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Enhancing Paddy Returns Through Market Diversification in Lake Zone of Tanzania

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ABSTRACT

The study was conducted in the Lake Zone of Tanzania to investigate strategies used to diversify paddy markets while increasing profits. A survey was conducted in Mwanza (Misungwi and Sengerema districts) and Shinyanga regions (Kahama and Shinyanga rural districts), where 265 respondents (231 male and 34 female) were involved. The results showed that most farmers are food insecure due to the fact that they sell their rice beyond threshold. Marketed surplus for paddy farmers was 66.40% where marketable surplus was 60.31% of the total production. Moreover, farmers market rice expanded profit margin by gaining extra profit of 19364.73 TZS equivalent to 27.60% of the paddy traders. Furthermore, 94.90 % of paddy farmers in the study area do not employ chemical inputs i.e. pesticide where 5.10 %. In conclusion, due to low purchasing power of farmers and high cost of chemical fertilizers in their areas paddy farmers may use organic sources of fertilizers such as farm yard manures (FYM) to intensify and improve their production in order to increase productivity, profitability and welfare.

I. INTRODUCTION

Paddy is more preferred cash and food crop in the Lake Zone than other food crops. Ranking second most important food crop grown in Tanzania after maize, it is estimated that 18 per cent of farming households grow paddy, which in the recent years has turned to be the main cash crop (MAFAP 2013, FEWSNET 2018). Twenty per cent of farmers in Tanzania are involved in paddy farming, mostly are smallholders under rain-fed conditions with an average yield ranging from 1.6 – 2.4 t/ha compared to the potential yields of 4 – 6 t/ha (Wilson and Lewis, 2021). The current intervention at national level is to increase paddy production and productivity through irrigation development and encourage export trade (IRRI 2017/18). Paddy supplies are therefore expected to raise because of the large harvest and high carryover stocks which in turn will lower the domestic prices (FEWS NET, 2018). Therefore, strong marketing diversification strategies need to be initiated and implemented especially via the creation of form, storage utility and improvements in paddy production efficiency.

Measures to stabilize or increase paddy price to benefit producers are of paramount importance, as it is obvious that an increase in production leads to increased food security but lowers the price of the product which eventually hurts the welfare and livelihood of the producers. Therefore, different opportunities to diversify the market and methods to increase profits from paddy production need to be explored. Methods to expand paddy markets have been explored in the present study undertaken in the Lake Zone of Tanzania. The objective of the study was to investigate market strategies to diversify existing market and enhance farmers profit.

II. MATERIALS AND METHODS

The multistage sampling technique was used to obtain the relevant qualitative and quantitative data from the study areas. Different sampling techniques were used in different stages based on population characteristics. Purposive sampling was used for the selection of the two regions, namely Mwanza and Shinyanga, selection of these regions was based on production potential. Two districts from each selected region were chosen namely Sengerema and Misungwi (Mwanza) and Kahama and Shinyanga rural (Shinyanga). Complete list of wards was prepared in the selected district and simple random sampling was employed to select

eight wards, two wards from each district. In the fourth stage, two villages from each selected wards were randomly selected which make total of sixteen village, while the final stage involve selection of 16 or 17 farmers which form the total sample of 265 paddy farmers for interview. Cross sectional primary data was obtained through individual field sample survey by the use of structured questionnaire. Statistical Package for Social Scientist (SPSS) computer software was used for data analysis, where mean, percentage, and Chi - square test were computed.

III. RESULTS AND DISCUSSION

Production Characteristics

Majority of paddy grower (84.25%) use local varieties such as mara mata, rangi mbili and sukari sukari, however, few of them rely on improved (8 %) i.e. $SARO_5$ or both local and improved (9.75) varieties (Table 1). Findings are supported by (Lazaro *et al*., 2016; Sekiya *et al*., 2020) who argued that, paddy farmers prefer local varieties which have big grain size, good aroma and taste though are low yielding as compared to improved varieties. The traders prefer local varieties because these have large market opportunities not only within the country but also in the export market. The local varieties obtained great opportunities in term of high price and proved more preferable as compared to the improved varieties. Therefore, most of paddy farmers rely on local varieties and marginally on improved varieties. On average, 92.50 % of paddy farmers in Kahama district cultivates local varieties, where proportion of farmers using local varieties in Shinyanga rural, Sengerama and Misungwi districts accounts to 86.70 %, 82.80 % and 75 % respectively. Larger number of farmers using improved varieties were found in Misungwi district (17.30 %) followed by Sengerema (3.40 %) and Shinyanga rural (3.30 %). Few farmers were found using both local and improved varieties in their farms, of which Sengerema (13.80 %) was leading, followed by Shinyanga rural (10 %), Misungwi (7.70 %) and Kahama district (7.50 %).

Table 1: Number of observations and proportion of using improved, local or both paddy varieties

Location	Improved varieties	Local varieties	Local + Improved
Misungwi	11 (17.30)	50 (75.00)	5 (7.70)
Sengerema	2 (3.40)	58 (82.80)	10 (13.80)
Kahama	0	62 (92.50)	4 (7.50)
Shinyanga rural	2 (3.30)	54 (86.70)	6 (10.00)
Grand mean	15 (8.00)	224 (84.25)	26 (9.75)

Values in parentheses are representing percentage (%) and the chi-square is 22.86

Marketed surplus

Vishnu (2013) defined marketable surplus as the amount of produce offered by farmers after meeting the household need, whereas the quantity of produce actually sold is marketed surplus. The study shown that paddy farmers consume 32.98 per cent of the total paddy produced while 6.05 per cent is kept as seed (Table 2), therefore, on an average paddy farmers have a marketable surplus of 60.31 per cent of the total paddy harvested but in fact selling 66.40 per cent of the produced. It means that marketed surplus is higher than marketable surplus, therefore, paddy farmers in Lake Zone are under distress selling. Higher distress selling observed in Sengerema and Shinyanga rural districts while the lowest distress observed in Kahama district.

Table 2: Marketed and marketable surplus of paddy produced in Shinyanga and Mwanza region.

District	Production (t ha^{-1})	Household Consumption (t ha^{-1})	Seeds (t ha^{-1})	Marketable surplus (t ha^{-1})	Marketed (%)	Marketable surplus (%)
Misungwi	1.26	0.41	0.04	0.81	69.66	64.43
Sengerema	1.56	0.39	0.06	1.10	79.55	70.67
Kahama	1.42	0.55	0.12	0.74	54.32	52.61
Shinyanga rural	1.03	0.38	0.09	0.55	61.14	53.51
Average	1.32	0.43	0.79	0.80	66.40	60.31

Marketing utility

Mtembeji and Singh (2021), the livelihood of Lake Zone farmers depends on paddy production by 21 per cent. Paddy has large market opportunities, however there is inconsistent market price owing to the market seasonality behavior. Rice being a commercially potential crop, 66.40 per cent of its total production is marketed. On an average 17.58 per cent of paddy farmers market milled rice to catch higher price and increase profit, where as 82.42 per cent of paddy farmers market un-milled rice. Percent of paddy farmers selling milled rice range from 9.0 to 30.80 while farmers selling un-husked rice ranges from 69.20 to 91.00 per cent.

Table 3: Common forms of rice used for the market in Mwanza and Shinyanga regions

Districts	Rice	Paddy
Misungwi	250.65	563.18
	(30.80)	(69.20)
Sengerema	190.11	915.19
	(17.20)	(82.80)
Kahama	67.18	679.30
	(9.00)	(91.00)
Shinyanga rural	73.24	477.40
	(13.30)	(86.70)
Grand mean	141.36(17.58)	662.71(82.42)

Price diversification

Result shows a large price variation of both milled and un-milled rice among farmers in Mwanza and Shinyanga regions (Table 4). It was found that the farmers selling un-milled rice gained on average a price of TZS 70,162 per bag (1 bag ~ 90 kg), however when same bag is milled can be sold at price of TZS 89,527 per bag. In this study farmers' selling milled rice obtained an extra amount of TZS 19,365 equivalent to 27.60 per cent difference (Table 4). These finding are in line with the result obtained by Nkuba *et al*. (2016); Mgale and Yunxian ,(2020). The t test showed that the mean difference between two prices was significant ($P < 0.01$). On an average, the high price of un-milled rice was observed in Shinyanga rural (TZS 72,864) and Kahama district (TZS 72,694) while low price was observed in Sengerema district (TZS 65,717). Milled rice had highest price in Kahama district (TZS 98,264) and the lowest in Shinyanga rural (TZS 80,203). The high price of milled rice in Kahama district was due to market demand in neighboring countries like Kenya, Rwanda, Uganda, Burundi and Congo DR which is closer to Kahama, good and passable road network in the villages where paddy is produced is also a contribution factor.

Table 4: Market price of milled and un-milled paddy per bag of 90 kg in the study area

Districts	Un-milled rice	Milled rice
	(90 kg/bag)	**(90 kg/kg – 40%)**
Misungwi	69,373	92,405
Sengerema	65,717	87,229
Kahama	72,694	98,264
Shinyanga rural	72,864	80,209
Grand mean	**70,162**	**89,527**
t- test ($P < 0.01$)	**41.63**	**23.33**

Strategies used to maximize profit

Paddy farmers in the study area adopted three different strategies for increasing their profit. This includes form utility, storage utility and in rare cases they use improving method of farming for maximizing profit. According to the law of demand, during the abundant production, normally price tends to decrease and vice versa. It also applies to crops production, that price of a given commodity decreases during harvesting time and then raises during late season. Table 5 showed storage utility (70.3 %) as the most notable strategy used by farmers to enhance producers' profit. Due to the presence of a large number of smallholder or subsistence farmers in the location and minimal alternative source of income, only few farmers could manage to store paddy for more than three months. Shortage of storage facilities, processing plants and lack of awareness among farmers lead them to sell un-milled rice (Musowo et al,2019). In addition, 26.60 per cent of paddy farmers in the study area added values through milling

prior to selling which increased price by 27.60 per cent. Farmers used improved farming practices such as improved rice variety and fertilizer as the methods to increase production and profit were 3.10 per cent (Table 5). Therefore, use of improved practices enhanced production by 20 per cent over local cultivation methods (FAO, 2018).

Table 5: Market strategies used by farmers to increase profit

Districts	Storage	Processing	Improving farming
	(Percentage - %)		
Misungwi	63.9	31.1	5
Sengerema	65.7	26.9	7.4
Kahama	75.4	24.6	0
Shinyanga rural	76.3	23.7	0
Average	70.3	26.6	3.1

Opportunity for natural farming produces

Over the years, consumers' awareness on food quality has increased due to food contamination caused by chemicals, serious health hazards and environmental issues. This has enhanced the demand for safe and healthy food all over the world. To account on that demand for organic product has in turn increased and broadened the opportunity for a new stream of agriculture market. Production and marketing organically produced commodity are one of the fundamental ways for providing safe food to consumers and diversifying market to increase profit. Moreover, factors determining consumers' preference for organically produced expose health to be the main attribute for shifting to organic rice consumption from inorganic product (Meena and Sharma, 2015).

Sixty one per cent of paddy farmers in Mwanza and Shinyanga regions do farming along with livestock keeping. On average, 36 % of farm households are engaged directly in livestock keeping (NBS, 2012; Engida *et al.,* 2015). They normally keep cattle (64%), goat (45%) and chicken (90%) at their locality (Pica-Ciamarran *et al.,* 2011). The animals kept in totality have been a good source of farm yard manure in rural households.

The study revealed that 78.60 per cent of farmers do not use fertilizer while 21.40 per cent of paddy farmers use fertilizers. However out of 21.40 per cent paddy farmers, 55 per cent use inorganic fertilizers such as Diammonium Phosphate (DAP) and UREA while 45 per cent use organic fertilizer like Farm Yard Manure.

This study indicates that many paddy farmers (78.60 %) do not use fertilizers, only 24.60% use fertilizers in the area. Two scenarios may arise here; either price of rice does not guarantee the cost incurred or farmers have no enough knowledge hence need training to intensify farming through use of agricultural inputs. On average 94.90 percent of farmers do not use pesticides compared to only 5.10 per cent who use pesticides to control important insect pests. However, when fertilizer source was compared, many farmers reported to use more mineral fertilizers (55 %) than farm yard manure (45 %). Moreover, organic farming is highly substitutable with convention paddy production, hence, transformation to organic farming will create new market opportunity using locally least cost inputs, while obtaining premium price and consistence market.

Table 6: Usage of agricultural inputs for paddy production in the study area

Districts	Uses of pesticide (%)		Uses of fertilizers (%)		Basal fertilizer (%)	
	Pesticide	No pesticide	Fertilizer	No fertilizer	DAP	FYM
Misungwi	5.80	94.20	30.80	69.20	66.7	33.3
Sengerema	3.40	96.60	17.20	82.80	50	50
Kahama	4.50	95.50	20.90	79.10	83.3	16.7
Shinyanga rural	6.70	93.30	16.70	83.30	20	80
Average	5.10	94.90	21.40	78.60	55	45
$\chi 2$ ($P < 0.05$)	315.35		154.22		111.80	

IV. RECOMMENDATION

The results indicate that the majority of farmers in the study area still rely on traditional farming methods, not utilizing fertilizers, pesticides, or improved paddy seeds. This is largely due to poverty or a lack of awareness about better agricultural practices. Additionally, few paddy farmers in the region add value to their produce to enhance prices and increase profits. To mitigate the risks of loss during market downturns, shortages of processing plants, and inadequate village storage facilities, there is a need to establish strong financial institutions such as Savings and Credit Cooperative Societies (SACCOs) and Agricultural Marketing

Cooperative Societies (AMCOS). These community-based financial and technical support systems would help empower farmers. Furthermore, raising awareness among paddy farmers about market diversification strategies, both before and during market recessions, should be a key focus to reduce associated risks.

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VI. DISCLOSURE

The author reports no conflicts of interest in this work.

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