

Review of Knowledge Economy

2014 Vol.1, No.2, pp.39-47

ISSN(e): 2409-9449

ISSN(p): 2412-3668

DOI: 10.18488/journal.67/2014.1.2/67.2.39.47

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COMPARATIVE PROFITABILITY ANALYSIS OF WATERMELON AND PEPPER PRODUCTION IN DANKO-WASAGU LOCAL GOVERNMENT AREA OF KEBBI STATE, NIGERIA

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ABSTRACT

This research was carried out to examine the comparative profitability of watermelon and pepper production in Danko-Wasagu Local Government Area of Kebbi State, Nigeria. Proportionate random sampling technique was used to select sixty (60) watermelon producers and sixty (60) pepper producers. Thus, a total of one hundred and twenty respondents constitute the sample size for the study. Interview schedule was used to collect primary data from the respondents. The data collected were analyzed using percentage, farm budgeting technique and t-test statistics. Result revealed that majority of watermelon (75%) and pepper (71.6%) producers are males and that 56.67% of watermelon and 48.33% of pepper producers are within the age bracket of 31 – 40 years. Findings also revealed that net farm income for watermelon and pepper production were ₦ 30, 946 and ₦ 19, 592 per hectare, respectively. This therefore, indicated that both enterprises were profitable, but watermelon is more profitable than pepper. The rate of return on investment per hectare was estimated at 55.1% and 45.3% for watermelon and pepper, respectively. Hence, for every naira invested in watermelon and pepper production, the producers generated 55.1% and 43.5% as profit. However, theft, pest and diseases are the most severe problems faced by watermelon and pepper producers in the study area. It is therefore, recommended that adequate security measures and prompt pest and disease control measures will improve the overall productivity of both watermelon and pepper production which will in turn generate more income for the farmers.

Keywords: Comparative, Profitability, Watermelon, Pepper, Production, Danko-Wasagu, Kebbi State.

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Contribution/ Originality

This study contributes to the existing literature in Watermelon and Pepper production and will provide empirical information to policy makers in the formulation of appropriate policies. It will also serve as a guide to practicing and prospective farmers and to researchers who may investigate further into the subject matter.

1. INTRODUCTION

Watermelon *Citrullus lanatus* is one of the most widely cultivated crops in the world (Huh *et al.*, 2003). Its global consumption is greater than that of any other cucurbit. It accounts for 6.8% of the world area devoted to vegetable production (Guner and Wehner, 2004). China is the leading country in the production of watermelon followed by Turkey, United State, Iran and Republic of Korea (Huh *et al.*, 2003). Watermelon *Citrullus lanatus* is a member of Cucurbit, family *Cucurbitaceae*. The crop is grown commercially in areas with long frost-free warm period (Food and Agriculture organization (FAO), 2003). Watermelon is utilized for the production of juices, nectars and fruit cocktails (Miles, 2004). Management of plant pest is essential during the production period. The fruits are harvested by hand with the most experienced workers doing the cutting (removal of fruits from the vine). Watermelon fruit is 87 – 92% water with small amount of protein, fat, minerals and vitamins. The major nutritional components of the fruit are carbohydrate, vitamin A and lycopene, an anti-carcinogenic compound found in red flesh watermelon. Lycopene may help reduce the risk of certain cancers such as prostate, pancreases and stomach. As with many other fruits, it is a source of vitamin C. watermelon also contain large quantities of beta carotene (Food and Agriculture organization (FAO), 2003).

Pepper *Capsicum spp* belongs to the family *solanaceae*, which is an important group of vegetables cultivated extensively in Pakistan and also widely cultivated in almost every country of the world. It thrives best in warm climate where frost is not a problem during the growing season. In general, it requires temperature ranging from 25^o – 35^oC (Channabasavanna and Setty, 2000). *Capsicum spp* are popularly grown in every tropical country and they provide the chief spices of the world. *Capsicum spp* are commercial pepper of West Africa, it originated in west India, peru and Mexico, and they were spread by birds. West Africa has become an important source of pepper. Pepper is used as condiments in stews, hot sauce and for seasoning food, they are rich source of vitamin C, pepper are grown by numerous farmers all over west Africa, usually in mixed cropping and they are grown behind houses (Anyawo, 2003). Pepper is cultivated in many part of west Africa, usually on small scale and are frequently inter – cropped with other crops, they are grown mainly for home consumption (Philips, 2002). *Capsicum spp* grows well on rich well drained loamy soils and in areas of moderate rainfall. Insect pest that affect pepper includes grasshopper and cricket these affects the crops in the field causing wilting and death. Crop rotation will help to reduce the effect of pest infestation (Anyawo, 2003).

2. METHODOLOGY

Danko-Wasagu Local Government is one of the twenty one (21) Local Governments of Kebbi State. It covers a geographical land area of four thousand two hundred and eight (4,208) square kilometers, with an estimated population of about two hundred and sixty five thousand, two hundred and seventy one (265,271). It is boarded in the south by Sakaba Local Government area of Kebbi State, in the west by Zuru Local Government of Kebbi State and in the North – East by Bukkuyum Local Government of Zamfara State. Danko/Wasagu lies between latitude 11° N and longitude 5° and 6°E of the equator (National Population Commission (NPC), 2006). The topography of the local government is flat or low land area with a fertile soil covered by sandy soil, sometimes coarse in texture with the several fadama and alluvial plain soil suitable for Agricultural activities (Girma, 2008). The local government is made up of eight administrative districts namely: Danko, Wasagu, Ribah, Waje, Kanya, Bena, Kyabu and Wari districts. The weather is marked by a single rainy season and long dry season. The average rainfall is 720mm, the rainy season period is between May to October and the length of rainy season is about four or five months. The mean temperature range from 31°C and 38°C respectively. Hence, the months of November to February are particularly cold due to dry harmattan and from March to May are generally hot and wet as in the tropics (Girma, 2008).

Danko-Wasagu local government area is made up of Eight (8) administrative districts, namely, Danko, Ribah, Waje, Kanya, Wasagu, Bena, Kyabu and Wari. Multi-stage sampling was used for the study. The first stage involved selecting four districts purposively; this is because of the concentration of watermelon and pepper producers in the districts. The second stage involved selecting two villages randomly using a sampling frame from each district headquarters. The third stage involves selecting sixty (60) pepper producers and sixty (60) watermelon producers using proportionate random sampling. A total of one hundred and twenty (120) respondents constitute the sample size for the study. Data was collected using interview schedule. Trained enumerators were used to collect primary data from the respondents. Data analysis was carried out using descriptive statistics, farm budgeting technique, financial analysis and t-test statistics.

2.1. Specification of Models

Net Farm Income signified the difference between total returns in naira for the farm and total expenses of production in naira. The total revenue is defined as the total money value of all output produced whether sold, consumed or in stock. Total fixed costs are costs which do not vary when output changes and therefore have no influence on production decisions. While total variable costs are costs of variable inputs such as feeds, labour and drugs used in production. They change directly with the level of production. Gross margin is the difference between total revenue and total variable costs (Ajala *et al.*, 2007).

The equation for obtaining the Net Farm Income can be stated as follows:

$$NFI = TR - (TVC + TFC) \dots\dots\dots (1)$$

Where

NFI = Net Farm Income (₦)

TR = Total Revenue (₦)

TVC = Total Variable Cost (₦)

TFC = Total Fixed Cost (₦)

Rate of return on Investment – This is a performance measure used to evaluate the efficiency of an investment or to compare the efficiency of different investments. Rate of return on investment is net farm income divided by total cost of investment and is usually expressed as a percentage or ratio.

Rate of return on investment is expressed as follows:

$$RRI (\%) = \frac{NFI}{TC} \times 100\% \dots\dots\dots (2)$$

Where, RRI = Rate of Return on Investment

NFI = Net Farm Income

TC = Total Cost

Capital Turnover – This is a ratio of total revenue by total cost. Generally it measures the efficiency of a business and provides information about the business capability to deliver a return per naira of its capital investment. Capital turnover is expressed as follows;

$$CTO = \frac{TR}{TC} \dots\dots\dots (3)$$

Where, CTO = Capital Turnover

TR = Total Revenue

TC = Total Cost

T-test – A statistical used for comparing the means of two samples (or treatments), even if they have different number of replicates. In simple terms, the t-test compares the actual difference between two means in relation to the variation in the data expressed as the standard deviation of the difference between the means (Spiegel, 1992).

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{(SE_1)^2 + (SE_2)^2}} \dots\dots\dots (4)$$

Where;

\bar{X}_1 = Mean of group 1 (Mean value of returns from watermelon production).

\bar{X}_2 = Mean of group 2 (Mean value of returns from pepper production).

SE = Standard deviation.

3. RESULTS AND DISCUSSION

3.1. Socio-Economic Characteristics of Respondents

Table 1 showed that 75% of watermelon producers were males, while only 25% were females. The Table also indicated that 71.7% of pepper producers were males while 28.3% were females. This showed that males are more involve in watermelon and pepper production than females.

Table-1. Distribution of Respondents According to Socio-economic Characteristics

| Watermelon | | | Pepper | | |
|-------------------------------|----|------|-------------------------------|----|------|
| Variables | F | % | Variables | F | % |
| Sex | | | Sex | | |
| Male | 45 | 75 | Male | 43 | 71.7 |
| Female | 15 | 25 | Female | 17 | 28.3 |
| Total | 60 | 100 | Total | 60 | 100 |
| Age | | | Age | | |
| 21 – 30 | 17 | 28.3 | 21 – 30 | 21 | 35 |
| 31 – 40 | 34 | 56.7 | 31 – 40 | 29 | 48.3 |
| 41 and above | 9 | 15 | 41 and above | 10 | 16.7 |
| Total | 60 | 100 | Total | 60 | 100 |
| Marital Status | | | Marital Status | | |
| Single | 18 | 30 | Single | 19 | 31.7 |
| Married | 42 | 70 | Married | 41 | 68.3 |
| Total | 60 | 100 | Total | 60 | 100 |
| Educational Attainment | | | Educational Attainment | | |
| Primary | 11 | 18.3 | Primary | 7 | 11.7 |
| Secondary | 15 | 25 | Secondary | 25 | 41.7 |
| Tertiary | 8 | 13.3 | Tertiary | 11 | 18.3 |
| No Education | 26 | 43.3 | No Education | 17 | 28.3 |
| Total | 60 | 100 | Total | 60 | 100 |
| Occupation | | | Occupation | | |
| Trading | 6 | 10 | Trading | 4 | 6.7 |
| Civil Servant | 11 | 18.3 | Civil Servant | 14 | 23.3 |
| Farming | 39 | 65 | Farming | 36 | 60 |
| Student | 4 | 6.7 | Student | 6 | 10 |
| Total | 60 | 100 | Total | 60 | 100 |
| Family Size | | | Family Size | | |
| 1 – 5 | 35 | 58.3 | 1 – 5 | 33 | 55 |
| 6 – 10 | 19 | 31.7 | 6 – 10 | 20 | 33.3 |
| 11 and above | 6 | 10 | 11 and above | 7 | 11.7 |
| Total | 60 | 100 | Total | 60 | 100 |
| Years of Experience | | | Years of Experience | | |
| 1 – 5 years | 60 | 100 | 1 – 5 years | 15 | 25 |
| 6 – 10 | - | - | 6 – 10 | 36 | 60 |
| 11 – 15 | - | - | 11 – 15 | 9 | 15 |
| Total | 60 | 100 | Total | 60 | 100 |

Source: Field survey Data and Computation by the Researcher, (2014).

This indicated dominance of male folk in watermelon and pepper production. This finding is in line with the findings of [Food and Agriculture organization \(FAO\) \(2003\)](#) that males are more

involve in agricultural activities than females. Result also revealed that majority (56.7%) of watermelon producers fall within 31 – 40 years, while in the case of pepper producers 48.3% fall within 31 – 40 years. These implied that people within this age bracket of (31 – 40) are known to be active and innovative. This is in line with findings of [Adebayo \(2006\)](#) that most farmers are within the age bracket of 31 – 40 years (middle age) because they are strong enough to produce more compared to young and old age. Furthermore, result revealed that majority (70%) of watermelon producers were married, while majority (68.3%) of pepper producers were married. This implied that married people are more committed to agricultural production activities in order to maintain their family than those that are not married. This is in line with findings of [Anyawo \(2003\)](#) who confirmed that married people are more responsible and are more reliable when it comes to agricultural activities. In the case of educational attainment result revealed that majority (56.7%) of watermelon producers had one form of formal education or the other, while majority (71.7%) of pepper producers had one form of formal education or the other.

Further revealed from the result is the fact that majority (65%) of watermelon producers were farmers, while majority (60%) of pepper were farmers. This indicated that the study area is more or less agrarian in nature, therefore struggle to find means of survival through agricultural activities is eminent. This finding is in line with the findings of [Anyawo \(2003\)](#) that farming is the most important aspect of life as it is a way of life and source of income to rural farmers. More so, result also revealed that majority (58.3%) of watermelon producers have family size of between 1 – 5 people, while majority (55%) of pepper producers have family size between 1 – 5 people. This may be due to the fact that most of the farmers in the study area are monogamous. Moreover, the Table showed that 100% of watermelon producers in the study area fall between 1 – 5 years of farming experience, while majority (60%) of pepper producers fall within 6 – 10 years' experience. This indicated that watermelon production is relatively new in the study area compared to pepper.

3.2. Profitability Analysis of Watermelon and Pepper Production

The profit associated with pepper and watermelon production in the study area is presented in Table 2. The result of the analysis for watermelon production revealed that the variable cost constituted 83% of the total cost of production of watermelon enterprise whereas fixed capital accounted for about 17%. The result also showed that a typical farmer realized net farm income of ₦ 30,946 per hectare. This showed that watermelon producer's realized profit. This finding has disagreed with the findings of [Adeoye et al. \(2011\)](#) that the net margin was higher by about ₦ 258,448.96 per hectare. On the other hand, the profit analysis of pepper production revealed that the variable cost constituted 71.6% of the total cost of production, whereas fixed capital accounted for about 28.4%. The result also showed that a typical farmer realized net farm income of ₦ 19, 592 per hectare. This showed that pepper producers realized profit. Therefore, the result of both enterprises

when compared confirmed that watermelon is more profitable than pepper. The rate of return on investment per hectare was estimated at 55.1% and 43.5% for watermelon and pepper, respectively. Hence, for every naira invested in watermelon and pepper production, the producers generated 55.1% and 43.5% as profit, while the capital turnover per hectare for watermelon (1.55) and pepper (1.43) were greater than 1, implying that for every naira invested in watermelon and pepper production about ₦ 1.55 Kobo and 1.4 Kobo returned to the farmer as revenue. This finding has disagreed with the findings of Adugna (2009) who confirmed that the average gross returns of Pepper was ₦ 791,334/ha, net return ₦ 539,579 and benefit cost ration of (3.1:1).

Table-2. Profitability of Pepper and Watermelon Production/ha

| Watermelon | | | Pepper | | |
|-------------------------------|----------------------------|------------|-------------------------------|-------------------------------|------------|
| Items | Average cost/ value (N) | Percentage | Items | Average cost/ value (N) | Percentage |
| A. Variable cost | | | A. Variable cost | | |
| Labour | 21,068 | 37.5 | Labour | 13,717 | 30.5 |
| Seeds | 11,39 | 2.0 | Seeds | 1,815 | 4.1 |
| Fertilizer | 17,710 | 31.5 | Fertilizer | 11,731 | 26.1 |
| Manure | 2,032 | 3.6 | Manure | 896 | 2.0 |
| Herbicide | 1,977 | 3.5 | Herbicide | 1,627 | 3.6 |
| Pesticide | 1,948 | 3.5 | Pesticide | 1,723 | 3.8 |
| Dressing chemical | 752 | 1.4 | Dressing chemical | 690 | 1.5 |
| Total var. cost (TVC) | 46,626 | | Total var. cost (TVC) | 32,199 | |
| B. Fixed cost | | | B. Fixed cost | | |
| Land | 6,908 | 12.3 | Land | 10,850 | 24.1 |
| Farm tools | 2,651 | 4.7 | Farm tools | 1,941 | 4.3 |
| Total fixed cost (TFC) | 9,559 | | Total fixed cost (TFC) | 12,791 | |
| Total cost (TC) | 56,185 | | Total cost (TC) | 44,990 | |
| C. Revenue | | | B. Revenue | | |
| Sales of watermelon | 87,131 | | Sales of pepper | 64,582 | |
| Total revenue (TR) | 87,131 | | Total revenue (TR) | 64,583 | |
| Net Farm Income (NFI) | 30,946 | | Net Farm Income (NFI) | 19,592 | |
| Rate of Return on Investment | 55.1% | | Rate of Return on Investment | 43.5% | |
| Capital Turn Over | 1.55 | | Capital Turn Over | 1.43 | |

Source: Field survey Data and Computation by the Researcher, (2014).

3.3. Problems of Watermelon and Pepper Production

Table 3 indicated that 10% of watermelon producers encountered problem of drought, 21.67% pest and diseases, 13.33% lack of technical advice, and 55% who are the majority encountered theft as a problem. This is due to the fact that most of the watermelon farms in the study area are not fenced and farmers have no any other means of security. Moreover, the Table also revealed that 16.67% of pepper producers in the study area faced problem of drought, 40% problem of pest and diseases, 15% lack of technical advice and 28.33% cried of theft. This showed that the majority of pepper producers are faced with problem of pest and diseases. This is not in line with the findings of Adigun (2001) that pepper is resistant to most pests and diseases. But outbreak may occur under certain conditions.

Table-3. Distribution of Respondents According to Problems Encountered

| Watermelon | | | Pepper | | |
|--------------------------|----|------|--------------------------|----|------|
| Problems | F | % | Problems | F | % |
| Drought | 6 | 10 | Drought | 10 | 16.7 |
| Pest and diseases | 13 | 21.7 | Pest and diseases | 24 | 40 |
| Lack of technical advice | 8 | 13.3 | Lack of technical advice | 9 | 15 |
| Theft | 33 | 55 | Theft | 17 | 28.3 |
| Total | 60 | 100 | Total | 60 | 100 |

Source: Field survey Data and Computation by the Researcher, (2014).

3.4. Test of Hypothesis

Table 4 revealed that watermelon producers had significantly ($P < 0.01$) more net profit (3.430) compared with pepper producers with less (2.088) in the study area. The hypothesis is therefore accepted.

Table-4. Mean difference of watermelon and pepper production

| Variables | Mean | N | Std. Deviation | Std. Error mean |
|------------|--------|----|----------------|-----------------|
| Watermelon | 3.4304 | 60 | 26942.96284 | 3478.322 |
| Pepper | 2.0885 | 60 | 17254.7667 | 2227.581 |

Source: Field survey Data and Computation by the Researcher, (2014).

4. CONCLUSION

It could be concluded that both watermelon and pepper were profitable, but watermelon is more profitable than pepper in the study area. And that the major problems facing watermelon and pepper producers in the study area were pest and diseases and theft, respectively.

5. RECOMMENDATIONS

Based on the findings of the findings of the study, it is recommended that, watermelon farmers should provide adequate security for their farms so as to curb the menace theft and more research on pepper should be encouraged especially in the areas of disease and pest control. This will solve The Problem of Infestation during the Growing Period.

REFERENCES

- Adebayo, I., 2006. Consumer preference and awareness for some exotic vegetables in Ibadan, Oyo State. Annual Conference of the Horticultural Society of Nigeria Ibadan, Oyo State, pp: 228 – 233.
- Adeoye, I.B., F.B. Olajide-Taiwo, O. Adelani, J.M. Usman and M.A. Badmus, 2011. Economic analysis of watermelon based production system in Oyo State. Nigerian Journal of Agricultural and Biological Sciences, 1(2): 2- 3.
- Adigun, J.A., 2001. Influence of intra – row spacing and chemical weed control on the growth and yield of chilli pepper, (*Capsicum Frutescens* L). Nigerian Journal of Horticultural Sciences, 5(67): 8 - 10.

- Adugna, J.A., 2009. Analysis of fruit and vegetable market chains in Alamata Southern zone of tigray: The case of pepper, onion, tomato. Msc Dissertation Submitted to the School of Graduate Studies of Haramaya University Ethiopia. pp: 98.
- Ajala, M.K., N. B.I., A.A. Sekoni and A.O.K. Adeshinwa, 2007. The profitability of Turkey production in Zaria, Kaduna State, Nigeria. Asian Journal of Information Technology, 6(1): 27 – 33.
- Anyawo, E., 2003. Evaluation of capsicum in Nigeria. Journal of Agricultural and Biological Sciences, 2(6): 1 – 6.
- Channabasavanna, A.S. and R.A. Setty, 2000. Influence of different irrigation interval on growth and yield of pepper. International Journal of Scientific Nature, 1(1): 9 – 13.
- Food and Agriculture organization (FAO), 2003. Agricultural production: Primary crops. 50. Available from Htt://www.fao.org. [Accessed 31 August 2012].
- Girma, S.A., 2008. Seminar Paper Presented to Student of Usmanu Danfodiyo University on Tours of Physical Features of Zuru Emirate, October 12th, pp: 28.
- Guner, N. and T.C. Wehner, 2004. The genes of watermelon. Nigerian Journal of Horticultural Sciences, 39(6): 1175 – 1182.
- Huh, Y.C., A. Solmar and N. Sari, 2003. Morphological characterization of Korean and Turkish watermelon germplasm. Proceedings of the 9th EUCAPIA Meeting on Geneica and Breeding of Cucurbitaceas (Pitrat M. Ed INRA, Avignon, France): pp: 21 – 24.
- Miles, C., 2004. Icebox watermelon crop production, vegetable research and extension. Vancouver, Vancouver USA: Washington state University. Available from: Htt://www.wsu.edu/watermelons [Accessed 10 September 2012].
- National Population Commission (NPC), 2006. National Census Figures. Abuja: Federal Republic of Nigeria, pp: 65.
- Philips, S.M., 2002. Capsicum species, plant resources of tropical foundation. Netherland: Wageningen. pp:154 – 163. Available from http://www.laneag.org/world/research_update [Accessed 1st October 2012].
- Spiegel, M.R., 1992. Theories and problems of probability and statistics. New York: McGraw-Hill. pp: 117.

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