



RESEARCH ARTICLE

ADOPTION OF SMALL-SCALE IRRIGATION TECHNOLOGIES FOR VEGETABLE PRODUCTION BY FARMERS IN NASARAWA STATE, NIGERIA

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ABSTRACT

The research was conducted to assess the adoption of small-scale irrigation technologies for vegetable production by farmers in Nasarawa State. A multi-stage random sampling techniques was adopted on selecting three (3) local government each from the three agricultural zones in the state namely; Nasarawa North, Nasarawa south and Nasarawa west to give a total number of nine (9) local government that was used for the study, from each of the nine (9) selected local government, fifteen (15) small-scale farmers were randomly selected to give a total number of one hundred and thirty five (135) respondents that was used for the study. Data were collected and analyzed using simple descriptive statistics such a frequency count, mean score, percentage score and standard deviation to satisfy all the objectives. Instrument for data collection was administered through a well structured questionnaire and oral interview. The instrument covered all the objectives of the study. The major findings revealed that majority of the respondents (63%) were full-time farmers while (37%) were engaged in other forms of occupation. The result also indicate that majority (41%) of the respondents fall within the ages of 21 – 30yrs (30%) falls within the ages of 31 – 40yrs (15%) falls within 1 – 20yrs and (7.4%) falls within 51 and above. The findings revealed that (66%) of the respondents are male while (34%) are female. The result also shows that (70%) of the respondents are married while (37%) are single. The findings revealed that majority (46.66%) of the respondent's uses stream as the source of water supply (27%) uses dams and (19%) uses rivers (7.40%) uses canals.

KEYWORDS

Adoption, Vegetable, Irrigation, Technologies.

1. INTRODUCTION

Adoption process consists of stages or step that an individual goes through in adopting an innovation or a technology. These are awareness stage, interest stage, evaluation stage, trial and adoption stage (Vanden Ban & Hawkins, 1996). However, observed that farmers reject many apparently attractive and supposedly appreciate technologies either by non-adopting or discontinuation of earlier adopted technologies because they were not really appropriate or that the method of technology transfer was not adequate (Yates, 1995).

He argue that technologies are transfer through authoritarian imposition are not stable because once the coercion is withdrawn or released, the adoption of the technology is discontinued.

According to recent study, adoption decisions by farmers are condition by their perceptions of the technology specific attributes, but their preference for technology characteristics are subjective. Adoption or rejection of technologies by farmers may reflect rational decision making based on farmers perceptions of the appropriateness or inappropriateness of the characteristics of the technologies (Ashby and Sperling, 1992). Adoption is defined as a decision to make full use of an innovation or technology as the best course of action available. Adoption of an innovation is the

decision of an individual or group to use or apply an innovation.

Adoption improved technologies by farmers can lead to increase in farm output, better quality of products and higher income level (Roger, 1995).

Based on a study, recommended that adoption of irrigation technologies by farmers on vegetable production have various responses depending on the farmers level of income (Nwa, 2003). (Akinsanmi, 2000), spired that by irrigation farmers can raise a greater variety of vegetable crops. They can also be largely independent of the weather and can work safer and efficiently since they no longer have to wait for rain.

A research defined irrigation as the artificial application of water on the land used by farmers in place of rainfall to help the growth of their crops, this process is called irrigation, many areas were vegetable production is practice do not have enough rainfall for it to live and grow. Irrigation is supplied to supplement the water available from rainfall and the distribution to soil moisture from ground water (Michael, 1999). In many areas, the amount and timing of rainfall are not adequate to meet the moisture requirement of crops and irrigation is essential to raise crops necessary to meet the needs or food vegetables.

Recent study pointed out that where rainfall is low water becomes a limited factor in vegetable production (Akinyosoye, 1986). Therefore,

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irrigation may be used to bring water to this area so that the root zone of this vegetable crop receive adequate supplies. He also emphasized on the way of applying water to a dry soil, it may be in form of rain (flood irrigation), water may also be introduced through watering can or applied to the soil through perforated pipe (sub-surface irrigation).

However, the broad objectives of the study is to assess the rate of adoption of small-scale irrigation technologies for vegetable production by farmers in Nasarawa State,

Nigeria. The specific objectives of the study is to;

- (i) describe the socio-economic characteristics of the respondents
- (ii) identify the level of adoption of water sources for irrigation
- (iii) identify which water sources are mostly used by farmers
- (iv) identify the techniques or irrigation used in the study area
- (v) ascertain the constraints militating against irrigation farming in the study area.

2. METHODOLOGY

The study was carryout in Nasarawa State, Nigeria. A multi-stage random sampling techniques was used in selecting three (3) local government from the three (3) agricultural zones in the state namely; Nasarawa North, Nasarawa South and Nasarawa West to give a total number of nine (9) local government that was used for the study. From each of the nine selected local government, fifteen (15) small-scale farmers were randomly selected to give a total number of one hundred and thirty five (135) respondents that was used for the study. Data were collected and analyzed using simple descriptive statistics such as frequency count, mean score, percentage score and standard deviation to satisfy the entire objectives. The instrument for data collection was administered through a well structured questionnaire and oral interview. The instrument covers all the objectives of the study.

3. RESULTS AND DISCUSSION

Table 1: Socio-economic characteristics of the respondents		
Variable	Frequency (F)	Percentage (%)
Age(yrs)		
1 – 20	20	15
21 – 30	55	41
31 – 40	35	30
41 – 50	15	11
51 and above	10	7.4
Gender		
Male	39	66
Female	46	34
Marital status		
Single	40	30
Married	95	70
Occupation		
Farming	85	63
Other occupation	50	37
Educational attainment		
Below primary	45	33
Primary certificate	19	14
Adult education	25	18.5
GCE/SSCE	35	25.9
HND/Degree and above	11	8.14
Membership of cooperative		
Member	47	34.8
Non-member	88	65.2
Farming experience (yrs)		
1 – 2yrs	15	11
3 – 4yrs	34	25.2
5 – 6yrs	20	14.8
7 and above	66	48.8
Farm size (ha)		
1 – 2	87	64.4
3 – 4	30	22.22
5 and above	18	13.33
Annual income of farmer (N)		
10 – 20,000	67	49.6
20,000 – 30,000	48	35.55
30,000 – 40,000	15	11.11
40,000 and above	5	3.70

Source: Field survey, 2020

Table 2: Distribution of respondents based on sources of water for irrigation		
Source of water	Frequency (F)	Percentage (%)
River	25	19
Dams	37	27
Canals	10	7.40
Stream	63	46.66
Total	135	100.00

Source: Field survey, 2020

Table 2 above revealed that majority of the respondents (46.66%) depends on stream for their source of water for irrigation practices (27%) used dam (19%) depends on rivers as their only source of water for irrigation practices for vegetable production while (7.40%) uses canals. This result indicates that majority of the irrigation farmers in the study area uses stream as their source of water for irrigation. It was noticed that there are a lot of streams around the study area, this made the farmers to always use the stream because they have access to it.

Table 3: Distribution of respondents according to types of irrigation techniques used		
Types of irrigation techniques	Frequency (F)	Percentage (%)
Surface irrigation	98	72.59
Underground irrigation	37	27.40
Total	135	100.00

Source: Field survey, 2020

Table 3 above shows that majority (72.59%) of the respondents were using surface irrigation as their irrigation techniques while (27.40%) of the respondents engaged in underground irrigation. This indicates that surface irrigation is commonly used in the study area (Nwa, 2003), pointed out that, the method mostly adopted by farmers is surface irrigation which is most important to farmers and in this system the farrow, basin and border methods are predominant.

Table 4: Distribution of respondent according to water supply methods		
Method of water supply	Frequency (F)	Percentage (%)
Water pump	25	18.52
Shaduff	77	57.04
Others	33	24.44
Total	135	100.00

Source: Field survey, 2020

Table 4 indicates that, majority (57.04%) of the respondents were dependents of shaduff for water supply, (24.44%) uses other devices such as bucket, watering can etc for the supply of water to their irrigation farm land, while (18.52%) of the respondents make used of water pump to supply water to their irrigation farm land. This shows that, majority of irrigation farmers in the study area depends on traditional method (shaduff) of water supply on their farm land for vegetable production. The level of adoption of the irrigated areas were not equipped with necessary modern irrigation facilities. In this case, the farmer goes for traditional irrigation sometimes due to financial constraint or lack of awareness of this modern irrigation.

Table 5: Distribution of respondents according to problems encountered.		
Problems	Frequency (F)	Percentage (%)
Finance	52	38.52
Lack of water	33	24.44
Lack of improve varieties	22	16.30
Lack of good techniques	28	20.74
Total	135	100.00

Source: Field Survey, 2020

The above tables shows that majority (38.52%) of the respondents were faced with the problem of finance, (24.44%) were confronting with the problem of lack of water (16.30%) are faced with the problem of improve varieties while (20.74%) are faced with problem of lack of good techniques for irrigation. Emphasized on the problems facing irrigation

such as shortage of water supply due to natural disasters, drought and seasonal variation of rain, the use of local irrigation facilities by farmers and lack of capital to finance the irrigation practices. However, these problems can hinder the successful achievement of irrigation activities (Adekalu and Ogunjimi, 2004).

4. CONCLUSIONS

The results of the study showed that farmers in the study area used predominantly the traditional irrigation methods (shaduff) while other methods are used but in a limited scale. The study shows that the various irrigation device were adopted at the following percentages: shaduff (57.04%) others (24.44%) while water pump (18.52%) and the various techniques were also revealed as surface irrigation (72.5%) and underground (27.40%).

RECOMMENDATIONS

- i. Government should try and send more extension workers to the rural areas to educate and encourage irrigation farmers on the various modern techniques and devices for irrigation practice.
- ii. Improved crop (seed) varieties should be provided to irrigation farmers at subsidized rate to encourage the farmers so that they can put their best to produce more vegetables.
- iii. Since most of the irrigation farming is carried out or practiced in rural areas, government should try and make these area more accessible for free movement of goods and services and to encourage sufficient vegetable production.
- iv. From the data collected, most of the irrigation farmers do not belongs to co-operative organization irrigation farmers should try and be part of co-operation organization which will help them in one way or the other to have access to credit facilities which will

enable them to purchase modern irrigation machines and improved varieties of seed

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