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Resource Use and Productivity Among Rain-Fed and Irrigated Irish Potato Producers in Plateau State, Nigeria

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ABSTRACT

Although Potato is grown in all the three zone of Plateau State, reports indicate that only part of the central and northern zones produce substantial quantities for consumption within the zones and sale to others. Its importance to plateau State its people are evidenced in the number of producers involved, land area cropped, quantities realised and valued. This study which lasted from October, 2004 to September, 2005 was carried out to evaluate the resources use and productivity among rain-fed and irrigated Irish potato producers in Plateau state. A questionnaire was designed to collect data from 90 randomly selected irrigated irish potato producers and 90 randomly selected Irish potato producers in the study area, making a total sample size of 180 Irish potato producers (respondent) that were surveyed. The data were analysed using regression analysis model. Also an average comparative cost-returns analysis was used to compare the costs and return of the rain-fed and irrigated Irish potato producers. The major findings of the result for rain-fed shows that the resources used have 705 influence on productivity with fc>Ft (23.8823>2.02). This therefore implies that we should reject the three hypotheses which seem to accept that:-

- The Socio-economic characteristics of producers do not influence resources efficiency and productivity.
- There is no significant difference in resource use and productivity between rain-fed and irrigated Irish producers.
- There is no significant difference between rain-fed and irrigated Irish potato production.

for the irrigated Irish potato production, the result of the findings show that the resources used ha 95% influence on Irish potato productivity, with high value of Fc=282.373. the overall model is statistically significant, hence we are to reject the three hypotheses as stated above. From the findings, we therefore recommend among others a realistic and aggressive Irish potato programme which will promote all season production through rain-fed and irrigated Irish potato production. The research therefore solve a range of problems in Irish potato production.

INTRODUCTON

The development of agriculture in Nigeria is not meeting the demand of its teeming population. Despite the country's endowment with abundant and diversified range of natural, human and capital resources and oil revenue has remain one of poorest Countries in Africa (UNPP, 1999). Although agriculture is practiced and where smallholder farmers dwell, are still engrossed in abject poverty. These areas are characterised by low productivity, low income, large family size, lack of formal education, low savings and investment, lack of access to credit facilities, inefficient use of the abundant farm resources and the continued use of crude technology.

In response to the dwindling performance of the agricultural sector and also to avert eminent starvation due to poverty, various measures have been introduced by successive governments of Nigeria to combat food shortages and poverty. These include river Basin and Rural Development Authority, (1976 and 1987) , land use Decree (1978), World Bank Assisted Agricultural Development Programme (1979 and 1985), National Fadama Development Project, (1992). Root and Tuber Expansion programme (2000), and the Special Programme on Food Security (2001).

However, none of this measure has been able to adequately solve the food problem, since the desired objectives have not been achieved and productivity of food crops have remain low. The low output realised by small holders farmer is an indication that resources needed in the production of the crop are inadequate and not at the optimal (Nwese, 2002). Therefore, the need to increase resources use efficiency and production of food crops in a Nigeria cannot be over emphasized. The choice of the most appropriate crop or set of crops in a given locality has to be completed by working out and providing sustainable ways of improving output. This could be done through a more efficient use of the resources at the farmer's disposal. One of the staple food crops which has the potential for pulling the country out of the present food deficit and which seems to have been neglected over the years is Irish Potato. Irish potato possesses some prominent

qualities among which are low capital requirement, minimum labour and land required for its production. Irish potato also ha a growing cycle which allows for two or more cultivation periods in a year (Woolfe 1987) in view of the resources constraint for Irish Potato production, it is important to find out which system of production (rainfed or irrigated) is more profitable. This is particularly so when government is today laying emphasis on Fadama Production of Crops, an approach that needs justification.

The objectives are: to describe the relevant socio-economic characteristics of producers and their resource situations, analysis factors which contribute to variation in resources use and productivity . Estimate and compare resource use and productivity between rain-fed and irrigated production, determine and compare cost and returns; and identify problems and constraints to resources use.

METHODLOGY

Purposive and multi-stage random sampling procedures were used in selecting 180 respondents from the nine Local governments, namely, Pankshin, Mangu, Bokkos, B/ladi, Riyom, Jos South, Jos East, Jos North and Bassa. The nine local government Areas were cach divided into five units for spread of date. Giving a total of 45 units. The respondent were clustered into two groups of Irish Potato producers that is one group under irrigated production. Simple random sampling techniques used to select two producers from each of the two groups (rain-fed and irrigated production) form each unit of the Local Government. All together a total of 180 respondents that is, 90 rain-fed and 90 irrigated were sampled. These respondents and their respective statistics and multiple regression techniques.

RESULTS

From the result, the socio-economic characteristics have a lot of influence on the productivity of Irish potato in the study area. Result showed male dominance in both rain-fed and irrigated production of Irish potato in the study area. For objectives two and three, the results for rain-fed shows an autonomous Irish potato output of 1,310.9 tones.

While for irrigated Irish potato production, there is an autonomous output of 129.89 tones based on statistical analysis, the three null hypothesis which seem to accept that the socio-economic characteristics of producers do not influence resource use efficiency and productivity between rain-fed and irrigated Irish potato producers, have been been rejected and the alternatives accepted.

The result also showed that resources such as seeds, land and labour had significant influence on productivity in both rain fed and irrigated Irish potato production. The explanatory variables, as shown by R^2value, had 70% influence on productivity for rain –fed 97% for irrigation. This showed that variation in resources used for the two is up to 27% greater for irrigation. The F_c and F_t values for the two (irrigated and rain-fed) suggest that our hypothesis are rejected. The result of the Gross margin analysis between rain-fed and irrigated Irish Potato production per hectare revealed an average total cost of N79.070 and N66.140 respectively. A profit of N 129,400 and N98,100 for rain-fed and irrigated irish potato production , see tables i-iv the researce also revealved that continuous cropping system without adequate fertilizer application, poor harnessing and conservation of natural resources, such as land water resources among others, were the major constraints to resource use and productivity in irish potato production in the study area.

SUGGESTIONS/RECOMMENDATIONS

Resource-use efficiency and productivity is one of the major problems of the irish potato producers in Plateau State, the following are recommendation for effective resource use and productivity of Irish Potato production in Plateau State.

- If subsidies were given for fertilizers and credits made available to Irish potato producers in the study area at the desired time, the potential responses of this crop to fertilizer would be realised, given the fertility of the area and availability of other resources.

- The few variables production methods especially in irrigated production were developed by traditional farmers and producers, and it is likely that modern technology will have high potentials for improving these existing systems. Therefore, intervention possibilities seem to exist at all levels starting form variety selection to specific production possibilities and efficiency in resources-use and productivity.
- Realistic and aggressive irish potato production programme such as Root and Tuber Exapansion Programme (RTEP) would necessitate a major modification or transformation of the existing traditional production practices.
- Improved food processing plant at strategic locations in the study area and the country at large would overcome some of the major problems of Irish potato , production, preservation and storage. This would reduce food waste, make food of better quality available and hence, would permit better utilization of Irish potato in the national dietaries. Improve food processing facilities would also lead to the high quality. This would also increase the incomes of producers and therefore create incentives for increased food production, which could lead to national socio-economic development.
- Promotion of all season farming through rain-fed and irrigated Irish potato production especially Fadama Should be encouraged. Infrastructure and cost – effective should irrigation schemes that would sustained year – round Irish Potato production should be provided in the study area.
- Irrigation should be aimed at extending the land area under cultivation to the drier areas. There is need to supplement the water needs of crops during the normal growing periods and achieve all year round Irish potato production b growing Irish potato the dry off season periods.
- To stem land degradation, efforts at promoting the wide spread adoption by Irish potato producers of resource management techniques that increase yields and

simultaneously maintain the long-term productivity of land resources must be made.

- It is important to develop appropriate chemical and inorganic fertilizers under wide spread application in an efficient use or manner. Also infrastructural expansion with particular reference to the development of good road networks and the use efficient farm power and labour should saving machinery should be watchword.

CONCLUSION

The study was designed to evaluate and compare land, labour, capital and management resources use and productivity among rain-fed and irrigated Irish potato producers in the study area .findings showed that both male and female were into irish potato production , with more female into rain-fed Irish potato production than into irrigated Irish potato production. Findings further revealed among others that the socio-economic characteristics of irish potato producers influence resource-use efficiency and productivity. Also there is significance difference in resoures-use and productivity between rain-fed irish potato and irrigated irish Potato in the study area. Finding, the establishment of agro-industries to use potato products as raw materials would lead increase production, efficient resource –use and productivity, which will give more returns to the potato industry and development in the agricultural setor.

REFERENCE

Achike, A (2004) Microeconomics picture of Nigeria Agriculture: Strategic analysis of development constraints and priorities in southern Nigeria. Updates on Agriculture and conflict.July USAID Mission Abuja. Nigeria, Pp. 3-14.

African Farmer (1999). Better Nutrition for African Families. Journal of Africa. Farmer, No. 8, pp15-16.

Ifenkwe O.P (1986). A review of the state of potato production in Plateau State of Nigeria.Research Bulletin.NRCRI, Umidike, no. 1,1-9pp.

Nweze, N.J. (2002). Agricultural Production Economic. An Introduction Text AP Express Publisher Ltd, Nsukka, Nigeria. UNDP (1999). United Nations Development Programme: Human Development Report.

Woofe, J.A (1987). The potato in the Human Diet, Cambridge: Cambridge University Press.

Table i. Coefficients of multiple linear regression for irrigated production

Model	Unstandardized coefficient B	Standard Error	Standardized coefficients Beta	T	Sig.
1. (Constant)	129.875	277.598	-0.007	0.468	0.641
AGE	-1.923	7.001	0.031	- 0.275	0.784
FARM					
EX[EROEMCE	14.100	12.519	-.038	1.126	0.263
LEVEL	-10.446	6.031	-0.107	- 1.732	0.087
FERTILIZER	-35.782	18.232	0.331	- 1.963	0.053
LAND	861.322	491.181		1.754	0.083
SEED	922.044	249.882	0.688	3.690	0.000
LABOUR	5.793	1.805	0.102	3.209	0.002
CAPITAL	1.141e.02	0.024	0.011	0.472	0.638

F_c 282.372 : $F_t(0.05 = 2.02$

R^2 0.966 : $R^2 = 0.962$

Source: Analyzed data, 2005

Table ii. coefficients of multiple linear regressions for rain-fed Irish Potato Production

Model	Unstandardized coefficient B	Standard Error	Standardized coefficients Beta	T	Sig.
1. (Constant)	1310.86	1107.14		1.184	0.24
AGE	13.996	23.016	0.049	0.608	0.545
FARM					
EX[EROEMCE	- 56.720	38.847	-111	-1.460	0.148
LEVEL	22.336	26.978	0.055	0.828	0.410
FERTILIZER	-27.204	47.089	-0.071	0.0578	0.565
LAND	1589.080	615.018	0.395	2.583	0.012
SEED	1099.954	397.082	0.473	2.770	0.007
LABOUR	3.621	6.738	0.043	0.537	0.592
CAPITAL	-125	0.091	-0.087	-1.377	0.172

F_c 23.882 : $F_t(0.05 = 2.02$

R^2 0.702 : $R^2 = 0.673$

Source: Analyzed data, 2005

Table iii. Gross Magin Analysis or Average Cost Returns

	Rain-fed Production (#)	Irrigated Production (#)
Gross Income		
Gross Product X Price	208.000	120.000
VARIABLE COSTS		
Land	6,100	5.000
Labour	24,000	24,900
Seeds	12,500	10,000
Fertilizer	36,000	30,000
TOTAL VARIABLE COST	78,600	69,900
Gross Margin	129,400	50,100
Gross Margin/Ha	2.6	1.7

Source: Analyzed from field survey data, 2005.

Table iv. The linear regression estimates of variables.

Variables Model (variables)	Unstandardized Coefficients (Estimaed) B	Std Eror	Standardized coefficients beta	T	Sign.
1 (Constant)	220234.41	69424.634		3.172*	0.002
Cost PTOI	-36.941	32.623	-0.131	- 1.132	0.261
Cost PLAI	33.255	24.281	0.159	1.370	0.175
Cost IMI	-59.645	25.581	-0.240	-2.332*	0.022
Cost PHAI	1.171	0.359	0.336	3.258*	0.002
Relationship between Cost And Production and Sale	12143.989	14361.856	0.088	0.846	0.400
F – Statistic				3.455*	
R^2				0.174*	

Source: Analyzed data, 2005

* Indicates that it is significant at 5 percent level of probability (P=0.5). R^2 = test the proportion of out put that is explained by the variables used in the model and is significant at 0.174*, while F – Statistic implies that all or some of the coefficients contributed significantly in explaining the model used in the analysis at 3.455*.