Case Study

Challenges for Small Scale Rice Farmers- A Case Study from Tanzania

James Nkwabi*, Ravinder Sharma, Kapil Dev, Samriti and Subhash Sharma

Department of Social Sciences, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni-173230, Solan, Himachal Pradesh, India

*Corresponding author: nkwabi77jjj@gmail.com (**ORCID ID:** 0000-0003-4107-640X)

ABSTRACT

The present study was conducted in the Lake Zone of Tanzania, with a sample size of 265 rice farmers has been selected. The objective was to find out the constraints faced by rice farmers to propose Government's policies regulating to overcome the constraints of rice production promotion and marketing in Tanzania. The study found that the agro-ecological constraints faced by farmers, ranked from more to less serious, were related to production and marketing problems; the major production challenge was drought faced 89.81 % of rice farmers from attaining the high rice production potential in the Lake Zone, followed by pests 34.34 %, shortage of inputs 31.32 % and diseases were the other major challenge encountered by the 25.29 %. The major diseases were the Yellow Mottle Virus and rice blast. Further, it shows that the low price of rice was a major marketing challenge faced by 38.95 %, followed by price fluctuations of 17.90%, and improper measurement scale was observed to be a challenge faced by 14.90 % of rice farmers.

Highlights

◉ Production challenge *viz.* drought, flood, disease, shortage of extension facilities, shortage of agricultural machinery, high cost of inputs, and lack of package practice knowledge

◉ Marketing constraints include low price, price fluctuation, and unavailability of a large market facility, improper weigh scale, poor marketing system, and shortage of processing unit.

Keywords: Rice production, production challenges, market challenges, Lake Zone, Tanzania

Tanzania has a total land area covering 94.5 million hectares, out of which 44 million hectares are suitable for agriculture. Moreover, it is estimated that a total land of 21 million hectares is suitable for rice production with abundant water resources, out of which 1.35 million hectares is under rice cultivation (URT, 2009; Minot 2010 and EUCORD, 2012). Rice is the second most widely grown cereal crop and is the staple food for more than half of the world's population. Rice farming in Tanzania provides the livelihood for small-scale farmers and ranks as the second most important food crop for production and consumption after maize (Therkildsen, 2011). It occupies 1,455,564 ha, which is 16.8 % of the total food crop area, and 18 % of farming households grow rice. Also, rice is the

second-largest cereal crop harvested (1,382,794 tons; after maize which has the largest production with 5,766,984 tons, equivalent to 74.30 percent (URT, 2016). Rice contributes approximately up to 3 % of the country's Gross Domestic Product.

Tanzania's government invested in rice sub-sectors with the expected to increase rice production efficiency in order to become a large producer and exporter of rice in the region and Africa in general. Current statistics have attested that the country is among the leading Sub Saharan Africa countries

in rice production (FEWSNET, 2016), while it ranks fourth in Africa in terms of rice production (Tigchelaar *et al*. 2018). The potential existence of rice production in Tanzania includes irrigated low land and rainfed low land. Currently, most of the rice is being produced by smallholder farmers under low land rain-fed conditions (Msangya and Yihuan, 2016). However, rice sector needs a better performance in farming and marketing unless the government takes appropriate action to rescue the prevailing challenges, Ndanitsa *et al*. (2011) reported challenges facing rice production in Tanzania related to individuals and institutional factors. These factors have jointly led to the large gap observed in rice demand and domestic rice production over the years. Therefore, the purpose of the study was to single out key findings that could guide the government in coming up with appropriate interventions for the challenges of rice farmers in the Lake Zone of Tanzania.

MATERIAL AND METHODS

The multistage sampling technique was used to obtain the appropriate data (qualitative and quantitative) from the study areas. Different sampling techniques were used in different stages based on population characteristics. Purposive sampling was used for the selection of Lake Zone and two regions *i.e.*, Mwanza and Shinyanga, out of a total of six regions viz., Mwanza, Shinyanga, Kagera, Mara, Geita, and Simiyu based on rice production. The second stage involved the selection of four districts, namely Misungwi, Sengerema, Kahama, and Shinyanga rural, two districts from each selected region on the basis of rice production. A complete list of wards was prepared in the selected district, and simple random sampling was employed to select eight wards, two wards from each districts. In the fourth stage, two villages from each selected ward were randomly selected, while the final stage comprised a selection of 265 rice farmers for interview. Cross-sectional primary data was obtained through a field sample survey by the use of a structured questionnaire. Percentage and mean were obtained, chi-square test was used to find the significance of the finding, and the statistical package for social scientist software was used for data analysis.

$$\bar{X} = \frac{\sum_{i=1}^{N} X_i}{N}$$

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

RESULTS

Rice farmers in Lake Zone are facing a number of challenges that result in decreased rice production. These challenges differ from place to place, while others cut across the entire zone. The main challenges are drought, floods, pest (bird, weed, and worms), diseases (Yellow Mottle Virus and rice blast), lack of knowledge about a package of practices, lack of capital, shortage of inputs, high cost of inputs, lack of extension facilities and infertile lands. Drought is the greatest challenge in agricultural production and food security in Tanzania and Africa in general. Despite the presence of rivers and the biggest freshwater lake (Lake Victoria), only 5 % of cultivated land is under irrigation in Tanzania Drought was the major problem that restricted 89.81 % of rice farmers from attaining the high rice production potential. The problem was due to the dependence on unpredictable rainfall for irrigation. The selected zone had faced the severe drought problem, *i.e.*, Kahama (100 %) followed by Misungwi (92.40 %), Shinyanga rural (91.90 %), and Sengerema district (75.70 %). The drought problem can be managed by improving the irrigation system through investing more in modern irrigation technologies as these districts are near to or surrounded by Lake Victoria (Tsujimoto *et al*. 2019).

Pests (weeds, worms, and birds) were the second major challenge faced in rice production, as it affects 34.34 % of rice growers. The highest number of farmers affected by the pest attack was in Shinyanga rural (51.60%) followed by Misungwi (33.30 %), Kahama (29.90 %), and Sengerema (28.60 %). The pests attack varied significantly between different districts of Lake Zone. It was observed that the severity of pest attack depended upon the nature of the land, location of the fields, and weather condition of the place *i.e.*, Shinyanga rural, which had severe drought problems also had the highest level of pest infestation as well as Sengerema district which had the lowest drought problem also has observed the lowest pest infestation. An average

Fig. 1: Existing irrigation system in Lake Zone

Fig. 2: RYMV disease in Isole village - Sengerema district

of 31.32 % of rice farmers faced a shortage of agriculture inputs. The shortage of the inputs, led to a reduction in rice production in the study area. Inputs (fertilizer, pesticide, and improved seeds) in the agriculture sector are important components that determine production and allocation of capital (Table 1).

Diseases were challenges encountered by the 25.29 % of rice growers. The major diseases of rice in the Lake Zone were Rice Yellow Mottle Virus (RYMV) and rice blast. Majority of rice farmers, an average of 52.80 % in Sengerema district, faced diseases, followed by Misungwi (22.70 %) and Kahama district (14.90 %). The lowest problem of disease was observed in the Shinyanga rural district, where only 8 % of rice farmers faced this problem. The response to the disease was significantly different in four selected districts of the Lake Zone. Farmers were opting out from rice production and shifting

to other crops like vegetables and chickpea because of RYMV severity; the incidence of RYMV and rice blast in Sengerema and Misungwi districts revealed the real situation of these diseases in the study area (Fig. 2 and 3).

Most of the farmers were not very skillful in the uses of farm inputs, particularly newly introduced improved technologies; this lead to inefficient uses of inputs as 21.51 % of rice growers in the study area had lack of knowledge about the package of practices, similar constraint was also found by Kumar *et al.* (2020). This constraint was faced maximum in Kahama district (31.30 %) followed by Shinyanga rural (30.60 %), Misungwi district (19.70%), and the lowest was observed in Sengerema district (5.70 %). High cost of agricultural inputs *i.e.*, pesticide, improved rice seeds, and fertilizers, was a limiting factor of rice production for 19.25 percent of rice farmers (Table 2). The key factor affecting

Fig. 3: Field affected by rice blast disease -Misungwi village

Table 1: Production constrains faced rice growers (Multiple response = %)

Constraints	Misungwi	Sengerema	Kahama	Shinyanga rural	Total	Value of χ^2
Drought	61 (92.40)	53 (75.70)	67 (100)	57 (91.90)	238 (89.81)	3.5
Pest (bird, weed, worms)	22 (33.30)	20 (28.60)	20 (29.90)	32 (51.60)	94 (34.34)	10.24*
Shortage of inputs	14 (21.21)	16 (22.86)	44 (65.70)	7 (11.30)	83 (31.32)	52.74*
Diseases	15 (22.70)	37 (52.80)	10 (14.90)	5 (8.0)	67 (25.29)	53.24*
Lack of package of practices knowledge	13 (19.70)	4 (5.70)	21 (31.30)	19 (30.60)	57 (21.51)	20.07*
High cost of inputs	10 (15.20)	17 (24.30)	12 (17.90)	12 (19.40)	51 (19.25)	2.27
Shortage of farm machineries	8 (12.12)	8 (11.42)	12 (19.35)	4 (6.45)	32 (12.08)	18.77*
Lack of capital assets	8 (12.10)	15 (21.40)	5 (7.50)	2 (3.20)	30 (11.32)	16.14*
Lack of extension contacts	4 (6.10)	—	14 (20.90)	6 (9.70)	24 (9.06)	25.55*
Floods	—	6 (8.60)	—	15 (24.20)	21 (7.92)	49.36*
Infertile lands	4 (6.10)	1 (1.40)	7 (10.40)	—	12 (4.53)	14.84*
Lake Zone	66	70	67	62	265	

*Figure in parentheses is the per cent to the total, ** denote significant at 5 per cent.*

the use and extension of agriculture inputs is the high price offered by agriculture inputs agents. It will be very difficult to use improved farm inputs if their prices are beyond the financial capacity of the farmers. Lack of capital was observed as a constraint in rice production by 11.32 %. This problem was reported maximum (21.40 %) in Sengerema district, followed by Misungwi district (12.10 %), Kahama district (7.50 %), and the lowest problem was observed in Shinyanga (3.20 %) the results are similar with (Singh *et al.* 2020).

Dissemination and training on improved agricultural technologies can be determined by the efficiency, effectiveness, and availability of agricultural extension facilities in the study area. About 9.06 % of rice farmers faced this problem which has a negative impact on the adoption of new technologies of rice production and ultimately resulting in lower

rice production. Climate changes have reversed the pattern of rainfall, which caused some areas to be dry while others faced uncertain floods (Kulyakwave *et al.* 2019; Sawe *et al.* 2018); as a result, rice farmers have shifted from highland to lowland to find or be near the reliable sources of water. This strategy has the benefits of increasing rice production and reducing farming costs, i.e., irrigation cost, and assured a permanent source of water for irrigation. However, continuous rainfall, floods affect (7.92 %) rice farmers in the study area. Rice farmers have been using the same rice field for several years without any effort to improve soil fertility. Lack of knowledge along with the wrong perception that rice fields contain enough organic matter is the main reason for not applying fertilizer, while application of improved inputs like fertilizers done in other crops like vegetables. Continuous

Table 2: Marketing constraints faced by rice growers (multiple response = %)

Variable	Districts				Total	Value of χ^2
	Misungwi	Sengerema	Kahama	Shinyanga rural		
Low price	49 (48.00)	36 (30.80)	43 (40.60)	39 (36.40)	167 (38.95)	4.04
Price fluctuation	16 (15.70)	17 (14.50)	30 (28.30)	14 (13.10)	77 (17.90)	8.25*
Lack of large market	11 (10.80)	21 (17.90)	4 (3.80)	19 (17.80)	55 (12.58)	10.8*
Improper weigh scale	9 (8.80)	24 (20.60)	25 (23.60)	8 (7.50)	65 (14.90)	12.8*
Poor quality of rice	7 (6.90)	6 (5.10)	—	—	13 (3.00)	12.54*
Poor marketing system	4 (3.90)	10 (8.50)	4 (3.80)	23 (21.50)	41 (9.43)	22.15*
Shortage of processing unit	6 (5.90)	3 (2.60)	—	4 (3.80)	13 (3.00)	4.07

*Figure in bracket are per cent total, *denotes significance at 5 per cent.*

Table 3: Marketing agencies involved in Lake Zone

Agencies	Districts				Total within the rice market
	Misungwi	Sengerema	Kahama	Shinyanga rural	
Processors	15 (25.90)	11 (16.20)	26 (37.70)	6 (8.60)	58 (21.90)
Local market	10 (17.20)	19 (27.90)	25 (36.20)	16 (22.90)	70 (26.40)
Middle men	33 (56.90)	38 (55.90)	18 (26.10)	48 (68.60)	137 (51.79)
Total within the district	58 (21.90)	68 (25.70)	69 (26.00)	70 (26.40)	265 (100)

Figure in parentheses are per cent to the total.

farming without application of fertilizer turned the land infertile, as reported 4.53 % of rice farmers in Lake Zone. The highest level of infertile land (10.40%) was observed in Kahama district, followed by Misungwi district (6.10 %), and the lowest is in Sengerema (1.40 %). The shortage of farm machinery was faced by 12.08 % of rice farmers, and the highest shortage was faced in Kahama district (19.35 %), followed by Misungwi district (12.12 %), Sengerema (11.42 %), and the lowest was reported in Shinyanga rural (6.45%). Shortage of farm machinery might be caused by a lack of capital for hiring and purchasing farm machinery. The study conducted by Msangya and Yihuan (2016) found that 25 % of small-scale farmers were using a tractor for ploughing and 33 % used hand hoe, which had limitation in terms of time, efficiency, and operational output in rice production, and 42 % of farmers used Oxen plough. Poor farm equipment reduced the timeline of farm operations, the area cultivated and limits the efficacy of essential operations such as weeding. This constraint was observed to be significant, which implied that the problem was faced by the rice farmers in the entire study area.

Agricultural marketing connotes the marketing of farm commodities and farm inputs required by farmers' during the production process. Products and inputs prices are the main factors that determine farm adjustment and profit earned. The study discovered low price with price fluctuation, lack of large market, improper weigh scale, and low quality of rice, poor marketing system, and shortage of processing unit as the major market challenges which limit the proper market conduct study area. It can be observed that the low price of rice was a major market challenge faced by 38.95 % rice farmers though the worst affected were the farmers of Misungwi district (48.0 %) followed by Kahama district (40.60 %), Shinyanga rural (36.40), and lowest in Sengerema district (30.80 %). It can be concluded that the low price of rice is faced by the farmers across the entire study area. Price fluctuations were observed to be a second major marketing challenge for rice growers. About 17.90 percent rice farmers reported the problem of price fluctuations. The highest price fluctuation was observed in Kahama district (28.30 %), followed by Misungwi district (15.70 %), Sengerema (14.50 %), and the lowest price in Shinyanga rural (13.10 %). Price fluctuations significantly varied among different districts of Lake Zone. The price fluctuation is caused by lack of storage facilities and a lack of other sources of livelihoods.

The marketing process involves the creation of time, form, place, and possess utilities. Improper measurement scale was observed to be a challenge

faced by 14.90 % of rice farmers. The problem of improper weigh scale was observed highest in Kahama district (23.60 %), followed by Sengerema (20.60 %), Misungwi (8.80 %), and the lowest problem observed in Shinyanga rural district (7.50%). Rice market dominated by middlemen who purchase rice by using large volume bucket instead of weighs scale thus purchasing large quantities of rice at a much lower price thereby causing losses to the farmers. Middlemen dominated (51.79 %) rice market and 21.90 % sold rice to processors and 26.40 % at a local market (Table 3); these results were well supported by (Msangya and Yihuan, 2016), and purchasing rice directly from producer by using improper measurement while larger trades purchase large quantity at once by using recommended weigh scale from middlemen. Lack of a larger market or lack of direct interactions between producers and larger traders posed a serious problem to 12.58 % of rice farmers in Lake Zone.

A poor marketing system causes an imbalance in the flow of rice, resulting in unbiased profit gain into the marketing channel. Poor marketing system as a challenge is faced by 9.43 % rice farmers in Lake Zone, improper management of agriculture make rice price to be determined through bargaining without full involvement government during price determination. , The shortage of processing plants in the study area was observed by 3.00 % of rice growers. Value addition which comprises change of form utility, is an important component of the rice business for increased durability and profit. Harvesting and -post-harvest equipment are very important tools to ensure good quality of processed rice with minimizing post harvest. Lack of processing units was higher in Misungwi (5.90 %), followed by Shinyanga rural (3.80 %) and Sengerema district (2.60 %). Kahama district has well equipped and sufficient processing unit facilities.

Low quality of rice, on average, was faced by 3.0 % of total rice farmers, highest (6.90 %) by rice farmers in Misungwi districts, followed by Sengerema by (5.10 %). However, Kahama and Shinyanga rural districts were observed to have no problem with the low quality of rice. Quality of product produced is very important during marketing process in order to attract buyer and compete with external

market or imported rice. In Lake Zone, markets are characterized by inadequate adherence to rice quality, standards, grades, and -post-harvest management, which limit a product to compete and access broad, regional, and international markets (Kaminski *et al*. 2014). Efficient technologies for harvest, handling, drying, storing, and milling/ processing of rice at farmer's level is essential to maintain the quality of rice product. The current process of harvest and post-harvest operation involves hand reaping, threshing by trampling/stick beating, and wind winnowing, which accelerate into the mix with foreign matter, *i.e.*, sands, and lead to poor quality of rice and milled rice.

CONCLUSION

Rice farmers in Lake Zone are facing a number of challenges which results in decreased rice production. These challenges differ from place to place or district to district, while others cut across the entire zone. The main production challenges are drought, floods, lack of knowledge about a package of practices, lack of capital, shortage of inputs, high cost of inputs, lack of extension facilities, and infertile lands. While the market challenges were low price with price fluctuation, lack of large market, improper weigh scale, poor marketing system, and shortage of processing unit as the major market challenges which limit the proper market conduct in the study area. Traders in Lake Zone use improper measurement during trade in the local market which discourages rice farmers; there is a need to strengthen the marketing system to enhance rice production. Thus, to avoid the peak and low season market variation, the government should formulate a policy to construct a warehouse in each village for the storage of different agricultural commodities.

REFERENCES

EUCORD. 2012. Sector Development in East Africa. A Desk Study Prepared for Common Fund for Commodities. European Cooperative for Rural Development, Brussels, 73p.

Famine for Early Warning System (FEWSNET). 2016. Regional Maize Market Fundamentals Survey Report- Southern Africa.

Kaminski, J. Christiaensen, L. Gilbert, C. and Udry, C. 2014. Seasonality in Local Food Markets and Household

Consumption in Africa. Rabat, Morocco: IMF-OCP-NYU Conference on Food P Volatility in LDCs.

Kulyakwave, P.D. Shiwei, X and YU, Wen. 2019. Households characteristics and perceptions of weather variability impact on yield: empirical analysis of small scale farmers in Tanzania. *Cienc. Rural* [online], **49**: 1-13.

Kumar R., Bishnoi, D.K., Sumit and Singh, A. 2020. Constraints in Production, Marketing and Processing of Onion (Allium Cepa L.) in Nuh District of Haryana. Econ Affairs, **65**: 653-657.

Minot, N. and Golleti, F. 2000. Market Liberalization and Poverty in Viet Nam, Research Report No. 114. Washington, D.C. *Int Food Policy Res Inst* (IFPRI).

Msangya, B. and Yihuan, W. 2016. Challenges for Small Scale Farmers: A Case Study of Ulanga District Morogoro, Tanzania. *Int. J. Scientific Res. Innovate Tech.,* **3**: 65-72.

Ndanitsa, M.A, Musa, S.A. and Umar, I.S. 2011. Impact of Microfinance Institutions' Micro-Credit Program on Poverty Alleviation through Agricultural Finance Intermediation to Maize Farmers in Niger State, Nigeria. *Savannah J. Agric.*, **6**: 82-92.

Sawe, J. Mung'ong'o, C.G and Kimaro, G.F. 2018. The impacts of climate change and variability on crop farming systems in Semi-Arid Central Tanzania: The case of Manyoni District in Singida Region. *Afr. J. Environ. Sci. Tech.,* **12**: 323-334.

Singh, A. Bishnoi, D.K. Kumar, N. and Kumar, R. 2020. Constraints faced in adoption of establishment techniques of wheat in Karnal and Kaithal districts of Haryana. *Economic Affairs*, **65**: 179-181.

Therkildsen, O. 2011. Policy making and implementation in agriculture: Tanzania's push for irrigated. DIIS Working Paper 2011:26. 2011. Available from: http://hdl.handle. net/10419/122235. Accessed: Sept. 09, 2020.

Tigchelaar, M. Battisti, D. Naylor, S. and Ray, D.K. 2018. Future warming increases probability of globally synchronized maize production shocks, **115:** 6644-6649. Proceedings of the National Academy of Sciences USA.

Tsujimoto, Y. Rakotoson, T. Tanaka, A. and Saito, K. 2019. Challenges and opportunities for improving N use efficiency for rice production in sub Saharan Africa. *Plant Prod. Sci.,* **22**, 413-427.

United Republic of Tanzania. 2009. National Development Strategy. Ministry of Agriculture Food Security and Cooperatives, United Republic of Tanzania. Final Draft Report.

United Republic of Tanzania. 2016. Annual Agriculture Sample Survey Initial Report, Ministry of Agriculture Food and Cooperative. Agricultural Sample survey Report, 20-24.