

CLIMATE CHANGE IMPACT RESOLUTION ASSESSMENT THROUGH SMALL GRAIN CROPS ADAPTABILITY SHIFT ACCEPTANCE AT PRODUCER / CONSUMER LEVELS AMONG THE ZIMBABWEAN COMMUNITIES

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Abstract: The study was about climate change impact resolution assessment through small grain crops adaptability shift acceptance at producer / consumer levels among the Zimbabwean communities. Climate change recurrence, extinction of nutritionally rich, health stabilizing, drought tolerant and low production cost small cereal grain crop, finger millet, prompted a strong drive in the execution of this study. Relevant literature was sort, succeeded by the research study which adopted both quantitative and qualitative methodologies coupled with convenience sampling and cohort study in gathering data. Questionnaires were confined to 100 respondents consisting of small holder and rural farmers as producers and the public as consumers. Statistical Package for Social Sciences (SPSS) was used to capture questionnaire raw data on which frequency tables and correlation were run. Producer / consumer perceptions, preferences, and attitudes were key variables used among others. Change theories, applied in latent, were deemed necessary for similar future studies. Conclusion, and references were finally presented, and the resultant study outcome showed a dragged and heterogeneous production outcome against highly acceptable consumer by product preferences.

Keywords: Climate change, food security, food insecurity, small grain crops, finger millet.

I. INTRODUCTION

World food consumption patterns seem to have been affected much by globalization, a factor that has influenced and dissociated most people in some communities from small grain crops consumption. Global village societal multi - cultural shift must have to this extend manipulated people's farming attitudes leading to new paradigm shift on food preferential taste adoption, a move that has led to the dispositioning of the agricultural productivity patterns. Affected most, are the unconservative, volatile and radically behaving societies with inconsistent feeding habits which tend to be easily swerved by cultural change dynamism, shunning own culture and its food preferences and yet **food insecurity** has become a global challenge out – cry, aggravated by multiple factors. According to Kent (2021) ‘the first, shared global challenges—include climate change, disease, financial crises, and technology disruptions which are likely to manifest more frequently and intensely in almost every region and country.’ Resolutions to these factors may not be swiftly simultaneously tackled, but rather achieved in phases. **Climate change** has become a worrisome phenomenon that has seemingly been observed as forming the basis for food insecurity challenge globally. Delgado et al (2023) view food security as threatened by market pressure

caused by high global food costs. **Food security** according to FAO (2010) exists when all people, always, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level. (FAO, 2023a) – defined Food insecurity as ‘a lack of regular access to enough safe and nutritious food for normal growth and a healthy life, either due to unavailability of food and/or a lack of resources to obtain it.’ (FAO, 2023) reiterates that ‘The downturn in food security conditions in Zimbabwe is largely on account of poor food access, due to prevailing high food prices and reduced incomes owing to the effects of an economic downturn also evidenced by a palpable uptick in the annual food inflation rate in May 2023, when it reached 117 percent, up from 102 percent in the previous month. According to Dzerowicz, (2023), ‘A marked increase in global food prices has worsened food affordability, an issue intricately linked to the impact of the COVID-19 pandemic, natural disasters, climate change, and conflict.’ To the developing nations one stringent and contingent tactic to overcoming this access to food barrier would be resorting to **small grain crop** production. Small grain crop under this study is ‘**Finger millet**’ A study by Shinggu, etal (2016) claim that the crop has received less attention in Nigeria evidenced by a few farmers that accepted the crop in the country having identified some problems associated with the production of finger millet –viz: striga problem, difficulties in differentiating between weeds and finger millet at early stage of growth, high labour requirement to grow it, the problem of blast disease and inaccessibility to improved varieties or cultivars. It is therefore important to equip farmers with important knowledge on finger millet production and other agronomic interventions. Furthermore, development of proper value chains, regulated markets, establishment of production cooperatives, and various value addition initiatives should receive support so that demand can drive its cultivation. The same views were upheld by Riches (1997) in Svodziwa (2015) that production of small grains has been on the decline in Zimbabwe due to policies that favor production of maize. However, there has been some heterogeneous public perception of finger millet consumption.

The purpose of this study is to therefore demystify this disillusionment by making an assessment on the resolutions that can best be adopted to overcome the impact of climate change through special emphasis on reorienting tropical regions people into adopting relevant cropping systems (Small cereal grain crop production) as a food insecurity overcoming venture among the Zimbabwean communities.

Despite having scanty research aligned to the crop, there are a few researchers who presented a couple of relevant literature where (FAO, 2010; Svodziwa, 2015; Owere etal, 2016; associate the crop with production challenges of low yield compared to other gain crops like maize, easy subjection to birds which further reduce yield, low profitability, lack of government support, more labour on weed control, blast diseases, lack of certified seeds as well as heterogeneous taste preferences). Most farmers are not even aware of fertilizer use in small grains and currently, few farmers use fertilizers on small grains.’

On nutritional acceptance, Patil, etal (2023) on the other hand regard finger millet as one such an important small grain crop characterized by several merits. “The grains were gently roasted (sometimes following sprouting and drying), crushed and screened. The ragi (finger millet) flour is consumed like a salted or sweetened gruel or ball. These crops might add variety to the food supply and guarantee food security in terms of nutrition. Millets offer affordable health benefits for everyday eating and support with managing conditions like diabetes, obesity, hyperlipidemia etc. The calcium content of ragi (finger millet) grain is exceptionally high (300–400 mg), around ten times that of common cereals like wheat and rice. Numerous micronutrients like thiamine, iron, magnesium, zinc, chromium, and iodine are present. The millets are regarded as cool food due to high mineral content, which likely contributes to maintaining the acid-base balance in the human body. Round bread cakes that are traditionally leavened with baking powder are known as biscuits. It is a frequently offered snack that is very nutritious for children and those with diabetes. Those with celiac disease or gluten sensitivity are advised to follow a gluten-free diet as part of their medical nutrition therapy.

Patil, (2023) further reiterates that there has been a rapid dietary change which has occurred in recent years, urbanization, globalization, as well as social prosperity, which has led people into suffering from poor health and diseases like obesity, diabetes, disorder stroke, hypertension, and a few types of cancer. Food would also help individuals avoid diseases linked to poor nutrition, alleviate hunger, and improve both their physical and emotional health. This idea led to the emergence of modern perceptions of diet and nutrition such as health foods.

II. STUDY METHODOLOGY

This research adopted both quantitative and qualitative methodologies. Convenience sampling and cohort study were adopted in gathering data with questionnaires used to ensure consistence. Data was gathered from 100 respondents covering small holder and rural farmers as producers and the public as consumers.

Statistical Package for Social Sciences (SPSS) was used to capture questionnaire raw data, frequency tables and correlation were run. Data was quantitatively interpreted succeeded by qualitative discussion. Gender, age, marital status, religion, employment details, academic / professional qualification, farming regional location, producer / consumer perception, consumer by-product preferences, and producer / consumers' attitudes were used as variables in the study. Conclusion, and references were finally presented.

III. RESULTS

Gender Male respondents constituted a greater valid percentage of 60% compare to their counterpart constituting 40%. **Age** Respondents of 40 years and above willingly responded followed by less than 20, 31 – 40 and lastly 21 – 30 years. **Marital status** on marital status single respondents participated most with 33%, followed by 30% for the married, 19% divorced and lastly widowed with 18%. **Religion** African Tradition Religion 40% was the highest, followed by Christianity 35%, Others 19% and lastly Islamic with 06% **Employment status** More respondents were from non – formally employed 52% against formally employed with 48%.

Academic / relevant professional qualification

45% of the respondents with scanty knowledge about finger millet dominated, followed by the ones with residual knowledge 23%. The highly academically qualified (A level) with relevant skills (Farming Degree) followed constituting 17%, qualified and relevant skills had 10% and lastly 5% of those with relevant finger millet production skills.

Natural farming region

Respondents were found residing in the following regions: 3 (48%), 2 (25%), 4 (16%), 1 (9%) and lastly 5 with (2%)

Producer - Consumer by – product perception

From the results respondent perception were as; extremely low perception 44%, moderate 17%, low 14%, very high 13% and lastly high 12%. Summative perception reflected an outweigh of 52% vs 48% of high perception by low perception respectively from both producer and consumers' points of view.

Consumer by – product preferences

Basing on high versus low by – product preferential treatment extremes, consumers highly preferred the products 41% against a 24% on the low extreme end. **Producer / consumer attitude**

Producer / consumer finger millet production attitude was found inclined on both extremes of high and low, however, a higher extreme ought - weighed the lower reflecting sums of 54% and 41% respectively with 5% being the moderate response. Core – existence of respondents who prefer the crop products but shunning the production aspect could be evident.

IV. DISCUSSION

Levels of finger millet production and consumption seem to rest most on the degrees of producer and consumer perception, preferences, and attitudes. These three independent variables depended much on gender, age, marital status, religion, employment status, educational qualification, and one's natural farming regional location.

V. CONCLUSION

The conclusion of this study rests on some advantages and disadvantages drawn. Advantages outweighed disadvantages where perception, preferences and attitude were treated as most important variables on the production and consumption of finger millet by – products. The study however, noted a gap existing among most respondents on the need to change their mind sets through fusion of change theories which appear to be very relevant in the context. Application of Prosci's ADKAR change model as cited by Fabia McLean Bourda (2013) would be useful in changing the mind sets of respondents in principle, to make a change successfully an individual needs: Awareness of the need for change, Desire to participate and support the change, Knowledge on how to change, Ability to implement required skills and behaviors and lastly Reinforcement to sustain the change.

Advantages

- The study has established the role played by finger millet as a food insecurity resolution tool due to its ability to thrive under agitating and crop repulsive environments filled with socio – economic unrest.
- The study established uncompromised presence of nutritionally reach broad – spectrum components in the crop.
- Minimal or sometimes no fertiliser is needed to grow it.
- The study has placed conceded emphasis on the complacency on the crop’s storage longevity trait.
- The crop suits marginalised areas by providing food security assurance on relatively poor soil.
- A lesser quantity of flour is required to bake the main meal compared to maize.
- Finger millet is cost effective to grow for there are minimal costs of purchasing expensive inputs.
- The seed is retainable for several years.

Disadvantages

- Finger millet has been found to pose conflicting decisions in distinguishing it from other related plants which happen to be weeds during weed control periods.
- Limited literature on the crop has also limited some technological improvements in both production and by – products usage ventures.
- Confinement of the crop in the tropical countries has also limited its sphere of influence resulting in minimised demand on the world food market rendering it to an uneconomic crop to venture into.
- Lack of the crop’s popularity poses some challenges in processing it due to ignorance.
- The crop does not get government support in its production and as such, communities tend to neglect it means of production acquisition retardation.

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