



# Analysis of Fish Landing Price on Subjective Wellbeing of Fishers Around Lake Victoria, Tanzania

Damian Sambuo<sup>1</sup> · Stephen Kirama<sup>2</sup> · Kitala Malamsha<sup>1</sup>

© Springer Nature B.V. 2019

## Abstract

Landing price variations as a result of its determinations impact fishers' subjective wellbeing. This paper presents an analysis of the fish landing price effect on the subjective wellbeing of fishers around Lake Victoria, Tanzania. A cross-sectional study was carried out from the sample size of 289 of artisanal fishers. The multinomial logistic model employed to examine the effects of the landing price on the subjective wellbeing of fishers. This study found that landing price positively influenced subjective wellbeing satisfaction of fishers given that, often and all the time during landing, the landed price of fish is determined by fishers and negatively influencing subjective wellbeing of fishers for the rarely and some of the time this landing price is determined by fishers. This study concluded that there is a significant change on the subjective wellbeing of fishers with significant changes in the landing price in the way it is determined by fishers around Lake Victoria, Tanzania. It is recommended action to be undertaken by fishers to reduce rarely and some of the time, capability in determining landing price in order to minimize negative feelings on landing price received by fishers. This can be done through a collective agreement between fishers' cooperative framework, a room for provisions of pricing skills among artisanal fishers and buyers.

**Keywords** Fish · Landing prices · Subjective wellbeing · Artisanal fishers

---

✉ Damian Sambuo  
damiansambuo548@gmail.com

Stephen Kirama  
ngareni3@gmail.com

Kitala Malamsha  
mwishurie@yahoo.co.uk

<sup>1</sup> Department of Economics and Statistics, Moshi Co-operative University, P.O Box 474, Moshi, Tanzania

<sup>2</sup> Department of Economics, University of Dar es Salaam, P.O Box 35091, Dar es Salaam, Tanzania

## 1 Introduction

Globally, determinants of subjective wellbeing (SWB) of fishers remain inconclusive as studies explored various determinants of subjective wellbeing using different methodological approaches (Gillam and Charles 2018; Daw and Gabriëlsson 2016; Purcell et al. 2016a, b; Chandra 2010). Not all sorts of literature that explored subjective wellbeing determinants in individuals' level focused on landing price paid to fishers. Studies, including (Purcell et al. 2016a, b; Bjørnskov et al. 2008) were limited to some of the individual's wellbeing determinants and leaves open remarks on fish landing price.

Fish landing price is defined as the price of fish valued based on fish size, days spent in storage, type of vessel, grade, distance and time needed to reach primary buyers, and differences in market categories (McConnell and Strand 2000; Lee 2014; Gobillon et al. 2017). There are other factors such as the number of buyers, sellers, and management facilities that determine landing price and quantities sold which contribute to the individual wellbeing of fishers (Janssen et al. 2001). Fish are the animals traded for consumption nearly around 34,000 species living in fresh and salt waters (FishBase 2018).

While there are various measures of wellbeing, but individual wellbeing is subjective, known as subjective wellbeing which is the evaluations of the order of individual needs or level of satisfaction when needs are met (Dimoso 2009). The evaluations of needs satisfaction are based on their individual perceptions by cognitive judgments of their emotions and moods, experiences (Conceição and Bandura 2008; Kahneman and Krueger 2006). The individual needs including fishers are in terms of materials (for example, income, facilities, and other resources), relational with others, health and feeling about quality life (Britton and Coulthard 2013; Hallerod and Selden 2013).

According to Kambewa (2007) fishers are individuals who have fished and trading experience ranging from 2 to over 40 years. Despite the fact that fishing contributes to fishers' needs of food, employment and income in developing countries (Henson and Mitullah 2003). In Tanzania it is accounted for national wellbeing by 2.5% of real GDP (BOT 2017), and employed more than 4,000,000 people countrywide. Around Lake Victoria alone, 104,000 people are directly employed and about 500,000 more are indirectly employed (Abila 2015; Luomba 2009; URT 2010).

With the notable contribution of fishing to individual fishers and national wellbeing, accurate determinants of fishers' subjective wellbeing remain inconclusive. According to Easterlin Paradox, subjective wellbeing satisfaction does rise with average incomes, but only up to a point. Beyond that, happiness does not increase when income increases (Easterlin 1974, 2001). Therefore, income is not the only factors contributes to the subjective wellbeing of fishers.

The study of Pollnac and Poggie (2008) argued that despite the declining of income among fishers which could worsen subjective wellbeing achievement, satisfaction in fishers' occupation prevents fishers from leaving occupation; leaving narrow information of landing price effects on subjective wellbeing achievement among fishers (Pollnac and Poggie 2008). This contradicts with the findings of Phillips and Subasinghe (2010) who argued that the low income earned was caused by 'the way fish prices were determined' and dominated by middlemen; thus, deteriorating pleasant fishers' emotions for the autonomy of landing price determination and therefore affecting subjective wellbeing achievement.

Kambewa (2007) argues that 'the way fish prices are determined' is associated with the uncertainty of selling price, the power of negotiations, catch volume, type of buyer, deficiency of fishing gears and loans. Therefore, they affect fishers' emotions on life judgment

on the attainment of subjective wellbeing (Conceição and Bandura 2008) due to unsure determination of landing price or fish price to be paid during landing, hence forth deteriorates fishers subjective wellbeing. Moreover, Chandreshekar (2014) argued that a fisherman's cooperative strategy could improve and sustaining higher landing prices of fishes as a solution to subjective wellbeing of fishers.

Despite the restrictions of factors on subjective wellbeing achievement, the government of Tanzania facilitates constructions and availability of fishery facilities to ensure life satisfaction among fishers through receiving a better landing price (URT 2014). However, studies confirm variation of landing price impacts fishers' subjective wellbeing is caused by variations of fish freshness, quantities, and processed fish at markets. As a result, the variation of landing price affects economic incentives that bring fishers into subjective wellbeing (Asche et al. 2015; Lee 2014). The argument is similar to that of Deaton (2011) who argued that market shock prices, which affect national wellbeing, also affect individuals' wellbeing.

Various literature (Asche et al. 2015; Phillips and Subasinghe 2010; Pollnac and Poggie 2008) remarks that fishing remains a risky occupation with low income earned, but the way fish landing price is determined as an incentive that contributes to wellbeing achievement remains undisclosed around Lake Victoria, Tanzania.

Therefore, studies (Gillam and Charles 2018; Purcell et al. 2016a, b; Asche et al. 2015; Britton and Coulthard 2013; Hallerod and Selden 2013; Bergman 2012; Phillips and Subasinghe 2010; Pollnac and Poggie 2008) are in country-specific focused on other determinants of subjective wellbeing, and left fish landing price around Lake Victoria, Tanzania inconclusive in the way that it affects subjective wellbeing of fishers as depicted by Asche et al. (2015), Lee (2014), Deaton (2011) and Phillips and Subasinghe (2010).

There is little empirical evidence on the relationship between landing price and fisher's subjective wellbeing achievement, despite the notable contribution across the country at least in the study area around Lake Victoria, Tanzania. This study therefore filled this gap and contributes to reference resources to guide policymakers in addressing fishers' satisfaction for landing price and other associated benefits that contribute to fishers' subjective wellbeing achievement. The objective of the paper is to analyze the effects of fish landing price on the subjective wellbeing of fishers around Lake Victoria, Tanzania.

## 2 Theoretical Review

The study was guided by Maslow's hierarchy of needs theory (Dimoso 2009). Maslow's needs theory informed that an individual is motivated by his/her needs that contribute to wellbeing achievement (Dimoso 2009). These needs are in terms of material, relational and feeling about quality life that must be met (Britton and Coulthard 2013; Hallerod and Selden 2013) and therefore become self-actualized. Since fishers' subjective wellbeing is the different valuations of individual life in a given aspect experienced at a point in time (Reyes-García et al. 2016). Then in this study valuations includes fishers' satisfactions on feelings and fishing motivation from the landing price of fishes. This theory is a useful guide for understanding how fishers become self-actualized from landing price of fishes around Lake Victoria, Tanzania.

The theory assumes that the order in which individual needs are fulfilled does not always follow the standard progression and some needs are basic by all individual members (Maslow 1968). This enhances understanding the diversity and progression of fishers'

life valuations and in this case landing price. Valuation focuses on the involvement of fishers in determining fish landing price as one of the emotional influences on wellbeing achievement (Mannino and Caronia 2017). By involving on the determination of fish landing price, other fishers' needs are fulfilled by obtaining other socioeconomic benefits such as the amount of income from determining landing price, service, and fishing resources (Britton and Coulthard 2013; Borrero et al. 2013; Easterlin 1974, 2001). Therefore, these socioeconomic benefits also form part of fisher's subjective wellbeing (Daw and Gabrielson 2016; Reyes-García et al. 2016).

Despite the socioeconomic benefits associated with landing price, but autonomy on determination of landing price brings satisfaction to individuals as well as subjective wellbeing achievement as demonstrated by Ryan and Deci (2000) on the Self-Determination Theory (SDT). Then, with this assumption, if focused on landing price, the autonomy in determining landing price by fishers remains a need for the motivation to pursue fishing life as their main occupation and earn income. However, the exercise of market power on the determination of landing price associated with changes on loan arrangements and other fishing resources by monopolistic middlemen leads to welfare/subjective wellbeing losses of fishers (Mannino and Faraci 2017; Gordon and Hussain 2015; Dimoso 2009; Meyer and Cramon-Taubadel 2004). Despite the monopolistic tendency by middlemen, the capability approach as demonstrated by Amartya Sen by the year 1985 is useful to understand the capabilities of fishers' in determining landing price (Sen 1985). This approach supports the assumptions that fishers' needs to include the capability to acquire fishing facilities, vessels, and other resources that are useful on their capability to determine landing price henceforth subjective wellbeing achievement (King et al. 2014).

While among the criticisms of Maslow theory is that deficiency for one is not necessarily a deficiency in another. The theory is useful to this study because landing price remains important to all fishers. A change of landing price might affect fisher's happiness. Thus, the study focused on understanding how the landing price has an influence on the subjective wellbeing of artisanal fishers around Lake Victoria, Tanzania. This paper stated hypothesis that, there is no significant influence on the landing price on the subjective wellbeing of artisanal fishers around Lake Victoria in Tanzania. The paper is organized as follows, Sect. 1 presents an introduction, Sect. 2 presents theoretical review, Sect. 3 presented empirical review, Sect. 4 presents methodology, Sect. 5, presents the results and discussion thereof. The paper concludes in Sect. 6.

### 3 Empirical Review

Several studies, including Britton and Coulthard (2013), Hallerod and Selden (2013), Bjørnskov et al. (2008) and Kahneman and Krueger (2006) analyzed individual subjective wellbeing determinants such as age, family experience, income, or health and other external determinants including occupation satisfaction, management or values. Others are household size, personal relations, and marital status (Kabote 2018; Dimoso 2009; Bjørnskov et al. 2008; Shapiro and Keyes 2008). However, there are no agreed indicators of measuring or conceptualise determinants of subjective wellbeing (Cummins 2014).

King et al. (2014) recommended that subjective wellbeing measures features of individuals' perceptions of their experiences, the cognitive process of personal judgment, attribution and time perspective. Therefore, subjective wellbeing is not only a subject to economic wellbeing but also a psychological or sociological explanation that identifies situations

that brought individuals satisfaction (Borrero et al. 2013). Using individual experiences from interpersonal comparability approach, studies by Waldron (2010), Dimoso (2009) and Ferrer-I-Carbonell (2005) considered the basis of subjective wellbeing valuation in three response choices: 'Very dissatisfied', 'Dissatisfied' and 'Satisfied' from the question 'taking everything into account, how satisfied are you in this life in a way you are living these days?'. Meanwhile, a study of Lo Coco et al. (2018), use a similar approach, but differs in scale of response choices ranging from 1 (strongly disagree) to 4 (strongly agree) on measuring to subjective wellbeing.

Among the interpersonal comparability on determinants of subjective wellbeing, is a cross-sectional study by Dimoso (2009) that employed ordered probit model in the subjective wellbeing analysis of life satisfaction of individuals at household level from environmental conditions, income, occupation, household size, and environmental products. Meanwhile, with cross-sectional data, Reyes-García et al. (2016) used an ordered logit model on the relationship of the subjective wellbeing determinants which were absolute income, adaptation, social comparison and found that absolute income covariates with subjective wellbeing. Ruiz (2012) found that fishing is satisfying as an occupation, yet fishers can be dissatisfied about the level of earnings from selling due to the mechanism of fish price determination.

Purcell et al. (2016a, b) employed generalised linear mixed model (GLMM) and analyses a sale price of sea cucumbers and other fishers' determinants of subjective wellbeing satisfaction and found that there is gender diversity on prices of fishes. Purcell et al. (2016a, b) found that fishers were dissatisfied because they expected a set price for sea cucumbers, but were sometimes offered lower prices by fewer buyers. Therefore, it is with this ground in this study, cross-sectional data were employed in the multinomial logistic regression analysis of the fish landing price effects on subjective wellbeing satisfaction of fishers (Pellerone 2016; Dimoso 2009; Jackson and Mare 2007) by employing landing price, occupation, age, household size, education, personal relation and marital status as independent variables that are determinants of fishers' subjective wellbeing.

## 4 Methodology

### 4.1 Data Source and Sampling

This study employed cross-sectional data of fishers living around Lake Victoria, in the Mwanza region and was collected by enumerating sample respondents at Buchosa and Sengerema Districts within the region. The design allows data collected from the two different Districts at a single point in time by including detections of multiple variables associated with similar patterns (Bryman 2008). The two Districts were selected based on ranking with a high collection of fish catches within the Mwanza region, a 'leading fish market stop centre' with seven fish processing industries, fish trading and exporting (URT 2017). This region surpasses the other regions near Lake Victoria. There are fishers of a total of about 52,942 in the Mwanza region on the shores of Lake Victoria (URT 2014).

According to FAO (2014), artisanal fishers are fishers using relatively small amounts of capital and energy whose fishing is primarily for local consumption. A large part of their catch is for local markets in landing sites (Hoof and Kraan 2017). Sample respondents of artisanal fishers for this study were obtained through a stratified sampling of six landing sites, active in landing processes and the sale of fish landed, the criteria given by respective

District Fishery Officials. The selected landing sites were Busisi, Kijiweni, and Nyakalilo in the Sengerema District, and Kanyala, Itabagumba, and Bulyaheke in the Buchosa District. A pre-tested questionnaire was initially administered to 15 randomly selected respondents (5% of total respondents) for the purpose of rectifying unfamiliar terms used therein.

A study involving the full sample was later conducted using both quantitative and qualitative data to fishers. Quantitative data were collected by using a rectified questionnaire to obtain information related to socio-demographic characteristics of fishers, landing prices, determination of landing price, perceptions on life satisfaction, the contribution of physical and non-physical materials to fishers' life satisfaction. Therefore, a final sample size included 300 fishers computed by using Israel (2013) formula,  $n = N / (1 + N(e^2))$  where  $n$  is the sample size,  $N$  population size,  $e$  is the level of precision. The precision level of  $\pm 5\%$ , which is the acceptable sampling error, equivalent to 95% confidence level was employed. From an estimated total population of 1200 fishers from two districts, then  $n = 1200 / (1 + 1200(0.05)^2) = 300$ . Out of 300 fishers, 289 completed the questionnaire, a 96% response rate, and were used in the analysis. The remaining incomplete questionnaires were discarded. This was in line with the suggestion by Evans (1991) that a high response rate (> 80%) from a sample is preferable.

Qualitative data were collected to support the results on quantitative data, focused on so by using Focus Groups Discussion (FGD) and Key Informant Interviews (KII). Therefore, six FGD was formed, one for each landing site, the approach is useful in addressing the heterogeneity between and within groups (Novara 2018). Each FGD consisted of five fishers, selected to identify fishers with the ability to elicit information on fishery occupation, determination and contributions of landing price on wellbeing as well as socio-economic benefits from fishing activities. Key Informant Interviews (KII) were conducted to enrich FGD themes, facts and figures of subjective wellbeing and landing prices from the questionnaire. The KII constituted of three, purposefully selected leaders from fishers, one buyer from Sengerema, one agent from Buchosa, two Beach Management Unit (BMU) leaders, two District fishery officers, one representative from the Tanzania Fisheries Research Institute (TAFIRI) and two village executive officials, a total of 12 key informants. Since different vessels catch more than one species of varying fish sizes, data collected from artisanal fishing was based on subsistence, commercial and quantity marketed for more than one species (Hoof and Kraan 2017).

## 4.2 Variable Descriptions

Independent variables included in this study are landing price, age of fishers, age squared, fishery occupation, household size, education, personal relation, and marital status. With consideration of the fishing experience around Lake Victoria, Tanzania, artisanal fishers had no mechanism installed in the past to obtain previously recorded fish landing price trends per unit items of fish species sold. Therefore, the landing price was redefined as the frequency of time that fishers experienced in determining the landing price and brought satisfaction at a period of time of their fishing life (Mannino et al. 2017). This approach, as used by Dimoso (2009) found useful to capture interpersonal fishers' perception of self-satisfaction and motivation for a paid landing price upon decision during selling as depicted by Maslow's needs theory (Dimoso 2009).

The fishing occupation remains of importance to fishers' capability on the way landing price is obtained. Eggert and Lokina (2007) argued that artisanal fishers depend largely

on the fishing occupation for daily household needs and are earning a significantly lower income than the large-scale fishers. Therefore, the occupation was another independent dummy variable employed in assessing whether artisanal fishers undertake fishing activity as the main source of income thus form part of their capability to obtain satisfied landing price. Thus, it is paramount to understand the contribution of fishing occupations on SBW satisfactions.

Age was measured as a number of years after birth and age square was included taking into consideration that age is U-shaped with life satisfaction as supported by a wide-ranging of literature (Di Tella et al. 2001; López Ulloa et al. 2013). Age squares were included to represent non-linear age effects (Dimoso 2009). Household size represents a number of family members; it is suggested to have a relation with subjective wellbeing (Dimoso 2009; Kabote 2018). Personal relation was a dummy variable referring to relation satisfaction with buyers that avails availability of contractual arrangement on fishing vessels and determination of landing prices. Personal relation satisfaction was considered to contribute to subjective wellbeing; as suggested, it varies from group relationship, such as crew, family and community members (Britton and Coulthard 2013; Gullo et al. 2015). This suggests that the fisher’s satisfying relationship with buyers contributes to SBW. Marital status and education level of the individual were also recommended to impact SBW (Dimoso 2009; Bjørnskov et al. 2008).

The dependent variable is SBW, but with the existing limitations of measuring subjective wellbeing, this study employed the standard measure of subjective wellbeing as overall appreciations of one’s life (Reyes-García et al. 2016). The standard question used to measure subjective wellbeing in this study is ‘taking everything into account, how satisfied are you in this life in a way you are living these days for the past twelve months?’ Then, the result of SWB was measured as 1 = ‘Very Dissatisfied’, 2 = ‘Dissatisfied’, 3 = ‘Satisfied’. The period of twelve months was included to capture the inclusions of other cross-section data (Dimoso 2009).

### 4.3 Analytical Framework

This study analysis follows the approach by Dimoso (2009), reported that subjective wellbeing (SWB) is denoted using  $P$  as different ‘naturally’ ordered labels ‘Very dissatisfied’, ‘Dissatisfied’ and ‘Satisfied’ denoted as  $a_i=1-3$  as the scale answer to the satisfaction question from an individual  $t$ , which belongs to the ordered set of labels  $L_p=L_1, L_2, L_3$ .  $P_a$  are the two threshold parameters representing estimated intercept terms and  $SWB^*$  is an unobserved latent variable, such that:

$$SWB_i = a_i = L_p \leftrightarrow P_a \leq SWB_i^* < P_{a+1} \tag{1}$$

Furthermore,

$$SWB_i = \begin{cases} 1 & \text{if } SWB_i^* < P_a \\ 2 & \text{if } P_a \leq SWB_i^* < P_a + 1 \\ 3 & \text{if } SWB_i^* < P_a + 1 \end{cases}$$

where  $P_a < P_a + 1$

Therefore, the model appears as:

$$SWB_i = \beta_0 + \beta_{ij}x_{ij} + \beta_{ij}V + \varepsilon \tag{2}$$



In this model,  $SWB_i$  is a multinomial variable recoded into three categories: {1—‘Very Dissatisfied’, 2—‘Dissatisfied’, 3—‘Satisfied’},  $x_{ij}$  is the set of other explanatory variables.  $V$  denotes fish landing price measured as a categorical variable: {1—‘None of the time’, 2—‘Rarely’, 3—‘Some of the time’, 4—‘Often’, 5—‘All of the time’}. Other selected explanatory variables are occupation (O) {1—Yes, 0—No}, age (A) and age squared ( $A^2$ ), education (E) measured as {1—‘illiteracy’, 2—‘incomplete primary school’, 3—‘complete primary school’, 4—‘high school and above’}, household size (H) and marital status (M) indicated as: {1—Unmarried, 2—Married/Single with a partner, 3—Divorced or separated, 4—Widowed}.

Furthermore, the study also included the variable for personal relations satisfaction (R) measured as {1—‘None of the time’, 2—‘Rarely’, 3—‘Some of the time’, 4—‘Often’, 5—‘All of the time’}. Therefore, the following expression was used for empirical analysis:

$$SWB_i = \beta_0 + \beta_{ij}O_{ij} + \beta_{ij}A_{ij} + \beta_{ij}H_{ij} + \beta_{ij}E_{ij} + \beta_{ij}M_{ij} + \beta_{ij}R_{ij} + \beta_{ij}V_{ij} + \varepsilon \quad (3)$$

The study used multinomial logistic regression model (MLM) because subjective well-being is a choice categorical dependent variable with an assumption that the choice of membership in one category is not related to the choice or membership of another category. The assumption of independence can be tested with the Hausman-McFadden test. Furthermore, multinomial logistic regression also assumes non-perfect separation.

Since the general form of the MLM model is described

$$Pr_{ij} = \frac{\exp(\beta_{ij}x_{ij})}{1 + \sum_{k=1}^J \exp(\beta_{ik}x_{ij})}$$

The log-likelihood function for the multinomial logit model is given by

$$Pr_{ij} = \sum_{i=1}^n \sum_{j=0}^J d_{ij} \ln \frac{\exp(\beta_{ij}x_{ij})}{\sum_{k=1}^J \exp(\beta_{ij}x_{ij})}$$

where  $Pr_{ij}$  is the probability that an individual  $i$  chooses an alternative  $j$ . The  $x_i$  is a vector of variables of the individual  $i$ ,  $j$  is the number of unordered alternatives,  $\beta_j$  measures the contribution of variables  $i$  to the probability of choosing an alternative  $j$ , and  $\beta_k$  measures the contribution of personal characteristic  $i$  to the probability of selecting the alternative  $k$ .

The log-likelihood function for the multinomial logit model is given by:

$$\ln L_{ij} = \sum_{i=1}^n \sum_{j=0}^J d_{ij} \ln \frac{\exp(\beta_{ij}x_{ij})}{\sum_{k=1}^J \exp(\beta_{kj}x_{ij})}$$

where  $d_{ij} = 1$  if an individual chooses  $i$  with alternative  $j$  and  $d_{ij} = 0$  otherwise (Green 2000). Coefficients of the MLM are difficult to interpret because of the proliferation of parameters, which results in increased complexity in interpreting the estimates (Green 2000). The coefficients are interpreted using the odds ratio, which is the exponentiated coefficient. The odds ratio is calculated by contrasting each category with the reference category. The odds ratio shows a multiplicative change in the odds for a unit change in an independent variable. It is interpreted as a one-unit change in the independent variable; the odds are expected to change by a factor of  $\exp(\beta)$  when other things are equal.

On the other hand, qualitative data were analyzed with content analysis focusing on key issues related to the significance of the fish landing price on individual wellbeing of



fishermen for triangulation purpose. Participants' quotes were chosen according to their relevance to the research objective. Analysis of qualitative data follows transcriptions, classification and manual coding of the field KII and FGD transcripts, notes, and recorded audio, images and text documents. Thereafter, identification of the common themes from the coded data was compared and linked to the study objective. These data were then summarized by remarkable quotations and tabulations from the transcript in order to highlight themes within the findings. Therefore, this study employed both quantitative and qualitative data analysis, a mixed method in a parallel approach for an effective understanding and exploration of quantitative data findings and implications of qualitative results using quotations and tabulated transcripts (Wisdom and Creswell 2013).

## 5 Results and Discussion

### 5.1 Socio-demographic Characteristics of Respondents and Wellbeing Achievement

The study established socio-demographic characteristics of respondents in relation to wellbeing achievement in terms of age, sex, household size, marital status, occupation, experience and gross income of the fishers as suggested by Borrero et al. (2013) and Easterlin (1974, 2001). Results in Table 1 show that the fishing occupation involves about 91% of the fishers who rely on it as the main source of income. This support Kahneman and Krueger (2006) argument that the fishers' occupation provides higher self-actualisation level of job satisfaction and wellbeing (Pollnac and Poggie 2008) with the majority of fishers aged 27 years with the average fishing experience of 14 years. This indicates that majority of fishers start early fishing activities at the age of 13 years old.

**Table 1** Socio-demographic characteristics of respondents (n = 289)

Variables	Sub-variables	Descriptive statistics			
		Mean	Percentage	Max	Min
Age		27		44	15
Sex	Male	0.97	96.9		
	Female	0.03	3.1		
Household size		4		11	1
Marital status	Married/single with a partner)	133	46		
	Divorced or separated	66	23		
	Unmarried	75	26		
	Widowed	15	5		
Occupation	Fishing	1.09	91	3	1
Education	High school and above		21		
	Complete primary school		59		
	Incomplete primary school		13		
	Illiteracy		7		
Experience		14		21	1
Income (TZS)		4500,000		868,000	300,000

This concurs with the recommendation given by a BMU leader as a key informant who reported that: ‘... We found our grandparents working here as fishers and they imparted us with the same fishing skills, the way to meet buyers and agreed to the pricing of fishes and therefore no other alternative skills that could satisfy us more than fishing...’ (Nyakalilo Ward—April 2017). Therefore, happiness in fishing life is part of an outcome of their pricing decisions contributing to subjective wellbeing achievements. Also, among the respondents, 97% are men and 46% are married, moreover the responses indicated that about 79% are of primary school education level, implying that correlation with fishing as a labor-intensive is an occupation that requires hard skills for life satisfaction.

Apart from a varied percentage of benefits of subjective wellbeing on an income basis of fish species caused by their differences in prices during landed, Table 2 shows available fishing vessels and other facilities from the respondents- including fishing gear, handline fishing, longline, trawl, wooden sailboat, canoes, and cooling storages contracted from agents or own source that satisfied life in the fishing occupation with regard to earned income. During a focus group discussion with an explanation on how fishers obtain some of these fishing vessels in relation to landing price, one fisherman responded that ‘... Fishing vessels are very helpful, but some vessels are expensive to be owned by an individual fisher, so he obtained them from buyers/agent in an agreement that the cost of the vessel to be deducted from landing price that he would have been supposed to be paid...’ (Busisi—April, 2017. Therefore, the landing price is subject to the availability of these vessels that

**Table 2** Percentage contribution of available resources and facilities to fishers’ subjective wellbeing (n = 289)

Physical and non-physical resources	Percentage of benefit	Physical and non-physical resources	Percentage of benefit		
Fishing occupation	91%	Non-agricultural assets	Car	00%	
Income from fish species	Nile Perch		29%	Motorcycle	21%
	Nile Tilapia		24%	Livestock	56%
	Sardine		26%	Television	07%
	Other species		07%	Radio	82%
Income from non-fishing	14%	Bicycle	61%		
		Mobile phones	92%		
	Fishing gear	21%	Houses	Burnt bricks	56%
	Handline	56%		Cement blocks	08%
	Longline	12%		Mud and trees	74%
	Trawl	62%		Unburnt bricks	21%
	Wooden-sail boats	11%		Grass	08%
	Canoes	76%		Iron sheets	81%
	Cooling Storage	36%			
	Agricultural assets	Tractor	04%		
Plough		26%			
Wheelbarrow		12%			
Cart		14%			
Hand hoe		100%			

facilitates the ability to the landing of fishes by the available vessels and is considered to be contributing to the satisfaction of individual wellbeing.

The study also revealed subjective wellbeing achievement on fisher landing price using descriptive statistics (Granieri et al. 2017) in percentage form in terms of feelings useful, feelings relax, deal with the price problem well and thinking, careful of determine landing price as suggested by Dolan and Robert (2012) to get more insight of the individual subjective wellbeing.

Table 3 are the results of the landing price feelings on subjective wellbeing achievement of fishers in the way are participating in the determined landing price of fishes. It was found that for the determined landing price allows fishers to enjoy maximum satisfaction, about 52% only are feeling useful to determine landing price, whereas about 21% are the only relaxed and satisfied with landing price as well as 26% deals with the price problem very well.

The percentages distribution in Table 3 suggests that the way pricing problems are resolved does not satisfy their subjective wellbeing that why majority of respondents about 74–79% are not relaxed or deal with price problem very well. Also, a large percentage of about 80% of respondents agreed to think carefully on how to get a better landing price that satisfies their life.

## 5.2 Effects of Landing Price on the Subjective Wellbeing of Fishers

In Table 4, often-determined landing price by fishers was found to be positively and significantly influencing subjective wellbeing satisfaction at 5% level of significance with an odds ratio of 0.31. Moreover, with the case that, all the time-determined landing price by fishers found significant and positive influencing satisfaction on the subjective wellbeing of fishers at an odds ratio of 0.94 and 5% level of significance. Both odd ratios indicated that multiplicative effects on subjective wellbeing satisfaction are greater than dissatisfaction. The odds ratio of 0.071 and 1.213 for rarely and some of the time landing price determination respectively are indicating the multiplicative effect of persistence of dominance of landing price determination caused by monopolistic middlemen in the around Lake Victoria, Tanzania. Therefore, fishers are not satisfied with the frequency of involvement in the determination of fish landing price.

By implication means that fishers are more satisfied with landing price if they are autonomous in determining landing price and dissatisfaction is caused by persistence of middlemen dominance behaviour at landing sites. The findings concur with results of Table 3 that, above 50% of fishers are feeling satisfied on subjective wellbeing by being involved in determining landing price. Moreover, a similar emphasis was given during the KII with BMU leader that, middlemen dominance behaviour on fish price determination at landing sites is caused by them being the first price information receiver. This is because middlemen are linked with major buyers who are fish processing facilities at Mwanza City (Kanyala—April, 2017).

Therefore, more frequent involvement of fishers in determining landing price over time experienced by fishers is subject to better life satisfaction (Mannino et al. 2017). Fishers who do not at all determine LP—or those who rarely do—may fail to achieve wellbeing because agents or middlemen may set a low price to make higher profits and dominate landing price determination. This concurs with findings by Deaton (2011), Dimoso (2009) and Chen (1999) who conclude that market price, monetary and oligopoly price discrimination affect wellbeing. This finding concurs with Maslow (1968) on the assumption that

**Table 3** Fishers satisfaction feelings about landing price (n = 289)

Items	Frequency	None of the time (%)	Rarely (%)	Some of the time (%)	Often (%)	All the time (%)	Total
1 Feeling useful in determining price	289	7	14	28	31	21	100
2 Feeling relaxed for landing price	289	24	24	31	18	3	100
3 Dealing with price problems well	289	21	19	35	24	1	100
4 Thinking carefully to get better price	289	12	8	24	30	26	100

**Table 4** Effects of fish landing price on subjective wellbeing

Variables	Dissatisfied		Satisfied	
	Coefficient (SE)	Odds ratio [Exp( $\beta$ )]	Coefficient (SE)	Odds ratio [Exp( $\beta$ )]
(Constant)	-0.203*** (0.067)	0.134	-0.657*** (0.204)	0.673
Landing price (Ref: none of the time)				
Rarely determine landing price	0.321* (0.011)	0.071	0.289 (0.187)	0.119
Some of the time determine landing price	0.262** (0.023)	1.213	0.130 (0.071)	0.172
Often paid determined landing price	0.119 (0.087)	0.714	0.083** (0.013)	0.310
All the time determined landing price	0.121 (0.736)	1.534	0.145** (0.023)	0.940
Occupation	1.435 (0.803)	0.825	0.701** (0.109)	1.025
Age in years	-0.006 (0.009)	0.673	-0.008 (0.005)	0.527
Age square	0.000 (0.000)	0.430	0.000 (0.000)	0.497
Household size	0.021 (0.000)	0.542	0.043 (0.021)	0.812
Marital status (Ref: married/single with a partner)				
Marital status for unmarried	0.176* (0.067)	1.233	0.197** (0.082)	0.765
Marital status for divorced or separated	0.623* (0.273)	0.645	0.335** (0.107)	1.293
Marital status for widowed	0.021 (0.551)	0.530	0.001 (0.00)	0.576
Education (Ref: incomplete primary school)				
Level of education for illiteracy	0.152 (0.432)	0.735	0.202 (0.106)	0.683
Level of education for complete primary school	0.231 (0.137)	0.442	0.379*** (0.101)	0.494
Level of education for high school and above	0.023 (0.042)	0.372	0.053 (0.037)	0.401
Personal relation satisfaction	0.137 (0.214)	0.450	0.315 (0.348)	0.437

Likelihood ratio: Chi square ( $\chi^2$ )=221.07 ( $P$  value < 0.05)

\*, \*\*, \*\*\*Estimated coefficient is significant at the 0.10, 0.05, and 0.01 level, respectively. N = 289

some needs, including autonomy on a landing price determination by fishers, are basic to all fishers and supported by Ryan and Deci (2000).

Even though not form the basis of discussion in this study, the study results in Table 4 also shows that occupation, education and marital status for unmarried, divorced or separated fishers were other significant variables found positively influencing subjective wellbeing of fishers. The results concur with Reyes-García et al. (2016). This suggests that the

more efforts on land catches among artisanal fishers with the available vessels are better off for subjective wellbeing satisfaction in terms of more earning of the income, fishing resources acquired and feeling about quality life if at all landing price is determined by fishers. By implication, it indicates that landing price is the needs that bring self-actualized in terms of feelings about quality life, as well as other fisher's material needs, are fulfilled in the course of determining it. Therefore, the autonomy of landing price determination by fisher's is motivating their happiness in fishing life. This finding supports the Maslow theory of needs on the assumption that the needs that bring self-actualised are in terms of material and feelings about quality life. It also contributes to the Easterlin paradox that landing price is forming among the factors found to influence subjective wellbeing. Therefore, in the fishery sector, the determination of the landing price is paramount to fishers' life satisfaction.

## 6 Conclusion

The fact that the fishery sector is vital for social, economic, policy and planning and therefore knowledge on information brought from landing price and subjective wellbeing of artisanal fishers remain supportive to policymakers. This study found that there is a significant effect of landing price on the subjective wellbeing of fishers around Lake Victoria, Tanzania in terms of the frequency of Fisher's participation in the determination of landing price as highlighted by Maslow theory and Self-Determination Theory. Thus, the hypothesized null hypothesis which stated that there is no significant influence on the landing price on the subjective wellbeing of artisanal fishers around Lake Victoria in Tanzania was rejected. Therefore, the study concluded that landing price has an influence on the subjective wellbeing of fishers around Lake Victoria, Tanzania.

Since findings show that some of the fishers are rare and sometimes, determined landing price, it is recommended action to be undertaken by fishers to reduce rarely and some of the time, capability in determining landing price in order to minimize negative feelings on landing price received by fishers. As argued by Mannino and Faraci (2017) establishing a new organizational form can lead to wellbeing achievement of workers/fishers. Therefore, fishers can establish a proper mechanism for price determination and negotiation with buyers as well as strengthening fishery occupation. This can be done by establishing a collective agreement between fishers and buyers, by using fishers' cooperative framework, a tool to raise capital for ownership of fishing vessels and acquire skills on pricing among fishers, therefore leads to better landing price and subjective wellbeing achievement.

## References

- Abila, R. (2015). *Fish trade and food security: Are they reconcilable in Lake Victoria*. Retrieved from <http://www.fao.org>. Accessed 2 June 2015.
- Asche, F., Chen, Y., & Smith, M. D. (2015). Economic incentives to target species and fish size: Prices and fine-scale product attributes in Norwegian fisheries. *ICES Journal of Marine Science*, 72, 733–740. <https://doi.org/10.1093/icesjms/fsu208>.
- Bergman, J. (2012). Nile Perch Export and Welfare around Lake Victoria Has the boom in exports been positive for welfare. Retrieved from [https://gupea.ub.gu.se/bitstream/2077/29748/1/gupea\\_2077\\_29748\\_1.pdf](https://gupea.ub.gu.se/bitstream/2077/29748/1/gupea_2077_29748_1.pdf).

- Bjørnskov, C., Dreher, A., & Fischer, J. A. V. (2008). Cross-country determinants of life satisfaction: Exploring different determinants across groups in society. *Social Choice Welfare*, 30(1), 119–173. <https://doi.org/10.1007/s00355-007-0225-4>.
- Borrero, S., Escobar, A. B., Cortés, A. M., & Maya, L. C. (2013). Poor and distressed, but happy: Situational and cultural moderators of the relationship between wealth and happiness. *Estudios Gerenciales*, 29(126), 2–11.
- BOT. (2017). Bank of Tanzania Annual Report 2015/16. Retrieved from <https://www.bot.go.tz/Publications/EconomicAndOperationsAnnualReports/BOT%20ANNUAL%20REPORT%202015-16.pdf>.
- Britton, E., & Coulthard, S. (2013). Assessing the social wellbeing of Northern Ireland's fishing society using a three-dimensional approach. *Marine Policy*, 37(C), 28–36. <https://doi.org/10.1016/j.marpol.2012.04.011>.
- Bryman, A. (2008). *Social research methods* (p. 784). New York: Oxford University Press.
- Chandra, G. (2010). Impact of adoption of pen culture technology on well-being of fishers of Haribhanga Wetland in Assam. *Indian Research Journal of Extension Education*, 10(2), 61–65.
- Chandreshekar, B. S. (2014). Fishery co-operative societies in India: Problems and prospects. *Global Journal for Research Analysis*, 3(7), 2277–8160.
- Chen, Y. (1999). Oligopoly price discrimination and resale price maintenance. *The Rand Journal of Economics*, 30(3), 441–455.
- Conceição, P., & Bandura, R. (2008). *Measuring subjective wellbeing: A summary review of the literature*. UNDP development studies—Working paper. Office of Development Studies, UNDP, New York, NY.
- Cummins, R. A. (2014). *Subjective indicators of well-being*. *Encyclopedia of quality of life and well-being research*. Dordrecht: Springer. <https://doi.org/10.1007/978-94-007-0753-5>.
- Daw, T., & Gabriellsson, I. (2016). What has wellbeing got to do with the price of fish: A focus on fishers' income might miss opportunities for sustainable poverty alleviation. In *ESPA 2016 annual science conference*. Retrieved from <https://www.espa.ac.uk/news-blogs/blog/what-has-wellbeing-got-do-price-fish-focus-fishers%E2%80%99-income-might-miss-opportunities>.
- Deaton, A. S. (2011). The financial crisis and the well-being of Americans. NBER working paper series. Working Paper 17128. National Bureau of Economic Research. <https://doi.org/10.3386/w17128>.
- Di Tella, R., MacCulloch, R., & Oswald, J. (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review*, 91(1), 335–341. <https://doi.org/10.1257/aer.91.1.335>.
- Dimoso, R. L. (2009). Environmental degradation and intra household welfare: The case of the Tanzanian Rural South Pare Highlands. Ph.D. Thesis, Wageningen University, Wageningen, NL.
- Dolan, P., & Robert, M. (2012). Measuring subjective wellbeing: Recommendations on measures for use by national governments. *Journal of social Policy*, 41(2), 409–427. <https://doi.org/10.1017/S004727941000833>.
- Easterlin, R. A. (1974). Does economic growth improve the human lot? Some empirical evidence. In P. A. David & M. W. Reder (Eds.), *Nations and households in economic growth: Essays in honor of Moses Abramovitz* (pp. 89–125). New York: Academic Press.
- Easterlin, R. A. (2001). Income and happiness: Towards a unified theory. *The Economic Journal*, 111(473), 465–484.
- Eggert, H., & Lokina, R. B. (2007). Small-scale fishermen and risk preferences. *Marine Resource Economics*, 22(1), 49–67. <https://doi.org/10.1086/mre.22.1.42629535>.
- Evans, S. J. (1991). Good surveys guide. *British Medical Journal*, 302(6772), 302–303. <https://doi.org/10.1136/bmj.302.6772.302>.
- FAO. (2014). *The state of world fisheries and aquaculture: Opportunities and challenges*. Retrieved from [www.fao.org/3/a-i3720e.pdf](http://www.fao.org/3/a-i3720e.pdf). Accessed 2 June 2015.
- Ferrer-i-Carbonell, A. (2005). Income and well-being: An empirical analysis of the comparison income effect. *Journal of Public Economics*, 89, 997–1019.
- FishBase. (2018). [<http://www.fishbase.org/search.php>] site visited on December 15, 2018.
- Gillam, C., & Charles, A. (2018). Fishers in a Brazilian Shantytown: Relational wellbeing supports recovery from environmental disaster. *Marine Policy*, 89, 77–84. <https://doi.org/10.1016/j.marpol.2017.12.008>.
- Gobillon, L., Wolff, F. C., & Guillotreau, P. (2017). The effect of buyers and sellers on fish market prices. *European Review of Agricultural Economics*, 44(1), 149–176.
- Gordon, D., & Hussain, S. (2015). Price determination and demand flexibilities in the ex-vessel market for tuna in the republic of Maldives. *Journal of Aquaculture Economics and Management*, 19(1), 8–28. <https://doi.org/10.1080/13657305.2015.994234>.
- Granieri, A., La Marca, L., Mannino, G., Giunta, S., Guglielmucci, F., & Schimmenti, A. (2017). The relationship between defence patterns and dsm-5 maladaptive personality domains. *Frontiers in Psychology*, 8, 1926. <https://doi.org/10.3389/fpsyg.2017.01926>.



- Green, W. H. (2000). *Econometric analysis* (4th ed.). New Jersey: Prentice Hall.
- Gullo, S., Lo, Coco G., Di Fratello, C., Giannone, F., Mannino, G., & Burlingame, G. (2015). Group climate, cohesion, and curative climate: A study on the common factors in the group process and their relation with members' attachment dimensions. *Research in Psychotherapy, 18*, 10–20. <https://doi.org/10.7411/RP.2014.023>.
- Hallerod, B., & Selden, D. (2013). The multi-dimensional characteristics of wellbeing: How different aspects of wellbeing interact and do not interact with each other. *Social Indicators Research, 113*(3), 807–825. <https://doi.org/10.1007/s11205-012-0115-8>.
- Henson, S., & Mitullah, W. (2003). Nile Perch exports from the Kenyan shores of Lake Victoria: Good or bad for local fishing communities? In *Livelihoods and ecosystems: Dealing with complexity in rural development and agricultural*. World Bank Policy Research Working Paper 3349. Washington, DC: World Bank.
- Hoof, L., & Kraan, M. (2017). *Scoping mission marine fisheries Tanzania*. Wageningen University and Research Report. The Netherlands. <https://doi.org/10.18174/404872>.
- Israel, D. G. (2013). *Determining sample size*. Gainesville: The University of Florida.
- Jackson, M. I., & Mare, R. D. (2007). Cross-sectional and longitudinal measurements of neighborhood experience and their effects on children. *Social Science Research, 36*(2), 590–610.
- Janssen, Christian, Zhou, Julie, & Söderberg, Bo. (2001). Robust estimation of hedonic models of price and income for investment property. *Journal of Property Investment and Finance, 19*(4), 342–360. <https://doi.org/10.1108/EUM0000000005789>.
- Kabote, S. J. (2018). Influence of women entrepreneurs' characteristics on personal well-being in Arumeru District in Tanzania. *African Journal of Business Management, 12*(11), 316–328. <https://doi.org/10.5897/AJBM2018.8558>.
- Kahneman, D., & Krueger, A. B. (2006). Development in the measurements of subjective wellbeing. *Journal of Economic Perspectives, 20*(1), 3–24. <https://doi.org/10.1257/089533006776526030>.
- Kambewa, E. V. (2007). Balancing the people, profit and planet dimensions in international marketing channels. A study on coordinating mechanisms in the Nile perch channel from Lake Victoria. Thesis for Award of Ph.D. Degree at Wageningen University, The Netherlands.
- King, M. F., Renó, V. F., & Novo, E. M. L. M. (2014). The concept, dimensions and methods of assessment of human well-being within a socio-ecological context: A literature review. *Social Indicators Research, 116*(3), 681–698.
- Lee, M. (2014). Hedonic pricing of Atlantic cod: Effects of size, freshness, and gear. *Marine Resource Economics, 29*(3), 259–277. <https://doi.org/10.1086/677769>.
- Lo Coco, G., Mannino, G., Salerno, L., Oieni, V., Di Fratello, C., Profita, G., et al. (2018). The Italian version of the inventory of interpersonal problems (iip-32): Psychometric properties and factor structure in clinical and non-clinical groups. *Frontiers in Psychology, 9*, 341. <https://doi.org/10.3389/fpsyg.2018.00341>.
- López Ulloa, B. F., Möller, V., & Sousa-Poza, A. (2013). How does subjective well-being evolve with age? A literature review. *Journal of Population Ageing, 6*(3), 227–246. <https://doi.org/10.1007/s12062-013-9085-0>.
- Luomba, J. (2009). The contribution of Lake Victoria fisheries to national economies. *African Journal of Tropical Hydrobiology and Fisheries, 12*, 47–51.
- Mannino, G., & Caronia, V. (2017). Time, well-being, and happiness: A preliminary explorative study. *World Futures, 73*(4–5), 318–333. <https://doi.org/10.1080/02604027.2017.1333849>.
- Mannino, G., & Faraci, E. (2017). Morphogenesis of work. Application to the psychological well-being and psychosocial health. *Rivista Internazionale di Scienze Sociali, 3*, 315–334.
- Mannino, G., Montefiori, V., Faraci, E., Pillitteri, R., Iacolino, C., Pellerone, M., et al. (2017). Subjective perception of time: Research applied on dynamic psychology. *World Futures, 73*(4–5), 285–302. <https://doi.org/10.1080/02604027.2017.1333850>.
- Maslow, A. (1968). *Toward a psychology of being*. New York, NY: Van Nostrand Reinhold.
- McConnell, K., & Strand, I. (2000). Hedonic prices for fish: Tuna prices in Hawaii. *American Journal of Agricultural Economics, 82*(1), 133–144. <https://doi.org/10.1111/0002-9092.00011>.
- Meyer, J., & Cramon-Taubadel, S. (2004). Asymmetric price transmission: A survey. *Journal of Agricultural Economics, 55*(3), 581–611. <https://doi.org/10.1111/j.1477-9552.2004.tb00116.x>.
- Novara, C., Lavanco, G., Mannino, G., & Serio, C. (2018). Management and human factors: exploratory research with focus groups. *World Futures, 74*, 343–354. <https://doi.org/10.1080/02604027.2018.1492294>.
- Pellerone, M., Iacolino, C., Mannino, G., Formica, I., & Zabbara, S. (2016). The influence of parenting on maladaptive cognitive schema: A cross-sectional research on a group of adults. *Journal of Psychology Research and Behaviour Management, 5*, 4. <https://doi.org/10.2147/prbm.s117371>.

- Phillips, M., & Subasinghe, R. (2010). Small-scale shrimp farmers and global market—Trends, future prospects and adaptation. In V. Alday-Sanzy (Ed.), *The Shrimp book* (pp. 35–45). Nottingham: Nottingham University Press.
- Pollnac, R. B., & Poggie, J. J. (2008). Happiness, well-being and psychocultural adaptation to the stresses associated with marine fishing. *Human Ecology Review*, *15*(2), 194–200.
- Purcell, S. W., Ngaluafé, P., Aram, K. T., & Lalavanua, W. (2016a). Trends in small-scale artisanal fishing of sea cucumbers in Oceania. *Fisheries Research*, *183*, 99–110. <https://doi.org/10.1016/j.fishres.2016.05.010>.
- Purcell, S. W., Ngaluafé, P., Foale, S. J., Cocks, N., Cullis, B. R., & Lalavanua, W. (2016b). Multiple factors affect socioeconomic and wellbeing of artisanal sea cucumber fishers. *PLoS ONE*, *11*(12), e0165633. <https://doi.org/10.1371/journal.pone.0165633>.
- Reyes-García, V., Babigumira, R., Pyhälä, A., Wunder, S., Zorondo-Rodríguez, F., & Angelsen, A. (2016). Subjective wellbeing and income: Empirical patterns in the rural developing world. *Journal of Happiness Studies*, *17*(2), 773–791. <https://doi.org/10.1007/s10902-014-9608-2>.
- Roangead. (2013). *Tanzanian Nile perch value chain baseline study*. Burgun Cedric: International Trade and Sustainable Development. Retrieved from [http://www.Roangead.org/IMG/pdf/Roangead\\_Rapport\\_Final.pdf](http://www.Roangead.org/IMG/pdf/Roangead_Rapport_Final.pdf).
- Ruiz, V. (2012). Job satisfaction among fishers in the Dominican Republic. *Social Indicators Research*, *109*(1), 81–94. <https://doi.org/10.1007/s11205-012-0057-1>.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American psychologist*, *55*(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>.
- Sen, A. K. (1985). Well-being, agency, and freedom: The Dewey Lectures 1984. *Journal of Philosophy*, *2*(4), 169–222.
- Shapiro, A., & Keyes, C. L. M. (2008). Marital status and social well-being: Are the married always better off? *Social Indicators Research*, *88*(2), 329–346. <https://doi.org/10.1007/s11205-007-9194-3>.
- URT. (2010). *Fishery sector development program Tanzania*. Government Printer, Dar es Salaam, Tanzania.
- URT. (2014). *Report on Lake Victoria fishery frame survey results-2014 Tanzania*. Government Printer, Dar es Salaam, Tanzania.
- URT. (2017). *Mwanza Region Investment Guide*. Government Printer, Dar es Salaam, Tanzania.
- Waldron, S. (2010). Measuring subjective wellbeing in the UK. Office of National Statistics Working Paper.
- Wisdom, J., & Creswell, J. W. (2013). Mixed methods: Integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models. *AHRQ Publication*. 13-0028-EF, March 2013. Rockville, MD, p. 20850.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.