AN ASSESSMENT OF DATE PALM TECHNOLOGIES UTILIZED BY THE FARMERS IN DUTSE LOCAL GOVERNMENT AREA OF JIGAWA STATE, NIGERIA

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ABSTRACT

Objectives of highly productive, high quality, efficient food production, in addition to increasing inputs for agricultural production, scientific and technical expertise are to be fully utilized to improve efficiency of production and to maintain sustainable agricultural development. This study asses the date palm technologies utilized by the farmers in Dutse Local Government area of Jigawa State, Nigeria. A total of one hundred and fifteen (115) respondents were selected using a multi-stage random sampling technique. The findings revealed that all date palm farmers are male, majority (59.1) had no formal education, 52.2% owned their land, 82.6% were self-financing, and only 20.9% access NIFOR to source for seedling. Findings also revealed that the assessment of nursery, plant management, post-harvest technologies utilization were 65.2%, 50.4% and 46.1% respectively. Results also revealed that majority (62.6%) utilized technologies moderately. The chi-square analysis further showed no significant relationship (p<0.05) between socio-economic characteristics, selected farm characteristics with date palm technologies utilization. PPMC analysis also showed no significant relationship between respondents' source of information and their level of technologies utilization. Based on the findings, the study concludes that date palm technologies had only been moderately utilized among date palm farmers. The study recommends that extension agents should ensure easy accessibility of improve technology information to date palm farmers. Also, there is need for local, state governments and financial institutions to help provide credit loan for date palm farmers in the study area.

Keywords: Date palm, technology, utilization, farmers, Jigawa State.

INTRODUCTION

Dates are considered as a fresh fruit ranking number fifth in the production list of tropical and sub-tropical fruits after citrus, mangoes, bananas and pineapples. Date palm is grown extensively in the arid region of the Northern parts of Nigeria from latitude 10^oN in the Sudan Savanna to the Sahel regions. These parts include Kaduna, Katsina Kano, Jigawa States etc. Also, because date palm tolerates a wide variety of soils it may be found in the lower latitudes within the derived savanna areas of Plateau, Nasarawa, Niger, Kwara and Benue States (Omoti and Okolo 2000).

To achieve sustainable date palm production, improve technology should be fully utilized to improve efficiency of production. Technology is the application of knowledge for practical purposes. Generally, technology is used to improve the human condition, the natural environment or to carry out other socioeconomic activities (Burton, 2000). Technology is also a means by which improvement in the quality and quantity of an output is achieved. Date palm cultivation is not in exception as it involved various stages of production during which some technologies have to be fully utilized for abundant outputs and to maintain sustainable date palm production.

For sustainable production of date palm in the growing region of the country in particular and its economic important to the country in general, the Nigerian Institute For Oil palm Research (NIFOR) initiated research on the date palm in 1981 with the collection and establishment of date germplasm materials in Nigeria. The preliminary results of evaluation of these materials indicated that soft, semidry and dry fruit types occurs in Nigeria and two main flowering seasons exist for the Nigerian date population. Flowerings occur in August/September and January/February (Omoti and Okolo 2000). NIFOR, Date palm sub-station located in Dutse is the research institute that is committed to carryout different research on the various aspects of date palm production, generate enough technology, planting materials and to also disseminate these technologies to the date palm farmers through extension agents in the country. Matanmi and Adesiji (2009) stated that the critical function of agricultural extension is to enhance the diffusion of agricultural innovations generated from research, and more often, the success of an extension program is associated with the level of adoption and utilization of recommended agricultural innovations. This is because the objectives of highly productive, high quality, efficient food production, in addition to increasing inputs of materials for production, scientific and technical expertise should be fully utilized to improve efficiency of production and to maintain sustainable date agricultural production.

Despite the comparative advantage the country has in the production of Date palm by having two growing seasons in a year, high rate of production has not yet been sustained. This is because most of the Dates consumed in the country are imported from the neighboring countries like Chad, Niger and Sudan. The cultivation of the crop is at subsistence level with farmers having few tree stands in their farms and two or more stands in their homesteads (Omoti and Okolo 2000). FAO (2006) had reported that modern technologies in crops, mostly imported and sometimes adapted, made it possible to achieve more uniformity and higher quality standard. Output is the summation of all the inputs and technologies used on the farm. Therefore, sustainable date palm production would signify correct combination of all the inputs including improved technologies that were utilized by farmers.

Objective of the study

The general objective of the study is to assess the Date palm technologies utilization by the farmers in Dutse Local Government Area (LGA), Nigeria. The specific objectives of the study are to; (i) determine the personal characteristics

of the respondents, (ii) determine farm characteristics of respondents, (iii) determine the technology utilization of the Date palm farmers (iv) determine their sources of information on date palm among respondents.

Hypotheses of the study

The null hypotheses stated were tested; HO_1: there is no significant relationship between the personal characteristics of the respondents and their technology utilization, HO_2: there is no significant relationship between the farm characteristics and the technological utilization of the Date palm farmers, HO_3: there is no significant relationship between the sources of information used by the Date palm farmers and their technological utilization.

METHODOLOGY

Study Area

Dutse L.G.A. is in Jigawa State of Nigeria. It is located between latitudes $11^0.42"N$ and $11^0.04"N$ and between longitudes $9^0\ 20"E$ and $9^0\ 31"E$. The local government area is bounded in the North by Taura L.G.A, in the South by Birnin Kudu L.G.A, East by Kiyawa L.G.A all of Jigawa state and in the west by Kano state. It has a population estimate figure of 17,697(NPC 2007).

The town Dutse serves as both the state capital and the headquarters of Local Government Area. The major languages spoken in the local government area are Hausa, Fulfude and Banawa. The local government area is made of the following towns Duru, Dundubus, Karnaya, Dutse, Shiwari, Sakwaya, Jaudi, Madobi, and Kudai and villages Chaichai, Yargaba, Dagwaje, Wurma, Warwade, Yalwa, Hammayayi and Baranda. Some of the crops grown in the L.G.A are maize, millets, beans, sorghum, rice, groundnuts, cotton, sesame, and the tree crops are Date palm, cashew, citrus, mangoes and Guava (JARDA). Lastly, the NIFOR, Date palm substation is cited in Dutse town.

Sampling Technique

The population of study comprises all the Date palm farmers in Dutse local Government area of Jigawa State. Multi – stage sampling techniques was used to select the respondents for the study, to get a true representative of the population. There were fifty two (52) date palm farmers who were registered by the Jigawa State Agricultural and Rural development Agency (JARDA). 90% of these registered Date palm farmers were randomly selected numbering forty – seven (47) respondents. Another sixty - eight (68) respondents were also selected using the snowball sampling techniques to arrive at the total number of One hundred and fifteen (115) Date palm farmers representing the sample size.

Data collection techniques

The instrument used for data collection was structured interview schedule guide. This was used to collect information on the various aspect to which the researcher have interest. The data for the study was obtained from the structured interview schedule administered to the Date palm farmers in Dutse Local Government area using the extension agents of the Jigawa State Agricultural and rural development agency as study enumerators.

Data Analysis

Data collected were subjected to both descriptive and inferential statistics. The descriptive statistics used were frequency count, means, and percentages while inferential statistics such as chi squares (χ^2) test and Pearson's Product Moment Correlation (PPMC) were used to test for hypotheses stated above.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

Results of data analyzed in table1 shows that 1.7% of the respondents were 30 years and below, 13.9% were between 31 and 40 years, 39.1% were between 41 and 50 years, 23.5% were between 50 and 60 years, 14.8% were between 61 and 70 years and 7% were 71 years and above. The modal class for the age distribution was 41-50 years of age. The table revealed that both the young and the older respondents represent 23.5% and the larger proportions of 53.0% of the respondents are between 31 and 50 years, representing the middle age group constitutes the bulk of the date palm farmers. This could be inferred that the middle aged group people are involved in date palm cultivation. Table 1 also shows that all the respondents in the study area are male 100%. Sex is an important variable in agricultural production and the role assigned to the sex by the society is known as Gender. The reason could be that male farmers have easy access to land than their female counterparts (Oladeji and Oyesola, 2000).

As regards religion, table 1 reveals that all the respondents in the study area were 100% followership of Islam faith. Date palm has lot of religion connotation both in the old world where it originated and the new world where it migrated to like Nigeria (FAO, 2002). In Nigeria, the Muslim dominated north uses the date palm to breakfast while the Christian dominated south uses other available palm leaves like palm oil, raffia or coconut for their Palm Sunday Easter festival. From Table 1, majority (99.1%) of the respondents were married while 0.9 percent was widower. This finding is similar with that of Ayanda *et al* (2010) and Suleiman (2010) who both reported similar higher percentage values of 85.3% and 100% for married respondents in a similar geographical location. Ekong (2003) noted that marriage was also perceived as a very essential factor facilitating household farming and processing activities.

Majority (63.5%) of the respondents have more than one wife which is also a predominant feature in the study area. The numbers of wives that a respondent has is another important variable in rural areas because it shows one's status of effluence in the society and also contributes to the number of family labour for increase in productivity. The results in table 1 also shows that 39.1% of farm households had 11-15 members followed by 35.7% for households of 6-10, 13.0% for household of 1-5 and 12.2% for household members of 15 and above members. The average household of the farmers in the study area was 10 person/ household. This finding was not far from Ekwe *et al* (2009) who reported that the average household size in African was about 9 and 8 persons per house- hold.

Table 1 shows that the respondents with no formal education are the majority 59.1% with while others with formal education of primary, secondary and tertiary have 27%, 7.8% and 6.1% respectively. This could be attributed to the fact that Quranic education was high among people in the study area as reported by Suleiman (2010) was 88.2%. Education is very crucial form any knowledge to be learnt, acquired and possibly the utilization. Ekwe *et al* (2008) had noted that sound education impacts on the farmers the ability for a balanced assessment of any innovation being transferred to them and high educational status of individuals enables them to make better assessment of the technology.

Table 1: Demographic Characteristics of Respondents.

Farmers' characteristics	Frequency	Percentage	Mean
Farmers age group			
Up to 30	2	1.7	53.1
31 – 40	16	13.9	
41 – 50	45	39.1	
51 – 60	27	23.5	
61 – 70	17	14.8	
71 – 80	8	7.0	
Sex			
Male	115	100	
Religion			
Islam	115	100	
Marital status			
Married	114	99.1	
Widower	1	.9	
Number of wives			
One	42	36.5	
Two	56	48.7	
Above 2	17	14.8	
Family size (ha)			10
0 – 5	15	13.0	
6 – 10	41	35.7	
11 -15	45	39.1	
>15	14	12.2	
Education status			
No formal education	68	59.1	
Primary education	31	27.0	
Secondary education	9	7.8	
Tertiary education	7	6.1	
Total	115	100	

Source: Field survey, 2012

Farm Characteristics of Respondents

Analysis on table 2 shows that majority (55.7%) of the respondents cultivated less than 2 hectares, 40% of them cultivated 2- 4 hectares of land and 4.3% of them cultivate 5 hectares and above. The study shows that majority of the respondents representing 95.3% in the study area operate within or have a farm size of less than 4 hectare. High farm size observed could be so relevant to utilization of technology as reported in a study by Voh (1982) and Basu (1969), who found that large farm size in teams of hectare and labour is significantly related to farmers' utilization of improved farm practices applicable to their farm enterprise. Table 2 further showed that high percentage (56.5%) of the farmers had only 20 and below date palm trees in number, 37.4% had between 21 and 40 date palm tree while 6% have more than 40 date palm trees farmer.

The finding from table 2 shows the farming experience of respondents were indicated as 15.7% for between 1-5 years, 14.8% for between 6-10 years, 12.2% for between 11-15 years, 29.6% for between 16 - 20 years and 27.8% for 20 years and above. Looking at this result, majority of the respondents representing 72.2% had farming experience of between 1-20 years and 27.8% have a farming experience of more than 20 years of farming. With majority having longer years farming experience, it is expected that the rate of adoption and utilization of innovation should be high.

Table 2 shows that the respondents that used family labour was 63.5%, hired labour (12.2%) while those that used both hired and family labours was 24.3%. This high rate of family labour utilization can be inferred from the above result indicating high availability of family members and wives in the study area. The result from table 2 shows that majority (52.2%) of the respondents owned their land, 36.5% of them inherited their land, 10.4% hired their land and 0.9% is community owned. This shows that 88.7% of the land is the study area were under the absolute control of the owner hence new innovations can be tried in their farms. Land ownership is a very important variable for the production of tree crops like date palm. A farmer cannot plant a tree crop on a land which he hired or do not have absolute control of. This in turn can affect production and the utilization of technology in the field.

The results from table 2 shows that 0.9% of respondents source for finance in commercial banks, 2.6% from cooperative society, 4.3% from money lenders, 9.6% from friends and relatives and 82.6% from personal savings. This shows that majority of Date palm farmers in the study area use their personal money to finance the operations in their farms. This result may account for the low production level of date palm experiencing in the country since there is no enough money to increase the inputs of production and the utilization of new technologies to enhance production. Source of finance in any business enterprises is very crucial as it determines the size of the business, the level of production, type of labour used and the quality of the produce.

Also, majority 47.0% of respondents source for Date palm seedlings by themselves. Only 10.4% were from JARDA, 20.9% were from NIFOR, and 21.7% were from other farmers. This implies that improved variety of Date palm trees may be low among farmers in the study area since very few percentages obtained their seedling from relevant research institutes. This implies that date palm farmers in the study area have not applied improve technology extensively. This may have negative implication on sustainable production of date palm. The result from table 2 shows that majority (91.3%) of the respondents are producing between 0 and 2 tonnes, 7.0% are producing between 3 and 4 tonnes and only 1.7% produces 5 tonnes and above. This result shows that Date palm production in the study area was low.

Table 2: Farm characteristics of Respondents

Farm Characteristics	Frequency	Percentage
Farm size		
Les than 2ha	64	55.7
2 – 4 ha	46	40.0
5 – 7 ha	5	4.3
Total number of palm trees		
1-20	65	56.5
21-40	43	37.4
41-60	2	1.7
Above 60	5	4.3
Years of farming		
1-5 years	18	157
6 – 10 years	17	14.8
11 – 15 years	14	12.2
16 – 20 years	34	29.6
Above 20 years	32	27.8
Source of labour		
Family	73	63.5
hired	14	12.2
Both	28	24.3
Land Ownership		
Lease	12	10.4
Inherited	42	36.5
Owned	60	52.2
Community owned	1	0.9
Source of finance		
Commercial bank	1	0.9
Cooperative society	3	2.6
Money lenders	5	4.3
Relatives	11	9.6
Personal	95	82.6
Output or yield/annual		
0 – 2 tons (Low)	105	91.3
3 – 4 tons (Moderate)	8	7.0
5 – 6 tons (high)	2	1.7
Source of seedlings		
JARDA	12	10.4
NIFOR	24	20.9
Personal	54	47.0
Other farmers	25	21.7
Total	115	100

Source: Field survey, 2012

Assessment of Date Technology Utilization among Respondents

Involvement in nursery practice: Results in table 3 shows that 68.7% of the respondents were involved in nursery practices while the remaining 31.3% were not. This results indicates higher survival of Date palm trees because nursery practice is one of the most important stages in the production of date palm as the survival of the tree depend more on this stage as it requires a lot of care and attention before moving to the next stage.

Table 3: Involvement in Nursery Practice

Involvement in nursery practice	Frequency	Percentage
No	36	31.3
Yes	79	68.7
Total	115	100.0

Source: Field survey, 2012

Nursery technology utilization: The result from table 4 revealed that only 32.2%, 21.7%, 17.4% and 16.5% greatly utilized the technologies of watering of the seedling, application of pesticides and insecticides to the seedlings, application of farm yard manure and weeding the polybags respectively. Most of the respondents partially utilized the nursery technologies with higher percentages recorded at bagging of the soil 66%, application of farm yard manure 58.3%, weeding of polybags 57.4% and sprouting of seeds 55.7%. The nursery technology which has the highest level of none utilization are mulching 93.9%, sprouting of seeds 40.8% and planting of sprouted seeds 42.6%. This can be inferred from the fact that it is difficult to break the seed dormancy in the process of sprouting the seeds. Instead the farmers plant their seeds directly on the ground.

Table 4: Nursery technology utilization

Technology	Greatly Utilized		Partially Utilized		Not Utilized		Mean score	Rank
	frequency	percentage	frequency	percentage	frequency	percentage		
Sprouting seeds	4	3.5	64	55.7	47	40.8	0.6261	8th
Application of FYM	20	17.4	67	58.3	28	24.3	0.9304	2nd
Bagging soil	8	7.0	76	66.0	27	27.0	0.8000	5th
Planting sprouted seedlings	9	7.8	57	49.6	49	42.6	0.6522	7th
Watering seedlings	37	32.2	47	40.8	31	27.0	1.0522	1st
Weeding	19	16.5	66	57.4	30	26.1	0.9043	4th
Application of pesticides to seedlings	25	21.7	57	49.6	33	28.7	0.9304	2nd
Mulching	1	0.9	6	5.2	108	93.9	0.696	6th

Source: Field survey, 2012

On the overall assessment of nursery technology utilization, table 5 shows that nursery technology utilization was high with 65.2% utilization rate, given the mean utilization of 5.9652.

Table 5: Nursery technology utilization by respondents

Scores		Frequency	Percentage
Low	0-5.9651	40	34.8
High	> 5.9652	75	65.2
Total		115	100.0

Source: Field survey, 2012

Plantation management technology utilization: This stage involves all the activities carried out once the seedling has been planted or the seed have germinated. Table 6 had revealed high value of greatly utilized plantation management technologies revealing covering of fruits with bag 49.5%, pollination of the flowers 37.4%, pruning of fronds 29.6%, and watering of the seedlings 27.0%. Majority of the respondents recorded more than 50% partially utilized plantation management except for pollination of the flowers 48.7% and covering of the fruits with bag. Generally, covering of fruit with bags, watering of seedlings, pruning of frond, pollination of flowers, and application of manure were ranked 1st, 2nd, 3rd, 4th, and 5th in plantation management technology utilization among farmers in the study area.

Table 6: Plantation management technology utilization

Technology	Greatly Utilized		Partially Utilized		Not Utilized		Mean score	Rank
	frequency	percentage	frequency	percentage	frequency	percentage		
Planting seedlings	16	13.9	92	80.0	7	6.1	1.0783	7th
Watering the seedlings	31	27.0	84	73.0	0	0.0	1.2696	2nd
Weeding the field	20	17.4	90	78.3	5	4.3	1.1304	6th
Application of manures	20	17.4	94	81.7	1	0.9	1.165	5th
Pruning of fronds	34	29.6	76	66.1	5	4.3	1.2522	3rd
Pollination of flowers	43	37.4	56	48.7	16	13.9	1.2435	4th
Harvesting	21	18.3	82	71.3	12	10.4	1.0783	7th
Covering of flowers bags	57	49.5	44	38.3	14	12.2	1.3739	1st

Source: Field survey, 2012

On the overall assessment of the plantation management technology utilization, Table 7 shows that plantation management technology utilized was slightly high with 50.4% while the low utilization was 49.6%. The mean value utilization is 9.5913.

Table 7: Plantation management utilization by respondents

	Score	Frequency	Percentage
Low	0-9.5912	57	49.6
High	> 9.5913	58	50.4
Total		115	100.0

Source: Field survey, 2012

Post-harvest handling activities: Post harvest handling activities are carried out after the date palm fruits have been harvested. They include transporting it to the markets or processing points, drying or curing, processing them to other forms to enhance its usability and increase its shelf life. The results from table 8 shows the following percentages as greatly utilized post-harvested activities by the respondents were 31% for transporting fruits to the market, 27% for fruits sold outside the locality and 13.9% for use of parts to make household utensils. Most of the post-harvest techniques recorded above 50% of partially utilized technology except sales of the fruits on the field 43.5%, processing of fruits to semi-finished products 35.7% and finished products 41.7%. The implication of the result is that the respondents in the

study area do not engage themselves in processing Date fruits to other uses or do not know much about processing techniques like freezing, use of preservative or chemicals.

Table 8: Post harvest handling activities

Technologies	Greatly Utilized		Partially Utilized		Not Utilized		Mean score	Rank
	freq.	%	freq.	%	freq.	%		
Transporting fruits to markets	31	2.7	65	60	15	13.0	1.1391	1st
Sales of fruits on the field	9	7.8	50	43.5	56	48.7	0.5913	5th
Drying of fruits	9	7.8	70	60.9	36	31.3	0.7652	4th
Processing of fruits to semi-finished product	4	3.5	41	35.7	70	60.8	0.4261	7th
Processing of fruits to finished products	7	6.1	48	41.7	60	52.2	0.5391	6th
Use of parts for household utensils	16	13.9	82	71.3	17	14.8	0.9913	3rd
Sold fruits outside the locality	27	23.5	69	60.0	19	16.5	1.0696	2nd

Source: Field survey, 2012

On the overall assessment of the post-harvest techniques utilization, table 9 shows that post-harvest techniques utilization was high with 53.9% utilization rate and low utilization rate of 46.1%. The mean utilization is 5.5217.

Table 9: Post harvest activities utilization

Scores	Frequency	Percentage
Low 0 - 5.5216	52	46.1
High > 5.5217	62	53.9
Total	115	100.0

Source: Field survey, 2012

Technology utilization by Date palm farmers: From table 10, the technological utilization for the date palm farmers in the study area shows 16.5% for low utilization, 62.6% for moderate utilization and 20.9% for high utilization. This clearly shows that majority of respondents' technology utilization falls into the moderate utilization category. This implies that technologies for Date palm cultivation have not been fully utilized among farmers in the study area.

Table 10: Technological utilization level

Levels	Frequency	Percentage	Technological utilization range
Low	19	16.5	6 - 14.4
moderate	72	62.6	14.5 - 27.6
high	24	20.9	27.7 - 44.0
Total	115	100.0	

Source: Field survey, 2012

Farmers' sources of information

Knowledge about NIFOR Date palm sub-station: Results on table 11 revealed that majority (80.9%) of the respondents had heard about NIFOR Date palm sub-station while only 19.1% indicated that they have never heard about NIFOR. Though this results cannot be used to generalize the popularity of NIFOR, Date palm sub-station because of the proximity of the sub-station to the respondents. Results further shows that almost halve (49.6%) had heard about the research institutes for about 11 years and above.

Table 11: Knowledge about NIFOR Date palm sub-station

Knowledge about NIFOR	Frequency	Percentage
Ever heard of NIFOR Date palm sub-station		
No	22	19.1
Yes	93	80.9
Total	115	100.0
How Long have you heard of NIFOR		
Not indicated	18	15.6
1-5 years	7	7.2
6 – 10 years	33	34.0
11 years and above	57	49.6
Total	115	100.0

Source: Field survey, 2012

Others sources of information on date palm technologies: Table 12 shows that 73% of the respondents made the most use of friends and relatives as a major source of obtaining information on date palm technologies followed by extension agents 66.1% and radio 50.4%. Others were agricultural show 7.8%, farmers group 4.3%, contact farmers 3.5% and television 2.6%. This trend could be explained in the view of the fact that Date palm production is a kind of family affairs as most of the respondents have been exposed to the trade at a very tender age and have learnt a lot from their parents and grandparents.

Table 12: Sources of information on data palm technologies

Sources	Frequency	Percentage*
Radio	57	50.4
Television	3	2.6
Extension agents	76	66.1
Agricultural Show	9	7.8
Trade fairs	23	20.0
Friends/relations	84	73.0
Contact farmers	4	3.5
Farmers group	5	4.3
Total	351	

*Source: Field survey, 2012   * =Multiple responses*

TEST OF HYPOTHESES

Hypothesis 1: There is no significant relationship between the respondents' demographic characteristics and education status with the level of technology utilization by respondents.

Table 13 shows the chi-square Test (χ^2) of relationship between demographic characteristics and the level of technological utilization at Nominal level. Results of the analysis revealed that, all the demographic characteristics of age, marital status, family size and educational status were not significant with date palm technology utilization. Meaning that, there were no relationship between the demographic characteristics and the level of date palm technology utilization. The chi-square (χ^2) values for religion and sex cannot be determined because they are constant. This is probably because the respondents are exposed to the business of date palm practices at very early age and the channel of sourcing for the technology was through friends and relations, there can never be any difference in their level of technological utilization regardless of their demographic characteristics.

Table 13: Chi square analysis relationship between respondents' personal characteristics and technology utilization

Personal characteristics	Chi square value	degree of freedom	P-Value	Remark
Age	6.660	10	0.757	Not significant
Marital Status	5.097	2	0.78	Not significant
Number of wives	3.227	4	0.521	Not significant
Family size	11.697	6	0.069	Not significant
Education status	9.691	6	0.138	Not significant

Level of significant = p≤0.05

Hypothesis 2: There is no significant relationship between selected farm characteristics (Farm size and Years of farming) and the level of technology utilization. Results of chi square analysis in table 14 shows that the relationship between farm size and year of farming with the level of utilization of technology were not significant. Meaning that, there is no relationship between these two farm characteristics and the level of Date palm technology utilization.

Table 14: Chi square analysis relationship between farm characteristics with level of technology utilization

Farm characteristics	Chi square value	degree of freedom	P-Value	Remark
Farm size	8.208	4	0.084	Not significant
Years of farming	7.549	8	0.479	Not significant

Level of significant = p≤0.05

Hypothesis 3: There is no significant relationship between the sources of information and the level of technological utilization. Pearson Product Moment Correlation test (PPMC) analysis in table 15 revealed that sources of information and the level of utilization at interval level were significantly not related.

Table 15: PPMC test for sources of information and the level of technological utilization

Variable	r- value	p-value	Remark
Sources of information	-0.014	0.884	N.S

r=correlation coefficient, p= probability level of significance $p \leq 0.05$ (significance).

CONCLUSION AND RECOMMENDATIONS

Findings showed that majority of respondent source for Date palm seedlings by themselves. It means majority cultivate local seedlings that cannot produce high yield. Considering the significant of source of seedling to output and sustainability of agricultural production in general, this situation would have negative implication on sustainable production of date palm in the study area. Study also revealed that majority of respondent source for finance for Date palm farming by themselves. Availability of source of credit loan for agricultural production for large scale production to ensure high yield can not be neglected if sustainable agricultural production must come to stay. The lack of finance for Date palm available to farmers may also be a setback to sustainable date palm production in the study area. This may be the reason for major of respondent were not able to cultivate more than 2 hectares.

Findings also showed that nursery technology utilization was high among respondents, Plantation management utilization was low, Post harvest activities utilization was high, Technological utilization level was moderate among respondents. Date palm farmers were utilized techniques probably been taught by extension agents as indicated by majority on local

varieties of seedling they sourced by themselves. This can still not improve and sustain the production of date palm in the study area.

Knowledge about research institutions committed to carryout different research on the various aspects of date palm production, generate enough technology and planting materials were indicated by majority but still majority did not cultivate seedling from them. This means that there may be constraint(s) faced by date palm farmers in accessing seedling from such research institutions. Further research may be needed to unveil such problems.

For the purpose of improving utilization of date palm technologies for increase and sustainable date palm production in the study area;

1. Sound and effective system for the utilization of date palm technologies should be established
2. The role of local agricultural extension officers for expanding new date palm technologies should be brought into full play. Dissemination of information through radio should also be encouraged since most of the farmers agreed that they listen to radio.
3. All necessary agricultural research institute should ensure easy accessibility of improve technology information to date palm farmers.
4. Majority of farmers still finance the cultivation by themselves, there is need for local, state governments and interested financial institutions to provide credit loan for date palm farmers in the study area.

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