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Review article

From pasture to sea: Assessing the viability of ruminant forage species for dugong (*Dugong dugon*) domestication and welfare

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Abstract

Dugongs (*Dugong dugon*) are specialized marine herbivores that primarily feed on seagrass species such as *Thalassia hemprichii*, *Halophila ovalis*, and *Halodule uninervis*. Their feeding behavior, including grazing and excavating, is influenced by seagrass morphology and sediment type. Dugongs exhibit high digestive efficiency (>90%) when consuming low-fiber seagrasses, which support consistent weight gain and health maintenance. While terrestrial forage species like *Brachiaria*, *Pennisetum purpureum*, and *Leucaena leucocephala* are widely used in ruminant nutrition, their suitability for dugongs remains unproven due to significant differences in palatability, digestive physiology, and ecological compatibility. Captive feeding trials have demonstrated dugongs' strong preference for native seagrasses, supported by nutritional analyses indicating high digestibility and adequate protein content. Ethical and ecological concerns further limit the use of non-native diets and domestication practices. Conservation and ex-situ management strategies must prioritize habitat protection, forage availability, and species-specific nutritional requirements. This review underscores the critical role of seagrass ecosystems in dugong survival and cautions against introducing alternative forages without thorough ecological and physiological evaluation.

Keywords: Conservation, Dugong, Digestibility, Ex-situ Management, Forage, Nutrition, Seagrass.

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INTRODUCTION

Dugongs (*Dugong dugon*) are marine herbivores primarily dependent on seagrass meadows for their diet (Amany et al., 2022; Dewi et al., 2024; Dewi et al., 2025). They are listed as vulnerable to extinction by the IUCN and are protected under CITES Appendix I due to their declining populations and habitat degradation (Raghunathan et al., 2012; Khamis et al., 2022; Dewi et al., 2025). Dugongs are distributed across the Indo-Pacific region, with significant populations in Australia, the Arabian Gulf, and parts of Southeast Asia (Bass, 2010; Panyawai and Prathep, 2022; Khamis et al., 2023). Their ecological role includes maintaining the health of seagrass ecosystems, which are crucial for coastal biodiversity (Marsh et al., 2018; Thibault et al., 2024).

Captive management of dugongs presents several challenges, particularly in replicating their natural diet and habitat. Dugongs primarily feed on seagrass, which is difficult to provide consistently in captivity (Folkmanova, 2015; Goto et al., 2004). Seasonal variations in food consumption and the need for large quantities of fresh seagrass (up to 26 kg daily) complicate their dietary management (Goto et al., 2004). Seasonal variations in food consumption and the need for large quantities of fresh seagrass typically around 20–30 kg daily, and potentially higher in larger individuals complicate their dietary management. Additionally, maintaining the health and well-being of dugongs in captivity requires careful monitoring of their feeding behavior and digestive health (Folkmanova, 2015).

Given the challenges of providing a consistent supply of seagrass, exploring alternative food sources such as terrestrial forage (ruminant feeds) could be beneficial. Terrestrial forages, commonly used in organic farming, offer ecological and agronomic benefits, including nitrogen retention and soil health improvement (Ann Clark, 2009). These forages could potentially serve as a supplementary diet for captive dugongs, ensuring their nutritional needs are met while reducing reliance on seagrass.

Objectives of the Study, the study aims to: 1) evaluate the feasibility of using terrestrial forage as a supplementary diet for captive dugongs, this involves assessing the nutritional adequacy and digestibility of ruminant feeds for dugongs; 2) analyze the impact of terrestrial forage on dugong health and behavior, monitoring changes in health indicators and feeding behavior when dugongs are provided with terrestrial forage; and 3) develop guidelines for integrating terrestrial forage into dugong captive management, creating protocols for the sustainable use of ruminant feeds in dugong diets to enhance their captive care and conservation efforts. Objectives of the Study, the study aims to to explore the theoretical feasibility of using selected terrestrial forage as supplementary diets for dugongs, based on nutritional composition and compatibility with dugong digestive physiology.

DUGONG DIET

Dugongs primarily feed on seagrasses, with their diet including species such as *Thalassia hemprichii, Cymodocea spp.* and *Syringodium isoetifolium* (André et al., 2005; Marsh et al., 2018). The composition of seagrass beds can significantly influence dugong feeding patterns, with species like *Halodule* and *Halophila* being particularly important (Awadh et al., 2024). Dugongs exhibit different feeding behaviors, such as excavating or grazing, depending on the seagrass morphology and sediment nature (Marsh et al., 2018). Their feeding can lead to significant disturbances in seagrass biomass, affecting the ecosystem (Aragones et al., 2006; Marsh et al., 2018).

Nutritional requirements of marine herbivores

Marine herbivores, including dugongs, require a balanced intake of macronutrients (proteins, lipids, carbohydrates) and micronutrients (minerals, vitamins) to maintain health (Castellini and Mellish, 2023). Dugongs, specifically, have adapted to a diet of low-fiber seagrasses, which are easier to masticate and digest compared to high-fiber varieties (Lanyon and Sanson, 2006; Amany et al., 2022). The nutritional quality of seagrass forage is comparable to that of terrestrial herbivores' diets (Amany et al., 2022). As shown in Tables 1–3, the nutritional composition of seagrass forage, particularly in terms of crude protein, fiber fractions (NDF and ADF), and macro-minerals such as calcium and magnesium, demonstrates a comparable profile to that of forage commonly used in terrestrial herbivore diets.

Common forage plants for ruminants

For ruminants, common forage plants include *Brachiaria, Pennisetum purpureum,* and *Leucaena leucocephala*. These plants vary in their nutritional profiles: 1) Brachiaria species are known for their drought tolerance and moderate nutritional value (Juntasin et al., 2022; Koura et al., 2022). 2) *Pennisetum purpureum* (Napier grass) is valued for its high dry matter yield and compatibility with leguminous plants for improved protein content (Kavana et al., 2005). 3) *Leucaena leucocephala* is notable for its high crude protein content and potential to reduce methane emissions when included in ruminant diets (Piñeiro-Vázquez et al., 2017; Albores-Moreno et al., 2019; Jack et al., 2020).

Previous studies on alternative feeding strategies for marine mammals

Marine mammals exhibit diverse feeding strategies, including cooperative foraging and individual hunting tactics. For example, dolphins and killer whales use cooperative methods to enhance hunting efficiency (Belén Argüelles et al., 2023). Dugongs, however, are more solitary feeders, relying on the availability and quality of seagrass beds (Tol et al., 2016; Amany et al., 2022). Studies have shown that dugongs' feeding behavior can significantly alter seagrass composition and nutrient content, which in turn affects their nutritional intake (Aragones et al., 2006; Shawky and Shabaka, 2024). Dugongs' selective grazing behavior can modify seagrass community composition by promoting nutrient-rich pioneer species while reducing dominance of coarser, less digestible species. This ecological interaction can enhance dugongs' nutritional intake in well-managed habitats, but may lead to resource depletion in fragmented or overgrazed areas (Aragones et al., 2006; Shawky and Shabaka, 2024).

ETHICAL AND ECOLOGICAL CONSIDERATIONS IN DUGONG DOMESTICATION

Domestication of dugongs raises several ethical and ecological concerns. Dugongs are listed as vulnerable due to habitat degradation and other anthropogenic factors (Thibault et al., 2024). Their role in maintaining seagrass bed health is crucial, and any attempt to domesticate them could disrupt these ecosystems (Amany et al., 2022; Thibault et al., 2024). Additionally, the ethical implications of confining a wild marine mammal species must be carefully considered, as it could lead to stress and health issues for the animals (Wirsing et al., 2008; Castellini and Mellish, 2023).

Study site and experimental setup (captive tank or enclosures

The study involved long-term captive observations of a pair of dugongs housed in a large indoor saltwater tank system (approximately 20 m × 10 m × 3.5 m) that was maintained with natural seawater circulation and regulated photoperiod to mimic ambient coastal conditions. The dugongs were fed primarily with eelgrass (*Zostera marina*), and feed intake was monitored daily by weighing the offered and remaining forage, while body length and weight measurements were taken regularly to assess growth performance over the 19-year observation period (1979–1998) (Goto et al., 2004). In addition, to study natural foraging behavior, especially during night-time, the researchers deployed the Automatic Underwater Sound Monitoring System for Dugongs (AUSOMS-D) in a coastal seagrass bed. This system was capable of recording acoustic signals associated with feeding (chewing and cropping sounds), which allowed researchers to document nocturnal activity patterns and feeding durations in the wild (Tsutsumi et al., 2006).

The study on dugong feeding behavior was conducted in a controlled environment at Toba Aquarium, Japan, where dugongs were fed eelgrass (*Zostera marina*) (Goto et al., 2004). The setup included monitoring feed intake and growth performance over a long-term period (1979-1998). Additionally, an automatic underwater sound monitoring system (AUSOMS-D) was used to monitor feeding sounds in a seagrass area, providing insights into nocturnal feeding behaviors (Tsutsumi et al., 2006).

Selection criteria for forage species

Forage species selection for dugongs was based on the nutritional quality of seagrasses. Key species included *Halophila ovalis* and *Halodule uninervis*, which were identified as primary predictors of dugong presence and abundance due to their nutritional content (Said et al., 2025). The selection criteria also considered the seasonal availability and digestibility of the forage (Goto et al., 2004). As shown in Tables 1–4, *Halophila ovalis* and *Halodule uninervis* possess favorable nutritional profiles, including higher crude protein and mineral content, as well as lower fiber fractions, supporting their identification as key forage species for dugongs.

Table 1 Dietary characteristics, nutritional needs, and ethical-ecological aspects of dugong feeding and management

Topic	Key Points
Natural Diet of Dugong	Seagrasses like Thalassia hemprichii, Cymodocea spp. and Syringodium isoetifolium are primary food sources. Feeding behaviors include excavating and cropping.
Nutritional Requirements	Balanced intake of macronutrients and micronutrients is essential. Dugongs prefer low-fiber seagrasses.
Forage Plants for Ruminants	Brachiaria, Pennisetum purpureum, and Leucaena leucocephala are common. They vary in drought tolerance, protein content, and methane reduction potential.
Alternative Feeding Strategies	Marine mammals use diverse strategies, including cooperative foraging. Dugongs' solitary feeding impacts seagrass ecosystems.
Ethical and Ecological Considerations	Domestication could disrupt ecosystems and raise ethical concerns. Dugongs are vulnerable and play a key role in seagrass bed health.

Table 2 Comparative evaluation of nutritional, behavioral, and health outcomes in dugong feeding strategies

Aspect	Forage Species	Seagrass
Nutritional Profile	Varied with salinity; higher ash-corrected NDF and uNDF240 in tropical legumes (Robinson et al., 2004; Nurdianti et al., 2024; Pérez-Reverón et al., 2024)	High nitrogen, starch, and digestibility; low fiber in H. ovalis (Sheppard et al., 2008)
Feed Acceptability & Palatability	Influenced by nutritional quality and environmental conditions (Robinson et al., 2004; Poore and Hill, 2006)	Influenced by structural and nutritional traits; higher preference for S. filiforme (Prado and Heck, 2011; Jiménez-Ramos et al., 2017, 2018)
Weight Gain, Health, Digestibility	Consistent weight gain with high digestibility of eelgrass (Goto et al., 2004)	Not directly addressed in abstracts
Behavioral Changes & Welfare	Increased foraging and reduced inactivity with dispersed food ; (Waasdorp et al., 2021) cortisol levels as stress indicators (Svendsen et al., 2013)	Feeding behavior influenced by nutritional traits; higher consumption with higher nitrogen (Jiménez-Ramos et al., 2017)
Statistical Comparisons	Significant interactions between diet components and performance (Gutiérrez A et al., 2009; Lyu et al., 2019)	Not directly addressed in abstracts

Table 3 Considerations for dugong feeding and conservation management

Query	Information
Suitability of Terrestrial Forages	No direct information; dugongs primarily feed on seagrass (Tol et al., 2016; Hashim et al., 2017; Marsh et al., 2018; Heng et al., 2022; Thibault et al., 2024; Said et al., 2025).
Digestive Adaptation and Feeding Behavior	Specialized feeding behaviors; high digestibility of eelgrass; seasonal food consumption (Goto et al., 2004; Marsh et al., 2018).
Potential for Sustainable Dugong Farming Practices	No specific information; principles of sustainable agriculture could be adapted (Abobatta and Fouad, 2024; Sharma et al., 2024; Pakeerathan, 2025; Sarmiento, 2025).
Risks and Limitations of Using Non-native Feeds	No direct information; potential risks due to specialized diet (Tol et al., 2016; Marsh et al., 2018).
Implications for Conservation and Ex-Situ Management	Focus on seagrass habitat protection; threats include habitat degradation and fishing nets; community engagement is crucial (Hines et al., 2005; Rajamani, 2013; Tol et al., 2016; Hashim et al., 2017; Thibault et al., 2024; B. Wang et al., 2025).

Table 4 Dugong Live Stranding Cases Linked to Malnutrition or Food Scarcity

Aspect	Details
Diet and Food Scarcity	Seagrass loss leads to food scarcity, affecting dugong health (Marsh et al., 2018).
Trophic Ecology	Differences in diet between calves and adults; potential impact on resilience to food scarcity (Thibault et al., 2024).
Mortality and Chronic Debility	Chronic debility observed in stranded dugongs; potential link to malnutrition 3 (Owen et al., 2012).
Human Activities	Habitat degradation and over-harvesting affect seagrass availability, leading to food scarcity (Marsh et al., 2004).
Pathological Findings	Various lesions observed; limited direct link to malnutrition (Nielsen et al., 2013; Woolford et al., 2015).

CHEMICAL AND NUTRITIONAL ANALYSES OF FORAGES

Chemical and nutritional analyses of the forages included measuring dry matter digestibility (DMD), crude protein, and other nutritional parameters. The eelgrass fed to dugongs had a high nutritive value with 74% total digestible nutrients and 14.6% digestible crude protein on a dry matter basis (Goto et al., 2008). Additionally, the nutritional quality of seagrasses was assessed through various parameters such as carbon:nitrogen (C:) and carbon:phosphorus (C:) ratios (Burkholder et al., 2012). The nutritional quality of seagrasses was further evaluated through elemental ratios, particularly carbon:nitrogen (C:N) and carbon:phosphorus (C:P). Lower C:N and C:P ratios suggest higher protein and phosphorus content, respectively, which are critical for dugong nutritional requirements and digestive efficiency (Burkholder et al., 2012).

DUGONG FEEDING TRIALS AND MONITORING PARAMETERS

Feed intake and growth performance: dugongs showed a steady increase in feed consumption, with daily intake rising from 10-15 kg to 23-26 kg of fresh eelgrass (Goto et al., 2004). Growth performance was monitored, with dugongs gaining 42-45 kg per year 1. Behavioral observations: feeding behavior was monitored using AUSOMS-D, revealing nocturnal feeding patterns (Tsutsumi et al., 2006). Behavioral regulation of nutrient intake was assessed through feeding assays, indicating that dugongs regulate their intake of carbon and nitrogen (Machado et al., 2018). Fecal and digestive analysis: fecal samples were analyzed for reproductive hormone monitoring, providing insights into the reproductive status and nutritional health of the dugongs (Burgess et al., 2013). Digestive efficiency was evaluated, showing a high dry matter digestibility of over 90% (Goto et al., 2004).

Using the AUSOMS-D system, Tsutsumi et al. (2006) recorded distinct nocturnal feeding activity, with dugongs producing identifiable “cropping” sounds predominantly between midnight and 4 a.m., suggesting that they adjust their foraging activity based on environmental cues such as human disturbance and tidal cycles. Additionally, Machado et al. (2018) demonstrated that dugongs exhibit selective foraging behavior and regulate their intake of specific nutrients, particularly carbon and nitrogen. In controlled feeding assays, dugongs preferentially consumed seagrass species with lower C:N ratios, indicating an ability to modulate nutrient intake behaviorally.

Over nearly two decades of captive observation, dugongs showed gradual adaptation and increased intake, starting from 10–15 kg/day to 23–26 kg/day of fresh eelgrass (Zostera marina). This increase paralleled steady weight gain (42–45 kg/year) and increased body length. Notably, dugongs exhibited consistent daily feeding intervals, with feeding spread over 6–8 sessions throughout the day, rather than in one large bout—suggesting behavioral pacing of intake (Goto et al., 2004).

Fecal analysis in captive dugongs showed not only hormonal markers for reproductive status, but also provided indirect evidence of digestive efficiency (Burgess et al., 2013). Dugongs produced relatively low fecal bulk relative to intake, which, alongside the recorded dry matter digestibility >90% (Goto et al., 2004), suggests highly efficient digestion. Additionally, dugongs were observed to chew seagrass thoroughly, and discard tougher roots and rhizomes, indicating a behavioral sorting mechanism that enhances digestibility and intake quality.

STATISTICAL ANALYSES

Statistical analyses included: 1) pearson correlation statistics to describe relationships between feed intake, growth performance, and health variables (Bowen et al., 2021). 2) generalized linear models to examine the predictors of dugong presence and abundance based on seagrass nutritional quality and environmental parameters (Said et al., 2025). 3) structural equation modeling to illustrate the impact of forage plants in different terrains on feeding bias (Wang et al., 2024). Previous studies have employed various statistical approaches to understand dugong foraging ecology: Pearson correlation analysis was used to examine relationships between feed intake and growth (Bowen et al., 2021) generalized linear models assessed the influence of seagrass nutritional quality on dugong presence (Said et al., 2025) and structural equation modeling illustrated feeding bias across habitat types (Wang et al., 2024). While the current manuscript does not present new statistical analyses, these studies provide context for interpreting the relationships discussed herein.

Nutritional profile of forage species VS seagrass

Forage species such as bermudagrass, alfalfa, and Paspalum have varied nutritional profiles influenced by salinity levels. Higher salinity generally improves nutritional quality, increasing organic matter and crude protein (Robinson et al., 2004). Tropical forage legumes have higher ash-corrected neutral detergent fiber (aNDFom) and undigested neutral detergent fiber (uNDF240) compared to temperate forages (Nurdianti et al., 2024). Native and endemic plant species in arid regions show significant differences in fiber, protein, lipids, and minerals (Pérez-Reverón et al., 2024). Seagrass species like *Halophila ovalis* and *Syringodium isoetifolium* have high nitrogen and starch content, with *H. ovalis* showing the highest digestibility and lowest fiber content (Sheppard et al., 2008). Seagrass species in the Gulf of Mexico have varying protein, lipid, and carbohydrate contents, influencing herbivore preferences (Prado and Heck, 2011). The nutritional patterns described from external studies are partially reflected in our data (Tables 1–4), particularly in the protein, fiber, and mineral profiles of *Halophila ovalis*, *Paspalum*, and *Leucaena*, which align with trends reported under different environmental conditions.

Feed acceptability and palatability

Forage species' acceptability varies with nutritional quality and environmental conditions. For instance, kikuyugrass, despite high biomass, is less acceptable due to poor nutritional quality (Robinson et al., 2004). The palatability of forage species is influenced by their chemical and structural traits (Poore and Hill, 2006).

Seagrass palatability is influenced by structural and nutritional traits. Herbivores like sea urchins prefer seagrasses with higher nutritional content and lower structural defenses (Piñeiro-Vázquez et al., 2017; Jiménez-Ramos et al., 2018). *S. filiforme* is preferred by fish due to its high lipid and carbohydrate content (Prado and Heck, 2011).

Dugong weight gain, health, and digestibility outcomes

Dugongs consuming eelgrass (*Zostera marina*) show consistent weight gain of 42-45 kg per year, with daily consumption increasing with age (Goto et al., 2008). Dugongs exhibit high dry matter digestibility (>90%) of eelgrass, with seasonal variations in food consumption linked to high digestibility (Goto et al., 2008).

Behavioral changes and welfare indicators

Herbivores' feeding behavior is influenced by the nutritional and structural traits of their diet. For instance, sea urchins show increased consumption rates with higher nitrogen content in seagrass (Piñeiro-Vázquez et al., 2017). Behavioral indicators such as increased foraging and reduced inactivity are observed with dispersed and chopped food presentation in zoo-housed animals (Waasdorp et al., 2021). Indicators like cortisol levels and stereotypic behaviors are used to assess welfare. Higher cortisol levels are associated with stress, while increased exploration and reduced self-directed behaviors indicate better welfare (Svendsen et al., 2013; Podturkin et al., 2023).

Statiatical comparisons across diet treatments

Statistical comparisons reveal significant interactions between diet components and animal performance. For instance, higher protein and energy levels in diets significantly enhance weight gain and food conversion in fish (Gutiérrez A et al., 2009). Similarly, dietary fiber levels affect nutrient digestibility and energy availability in pigs (Lyu et al., 2019). Increased dietary β-glucans in pigs lead to higher digesta viscosity and altered nutrient absorption, highlighting the importance of diet composition on digestive efficiency (Schop et al., 2020).

SUITABILITY OF TERRESTRIAL FORAGES FOR DUGONG FEEDING

There is no direct information in the provided abstracts regarding the suitability of terrestrial forages for dugong feeding. Dugongs primarily feed on seagrass, and their feeding behavior and habitat preferences are closely tied to the availability and quality of seagrass meadows (Tol et al., 2016; Hashim et al., 2017; Marsh et al., 2018; Heng et al., 2022; Thibault et al., 2024; Said et al., 2025).

DIGESTIVE ADAPTATION AND FEEDING BEHAVIOR

Dugongs exhibit specialized feeding behaviors and digestive adaptations that are closely linked to their primary diet of seagrass. They feed by excavating or cropping seagrass, depending on its morphology and sediment type (Marsh et al., 2018). Dugongs have high dry matter digestibility of over 90% when consuming eelgrass, and their food consumption varies seasonally (Goto et al., 2004). Their digestive efficiency is comparable to that of terrestrial herbivores, although they are less effective at masticating fibrous seagrasses. Additionally, dugongs show dietary plasticity, adjusting their feeding behavior based on seagrass availability and quality (Tol et al., 2016; Thibault et al., 2024; Lanyon et al., 2025).

POTENTIAL FOR SUSTAINABLE DUGONG FARMING PRACTICES

The abstracts do not provide specific information on sustainable dugong farming practices. However, sustainable agricultural practices in general emphasize the importance of soil health, biodiversity, and efficient resource use (Abobatta and Fouad, 2024; Sharma et al., 2024; Pakeerathan, 2025; Sarmiento, 2025). These principles could potentially be adapted to marine environments to support dugong conservation and habitat management. This review explores how principles of sustainable forage and nutritional management, as applied in terrestrial systems, may inform habitat-based dugong conservation. While dugongs are not candidates for farming in the conventional sense, concepts such as forage supplementation and habitat rehabilitation can be adapted to improve captive care and rehabilitation protocols.

RISKS AND LIMITATIONS OF USING NON-NATIVE FEEDS

There is no direct information on the risks and limitations of using non-native feeds for dugongs. However, dugongs are highly specialized feeders that rely on seagrass, and any deviation from their natural diet could pose risks to their health and digestive efficiency (Tol et al., 2016; Marsh et al., 2018). Introducing non-native feeds might disrupt their natural foraging behavior and digestive processes, potentially leading to negative health outcomes.

There is no direct information on the risks and limitations of using non-native feeds for dugongs. However, dugongs are highly specialized feeders that rely on seagrass, and any deviation from their natural diet could pose risks to their health and digestive efficiency (Tol et al., 2016; Marsh et al., 2018). Introducing non-native feeds might disrupt their natural foraging behavior and digestive processes, potentially leading to negative health outcomes. While dugongs are highly specialized herbivores dependent on seagrass, preliminary consideration of alternative forages is discussed solely within the context of temporary care under controlled settings, such as rescue, rehabilitation, or experimental study. It is not intended as a substitute for natural habitat feeding, which remains irreplaceable for their long-term health and ecological function.

IMPLICATIONS FOR CONSERVATION AND EX-SITU MANAGEMENT

Conservation efforts for dugongs should focus on protecting and restoring seagrass habitats, which are critical for their survival (Hines et al., 2005; Tol et al., 2016; Hashim et al., 2017; Thibault et al., 2024; Wang et al., 2025). Habitat degradation, incidental catch in fishing nets, and coastal development are significant threats to dugong populations (Hines et al., 2005; Zeh et al., 2016). Effective conservation strategies include establishing protected areas, monitoring dugong populations, and engaging local communities in conservation initiatives (Hines et al., 2005; Rajamani, 2013). Ex-situ management could benefit from understanding dugong feeding behavior and digestive adaptations to ensure their dietary needs are met in captivity (Goto et al., 2004; Marsh et al., 2018).

CONCLUSION

Dugongs are specialized marine herbivores that primarily consume seagrasses with high digestibility and balanced nutrient profiles, such as *Halophila ovalis* and *Halodule uninervis*. Their feeding behavior, digestive adaptations, and health are closely tied to these native seagrass species. While terrestrial forage plants like *Brachiaria*, *Napier grass*, and *Leucaena leucocephala* offer promising nutritional profiles for ruminants, there is no empirical evidence supporting their suitability for dugong diets. Key concerns include palatability, digestive compatibility, and potential long-term health impacts. Attempts to use non-native forages or domesticate dugongs raise significant ethical and ecological issues. Dugongs play a vital role in maintaining seagrass ecosystems and are listed as vulnerable; any ex-situ management must prioritize their welfare and ecological function. Further research is needed to experimentally evaluate alternative diets, but current evidence strongly supports the continued reliance on native seagrass species for dugong health and conservation.

AUTHORS CONTRIBUTIONS

Rezki Amalyadi: conceptualization (lead); data curation (lead); formal analysis (lead); funding acquisition (lead); investigation (lead); methodology (lead); project administration (lead); resources (lead); software (lead); supervision (lead); validation (lead); visualization (lead); writing – original draft preparation (lead); writing – review and editing (lead).

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this manuscript to any party.

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