoft Excel. The various data were then analyzed using descriptive and qualitative approaches. In this way, understanding animal diversity, their use as food (consumption), and conservation efforts can be comprehensive.

3. RESULTS AND DISCUSSION

3.1 Animal diversity used for consumption

Information was obtained based on interviews with the Sasak community in Sigerongan Village and field observations regarding various animal species used for consumption, as shown in Table 2. Based on the research, it was found that 13 families and 24 species of animals are used for consumption. Native species or also called indigenous species, are species that naturally inhabit an area or ecosystem without human intervention. The presence of native species in an area is the result of natural evolution and natural distribution, not due to intentional or unintentional human actions. Exotic species (or alien species, introduced species) are species that are not native to an area, but have been moved or introduced to that area, often by humans.

The animal family with the highest number of species used for consumption is Cyprinidae. Samad et al. [38] stated that Cyprinidae is the most commonly found family of freshwater fish. Cyprinidae is the largest fish family, consisting of 367 genera and 2006 species [39].

Table 2. Animals are used for consumption by the Sasak community in Sigerongan Village, Lombok Island

Family	Species	Vernacular Name	Conservation Status	Habitat	Species Origin	Folk Taxonomy
Ampullariidae	*Pila ampullacea*	Sisok, Keong Sawah	LC	Rf	N	W
Anabantidae	*Anabas testudineus*	Empak Betok	LC	Rv	N	W
Anatidae	*Anas platyrhynchos*	Bebek	LC	Ic, Rf, Fp, Hg	N	C
	Cairina moschata	Menthok, Itik Manila	LC	Ic, Rf, Fp, Hg	N	C
Bovidae	*Bos sondaicus*	Sampi, Sapi	NE	Hg, Rc, Pt	N	C
	Capra aegagrus-hircus	Embek, Kambing	NE	Hg, Pt	N	C
Channidae	*Channa striata*	Empak Gabus	LC	Ic, Fp	N	W
Cichlidae	*Oreochromis niloticus*	Empak Nila	LC	Ic, Fp	E	C
	Oreochromis mossambicus	Empak Mujair	VU	Ic, Fp	E	C
Clariidae	*Clarias gariepinus*	Empak Lele Dumbo	LC	Ic, Fp	E	C
	Clarias batrachus	Empak Lele Kampung	LC	Ic, Fp	N	C
Cyprinidae	*Cyprinus carpio*	Empak Mas	VU	Fp	E	C
	Rasbora argyrotaenia	Empak Wader Pari	LC	Ic	N	W
	Barbodes binotatus	Empak Wader Cakul	LC	Ic	N	W
	Puntius javanicus	Empak Tawes	LC	Ic	N	W
Equidae	*Equus caballus*	Jaran, Kuda	NE	Hg, Pt	N	C
Osphronemidae	*Osphronemus gouramy*	Empak Gurame	NE	Ic, Fp	N	C
	Trichogaster pectoralis	Empak Sepat Siam	NE	Ic	N	W
	Trichogaster trichopterus	Empak Sepat Rawa	NE	Ic	N	W
Palaemonidae	*Macrobrachium rosenbergii*	Udang	LC	Ic	N	W
	Macrobrachium lanchesteri	Udang	LC	Ic	E	W
Phasianidae	*Gallus domesticus*	Manok, Ayam	NE	Hg	N	C
	Coturnix coturnix	Kecepret, Burung Puyuh	LC	Hg	N	C
Synbranchidae	*Monopterus albus*	Empak Belut	LC	Ic, Rf	N	W

Note: Conservation Status, LC: Least Concern, NE: Not Evaluated, VU: Vulnerable. Habitat, Fp: Fishpond, Hg: Homegarden, Ic: Irrigation Canal, Pt: Pasture, Rf: Ricefield, Rv: River. Species Origin, N: Native, E: Exotic. Folk Taxonomy, W: Wild, C: Cultivated

Cyprinus carpio, Rasbora argyrotaenia, *Barbodes binotatus*, and *Puntius javanicus* are four species in the Cyprinidae family that are commonly used for consumption [40-43]. The most significant fish species for economic value is *Cyprinus carpio*. This is in accordance with Efianda et al. [44], who stated that in Indonesia and throughout the world, *Cyprinus carpio* is a vital freshwater commodity from an economic standpoint. This fish contributes to a healthy diet for

humans and is a rich source of nutrients. Eating this fish flesh may lower the risk of developing various cardiac illnesses in humans because of its high levels of unsaturated fatty acids and low levels of cholesterol and saturated fatty acids. Additionally, fish proteins can play a variety of advantageous roles in maintaining human health [45]. *Cyprinus carpio* has a bilaterally flattened body shape and a dorsolaterally flattened head. The body is yellowish black on the dorsal side and yellowish on the ventral side. The position of the mouth is terminal and can be popped out, complemented by the presence of an additional tool in the form of two pairs of whiskers, which are shaped like whips and are located at the corners of the mouth. The lateral line is located above the pectoral fins, running straight back to the middle of the tail fold. The fins are composed of hard rays and weak rays. The position of the pelvic fins is located behind the pectoral fins. *Cyprinus carpio* is processed by the Sasak people into *pepes*, soup, fried fish, grilled fish, and curry.

Al Adawiyah et al. [46] stated that *Rasbora argyrotaenia* is an important commercial fish used for consumption and as an ornamental fish. This fish is a type of freshwater fish, has a long body, and is slightly flat on the stomach, while the back is bulging. For every 100 grams of *Rasbora*, there were around 55.89 percent water content, 11.45 percent ash content, 47.54 percent total protein, 12.36 percent total fat, ±2.9 percent Fe, ±0.38 percent Cu, and ±3.64 percent Zn. Additionally, each 100 grams of *Rasbora* had 21.53 calories. 36,43 percent of oleic fatty acid (omega-9), 27.43 percent of palmitate, 11.97 percent of stearate, 3.75 percent of palmitoleate, 3.17 percent of laurate, 3.11 percent of myristate, and 2.98 percent of eicosapentanoic acid (EPA) were found in this fish. *Rasbora* has fourteen different types of amino acids, including seven essential amino acids (leucine, lysine, valine, isoleucine, phenylalanine, histidine, and methionine) [47]. The Sasak community uses *Rasbora argyrotaenia* to make *peyek, botok*, and fried.

The Sasak people in Sigerongan Village use *Barbodes binotatus* for consumption. This is in accordance with the statement by Batubara et al. [48] that this fish has important value because local people consume it as a source of protein. Originally from Sumatra, Borneo, Java, and the Bali Islands, *Barbodes binotatus* is a native species of freshwater fish found in the western half of Indonesia, extending eastward into the Wallacea region to Lombok and Sumbawa Islands [49]. *Barbodes binotatus* has black eyes with yellowish white edges. All fins are reddish yellow. Has two black spots: one under the dorsal fin and one in front of the caudal fin. Juvenile fish have more spots. Local people process *Barbodes binotatus* is divided into *peyek*, fried, and *botok*.

Puntius javanicus has a body covered with cycloid scales or mixed with stenoid scales. Some of the anal and dorsal fins are short, and some are long, while the tail fin is forked, and the shape is symmetrical. The pectoral fins are located far from the pelvic fins at the front of the body. The gill slits are wide, located behind the gill covers. The mouth is located at the terminal end (middle), and has two pairs of very small antennae. This fish is silvery in color, the scales on the back are darker, while the scales on the stomach are white. *Puntius javanicus* is a fish that is widely cultivated by people because it is used for consumption. Paul et al. [50] stated that *Puntius javanicus* is a rich source of vital elements that are necessary for human health, including protein, fat, ash, energy, minerals, vitamins, and amino and fatty acid content. Sasak people process *Puntius javanicus* into *pepes*, soup, fried, and grilled.

The animal family with the second largest number of species used for consumption is Osphronemidae. These species are *Osphronemus gouramy, Trichogaster pectoralis,* and *Trichogaster trichopterus. Osphronemus gouramy* has a distinctive body shape, with its body being rather long, flat, and wide. The body is covered with strong scales with rough edges. This fish has a small mouth, which is located at an angle not just below the tip of the snout. The lower lip looks slightly more advanced than the upper lip and can be poked out. The body color is generally blackish blue, the belly is white, and the back is brownish. The color will change as it matures, namely brownish on the back and silvery or yellowish on the stomach. *Osphronemus gouramy* has five types of fins, namely: pectoral, dorsal, pelvic, anal, and caudal fins. Handayani et al. [51] stated that a popular and highly valuable species of freshwater fish native to Indonesia is *Osphronemus gouramy*. Because of its greater market value than other freshwater fish commodities, farmers prefer it [52]. The meat of this fish has a tasty and unique flavor, which makes it popular with the community [53]. Its high nutritional content is excellent for promoting development and the production of energy [54]. This fish's chemical composition is as follows: ash (0.95–1.03%), fat (2.20–2.79%), protein (18.71–20.67%), and irrigation rate 72.96–75.48%. The values for vitamin A, B1, and B2 are 589,665 IU/100 g, 0.0786, 0.074, and 1,13 mg/100 g, respectively [55]. This fish is prepared by the Sasak people into soups, curries, grilled, fried, and *pepes*.

Trichogaster pectoralis has an elongated body. The body shape is flat to the side. The mouth is small and pops out. Fin radius the first stomach to undergo modification into long filaments until it reaches the tail. The color of the body on the back is greenish, while on the other side of the scales are lighter color. On the head and body, have lines transversely and from the eyes to the tail, there is a broken longitudinal line. On the anal fin, there are 2-3 black lines, the longitudinal ones. This fish can reach a length reaches 25 cm. *Trichogaster pectoralis* has a delicious taste and is quite liked by the community, so it can be used as a side dish to meet animal protein needs. In NilaiGizi.com [56], it is stated that every 100 g of *Trichogaster pectoralis* contains 84 kcal, 0.6 g fat, 4.7 g carbohydrates, 15.2 g protein, 78.8 g water, 0.8 g ash, and 211 mg sodium. Sasak people process *Trichogaster pectoralis* into soup, *lodeh*, curry, grilled, fried, *pepes,* and *rempeyek*.

Trichogaster trichopterus has a flat body shape and a sharp head. Body length cannot be greater than 15 cm. The beginning of the dorsal fin is above the weak part of the anal fin. On its body, there are two black dots, one in the middle of the body and one at the base of the tail fin. The caudal fin is divided into two shallow grooves. The part of the head behind the eyes is twice as long as the beginning of the dorsal fin above the hard-toed part of the anal fin. The fish *Trichogaster trichopterus* is well-liked by the locals. Adawyah and Puspitasari [57] stated that *Trichogaster trichopterus* is a source of animal protein, containing iron, phosphorus, vitamin A, vitamin B, fat, ash, water, carbohydrates, and calcium. Sasak people process *Trichogaster trichopterus* to make soup, *lodeh*, curry, *pepes*, grilled, fried, and *rempeyek* dishes.

The animal family with the third largest number of species used for consumption is Anatidae, Bovidae, Cichlidae, Clariidae, Palaemonidae, and Phasianidae. *Anas platyrhynchos* and *Cairina moschata* are two species of the Anatidae that are used for consumption by the Sasak community in Sigerongan Village. *Anas platyrhynchos* has a slender, long body and a relatively long neck. Its fur is dark

brown. Quaresma et al. [58] stated that *Anas platyrhynchos* has a total lipid content of 2 g/100 g of meat. *Anas platyrhynchos* livestock is an alternative that can be used to support the community's need for nutritious rations. The main production products of *Anas platyrhynchos* livestock are eggs and meat. Meat is one of the livestock products that can hardly be separated from human life and is a ration ingredient that is very beneficial for humans because it contains quite high levels of nutrients, complete amino acids, and is essential for the growth and development of body tissue [59]. Sasak people process *Anas platyrhynchos* meat into *opor*, fried, grilled, and *rica-rica*. Fajarwati et al. [60] stated that *Anas platyrhynchos* is native Indonesian germplasm that has genetic quality and the potential to be developed as a productive egg producer. One *Anas platyrhynchos* eggs contain several components, including 66% water and 34% dry contents are distributed into 12% protein, 10% fat, 1% carbohydrates, and 11% ash. Egg yolk contains about 48% water and 33% fat. Egg yolk also contains vitamins, minerals, pigments, and cholesterol. Egg whites in particular consist of protein lysozyme, which has anti-bacterial capabilities [61]. The Sasak people process *Anas platyrhynchos* eggs into salted eggs and fry them.

Cairina moschata has a red beak. Its body feathers are black and white. *Cairina moschata* has a larger body than *Anas platyrhynchos*. The neck is relatively short, and the legs have blackish-gray swimming membranes. da Silva Costa et al. [62] stated that *Cairina moschata* meat has a high protein content (18.6 to 20.8%), high in polyunsaturated fatty acids content (20 to 40% of total fatty acids) and low intramuscular fat (2.7 to 8.2%). Sasak people process *Cairina moschata* meat into *opor*, fried, grilled, and *rica-rica*.

Bos sondaicus and *Capra aegagrus-hircus* are two species from the Bovidae family that are used for consumption by the Sasak people. *Bos sondaicus* has a characteristic brick red color, legs from the knees down, and the rump is white. Medium-sized, deep chest, no hump, and legs are slender. The nose, hooves, and tip of the tail are black. Soeparno [63] states that *Bos sondaicus* meat contains 16-22% protein, 1.5-13% fat, 1.5% non-protein nitrogen compounds, 1% inorganic compounds, 0.5% carbohydrates, and 65-80% water. Apart from meat, *Bos sondaicus* also produces milk. Putri [64] stated that the nutritional content of *Bos sondaicus* is protein, calcium, vitamin A, vitamin B, vitamin D, amino acids, calories, fat, phosphorus, iodine, zinc, iron, copper, magnesium, and vitamin E. The Sasak people cook *Bos sondaicus* meat into *soto*, *rendang*, curry, *rica-rica*, *tongseng,* and satay.

Capra aegagrus-hircus has a medium-sized body, the head has horns on the left and right, the body is black, black with white stripes, white, black, or brownish, and has a short tail. *Capra aegagrus-hircus* is one of the many ruminants maintained in Indonesia because it has a fairly high selling value, especially in the provision of animal protein sources compared to other ruminants. Hardiansyah [65] states that in 100 grams of *Capra aegagrus-hircus* meat, there is a water content of 76.8 grams, protein 21.02 grams, total fat 0.52 grams, carbohydrates 0.82 grams, ash 0.85 grams, trans fat 0 mg, cholesterol 27.74 mg, and iron 3.32 mg. Apart from meat, *Capra aegagrus-hircus* also produces milk. Rukmana [66] stated that the nutritional value of *Capra aegagrus-hircus* milk contains 83.00-87.50 g water, 4.60 g carbohydrates, 3.30-4.90 g protein, 4.00-7.30 g fat, 129.00 mg calcium, 106.00 mg phosphorus, 185.00 SI vitamin A, 0.30 mg niacin, 0.14 mg riboflavin, and vitamin B12 0.07 mg. The Sasak people cook *Capra aegagrus-hircus* meat into curry, *rica-rica*, *tongseng,* and satay.

Oreochromis niloticus and *Oreochromis mossambicus* are two species from the Family Cichlidae that are used for consumption by the Sasak people in Sigerongan Village. *Oreochromis niloticus* has a flat, round body shape, with straight lines on the body and caudal fin. On the dorsal fin, a straight, elongated line is found. This fish has five fins, namely the dorsal fin, pectoral fin, ventral fin, anal fin, and caudal fin. The dorsal fin extends from the top of the gill cover to the top of the tail fin. There are also a pair of small pectoral and pelvic fins and a rather long anal fin. The tail fin is only one piece with a round shape. Nuryanto et al. [67] stated that *Oreochromis niloticus* has a high nutritional content, especially protein, calcium, and monounsaturated fatty acids. Local people in Sigerongan Village cook *Oreochromis niloticus* into *pepes*, fried fish, curry, and grilled fish.

Oreochromis mossambicus has a body shape that is flattened to the sides, slightly elongated, and a reddish-orange tail when it is mature. The body of this fish is covered with scales. The snout is located at the middle (terminal) end. On its lips, there are two pairs of antennae, and it has no teeth. Ullah et al. [68] stated that *Oreochromis mossambicus* contains proteins, lipids, and carbohydrates with a total energy of 124 kcal. The Sasak people in Sigerongan Village process *Oreochromis mossambicus* as *pepes*, fried fish, curry, and grilled fish.

Clarias gariepinus and *Clarias batrachus* are two species from the Clariidae family that are used for consumption by the Sasak people in Sigerongan Village. *Clarias gariepinus* has an elongated body shape, slimy and scaleless, slightly round in the middle, and the back is flat. The head is flat and almost a quarter of the length of the body. Around the mouth, there are four pairs of tactile barbels which function as a touch tool when looking for food or when moving. Abdel-Mobdy et al. [69] stated that the water, protein, lipid, and ash contents of *Clarias gariepinus* were 71.30%, 19.03%, 8.10% and 1.5% respectively. *Clarias gariepinus* meat has higher levels of calcium, phosphorus, and iron at 304.82 respectively 279.45, and 17.03 mg/100 g. The essential amino acid content is 41.81 g/100g protein. Oleic, linoleic, and palmitic acids are the fatty acids most abundant in *Clarias gariepinus* meat. Oleic acid contributes more than one-third of the fatty acid content in *Clarias gariepinus* meat. Due to its high oleic acid content, *Clarias gariepinus* meat is worth considering because it is associated with a low risk of cardiovascular disease [70]. The Sasak community in Sigerongan Village processes *Clarias gariepinus* into curry, *pepes*, fried fish, and grilled fish.

Clarias batrachus is a freshwater fish whose head is almost a quarter of its body length. The mouth of *Clarias batrachus* is located at the tip (terminal) and is equipped with real teeth or just a rough surface at the front of the mouth. *Clarias batrachus* also has four pairs of antennae located around the mouth. Bhandarkar and Paliwal [70] stated that *Clarias batrachus* is a freshwater fish that is healthy because it has high protein, vitamin, and mineral content, but also serves as a rich source of polyunsaturated fatty acids. The Sasak community in Sigerongan Village processes *Clarias batrachus* as curry, *pepes*, fried fish, and grilled fish.

Macrobrachium rosenbergii and *Macrobrachium lanchesteri* are two species from the Palaemonidae family that are used for consumption by the Sasak people in Sigerongan Village. *Macrobrachium rosenbergii* has a segmented body which is divided into two parts, namely: the front part, which

is called the head-thorax (cephalothorax), and the back part, which is called the tail (abdomen). The thoracic head is covered by the head calyx or head shell (carapace). The head petals towards the front form a jagged, pointed protrusion, called the rostrum. Its entire body consists of segments, which are covered by an outer skeleton (exoskeleton). Ferdose and Hossain [71] stated that *M. rosenbergii* is a high source of protein and very low in fat, so it can be used as a healthy food choice for human consumption. The Sasak people in Sigerongan Village process *Macrobrachium rosenbergii* as *pepes*, curry, soup, fried shrimp, and grilled shrimp.

Macrobrachium lanchesteri has a long, slender body and is pure white without patterns. Mayasari et al. [72] stated that *Macrobrachium lanchesteri* contains protein, fat, ash, crude fiber, and carbohydrate content were 58.68%, 10.70%, 15.31%, 7.70%, and 7.61%, respectively. The Sasak people in Sigerongan Village process *Macrobrachium lanchesteri* as *pepes*, curry, soup, fried shrimp, and grilled shrimp.

Gallus domesticus and *Coturnix coturnix* are two species from the Phasianidae family that are used for consumption by the Sasak people in Sigerongan Village. *Gallus domesticus* has a body covered by feathers with white, black, gray, or a combination of several colors. Its mouth has a beak, and its feet have four toes. Male *Gallus domesticus* has a red comb on the top of the head, while the female does not have a comb. *Gallus domesticus* produces meat and eggs. Handayani et al. [73] stated that *Gallus domesticus* meat contains protein and fat. *Gallus domesticus* eggs contain protein, calcium, magnesium, phosphorus, and potassium [74]. The Sasak people in Sigerongan Village process *Gallus domesticus* into soup, *soto*, *pepes*, fried chicken, grilled chicken, *rica-rica*, curry, and *opor*. The *Gallus domesticus* eggs are processed by the Sasak people in Sigerongan Village into fried and boiled eggs.

Coturnix coturnix has a small, fat, round body, short legs, a strong beak, a short tail, and four toes. *Coturnix coturnix* produces meat and eggs. Quaresma et al. [75] stated that *Coturnix coturnix* meat contains lipids, proteins, and minerals. *Coturnix coturnix* eggs contain protein and fat, which contribute positively to supporting human nutrition [76]. *Coturnix coturnix* meat is used by the Sasak people in Sigerongan Village as *rica-rica*, fried and grilled. The eggs are processed into soup, boiled eggs, and *oseng-oseng*.

3.2 The role of using animals for consumption in the conservation of animal diversity

Knowledge about the use and conservation status plays an important role in animal conservation. Nurfadilah et al. [77] stated that the conservation status refers to the IUCN Red List of threatened species. Based on the International Union for Conservation of Nature and Natural Resources Red List [37], animals used for consumption are divided into three categories, namely: Not Evaluated, Least Concern, and Vulnerable, as shown in Table 2 and Figure 2.

There are two animals (8%) identified as Vulnerable (VU), i.e., *Cyprinus carpio* and *Oreochromis mossambicus*, as shown in Figure 3. Nyboer et al. [78] stated that freshwater fish are thought to be one of the most vulnerable taxa. Freshwater ecosystems are home to the planet's most diverse ichthyofauna, and freshwater fish species provide essential livelihoods for millions of people across continents. Therefore, freshwater fish and other animals for consumption need to be conserved.

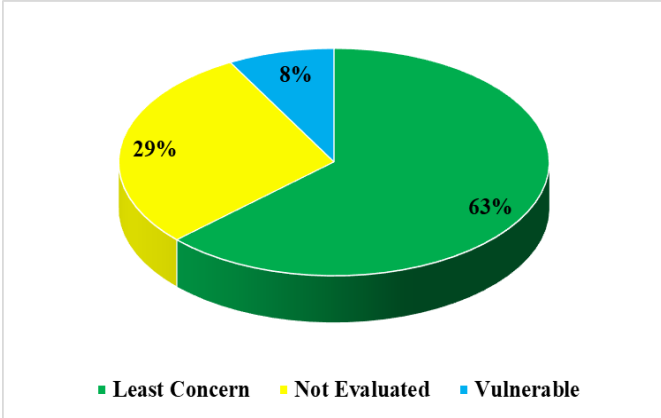

Figure 2. Number of animal species for consumption based on conservation status

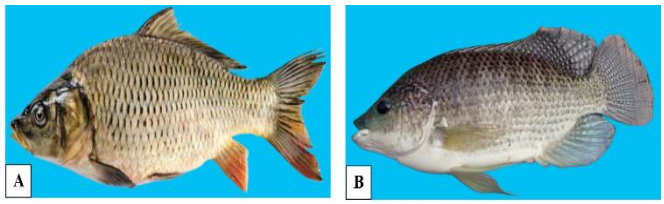

Figure 3. Two species with the conservation status category vulnerable (A: *Cyprinus carpio*, B: *Oreochromis mossambicus*)

Conservation strategies for *Cyprinus carpio* and *Oreochromis mossambicus* can be done through water quality management and sustainable fisheries management. Water quality management, including ensuring adequate water quality, including pH levels and oxygen content, is essential for the survival and reproduction of *Cyprinus carpio* and *Oreochromis mossambicus*.

Sustainable management of *Cyprinus carpio* and *Oreochromis mossambicus* fisheries is the management of *Cyprinus carpio* and *Oreochromis mossambicus* fisheries businesses that aim to maintain the sustainability of *Cyprinus carpio* and *Oreochromis mossambicus* and the environment, and ensure the sustainability of these businesses in the long term. Sustainable management of *Cyprinus carpio* and *Oreochromis mossambicus* fisheries seeks to maintain the availability of *Cyprinus carpio* and *Oreochromis mossambicus* and the aquatic environment so that they remain sustainable and do not experience a decline due to cultivation activities. Environmentally friendly of *Cyprinus carpio* and *Oreochromis mossambicus* cultivation techniques are carried out by applying cultivation techniques that minimize negative impacts on the environment, such as the use of probiotics, limiting hybrid species, and efficient cultivation design. This management pays attention to connectivity and balance between economic interests (cultivation efforts), social (community welfare), and environmental protection.

Traditional knowledge can be used as a means of conservation. Various animal species are used for consumption. Consumption is one of humans' primary needs. Because of this importance, the Sasak people cultivate various animal species so that they are easily available, so that these primary needs can be met. Cultivating various animal species in various habitats is a conservation effort carried out for generations among the Sasak people.

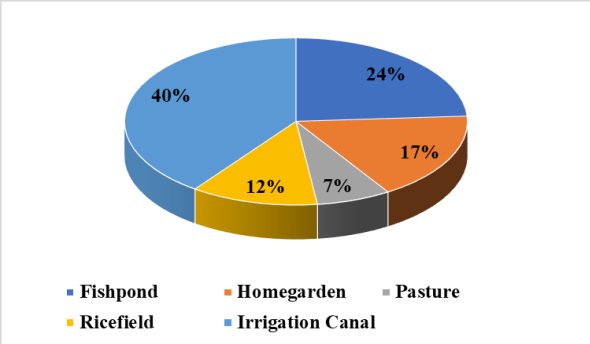

Figure 4. Number of animal species for consumption based on habitat

Figure 5. (A) Irrigation canal and (B) fishpond at Sigerongan Village

Animals used by the Sasak tribe for consumption can be found in various habitats, including: fishpond, home garden, pasture, ricefield, and irrigation canal, as shown in Table 2 and Figure 4. A fish pond is a pond or artificial body of water used for fish farming. The home garden is the land around the house that can be used for various purposes, such as cultivating plants and animals. Pasture is land covered with grass for grazing livestock, such as cows and goats. Ricefield is agricultural land in the form of plots that are irrigated and cultivated to plant rice. An irrigation canal is an artificial canal designed to canal water from a water source, such as a river or reservoir, to agricultural land for irrigation. A river is a natural water flow that flows from upstream to downstream, usually leading to a lake, sea, or another river.

These various habitats represent indigenous ecological and ethnozoological knowledge in land management play a role in preserving the environment and biodiversity. These animals were mostly found in irrigation canals (40%) and fishponds (24%), as shown in Figure 5. This is in accordance with research by Davis et al. [79] that irrigation canals are habitats for various fish species, especially Cyprinidae. Wallick et al. [80] stated that irrigation canals have very diverse and dynamic fish communities.

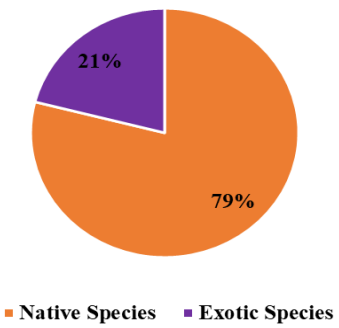

Figure 6. Number of animal species for consumption based on species origin

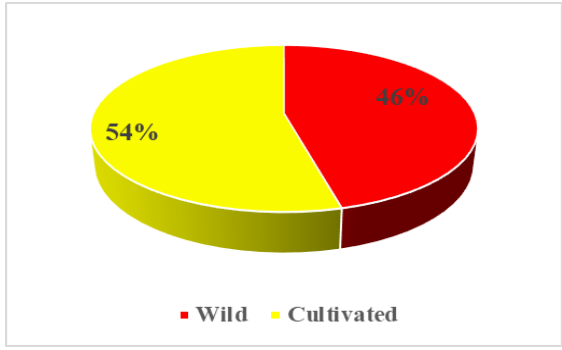

Figure 7. Number of animal species for consumption based on folk taxonomy

Irrigation has led to a boom in both agriculture and economic growth [81] and support for fish diversity. Irrigation canals provide many benefits, including conservation of biodiversity, strengthening climate resilience, and increasing food security and household economics [82]. Fishponds are part of aquaculture. FAO [83] stated that aquaculture encompasses the systematic growing, feeding, propagation, or preservation of aquatic resources (fish, crustaceans, mollusks, aquatic plants, algae, etc.) for uses that may be commercial, recreational, or communal.

Knowledge about the use of animals for consumption, including environmental management as an animal habitat, must be passed on to the younger generation of the Sasak community in Sigerongan Village, Lombok Island. This is in accordance with the statement of Rahayu et al. [84] that knowledge about the use of organisms, including environmental management as an organism's habitat, must be passed on from generation to generation.

The animals used for consumption are divided into two categories based on their species of origin, namely: Native and Exotic, as shown in Table 2 and Figure 6. Daly et al. [85] stated that native species are native species that naturally occur in a particular area or ecosystem. Exotic species are non-native species that are introduced to a place that has never been part of their natural area as a result of anthropogenic activities or natural processes [86]. Sallenave et al. [81] stated that commonly found in irrigation canals are native species (Cyprinidae). Most of the animals (79%) used for consumption by the Sasak tribe in Sigerongan Village are native species.

Wild animals are animals that live freely in nature and are not kept by humans. They generally live in their natural habitat. Wild animals do not depend on humans for food, shelter, or protection. They live according to their natural instincts and interact with their environment without significant human intervention. Wild animals are different from cultivated animals (pets or livestock) that have been tamed and depend on humans.

Cultivated animals are animals that are kept and bred by humans for their benefits, such as meat, milk, eggs, or energy. Animal farming is part of agricultural activities that aim to produce livestock products that have economic value. Cultivated animals, or often known as livestock, include various types of animals that are raised in a controlled environment to meet human needs. The activity of raising these animals is not only limited to maintenance, but also includes management of feed, cages, health, and breeding of livestock. The cultivation of these animals plays an important role in providing food, sources of animal protein, and other products that support various sectors.

Based on folk taxonomy, there are 46% of wild animal species and 54% of cultivated animal species that are used for consumption by the Sasak people, as shown in Figure 7. Therefore, the Sasak people continue to cultivate these animals in various habitats. This shows that the use of animals for consumption supports efforts to conserve animal diversity. Therefore, it is necessary to involve the local community of Sigerongan Village, Lombok Island, in participatory management as an effort to protect and conserve animal diversity used for consumption. Community-based conservation efforts for the diversity of animal species used for consumption can be carried out by providing training and education on conservation, integrating local understanding of ecosystems and conservation practices, and developing sustainable economic enterprises based on conservation.

4. CONCLUSIONS

It was found that 13 families and 24 species of animals are used for consumption. The Sasak tribe cultivates various animal species in various habitats, such as an irrigation canal, a fishpond, a ricefield, a pasture, and a home garden. These various habitats represent the Sasak tribe's ecological and ethnozoological knowledge in landscape management. Traditional knowledge plays an important role in animal conservation. Therefore, it is necessary to involve the local community of Sigerongan Village, Lombok Island, in participatory management as an effort to protect and conserve animal diversity used for consumption. This study focuses on the use of various animal species for consumption. Therefore, this study has limitations, namely: it does not mention the use of animals in medicine or rituals.

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