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Effect of Adoption of Ginger Production and Processing Technologies on Rural Households' Productivity in Anambra and Enugu States

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Abstract
This study examined effect of adoption of ginger production and processing technologies on rural households' productivity in Enugu and Anambra States. The study specifically described the socio-economic characteristics of ginger farmers and processors in the study area, assessed the level of utilization of ginger production and processing technologies, estimated the factors influencing rural households' utilization of ginger production and processing technologies and determined the effect of utilization of ginger production and processing technologies on production and income. Multi-stage sampling technique was adopted in selecting 192 farmers and processors from Anambra and Enugu States. A structured questionnaire was used to collect data. Data was analyzed using descriptive statistics such as frequency, percentage, mean and inferential statistics such as ordinary least squares regression and z-test. Majority of respondents were aware of most of the ginger production and processing technologies that were taken into consideration for this study, and they primarily obtained their information through ADP Extension personnel. In the study area, respondents had high level of use of ginger production technologies, but low level of use of ginger processing technologies. Age, marital status, extension contact, and income were factors influencing whether ginger production technologies were used, while factors influencing ginger processing technologies include; level of education, cooperative membership, processing experience, and extension contact. Following the use of ginger production and processing technologies, ginger farmers experienced a considerable increase in ginger productivity. Therefore, the study suggested that ADPs be strengthened to ensure that they successfully disseminate agricultural information and agricultural technologies developed should take into consideration the heterogeneity in the farmers' socioeconomic characteristics.

Keywords: Ginger, Effect, Adoption, Production Technologies, Processing Technologies, Productivity

Introduction

Ginger (*Zingiber officinale Rosc*) is a herbaceous perennial plant that is raised for profit as an annual crop. The crop's origin is said to have been in tropical South-East Asia, from which point it was disseminated to countries in Africa and other tropical areas of the world (Abeykera *et al*., 2005). It is a rhizomatous spice that is frequently produced for trade. The importance of ginger rhizome as a raw material is significant in the pharmaceutical, beverage, and confectionary industries. Zingerone, shogaols, and gingerols, volatile oils that comprise about 1% to 3% of the weight of fresh ginger are what give ginger rhizome its characteristic flavor and aroma (Prasad and Tyagi, 2015). It is a flowering plant whose rhizome is frequently consumed as a spice, either fresh or dry, or used for a number of therapeutic purposes (*US* NCCIH*, 2016).* Pickles, sweets, squash, powder, and beverages are all made with it. When ginger is dried, it contains 15% fragrant oil and 6% oleoresin, compared to fresh ginger's 12.3% carbohydrate, 2.3% protein, 0.9% lipids, and minor quantities of vitamins and minerals (Bijaya, 2018). In addition, it helps reduce other risk factors like asthma, cancer, headaches, constipation, and nausea. It also lowers blood pressure and cholesterol (Bhattarai *et al*., 2011). Ginger is a lucrative cash crop, and Nigeria is a major grower and exporter of it. According to 2019 statistics, the top five nations for ginger production are India (996,04mt), China (552,192mt), Nigeria (375,305mt), Nepal (293,094mt), and Indonesia (228,707mt) (FAO, 2019 as cited in Nation Master, 2020). Nigeria is the continent's top producer of ginger, according to the FAO (FAO, 2019; cited in Nation Master, 2020), yet her output is typically lower than that of other export items. Despite the low output, the product's quality-which is widely sought after on the global market makes up for it. In Nigeria, ginger production increased from 647,000 metric tons in 2020to over 734,000 metric tons in 2021 (Statista, 2022).

In Nigeria, ginger is laboriously grown because farm operations are majorly done manually (Ahmed, 2018).

This limits the size of land that farmers can cultivate. Furthermore, ginger production is unattractive due to the difficult procedures required and the high production expenses brought on by the comparatively high cost of labor (Nwankwo, 2018). These factors have caused poor management and delayed growth in the ginger industry and resulted to a low yield that directly affects the farmers' revenue. The production of ginger is believed to be economically advantageous for both rural farmers and urban industrial processors in terms of creating cash and jobs (Nandi *et al*., 2011). The economic potential of ginger has not yet been completely realized by farmers, despite its significance as a global phenomenon. However, there have been efforts to upgrade through the dissemination of improved production and processing technologies in order to increase economic benefits. These technologies include, but are not limited to: development and fabrication of ginger splitting machine; mulching; development of optimum rhizome sett sizes for seed and ware ginger production; development of optimum planting depth of 10cm; use of organic manure in ginger production; value addition to ginger rhizome by the development of some ginger-based recipes such as ginger drink, ginger powder, ginger bread biscuits, cookies etc (NRCRI, 2015). Through various methods, these technologies have been disseminated to rural households. This study therefore aims at examining the level of utilization of ginger production and processing technologies and its effect on productivity in Anambra and Enugu States of Nigeria. Specifically, the study described the socioeconomic characteristics of ginger farmers and processors, assessed the level of utilization of ginger production and processing technologies, estimated the factors influencing rural households' utilization of ginger production and processing technologies and determined the effect of utilization of ginger production and processing technologies on production and income.

Methodology

The study was conducted in Anambra and Enugu States. These two States are situated in Nigeria's south-east region. The terrain consists primarily of plains that are less than 200 meters above sea level. Subsistence farming is the primary occupation of the people of South-East Nigeria, particularly the rural dwellers. The main crops grown are yam, cassava, oil palm, cocoyam, rice, cocoa, maize, plantain, melon, ginger and okro. Multi stage sampling technique was used for the study. In the first stage, two Local Government Areas (LGAs) from Anambra and Enugu States were purposively chosen, namely; Ogbaru and Anambra East LGAs from Anambra and Ezeagu and Aninri LGAs from Enugu, due to the presence of more ginger farmers and processors in the area. In the second stage, one community was purposively chosen from each of these LGAs. They are Osamala from Ogbaru LGA and Aguleri-Otu from Anambra East LGA. In the same vein, Aguobuwa and Nenwe were purposively chosen from Ezeagu and Aninri LGAs, respectively. In the third stage, 12 ginger farmers and processors each were chosen at random from the four communities of the two States, for a total of 192 respondents (96 ginger farmers and 96 processors) chosen for the study. A structured questionnaire was used to collect data. Data was analyzed using descriptive and inferential statistics. Descriptive statistics such as frequency, percentages and means were used to describe the socio-economic characteristics of the respondents. Levels of utilization of ginger production and processing technologies were achieved with mean score using a 5- point Likert type rating weighed in this order: Never = 1, Rarely = 2, Occasionally = 3, Most times = 4, Always = 5. Mean score response equal to or above calculated mean score of 3.0 were regarded as high levels. Linear regression was used to estimate factors influencing the level of utilization of ginger production and processing technologies. The regression equation is given by:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, e)$$

Where: Y = Level of utilization of ginger production and processing technologies (mean scores).
X_1 = Age of respondent (years),
X_2 = Gender (Male = 1; Female= 2),
X_3 = Marital status (1=Married, 0=Otherwise),
X_4= Educational Level (years),
X_5 = Farm Size (hectares),
X_6= Extension contact (Yes = 1; No = 0),
X_7 = Cost of production (naira),
X_8=Income (naira),
X_9= Membership of cooperatives (Yes = 1; No = 0).
X_{10} = Farming/Processing Experience (years**),**
e = error term. Effect of utilization on output and income was realized with z –test thus;

$$Z_{cal} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s^2\bar{x}_1}{n_1} + \frac{s^2\bar{x}_2}{n_2}}}$$

Where;
$\bar{x}_1$ = Mean output and income (each) before adoption of ginger technologies.
$\bar{x}_2$= Mean output and income (each) after adoption of ginger technologies.
$s^2\bar{x}_1$= Variance of output and income (each) before adoption of ginger technologies.
$s^2\bar{x}_2$ = Variance of output and income (each) after adoption of ginger technologies
n_1 = number of respondents before adoption
n_2 = number of respondents after adoption

Results and Discussion

Socio Economic Characteristics of the Respondents

Table 1 shows the socioeconomic characteristics of ginger producers and processors in Anambra and Enugu States. They include; educational level, age, sex, marital status, years of experience, household size, membership of cooperative, farm size, extension contact, access to credit and land procurement. Majority (76.05% and 58.33%) of the farmers and processors respectively were between the ages of 40 and 59 years, according to the findings. Males made up the majority of the producers (67.71%), while females made up the majority of the processors (55.21%). Majority of

farmers (92.71%) and processors (65.63%) were married, according to the distribution of farmers by marital status. The distribution of ginger growers and processors by educational level reveals that the vast majority (92.71% each) have completed various levels of schooling. Furthermore, 43.75% of ginger farmers had a household size of 7–9 persons, while the majority (54.17%) of ginger processors had a household size of 4–6 persons. Additionally, majority of ginger growers (72.92%) and processors (67.71%) has experience ranging from 1 to 5 years. Similarly, majority of ginger farmers (60.42%) were not members of cooperative societies. However, majority of the processors (56.25%) were members of cooperative societies. The distribution of respondents by farm size reveals that majority (85.42%) of the farmers owned small farms of between 0.1 and 0.5 hectares with a mean farm size of 0.4 hectares, while majority (76.04%) of the processors owned farms of between 0.6 and 1.0 hectares with a mean farm size of 0.7 hectare. Majority of farmers (57.29%) and processors (55.21%) had access to extension services, whereas, only 27.07% and 35.42% in that order had access to credit. The bulk of the farmers (68.75%) and processors (54.17%) cultivate ginger on rented land.

Awareness and Source of Information about Ginger Production and Processing Technologies

Table 2 shows the distribution of respondents by their awareness of ginger production and processing technologies. Awareness is the first stage of the adoption process. Entries in Table 2 show that majority (65%, 98%, 82% and 76%) of the farmers were aware of the use of improved ginger varieties, use of ginger sett for production, combination of organic and inorganic manure and good agronomic practices respectively. Similarly, majority (100%, 98% and 97%) of the processors were aware of processing of ginger into powder, processing of ginger into split-dried ginger and production of ginger drink and other confectioneries from ginger respectively. However, only 43%, 46% and 48% of the respondents were aware of the use of planting depth of 10cm, ginger splitting machine and ginger drying machine respectively. This implies that majority of the farmers in Anambra and Enugu States were aware of most of the ginger production and processing technologies disseminated by National Root Crop Research Institute (NRCRI), Umudike. This is of advantage to the adoption of these technologies, as awareness is an indispensable and preceding step towards the adoption of any improved practice.

Table 3 shows distribution of farmers by their source of information of ginger production and processing technologies. Table 3 reveals that a good proportion of the farmers (43%, 38%, 34% and 33%) acquired information on ginger production technologies from Anambra and Enugu States Agricultural Development Programme (ADP) Extension agents, Television, Guide/Bulletin/Pamphlet and Family/friends respectively, while 26% obtained their information from Federal Ministry of Agric. and Rural Development and Non-Governmental Organizations. However, only 3% acquired information on ginger production technologies from National Root Crop Research Institute, Umudike (NRCRI). On the other hand, majority of the processors (60% and 54%) acquired information on ginger processing technologies from Family/friends and Agricultural Development Programme (ADP) Extension agents respectively, while a good proportion of the processors (43%, 38%, 29% and 28%) obtained their information from Television, Internet, NRCRI, and Federal Ministry of Agriculture and Rural Development/Non-Governmental Organizations respectively. However, only 19% and 3% of the processors acquired information on ginger production technologies from Guide/Bulletin/Pamphlet and radio respectively. This confirms the contribution of ADPs towards dissemination of agricultural technologies in the country.

Level of Utilization of Ginger Production and Processing Technologies in Anambra and Enugu States

Table 4 shows farmers' level of utilization of ginger production and processing technologies in the study area. Results show that respondents had high level of use of ginger production technologies ($\bar{x}$=3.33), except for the use of planting depth of 10cm, farmers had high utilization of the other production technologies considered in this study. The high level of use of ginger production technologies in the study area could be attributed to the high level of awareness of respondents to these technologies. On the other hand, respondents had low level of use of ginger processing technologies ($\bar{x}$=2.96). Respondents had low level of use of ginger splitting machine and ginger drying machine but high level of use of the value-added technologies. This could be because the machine technologies are expensive and out of the reach of small-scale processors.

Socio-Economic Factors Influencing Level of Utilization of Ginger Production Technologies

Table 5 shows linear regression analysis of some socioeconomic determinants on level of utilization of ginger production technologies. The R^2 value was 0.5573 which indicates that about 56% of the variation in utilization of ginger production technologies was explained by variables included in the model. The remaining 44% could be attributed to the variables not included in the regression model. The regression result reveals that four out of the eight variables considered in explaining utilization of ginger production technologies were significant. The F-statistic was also significant at 5% level of probability indicating goodness of fit of the model. The result revealed marital status (10%), extension contact (5%), and income (5%) were significant and directly related to use of ginger production technologies, while age (10%) was negative. Age was negatively associated with utilization of ginger production technologies. This implies that increase in age of the respondents will lead to a decrease in use of ginger production technologies. The fact that age and utilization have a negative association shows that

younger farmers are more open to using technologies. Younger farmers' utilization of ginger production technologies may be because they are more prone to embrace new technologies than traditional farming practices. This corroborates the findings of Mwangi and Kariuki (2015). Younger farmers are often less risk-averse and more likely to test new technologies, but older farmers are extremely risk-averse and have no interest in long-term investment for new technologies, which helps to explain the negative relationship. Marital status was positively signed; this indicates that farmers that are married were more likely to utilize ginger production technologies. This finding agrees with that of Asiabaka *et al.* (1999) who found out that marital status of respondents has an influence on adoption of agricultural technologies. Extension contact indicated a positive relationship with ginger production; this implies that the more farmers have extension contact, the more useful advice they adopt for their farm practices (Danso-Abbeam *et al*., 2018). This result shows the important role played by extension agents as sources of information that influence adoption and utilization of agricultural technologies. Contact with extension agents is not only important to provide farmers with information about a new innovation, but also the method through which the information is delivered. As extension contacts increase, tendency for rural farm households to access information and knowledge of cassava value-added innovation increase also. Income realized from sale of ginger also indicated a significant positive relationship with level of utilization of ginger production technologies. This implies that an increase in income realized from the sale of ginger would lead to a corresponding increase in utilization of ginger production technologies. Higher incomes are associated with higher levels of adoption rates (Kahimba *et al*., 2014). Higher income means that the farmer can buy inputs for farming and hence can engage in adoption and utilization of ginger production technologies.

Socio-Economic Factors Influencing Level of Utilization of Ginger Processing Technologies

Table 6 shows linear regression analysis of some socioeconomic determinants of level of utilization of ginger processing technologies. The R^2 value was 0.4451 which indicates that about 45% of the variation in utilization of ginger production technologies was explained by variables included in the model. The remaining 55% could be attributed to the variables not included in the regression model. The result reveals that 5 out of the 6 variables considered in explaining ginger processing were significant. The F-statistic was also highly significant at 5% level of probability indicating goodness of fit. The result revealed that marital status (5%), level of education (5%), and extension contact (1%) were significant and directly related to utilization of ginger processing technologies, while membership of cooperatives (10%) and processing experience (5%) were negative. This indicates that farmers that are married were more likely to utilize ginger processing technologies. This finding agrees with that of Asiabaka *et al.* (1999) who found out that marital status of respondents has an influence on adoption of agricultural technologies. Increase in an individual's level of education will lead to an increase in the level of utilization of these technologies. This is because education creates a favourable mental attitude for the acceptance and utilization of new practices especially of information-intensive and management-intensive practices (Caswell *et al.*, 2001). The more farmers have extension contact, the more useful advice they adopt for their practices (Danso-Abbeam *et al*., 2018). Respondents who were members of association were less likely to adopt and use ginger processing technologies. This result is contrary to *a priori* expectation. It is possible that cooperative members are only passive participants who do not benefit from cooperative membership such as access to agricultural information, credit and other production inputs as well as more enhanced ability to adopt innovations. However, the result is consistent with the findings of Ekumakama and Nwankwo (2002); Ironkwe *et al*. (2009); Nwaekpe and Agbarevo (2021). Processing experience was also negative; this implies that experience of respondents has an inverse relationship with utilization of ginger processing technologies. This result is contrary to *a priori* expectation. It could be the case that farmers with long years of experience are reluctant to adopt new technologies and prefer to continue using their old methods of processing. This result is consistent with the findings of Hailu *et al.* (2014).

Effect of Utilization of Ginger Production and Processing Technologies on Output and Income

Table 7 shows the effect of utilization of ginger production and processing technologies on output and income. Result shows that there was significant difference between ginger output/quantity of ginger processed before and after adoption of ginger production and processing technologies at 1% level of significance. Similarly, there was significant difference between the income realized from ginger before and after adoption of ginger production and processing technologies at 1% level of significance. This implies that ginger farmers experienced significant increase in ginger output and income after the adoption of ginger production and processing technologies.

Conclusion

The empirical findings show that majority of the respondents were aware of most of the ginger production and processing technologies considered in this study. Furthermore, there was high level of use of ginger production technologies, but low level of use of ginger processing technologies in the study area. The study found that age, marital status, extension contact, income, level of education, cooperative membership, and processing experience influenced utilization of ginger production and processing technologies. The study's findings further reveal that utilization of ginger production and processing technologies had a positive and significant effect on output and income of ginger

farmers. Therefore, the study recommends that: policies and programs aimed at enhancing farmers' access to extension information, credits, complementary inputs, and education will increase the use of the agricultural technologies. Such policies would entail the creation of viable microcredit programs and farmer cooperatives, and increased investment on education and extension services to further enlighten and promote technology among farmers. Development of agricultural technologies should take into consideration the heterogeneity in the farmers' socioeconomic characteristics.

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Table 1: Distribution of Respondents by Socio-economic Characteristics (n = 96)

Socio-economic Characteristics	Producers		Processors	
	Frequency	Percentage	Frequency	Percentage
Age				
20 – 29	5	5.20	14	14.58
30 - 39	17	17.71	22	22.92
40 - 49	39	40.63	26	27.08
50 - 59	34	35.42	30	31.25
60 and above	1	1.04	4	4.17
Sex				
Male	65	67.71	43	44.79
Female	31	32.29	53	55.21
Marital status				
Single	12	12.50	9	9.38
Married	74	77.08	63	65.63
Divorced	2	2.08	13	13.54
Widow/ Widower	8	8.34	11	11.45
Level of Education				
No formal Education	7	7.29	7	7.29
Primary Education	8	8.33	21	21.87
Secondary Education	63	65.63	51	53.13
Tertiary Education	18	18.75	17	17.71
Household size (Persons)				
1-3	17	17.71	23	23.96
4-6	37	38.54	52	54.17
7-9	42	43.75	21	21.87
Ginger Farming/Processing Experience (Years)				
1-5 years	70	72.92	65	67.71
6-10	23	23.96	25	26.04
11-15	3	3.12	6	6.25
Membership of farmer group or cooperative society				
Yes	38	39.58	54	56.25
No	58	60.42	42	43.75
Ginger farm size (Ha)				
0.1 – 0.5	82	85.42	21	21.88
0.6 – 1.0	14	14.58	73	76.04
1.1 – 1.5			2	2.08
Extension contact				
Yes	55	57.29	53	55.21
No	41	42.71	43	44.79
Land procurement				
Personal	16	16.67	25	26.04
Lease	14	14.58	19	19.79
Rent	66	68.75	52	54.17
Access to credit				
Yes	26	27.08	34	35.42
No	70	72.92	62	64.58
	96	**100.00**	**96**	**100.00**

Source: Field survey, 2021

Table 2: Distribution of Farmers by their awareness of ginger production and processing technologies

	Technology	Aware		Unaware	
	Production Technology	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1	Use of improved ginger varieties	62	64.58	34	35.42
2	Use of ginger sett for productipn	94	97.92	2	2.08
3	Combination of organic and inorganic manure	79	82.29	17	17.71
4	Good agronomic practices (Mulching & planting distance of 20 x 20cm)	73	76.04	23	23.96
5	Use of planting depth of 10cm	41	42.71	55	57.29
	Processing Technology				
6	Use of ginger splitting machine	44	45.83	52	54.17
7	Use of ginger drying machine	46	47.92	50	52.08
8	Processing of ginger into powder	96	100.00	0	0
9	Processing of ginger into split-dried ginger	89	92.71	7	7.29
10	Production of ginger drink and other confectioneries from ginger	93	96.88	3	3.12

Source: Field survey, 2021

Table 3: Distribution of Farmers by their source of information of ginger production and processing technologies

	Farmers		Processors	
Source	***Frequency**	**Percentage**	***Frequency**	**Percentage**
Radio	3	3.13	3	3.13
Television	36	37.50	41	42.71
Guide/Bulletin/Pamphlet	33	34.38	18	18.75
NRCRI Umudike	3	3.13	28	29.17
ADP Extension agent	41	42.71	52	54.17
Family/friends	32	33.33	58	60.42
Internet	18	18.75	36	37.50
Others (FMARD & NGO)	25	26.04	27	28.13

****Multiple responses recorded. Field survey, 2021***

Table 4: Distribution of Farmers by their level of utilization of ginger production and processing technologies

	Production Technology	Never	Rarely	Occasionally	Most times	Always	N Total	Mean	Remark
1	Improved ginger varieties (UG 1 and UG 2)	34 (34)	10 (20)	3 (9)	8 (32)	41(205)	96300	3.13	High
2	Use of ginger sett for ginger production	2 (2)	2 (4)	3 (9)	26 (104)	63(315)	96434	4.52	High
3	Use of combination of organic and inorganic manure	9(9)	6 (12)	6 (18)	41 (164)	34 (170)	96373	3.89	High
4	Good agronomic practices.	23(23)	9 (18)	4 (12)	40 (160)	20 (100)	96313	3.26	High
5	Use of planting depth of 10cm	57 (57)	9 (18)	21 (63)	6 (24)	3 (15)	96177	1.84	Low
	Grand Mean							**3.33**	**High**
	Processing Technology								
6	Use of ginger splitting machine	70(70)	20 (40)	3 (6)	3 (12)	0 (0)	96128	1.33	Low
7	Use of ginger drying machine	70 (70)	9 (18)	8 (24)	6 (24)	3 (15)	96151	1.57	Low
8	Processing of ginger into ginger powder	0 (0)	3 (6)	4 (12)	28 (112)	61 (305)	96435	4.53	High
9	Processing of ginger into split-dried ginger	17 (17)	5 (10)	29 (87)	25 (100)	20 (100)	96314	3.27	High
10	Production of ginger drink and confectioneries from ginger	3 (3)	3 (6)	15 (45)	34 (136)	41 (205)	96395	4.11	High
	Grand mean							**2.96**	**Low**

Field survey, 2021; Decision: Mean score > 3.00 indicates high level of use; mean score < 3.00 indicates low level of use

Table 5: Linear Model Estimates of Socio-Economic Factors Influencing Level of Utilization of Ginger Production Technologies

Variable	Coeff.	Std. Error	t-value	Sig.
Constant	3.8591	.4706	8.20	0.000***
Age of respondents (X_1)	-1.3261	.7201	-1.84	0.070*
Gender (X_2)	.1717	.1426	1.20	0.232
Marital status (X_3)	.3642	.2169	1.68	0.097*
Level of education (X_4)	-.2272	.2587	-0.88	0.383
Farm size (X_5)	-.7438	.5070	-1.47	0.147
Extension contact (X_6)	.3227	.1637	1.97	0.053**
Cost of production (X_7)	7.71e-07	6.91e-07	1.12	0.268
Income (X_8)	1.88e-06	8.64e-07	2.17	0.033**

R^2 = 0.5573. Adjusted R^2 = 0.3863. F- statistic = 2.67**

Table 6: Linear Model Estimates of Socio-Economic Factors Influencing Level of Utilization of Ginger Processing Technologies

Variable	Coeff.	Std. Error	t-value	p-value
Constant	2.7222	.2564	10.62	0.000***
Gender (X_2)	.0004	.0813	0.00	0.996
Marital status (X_3)	.2855	.1404	2.03	0.045 **
Level of education (X_4)	.3417	.1741	1.96	0.053**
Extension contact (X_6)	.2767	.0939	2.95	0.004***
Membership of cooperatives (X_9)	-.1388	.0828	-1.68	0.097*
Processing experience (X_{10})	-.4091	.1795	-2.28	0.025**

R^2 = 0.4451. Adjusted R^2 = 0.3360. F- statistic = 2.25*

Table 7: Z-test table showing the effect of utilization of ginger production and processing technologies on output and income

Variable	Before adoption		After adoption		
Producers	**Mean**	**SD**	**Mean**	**SD**	**z-test**
Output	462.60	280.42	886.80	558.32	10.864***
Income	30010.00	202.36.73	79940.00	106521.29	5.156***
Processors					
Qty processed	160.20	161.64	252.65	220.30	10.131***
Income	24795.92	14842.79	44346.94	27878.27	10.232***