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Research Paper

Analysis of Pyrethrum Farmers' Perceptions on Marketing Factors and Subjective Well-Being in Makete District; Tanzania

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ABSTRACT

The study analyzed pyrethrum farmers' perceptions on marketing factors and subjective well-being by using satisfaction levels in Makete district. Study employed quantitative approach and a cross-sectional study design used. Primary data was collected by using a structured questionnaire. Leyden approach was engaged and satisfaction with life as a whole question developed by Van Praag (1971) used to analyze subjective well-being in descriptive analysis. Results revealed that on subjective well-being, farmers were satisfied and very satisfied with the way they lived after starting selling pyrethrum. On marketing factors results reflected high dissatisfaction levels. Study motivated to perform Yeh's Index Perception Analysis (Yeh, 1975) to verify marketing factors and subjective well-being satisfaction levels results. Marketing factors used constituted of: non technological drying facilities, market information, rural farm transport and market stability. Results found were: most dissatisfied; more dissatisfied; very dissatisfied and dissatisfied respectively. For subjective well-being, results showed a percentage of reverse improvement, subjective well-being was attained by pyrethrum farm household heads after starting selling pyrethrum dried flowers in Makete district; Tanzania.

Keywords: *Pyrethrum marketing, marketing factors, Leyden approach, subjective well-being, Yeh's Index Perceptions.*

Marketing of agricultural produce stimulates the increase of income among farm households and consequently determine their economic welfare and well-being (United Republic of Tanzania, 2011). In some countries of the world considering East Africa in a country like Tanzania, pyrethrum farmers face severe pyrethrum marketing constraints towards accessing marketing factors for effective and efficient marketing activities at rural primary marketing level (URT, 2011). Such situation causes rural income deficiency that lead to the decline of the pyrethrum farmers' well-being in the country (URT, 2011). This study therefore, aimed to analyze pyrethrum farmers' perceptions on marketing factors and subjective well-being satisfaction levels in Makete district; Tanzania. In Makete district pyrethrum marketing is the major economic activity as it constitutes to about 99.9% of cash crops. In the year 2010/2011 pyrethrum marketing contributed most of

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the revenue at a total of Tsh.109, 171,500, though economic welfare and well-being of pyrethrum farmers are considered low. This fact was supported by the outcome results of the Household Population Index Survey of the year 2009 which showed that the per capita income in the district was Tshs. 200,000/-.

And the Gini Coefficient rate of 43 percent marked Makete district as having the worst uneven distribution of wealth in Njombe region as regional Gini Coefficient rate was 32 percent (NBS, 2013).

In the call to overcome the marketing constraints of agricultural produce in order to improve the economic welfare and well-being at rural primary marketing level, some scholars in various places of the world, conducted empirical studies on marketing factors to investigate the effect of the constraints. Here follows the discussion: quality of farm products is very vital for higher farm earnings partly depends on how transport is convenient for the harvested crops (Abdi, 2004); Transport can be measured in terms of availability of both the infrastructure like roads, trucks, motorbikes and farm animals (Samantha, 2015). Type of drying facilities is either of modern or traditional technology, does affect the quality of farm product (Lybbert & Sumner, 2012); commentary, with traditional drying facilities, there is always a possibility of contaminating pyrethrum flowers with dirty materials, dust and exposure to damages by domestic animals and poultry (USAID, 2012); and with modern facilities such as solar energy, shelves made of wire mesh and wood, would provide conducive environment for drying raw pyrethrum white flowers in more safety conditions and reduce risk of contamination (UNIDO, 2000). In addition, modern facilities would improve both the quality of pyrethrum dried flowers and easing the drying process for pyrethrum farmers (UNIDO, 2000). Market information irregularity can be resolved through systematic and uniform market information dissemination (FAO, 2011). Additionally, systematic and uniform market information dissemination ensures that farmers are provided with equal opportunity to access the market information. As for other stakeholders like buyers, venders, collectors, market information provides farmers with opportunity to reduce marketing related risks, such as loss due to ignorance of the price and competitors' price. Other scholars joined the discussion that challenges of market information flow among farmers is the major cause of low prices of farm products received by farmers, consequently reflect farmer's poor economic welfare and well-being (Srinivasan, 2008). In order to increase crop revenue, market information like price information, and quality standards of the crops, required packages and storage requirement should be adequately and timely disseminated to farmers (Russell, 2003). In addition, famers may be more likely to earn more from their sales and experience higher well-being. Global market instability disturbs the market stability for each individual country (Josling et al., 2010). Additionally, for this reason attainment of the balance for market stability at local and international level is thus an endless process which goes through regulations and international markets.

Objective of this study was to measure perceptions on these marketing factors also including the subjective well-being of pyrethrum farmers after starting selling pyrethrum in Makete district; Tanzania. We also included some socio-economic characteristics in this study (Alemu et al., 2006).

In this study we use three concepts namely welfare, well-being and subjective well-being. The former stands for the narrow concept of satisfaction derived from income or monetary welfare while the latter concept is a much wider concept; it stands for satisfaction with life

as a whole. Figure 1 shows how these two concepts fit together. In a mathematical language, welfare is a subset of well-being while well-being is a full set. Figure 1 introduces the concept of standard of living.

The standard of living refers to material issues only (material welfare) such as income, wealth and goods (Antonides and Raaij, 1998). Mishra and Ngullie (2003) argue that standard of living is the state of consumption activities that pertain to material requisites of well-being at the disposal of the consumer and consumption of willful and optional goods and services. The concept has sometimes been misconceived as the quality of life. The authors contend that the latter is inclusive of the former in addition to the impacts and effects of consumption of the surrounding externalities. The quality of life therefore defines the consumer's state of living in its entirety unlike the standard of living. As such, in mathematical language, standard of living is a subset of welfare. This study considers mainly well-being and subjective well-being concepts in its descriptive analysis.
(See Figure1).

Figure 1: Standard of living, welfare and well-being concepts

In Leyden approach subjective well-being was measured by using a satisfaction-with-life as a whole question, originated by Gurin et al., (1960) and developed by (Van Praag, (1971). Subjective well-being is defined as about lives going well', comprises a combination of feeling good and functioning effectively (Huppert, 2008) and economic definition of subjective well-being comprises both objective (outer qualities) and subjective (inner qualities) dimensions of 'life chances' and 'life results'. Subjective well-being constitutes the subjective dimension of life results.

MATERIALS AND METHODS

This study employed a quantitative approach and cross-sectional study design. The main type of data was primary. Sources of data were pyrethrum farmers (units of analysis). Primary data was collected from the Southern highlands in Makete district, Njombe region, Tanzania. This study was conducted in Makete district, where its people depend on pyrethrum crop as the main traditional cash crop for their livelihoods. Most pyrethrum farmers are believed to derive their economic welfare and well-being from pyrethrum sales' income. Research survey was conducted in Ivilikinge, Isapulano, Ibaga, Kidope, Makwaranga, Matenga, Kinyika, Igumbilo and Ludilu the pyrethrum growing villages among others. The study area has the volcanic soils due to the past volcano explosions in Livingstone Mountains; with the altitude of between 1500 to 3000 meters above sea level

and this makes the area to experience temperate climatic conditions with low temperatures ranging from 2º Centigrade to 20º Centigrade in the highlands are suitable and conducive for growing pyrethrum crop. In lowlands with temperatures, 20º Centigrade to 30º Centigrade, pyrethrum flowers are not grown.

In this paper, study involved the computation of measures of central tendency and dispersion including frequencies, percentages, means and standard deviations to describe the properties of the sample based on the units of analysis. Descriptive analysis results for the measures of central tendency and dispersion for some socio-economic variables of the respondents are shown in Table 2, followed by frequency results of pyrethrum farmers' subjective well-being and marketing factors are in Table 3. With regard to pyrethrum farmers' subjective well-being, the question asked for the respondents to express the extent of their satisfaction towards some well-being variables after starting selling pyrethrum. The responses were classified into a 1-5 scale, where 1 stands for very dissatisfied, 2 stands for dissatisfied, 3 stands for uncertain, 4 stands for satisfied and 5 stands for very satisfied. The answer to this question was taken as a proxy of an individual's subjective well-being (see Frey and Stutzer, 2002b; Luttmer, 2005).

Yeh's Index of Satisfaction Analysis, (YIS) was developed and used by Yeh, (1972) to measure the level of people's perception has been used in many studies, such as Anwar & Zafar, (2003) and Anwar et al., (2008) and was proved effective for descriptions of levels of satisfaction. Yeh's Index of Satisfaction can be obtained by subtracting the number of respondents who are dissatisfied from the number of satisfied ones and then divide the difference by the total number of responses. Yeh's Index of Satisfaction which ranges from -1 to +1 in Table 1. Shows the rule of thumb of Yeh's Index of Satisfaction which indicates the values and the corresponding levels of satisfaction by Yeh (1972) and Yeh (1975).

Table 1. Rule of Thumb of Yeh's Index of Satisfaction

YIS		**Levels of Satisfaction**
Less than 0.20	1	Very Low
0.20 – 0.39	2	Low
0.40 – 0.59	3	Medium
0.60 – 0.79	4	High
0.80 and above	5	Very High

Source: Yeh (1972) &Yeh (1975).

Yeh's Index of Satisfaction suggest that, a negative value of Satisfaction shows that there are more respondents who are dissatisfied than those who are satisfied with the said facility. The larger the negative value, the more the dissatisfaction of the respondents. Yeh's Index of Satisfaction is also a very suitable measure for the levels of peoples' perception, and gives a specific and comparable figure which indicates the opinion of the respondents about a particular facility (Zaidi, 1982). In this study, Yeh's Index of Perception was employed to measure the pyrethrum farmers' perception on marketing factors and subjective well-being satisfaction levels for verification. The analysis takes the same formula as the Yeh's Index of Satisfaction.

Thus, if an Index Perception number shows +1.000, it stands for "Satisfied", 0.000 for "acceptable" and -1.000 for "dissatisfied." Therefore, a positive score (+1.000) is for

satisfaction level with an attribute or item and a negative value (-1.000) is for dissatisfaction with a particular attribute; while zero (0) has no outright meaning but indicates equal response to satisfaction and dissatisfaction among the respondents on a certain attribute or item.

Descriptive Analysis Results

In Table 2 results show that the minimum age of pyrethrum farmers in the study area was 19 years and the maximum was 88 years. Mean age of pyrethrum farmers was 46.85 years with a standard deviation of 13.762 years. The results indicate that age distribution of pyrethrum farmers was highly detached between 19 and 88 years. The normal distribution rule states that 68% of the observation falls within 1α (1 times the standard deviation). This is in accordance with Wheeler & Chambers, (1992). Based on this theory, 68% of pyrethrum farmers are in the age between 33 years and 61 years. This supplicates a suggestion that, more than 68% of pyrethrum farmers were of the working-age (NBS, 2013).

Table 2: Descriptive statistics results

Variable	No. of observations	Minimum	Maximum	Mean	Std. Deviation
Age of the household head	267	19	88	46.85	13.762
Number of household members	267	1	8	4.10	1.636
Total size of land owned by household in acres	267	.50	10.00	2.1105	1.61057
Household pyrethrum sales in kilograms	267	13	5500	418.69	706.098
Total household pyrethrum income obtained from first and previous season selling	267	16600	9150000	720097.94	1215762.833
Yearly average income received by household from other sources of income by each household member	267	40000	9060000	897471.16	1150660.854
Yearly average income in Tanzania shillings	267	88700	10300000	1600236.89	1795162.280
Yearly household disposable income considered to be very dissatisfied with	267	180000	8430000	1325059.93	1353363.639
Yearly household disposable income considered to be dissatisfied with	267	300000	10050000	1597640.45	1559237.467
Yearly household disposable income considered to be satisfied with	267	390000	12480000	1868200.37	1795948.120
Want parameter	267	12.62	16.14	13.9537	.75337
Sensitivity parameter	267	.05	.56	.2144	.09192
Valid n (list wise)	267				

Source: Computed from field data collected in Makete district.

In Table 2 results show that the minimum number of household members was 1 and the maximum number of household members was 8. The mean was observed to be 4.1 with a standard deviation of 1.636. Results imply that on average, the number of household members was 4 individuals per farm household. The standard deviation of 1.636 indicates that pyrethrum farmers were experiencing varying number of household members that would differently manage their needs.

The average number of household members of 4.0 individuals per farm household was below that of Rural Tanzania Mainland which is 5 individuals per farm household, but equal to that of the Njombe region which is 4.1 individuals per household URT, (2014). The essence of having a larger number of household members of up to a maximum of 8 household members can be linked to pyrethrum farmers' satisfaction with cheap labour from farm household members especially for pyrethrum harvesting which is normally done on weekly basis after first blossoms. Also, the results in Table 2 show that the minimum total size of land owned a by farm household was 0.5 acres while the maximum total size of land owned was 10 acres. The mean was 2.1105 acres with a standard deviation of 1.61057. Since the standard deviation was relatively small it indicates that majority of pyrethrum farmers owned an average of 2 acres of land for their pyrethrum farming and few pyrethrum farmers had big total size of land owned up to 10 acres. In accordance with (TPB, 2011), 1 acre has a potential of producing up to 1000 kilograms of pyrethrum dried flowers. These results imply that pyrethrum farmers in Makete district had a potential of harvesting an average of up to 2000 kilograms of pyrethrum in 2 acres. Also results show pyrethrum farmers were likely to harvest between the minimum of 13 kilograms and the maximum of 5,500 kilograms of pyrethrum dried flowers per a season and the mean harvest was 418.69 kilograms with a standard deviation of 706. The huge standard deviation indicates that pyrethrum harvests were highly varying among pyrethrum farmers. The fact that on average the total size of land owned by farm household was 2 acres, reveals that on average pyrethrum farmers were harvesting about 209.35 kilograms per acre which is less than the yearly potential of 1000 kilograms per acre, TPB (2014). This result shows there is still more than enough opportunity among pyrethrum farmers in the study area to utilize resources and maximize production, resulting to great sales of pyrethrum dried flowers that lead to improve their economic welfare and well-being.

Results in Table 2 show that pyrethrum farmers in Makete district were earning a minimum of Tshs. 16,600/- and the maximum of Tshs. 9,150,000/- from pyrethrum sales. The mean income earned from pyrethrum sales was Tshs. 720,097.94/- with a standard deviation of Tshs. 1,215,762.83/-. The huge standard deviation indicates that pyrethrum farmers were exhibiting varying degrees of annual pyrethrum sales income levels. The fact that an average income earned by pyrethrum farmers was about 50% of the total annual average income, one can recommend that pyrethrum is the main source of income in the study area. The observation reflects the general consideration that 75.9% of rural populations depend on agriculture as the main source of income (URT, 2013b). Results from other sources of income show that pyrethrum farmers were earning a minimum of Tsh. 40,000/- and the maximum of Tsh. 9,060,000/-. The mean income earned was Tsh. 897,471.16/- with a standard deviation of Tsh. 1,150,660.85/-. This huge standard deviation indicates that pyrethrum farmers were exhibiting varying degrees of annual income levels from other sources of income, In addition, results shows that minimum yearly total pyrethrum farmers' average income was Tsh.88,700/- and the maximum was Tsh.10, 300,000/-.The mean yearly household income was Tsh. 1,600,237/- with a standard deviation of Tsh. 1,795,162/-. This

huge standard deviation indicates that pyrethrum farmers were exhibiting varying degrees of yearly total income levels. The yearly total average income exceeds the lower minimum wage of Tsh. 1,200,000/- as determined by the Tanzanian government minimum wage policy (URT, 2013a). Table 3 shows distribution of pyrethrum farmers (percentages in brackets) on marketing factors and subjective well-being.

Table 3. Distribution of pyrethrum farmers by levels of satisfaction on marketing factors and subjective well-being (percentage in brackets)

Parameter	Very dissatisfied	Dissatisfied	Uncertain	Satisfied	Very Satisfied	Total
Rural farm transport	195 (73.3)	55 (20.7)	16 (6.0)	-	-	266 (100)
Non-Technological drying facilities	216 (80.9)	43 (16.1)	8 (3.0)	-	-	267 (100)
Marketing information	213 (79.8)	44 (16.5)	9 (3.4)	1 (0.4)	-	267 (100)
Market stability	220 (82.4)	29 (10.9)	9 (3.4)	9 (3.4)	-	267 (100)
Life after starting selling pyrethrum	28 (10.5)	31 (11.6)	43 (16.1)	154 (57.7)	11 (4.1)	267 (100)

SOURCE: Computed from field data collected in Makete district

Yeh's Index of Satisfaction suggests that, a negative value of Satisfaction shows that there are more respondents who are dissatisfied than those who are satisfied with the said facility. The larger the negative value, the more the dissatisfaction of the respondents. Yeh's Index of Satisfaction is also a very suitable measure for the level of peoples' perception, and gives a specific and comparable figure which indicates the opinion of the respondents about a particular facility (Zaidi, 1982). In this study, Yeh's Index of Perception was employed and used to measure the level of the respondents' satisfaction about the contribution of marketing factors. If an Index Perception number shows +1.000, it stands for "Satisfied", 0.000 for "acceptable" and -1.000 for "dissatisfied." Therefore, a positive score (+1.000) is for satisfaction with an attribute or item and a negative value (-1.000) is for dissatisfaction with a particular attribute; while zero (0) has no outright meaning but indicates equal response to satisfaction and dissatisfaction among the respondents. In the context of this study the respondents were also to respond to uncertain level.

Analysis of the level of satisfaction with marketing factors and subjective well-being gives a useful yardstick to the measure of farmers' satisfaction towards the quality of these factors in relation to the marketing of pyrethrum dried flowers and their corresponding lives. The formula of Yeh's Index Perception was given as

$$\mathrm{YIP} = \frac{\mathrm{B} - \mathrm{W}}{\mathrm{n}}$$

Where:
YIP is Yeh's Index of Perception;
B is the number of better responses represented by the respondents who were very satisfied and satisfied (higher satisfactory perception levels);
W is the number of worse responses represented by the respondents who were very dissatisfied and dissatisfied (lower satisfactory perception levels);
n = Total number of responses, or simply, the total number of respondents.

The results of YIP analysis for marketing factors and subjective well-being are shown in Tables 4 (a) & (b). The analysis outputs shown in the table with regard to the marketing factors and subjective well-being are later discussed separately in the next two sub-sections.

Table 4. Yeh's Index of Perception analysis for marketing factors and subjective well-being

Parameter	Dissatisfied	Uncertain	Satisfied	YIP	Rank of Perception Levels
(a) Marketing factor					
Rural farm transport	250	16	0	-0.9398	Third lowest
Non technological drying facilities	259	8	0	-0.9700	First lowest
Market information	257	9	1	-0.9588	Second lowest
Market stability	249	9	9	-0.8989	Fourth lowest
(b) Subjective well-being					
Subjective Well-being	165	43	59	-0.397	Fifth lowest

Source: Computed from field data collected in Makete district.

In Table 4 results show perceptions (levels of satisfaction) of the pyrethrum farmers in the study area concerning Yeh's Index of Perception analysis (YIP) for the marketing factors. The results imply that the YIP of market stability which is -0.8989 indicates that the pyrethrum farmers' were dissatisfied with how local markets functioned at the primary marketing level in the study area; The YIP of rural farm transport which is -0.9398 indicates that the pyrethrum farmers were very dissatisfied with how rural farm transport functioned at the primary marketing level in the study area; The YIP of Market information which is -0.9588 indicates that the pyrethrum farmers were more dissatisfied with how the market information functioned at the primary marketing level in the study area and The YIP of Non technological drying facility which is -0.9700 indicates that the pyrethrum farmers were most dissatisfied with how the Non Technological drying facilities functioned at the primary marketing level in the study area. The subjective well-being of pyrethrum farmers from way lived after starting selling pyrethrum gives us a very useful yardstick to measure the quality of their levels of satisfaction. The results of the analysis of YIP on subjective well-being from the responses of pyrethrum farmers are shown in Table 4(b). The results indicate a negative YIP value of -0.397. This figure implies a 39.7% of reverse improvement in subjective well-being attained by pyrethrum farmers after starting selling pyrethrum dried flowers in Makete District; Tanzania.

CONCLUSION

On marketing factors, the study shows that the majority of pyrethrum farmers were very dissatisfied with rural farm transport and on local rural farm transport a good number of the farmers were carrying pyrethrum harvests on their heads; on technological type of drying facilities study shows that majority of pyrethrum farmers were very dissatisfied; on market information it is shown that the majority of pyrethrum farmers were very dissatisfied with way accessed market information. Also, on market stability this study shows that majority of pyrethrum farmers were very dissatisfied with market stability functions at rural primary marketing level. Furthermore, for marketing factors' satisfaction levels, study shows large

negative values of Yeh's Index Perception such that, pyrethrum farmers were dissatisfied, very dissatisfied, more dissatisfied and most dissatisfied on: market instability, rural farm transport, market information and non-technological drying facilities, respectively.

This study also shows that on subjective well-being, more than a half of pyrethrum farmers were satisfied and very satisfied with life in the way they lived after starting selling pyrethrum. The study further reveals that the remaining part of pyrethrum farmers show that they were very dissatisfied, dissatisfied or uncertain with life in the way they lived after starting selling pyrethrum. In addition, for subjective well-being of pyrethrum farmers' satisfaction levels, study shows a negative small value of Yeh's Index Perception that reflected a reverse improvement in subjective well-being of pyrethrum farmers after starting selling pyrethrum dried flowers in Makete District; Tanzania.

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Conflict of Interest

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