Original Research Article

Marketing challenges faced by seaweed farmers in Zanzibar, Tanzania

Abstract

Aim/purpose: This study was conducted to identify marketing challenges faced by seaweed farmers in Zanzibarand recommend suitable strategies

Methodology: A case study approach was adopted.Exploratory data was collected first through a sample of 30 farmers. Analysed data was used to develop semi-structured questionnaires for the rest of the farmers. 591 seaweed farmers fromboth Unguja and Pemba participated in the study. The farmers were selected through multistage sampling. Analysis of challenges was done through the Garrett ranking method.

Results: It was found that the leading marketing challenges for the seaweed farmers were the absence of minimum selling price, limited buyers and the inability to set prices. Similarly, the study found that the farmers face intense competition due to limited production variety and being large in number. Farmers also have limited marketing and promotional skills and lack business strategy. Further, it was also found that there exist limited market information sources for the farmers.

Conclusion: Several interventions are required to aid the farmers. These include government procurement and provision of storage facilities to minimise the offloading challenge, which disposed of farmers to low prices. Further, seaweed industry guiding policies should be created to facilitate industry trade and protect seaweed farmers against low demand and price fluctuations at a global level. Additionally, the seaweed industry's business strategy should be established with a clear vision, goals and objectives. Revival of seaweed farmers associations is also necessary to help the seaweed farmers in the production and marketing of their output.Moreover, establishing domestic and regional demand is vital for the industry's sustainability. Farmers should also receive capacity-building trainings to enhance their agri-business and marketing skills. Lastly, financial assistance should also be provided to promote seaweed value-addition activities.

Originality/value – Examinationofmarketing challenges faced by seaweed farmers in Zanzibar was conducted using the Garrett ranking technique, and suitable recommendations were proposed.

Keywords: Marketing challenges, Zanzibar's seaweed farmers

Introduction

Zanzibar is Africa's leading producer and exporter of raw *spinosum* and *cottonii* seaweeds and holds a fourth-world position in the global red seaweed market (Cai *et al*., 2021). The seaweed industry in Zanzibar is the third largest revenue generator for the Revolutionary Government of Zanzibar and the second leading cash crop exporter (OCGS, 2021). Commercial cultivation of seaweeds commenced in 1989on the islandand expanded to other parts of the island and mainland Tanzania(Msuya, 2002). Zanzibar produces more than ninety-eight per cent of seaweeds from the United Republic of Tanzania.

Seaweed aquaculture has become a source of employment for the rural coastal dwellers in Zanzibar. The farming activity has also contributed significantly to the livelihood improvement of its farmers (Msuya, 2002; Msuya, 2010; Songwe *et al*., 2016; Msafiri, 2021). The seaweed industry in Zanzibar employs about 25,000 farmers who are, to a large extent, women (about 90%) (Msuya*et al*., 2022). Seaweed farmers in Zanzibar have benefited significantly from the farming activity by gaining meaningful employment opportunities, alternative sources of income (e.g. for fishermen and other aquaculture farmers) and overall livelihood improvement. The significant contributions of seaweed aquaculture are more pronounced among its women farmers, where women farmers have been able to construct their own houses, pay children's school fees, and meet personal needs without relying on spousal support (Msuya, 2010).

However, despite its significant contributions, the seaweed industry in Zanzibar has failed to expand and generate consistent higher profits despite the growing world demand for seaweeds. The challenge of farmers' low prices in Zanzibar has been linked to hostile demandconditions in the international seaweed market and limited export product variety (Songwe *et al.*, 2016; Msafiri, 2021; Shimba, Magombola and Ibrahim, 2021; Charisiadou*et al*., 2022; Msuya*et al*., 2022). As already noted, Zanzibar exports two raw varieties of red seaweeds, i.e.*spinosum* and *cottonii*. Redseaweeds derive their commercial value from carrageenan extraction. Carrageenan is applicable in various industries as a thickening agent (pharmaceuticals, pet food, cosmetics). *Kappa-carrageenan from cottonii* fetches higher prices in the international markets than *iota-carrageenan* from *spinosum*; however, *cottonii*has been facing growth failures in Zanzibar since 2012 due to severe environmental and climate conditions (Charisiadou*et al*., 2022; Msuya*et al*., 2022). Thus, the island exports low-priced *spinosum* to a large extent than high-priced *cottonii*.Consequently, the low industry returnshave led to farm abandonments and declining production trends (Songwe *et al*., 2016).

Further, domestic consumption is almost non-existent, with only one per cent of total production consumed as a value-addition (Msuya*et al*., 2022). Porter (2004) stresses that only those businesses with home-based competitors can compete effectively in international markets.However, in the case of the Zanzibar seaweed industry, it inorganically matured to global markets without first establishing a domestic market.At the time of this study, it was found that there exists a very weak domestic market base comprising passing tourists and individual buyers from mainland Tanzania who buy in low volumes seasonally.No studieshave examined the factors behind the URT's limited seaweed domestic consumer base. Hence this study attempts to bridge the existing gap in knowledge by examining current marketing challenges faced by the industry producers and recommending suitable interventions for performance improvement in the industry.

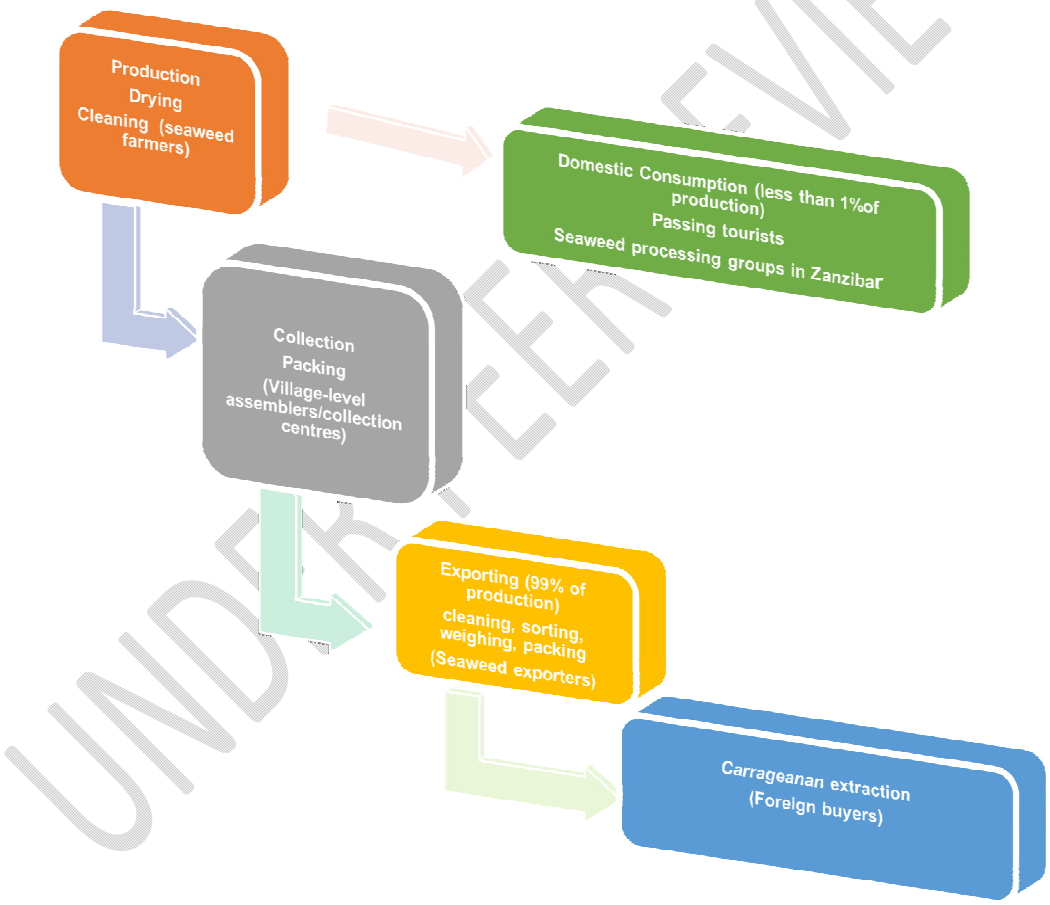

Figure 1: Marketing value chain of the Zanzibar seaweed industry

Materials and methods

This study was conducted in Zanzibar, Tanzania using a case study approach. Participants for the study were selected through multistage sampling. The study surveyed 592 farmers from 49 seaweed farming villages in Zanzibar. 291 farmers were selected from 24 villages in Unguja and 301 from 25 villages in Pemba. A triangulation mixed method design was implemented whereby exploratory data was collected first through a sample of 30 farmers. Analysed data was used to develop semi-structured questionnaires for the rest of the farmers. There were 591 seaweed farmer participants, 291 from Unguja Island and 301 from Pemba. The farmers were selected through multistage sampling. Analysis of challenges was done through the Garrett ranking method.

Garrett's ranking technique explained

Garrett ranking technique is a commonly used method applied by researchers when evaluating preferences or challenges faced by respondents. For instance, in studying; preference and ranking of E-Resources accessed by the Faculty (Dhanavan, 2016); status and constraints in fruits and vegetables export (Thulasiram and Alagumani, 2018); industrial problems (Aleeswari, Merline and Martin, 2019); and,factors influencing job satisfaction among teachers (Angayarkanni, 2021).

Garrett value is calculated using the following method:

$$\textbf{Percent position} = \frac{100\,(R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for the i^{th} variable by j^{th} respondents

N_j= Number of variables ranked by j^{th} respondents

Thus using Garrett's table, the per cent position calculated is converted into scores. Then for each factor, each respondent's scores are added and the total and mean values of scores are calculated. Factorswith the highest mean value are considered the most important.

Results and findings

Socio-economic profile of the seaweed farmers in Zanzibar

The socio-economic profile of respondents revealsseveral significant findings. First, there is limited participation of youth in the farming practice (2.74% and 3.98% in Unguja and Pemba, respectively)(**Table 1)**. The limited participation observed is attributed to the perception of the industry's unattractiveness due to low returns. Hence, most youths opt to engage in other higher-paying economic pursuits. However, since seaweed aquaculture in Zanzibar is practised in rural areas, with limited development in such areas, the youth are left with few economic alternatives. Most would migrate to Zanzibar-urban for jobs such as tour guides or construction. As a result, the island's rural areas are affected by the loss of an active working force. This is especially noted in the seaweed aquaculture practice because

farmers require labourers during planting and harvesting. This is because seaweed aquaculture is labour-intensive. Hence, they are forced to pay more for daily hires because of limited labour options, increasing farm operational costs.

Secondly, it can also be observed that the majority of farmers are female (more than 80%), thus confirming the work of previous researchers such as (Msuya, 2009; Msuya, 2010; Valderrama *et al*., 2015; Songwe *et al*., 2016; Kalumanga, 2018; Msafiri, 2021). Because of its low capital requirements and short production cycles, rural coastal women can easily engage in the activity and earn income regularly (in the case of seaweed farming, every after 45-60 days). Income from seaweed farming has enabled them to pay school fees, construct houses, and meet their personal and financial needs (source: farmers).

Third, most of the farmers were found to live in extended family settings. Most farmers lived with three to five dependents (grandchildren, own relatives,husband's relatives). This challenge negatively affects the farmers' income due to the financial implications that arise fromraised household expenditures and other economic burdens that the farmers should meet.

Fourth, it was found that the highest level of education for farmers from both islands was secondary education. Most farmers from Unguja and Pemba (45.70% and 38.87%, respectively) were found to have attained primary education, while only about 40.55% and 21.26% from both islands, respectively, had attained secondary education**(Table 1)**. The discrepancy in education levels is attributed to Unguja being more developed than Pemba.

Table 1: Summary profile of the seaweed farmers

		Islands			
		Unguja		**Pemba**	
Variables	**Sub-variables**	**N**	**%**	**N**	**%**
Age groups	20-30	8	2.74	12	3.98
	30-40	179	61.51	256	85.05
	40-50	71	24.4	13	4.32
	50-60	33	11.34	20	6.64
	Sub-total	**291**	**100**	**301**	**100**
Gender	Male	19	6.53	38	12.63
	Female	272	93.47	263	87.38
	Sub-total	**291**	**100**	**301**	**100**
Family Background	Nuclear family	23	7.90	14	4.65
	Extended/Joint family	268	92.10	287	95.35
	Sub-total	**291**	**100**	**301**	**100**
Education background	Illiterates	31	10.65	64	21.26
	Primary education	133	45.70	117	38.87
	Secondary education	118	40.55	115	38.21
	Short courses	9	3.09	5	1.67
	Sub-total	**291**	**100**	**301**	**100**

Source: Primary data

Marketing challenges faced by seaweed farmers in Zanzibar

The study's findings revealed that the absence of a minimum selling price (MSP) is the industry's leading marketing challenge. As already noted, Zanzibar seaweed production is mainly for exports; hence primary buyers for the farmers are exporters through their village collection centres. Seaweed associations for the farmers were found to exist in both Unguja and Pemba; however, they are dormant. Most farmers were not members and expressed disinterest in joining due to their perceived operational ineffectiveness. No seaweed cooperation was found on the island.

Farmers expressed that they are in no position to refute low price offers set by collectionscentres' officials since thereis no guiding industry policy. When this study was taken, there were about eight exporters recognised by the ministry of Blue economy and Fisheries, Zanzibar. The exporters are few against the current number of farmers (25,000). Even though they purchase in bulk, most farmers complain about the remaining harvests in their houses. With few buyers who buy in large quantities, farmers are left with no negotiating leverage and become price takers, thus being disposed to low-price offers.

Additionally to this challenge is that farmers produce similar variety and offload simultaneously, which poses them to drop in prices. Exporters pay farmers in Unguja between TZS 700-800 (US$0.30-0.35) per kg of dried *spinosum* seaweed and about TZS 2,000 (US$ 0.86) per kg for dried *cottonii*(source: farmers*)*.Farmers in Pemba receive about the same price per kg of dried *cottonii* but a relatively lower price per kg of spinosum, i.e. TZS 500 (US$0.22). The discrepancy in the price paid between the two varieties is because *cottonii'scarrageenan* is considered higher quality than *spinosum*.

Similarly, price offer disparities between Unguja and Pemba farmers can be attributed to exporting companies involved and production volume. ZANEA seaweed co ltd is the primary buying company in Unguja, while C-Weed co ltd is the primary buyer for Pemba island. Further, Pemba island produces twice the volume produced in Unguja because of favourable factor conditions and fewerecological challenges. As a result, during the time of harvest, when farmers usually offload at the time, the market becomes saturated, and demand-supply forces tend to drive prices down.

The Zanzibar seaweed industry uses the traditional off-bottom farming method, with a production cycle of between 45-60 days. A plot of seaweed farm in Unguja (50/100) produces about 50 kgs of dried *spinosum* in Unguja. In contrast, in Pemba, a plot of seaweed (100/200) produces up to 100 kgs of dried seaweeds (source: farmers). The differences in farm sizes between the two islands are attributed to factor conditions and ecology. The average number of plots owned ranges between one and eight seaweed farms. Hence, income from seaweed farming ranges between TZS 35,000 (US$ 15) and

TZS 280,000 (US$ 120) in Unguja and between TZS 50,000 (US$ 21.4) - TZS 400,000 (US$ 171.4) in Pemba per production cycle. A seaweed farmer can have an income of up to TZS 1,680,000 (US$ 720) (Unguja) and TZS 2,400,000 (US$ 1,028.6) (Pemba) per year.

Exporters determine prices based on prevailing demand conditions at international seaweed markets. The red-seaweed global market is heavily dominated by Asian producers, i.e.Indonesia, the Philippines and Malaysia, contributing to 98.8% of the world's production (Cai *et al*., 2022). The three leading countries export *spinosum* and *cottonii* varieties in raw and value-added forms.On the other hand, Zanzibar produces less than one per cent of the world's production and exports raw seaweeds in contrast to the Asian producers.Hence, in terms of competition, the scale of production, quality of seaweed thallus, proximity to buyers, and export product variety plays a significant role in determining price offers at the global level. Thus, Zanzibar is disadvantaged based on proximity to buyers and production scale.

Further, both the Asian producers and Zanzibar have similar buyers who are *carrageenan* processors,i.e.Chile, Denmark, the USA, Belgium and France.The buyers have high bargaining power due to; being few, lowswitching costs and high volume purchases.Therefore, to sell, seaweed exporters based in Zanzibar are left with no choice but to price their exports below prevailing global market prices. This challenge, in turn, translates to relatively lower prices paid to farmers.

Local demand on the island also exists but at marginal values (less than 1% consumption). The customer base for the local market consists ofsmall seaweed processing groups on the island, passing tourists and limited buyers from mainland Tanzania.However, these buyers are seasonal and purchase in low volumes. The nearly non-existent domestic customer base is underscored by limited awareness of the benefits of seaweeds and a lack of the industry's marketing and promotional activities.

Value addition exists but to a limited scale.Value-added seaweed products attract higher price margins than raw seaweeds; for instance, seaweed flour can be sold for TZS 10,000 (US$ 4.32) and soap up to TZS 3,500 (US$ 1.51) (source: farmers, personal observations). Expansion of the activities is constrained by limited seed and growth capital, lack of physical resources, training, and narrow distribution channels. Furthermore, even with value-added products, they are mainly sold to local passing tourists on the island who are seasonal and buy in low volumes (source: farmers).

Further, it was found that the marketing challenges faced by the industry's producers are also linked to limited marketing and promotional skills. Most farmers expressed that they cannot identify markets for their products and rely almost entirely on fellow farmers and exporters through village collection centres. Most farmers from Unguja Island (138/291)

rated themselves as having weak marketing skills compared to 34.4% from Pemba (104/301). About 30.7% of farmers in Unguja (89) rated themselves as having very weak marketing skills compared to sixteen per cent in Pemba (48). A considerable percentage (25% & 27%) of farmers from both Unguja (73 farmers) and Pemba (81 farmers), respectively, rated themselves neutral with regards to marketing skills levels. Lastly, very few percentages (9.9% & 9.5%) of farmers from Unguja (29 farmers) and Pemba (29 farmers), respectively, rated themselves as having strong marketing skills.

Similarly, for most farmers, seaweed farming is conducted based on historical and socio-cultural perspectives rather than being treated as a business. Most farmers engage in seaweed farming because of proximity to the beaches, ease of establishment and running and peer pressure. As a result, no coherent business plan is created to guide the economic activity, thus, poor outcomes.

Lastly, farmers lack storage facilities for harvested seaweed, leading to offloading challengeswhich prone them to low prices. Most farmers store dried seaweeds in their homes. The farmers also face transportation challenges to and from the production and collection centres. Farmers in most surveyed areas use cart transport to carry harvested loads from the production site to home and collection centres.Transportation costs per production cycle amount to about TZS 20,000 (US$ 8.57), which erodes their already limited incomes.

Table 2: Marketing challenges faced by farmers

	Unguja		Pemba	
Challenges	**Average**	**Rank**	**Average**	**Rank**
a. Absence of minimum selling price policy	79	1	82.7	1
b. Limited buyers	33.44	2	35.58	2
c. Inability to set prices	30.86	3	29.72	3
d. Limited value-addition	15.16	7	17.2	7
e. Logistics challenges	13.36	8	12.15	9
f. Limitedpromotional skills	10.2	10	11.24	10
g. Intense competition	29.28	4	30.14	4
h. Lack of market planning skills	27.8	5	27.8	5
i. Limited market information sources	25.36	6	23.38	6
j. Lack of business strategy	12.26	9	11.68	8

Source: Primary data

Conclusion

This study attempted to identify and examine marketing challenges facing seaweed farmers in Zanzibar, leading to low returns. The study found that the leading was the absence of minimum selling price, limited buyers and the inability to set prices. Similarly, the study found that the farmers face intense competition due to limited production variety and

being large in number. Farmers also have limited marketing and promotional skills andlack business strategy. Further, it was also found that there exist limited market information sources for the farmers.

Hence, severalinterventions are required to aid the farmers. First, government procurement of harvested seaweeds and provision of storage facilities is necessary to minimisethe offloading challenge, which disposed of them to low prices. Secondly, guiding industry policies should be created to facilitate industry trade and protect seaweed farmers against low demand and price fluctuations at a global level.The seaweed industry's business strategy should be established with a clear vision, goals and objectives for economic activity. Revival of seaweed farmers associations is also necessary to help the seaweed farmers in the production and marketing of their output.

Additionally, establishing domestic demand by investing in processing industries, linking farmers to vegetable markets, domestic industry integrations and creating regional demand is vital. Farmers should also receive capacity-building trainings to enhance their agri-business and marketing skills. Financial assistance should also be provided to promote seaweed value-addition activities. Lastly, further investment in infrastructure in rural Zanzibar is needed to alleviate or minimise farmers' transportation hassles.

Competing interests

Authors have declared that no competing interests exist.

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