

ANALYSIS OF CONSTRAINTS IN RESOURCE USE EFFICIENCY IN MULTIPLE CROPPING SYSTEM BY SMALL-HOLDER FARMERS IN EBONYI STATE OF NIGERIA

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ABSTRACT

The constraints militating against the small-holder farmers in multiple-cropping system in Ebonyi State, Nigeria were analysed. A multi-stage sampling technique was adopted to select and administer questionnaire to 240 small-holder multiple-croppers. Data were collected and analysed using descriptive statistics. High lease charges (45%), problem of land fragmentation (35%), low fertility of the land (78%), distance of cultivable land (52%) and sex discrimination (100%) were constraints militating against efficiency of land use. The constraints against efficient labour use were high cost of labour, emigration, sex discrimination and other competing labour use each constituted 23%, 22%, 19% and 14% respectively. Result on constraints against capital use showed that non-availability of improved varieties of yam and cocoyam, high cost of modern inputs, lack of adequate finance and lack of collaterals among others served as major constraints, which constituted 29%, 36%, 33% and 22% respectively. The study confirmed that multiple-cropping system would have been more efficient if these constraints were reduced or eradicated. Effective extension services as well as efficient policy formulation and implementation by government are recommended.

Key Words: Resource use, efficiency, multiple-cropping, Small-holder, Ebonyi State.

INTRODUCTION

Agricultural system in Ebonyi State, whether mono, mixed or multiple cropping system has been traditional in nature and mainly concentrated in the hands of peasants or small-holder farmers. According to Awoke (1998), these small-holder farmers are farmers whose production capacity falls between 2.5 and 5 hectares per season. They constitute the majority of the farming population and cultivate mostly the backyard land. Agbilibeazu (1984) described them as those farmers who produce on small-scale, not involved in commercial agriculture but produce on subsistence level, and cultivate less than five hectares of land annually on the average. Moreover, they constitute about 80% of the farming population in Nigeria (Madu, 1995).

Adegege (1982) noted that because of the low income status of these farmers, they are seldom able to accumulate capital goods. This makes their level of capacity utilization in terms of credit facilities very low (Awoke, 1998).

Generally, smallholder farmers in Ebonyi State are mostly multiple-croppers whose population constitute about 85% of the farming system. Basically, multiple cropping system here could be defined as the practice of growing several crops in one field during a production year. Akinsanmi (1978) defined it as the cultivation of more than one type of crop on a piece of land at the same time. Multiple-cropping is also the simultaneous growing of two or more crop species on an irregular arrangement, without a well defined planting pattern (Andrew and Kassan, 1976; Francis, 1986; Forbes, 1992). Indeed, the importance of this cropping system to the smallholder farmers in Ebonyi State cannot be over emphasized.

Nevertheless, the problems and prospects of smallholder farmers in resource use relative to multiple-cropping system are very enormous. For instance, Olayide (1980), observed that the kinds and qualities of resources used in primary production activities in tropical countries are characterised by old techniques and crudity or simplicity of forms which tend to give rise to low output. In

general, resource use or allocation efficiency in the developing countries such as Nigeria may be said to be faced with the problem of under capacity utilization which is associated with low returns. For example, Mac Arthur (1983) and Onwuekwe (1994), observed that there is low labour utilization or productivity in traditional agriculture.

In addition, it is observed that out of a total land area of 92.457 million hectares in Nigeria, about 75.3 percent (9.25 million hectares) can be brought under cultivation. These vast areas of arable land are believed to be capable of growing almost all types of tropical and sub-tropical crops, but the problem of supply and demand for land militates against the efficient use of the land resources. Specifically, Anthony, Ezedinma and Ochapa (1995) pointed out that land fragmentation is a constraints in the optimal utilization of lands in tropical agriculture. Alimba and Ezinwa (2001) also noted that resource allocation under the existing traditional system of farming in eastern Nigeria is inefficient.

Also, according to Ogunfowara and Olayide (1981), resources are not efficiently utilized or allocated under the small scale farming which is mainly traditional in style. This is largely attributable to the fact that most of the farmers are of low educational status. Thus, irrespective of the vast quantities of factor productivity existing in the African continent, they are largely under developed due to lack of pre-requisite skills by the peasant farmers. Consequently, the problem of resource allocation and utilization have assumed critical dimensions in the traditional agriculture among the small holder farmers.

Relatively, the process of resource utilization for food and fibre production, under conditions of rapid economic development, rural communities are faced with some problematic decisions of what, how and when to produce and utilize the scarce resources. Specifically, there is the problem of deciding on how much of the available factor productivity or resources to be devoted for future growth as well as how much to satisfy current consumption needs (Johnson, 1982).

Again, the problems of resource availability, resource allocation, scarcity of resources in relation to human wants, with the difficulty of tapping the resources or controlling them

in production process including the accessibility of the resources are great obstacles to efficient resource utilization. In fact, the problem of accessibility is grave since much of the environment may contain many seemingly "neutral stuff" of other primary resources awaiting the awareness of their potentialities, possibilities and development of technologies for efficient utilization. In addition, the problem of economic efficiency in the utilization of resources has been the greatest concern of production economists. Efficient utilization of productive resources may be affected by factors such as government policies, customs and institutions or cultural configuration, cost structures, resource management, ownership patterns and policies, resource administration and services (Upton, 1976; Nweke, 1979). Generally, it is expected that farmers in Nigeria need to exploit fully the opportunities for capital formation, improved resource base, higher productivity, innovation and improved management techniques. (Nweke and Winch, 1979). Also, Collinson (1972) opined that developing supportive policies and policy instruments should take into account, the ecological, social demographic and economic issues for effective sustainable natural resource utilization.

Therefore, having established the obvious fact, that resources are not efficiently utilized in agricultural production in Ebonyi State, it is the aim of this study to examine critically the problems and prospects of resource use in multiple cropping system by smallholder farmers. Ultimately, it is hoped that the study will help to bridge the gap between resource availability and efficient utilization in the multiple cropping system in Ebonyi State.

MATERIALS AND METHODS

Study Area

The study area is the whole of Ebonyi State, with thirteen Local Government Areas. These include: Abakaliki, Ebonyi, Izzi, Ishielu, Ohaukwu, Ikwo, Ezza South, Ezza North, Afikpo South, Afikpo North, Ohaozara, Onicha and Ivo. Ebonyi State belongs to the Igbo ethnic group with a total population of about 1.7 million inhabitants (National Census Figures, 1991). It is bounded on the North by Benue State and the South by Abia State. On the East, it shares a common boundary with Cross-River State and on the West with Enugu State. The area is drained by the tributaries of Ebonyi River and has a land area of approximately 5,935 square kilometers lying between latitude $7^{\circ}30'$ and longitude $5^{\circ}40'$ E and $6^{\circ}45'$ E (ABCCIMA, 1997).

Climatically, Ebonyi State is semi savannah with seasonal variations of hot, mild cold weather and a mixed grid vegetation with all eastern prototypes including agrarian, forestry and swamp ideal for rice cultivation. It has a mean temperature of 30°C during the hottest period (February-April) and mean temperature of 21°C during the coldest period (December-January). The mean annual rainfall is between 1,500mm and 1,800mm. Naturally, the climate is tropical hot humid type characterised by high rainfall, high temperature and sunshine with two marked seasons: the rainy and dry season. However, the rainy season occurs for a period of seven months, from April to October, while dry season last for a period of five months that is, from November to March. Ebonyi State is richly endowed with natural resources and solid mineral deposits which are at present largely unexploited. These minerals are found in commercial quantities across the state and include: Zinc, Copper, Aluminium, Coal, Granite, Lignite, Gypsum, Salt, Limestone, Kaolin, Bauxite and others. Therefore, agriculture appears to be the main-stay of

Ebonyi State economy. Hence, Ebonyi State is popularly known as the "foodbasket" of the nation.

Nevertheless, it is found that about 80% of the inhabitants are mostly small-holder farmers, who live in rural areas. Notwithstanding the primitive nature of agriculture in the state, it still provides food to the people as well as raw-materials to the small-scale industries in the state (Idachaba, 1998).

Sampling Procedure

This study concerns mostly small-holder farmers in the various autonomous communities of twelve of the thirteen Local Government Areas in Ebonyi State, with three geopolitical zones: Ebonyi North, Ebonyi Central and Ebonyi South. Administratively, it is divided into thirteen Local Governments with sub-division into communities and wards. Above all, the state is agriculturally fashioned out in line with the Agricultural Development Programme model, consisting of a stratification from zones to blocks and circles to sub-circles as well as contact farmers.

However, for the purpose of this study, the first sampling procedure was to carry out a pilot survey in the three zones of the state. This enabled the researcher to be acquainted with the socio-cultural and physical environment of these farmers for vital information. It was useful to use extension staff, teachers and local leaders in order to obtain more useful information and also assist the illiterate farmers in answering questions as contained in the questionnaire.

Specifically, the sampling techniques adopted for this research was multi stage sampling technique. It was not necessary to adopt "EBADEP" model of blocks, circles, sub-circles and contact farmers because of the geopolitical spread. Therefore, the multi stage sampling method adopted here involved a stage by stage technique of simple-random sampling of the small-holder farmers in all

the autonomous communities of the twelve Local Government Areas studied. Thus, the first stage was to purposively choose twelve (12) out of the thirteen (13) existing Local Government Areas in the state. This was done for reasons of proximity and accessibility. The next stage was a random sampling of five (5) autonomous communities in each of the already chosen twelve (12) local government areas. This gave a total of sixty (60) autonomous communities. Then, stage three involved sampling three villages in each of the sixty (60) autonomous communities. This gave a total of one hundred and eighty (180) villages required for the study.

Furthermore, two (2) small-holder farmers were randomly sampled out of the one hundred and eighty (180) villages. This then gave a total of three hundred and sixty (360) small-holder farmers which represented the required sample for the study. Finally, it was necessary to sample randomly a total of two hundred and forty (240) multiple-croppers small-holder farmers out of the three hundred and sixty farmers (360) for the research sample size.

It is also important to note that for a proportional representation of each village, a proportional percentage of the population per village was a "sine qua non" in the simple random sampling. This was properly adopted in the study.

Source of Data

Data for the study were obtained from mainly primary sources. These were obtained by using a well-structured questionnaire which was augmented with interview schedules. The respondents for the research were the small-holder farmers who engaged in the multiple cropping system.

Therefore, the information provided by these farmers formed the bulk of the primary data including direct field observation. It is not worthy that the data also provided such useful information on socio-economic status of the small-

holder farmers, resource sources and uses including the crop types adopted in multiple cropping system in the study area.

Other sources of data include secondary data collected from journals, research reports, and Ebonyi State Agricultural Development Programme (EBADEP). Such information are mostly related to the characteristics and list of small-holder farmers in the chosen villages for this study.

Analytical Techniques

The primary data collected for this study were analyzed using descriptive and inferential statistics. Specifically, use of measures of location, including percentages, frequency distributions, means and deviations were employed in order to determine the main constraints facing the small-holder farmers in resource uses in multiple cropping.

Table 1: Constraints Against the Efficiency of Land Use

Type of Constraints	Freq.	Percentage (%)	Mean	S.d	CV
Land Acquisition Constrains					
Stringent Customary Laws	11	4.42	50.5	31.62	
High lease charges/cost of buying	91	45.00	50.5	31.62	63
Sharing of Communal Family land not lands on merit basis to be leased out.	30	14.78	50.5	31.62	
Land Fragmentation	70	35.00	50.5	31.62	
Total	202	100.00%			
Sex Discrimination					
Women do not own land	76	30.52	124.5	48.5	38.96
Women cannot use all lands	173	69.48	124.5	58.5	
Total	249	100.00%			
Low Fertility of Land					
Effect	186	77.5	120	46.7	
No effect	54	2.5	120	46.7	38.92
Total	240	100.00%			
Land Distance					
Effect	124	51.67	120	4	3.0
No effect	116	48.33	120	4	
Total	240	100.00%			
Land Inheritance Traditions					
Female do not inherit land	76	25	101.3	70.8	
Age grade membership as a prerequisite	30	9.87	101.3	70.8	69.96
Communal land sharing for only taxable adults	198	65.13	101.3	70.8	
Total	304	100.00%			
Other Competing Land Use					
Building	120	33.33	72	26.9	
Plantations	167	46.39	72	26.9	
Animal rearing	25	6.95	73	26.9	
Crop drying	30	8.33	72	26.9	37.36
Hunting	18	5.00	72	26.9	
Total	360	100.00%			

Source: Field Survey, 1999.

Note: Coefficient of variation CV = $\frac{\text{Standard deviation}}{\text{Mean}} \times 100$

RESULTS AND DISCUSSION

In the course of this study, some problems were identified to be militating against the efficient use of production resources (land, labour and capital) in the area. These problems are subsequently discussed to include the following.

(a) Constraints Against the Efficiency of Land Use

From Table 1, 45% of the respondents disclosed that high lease charges/cost of buying land militate against the efficient use of land in farming activities. This is closely followed by the problem of land fragmentation, which constitutes 35%. However, about 4% and 15% of the farmers respectively revealed that the stringent customary laws

and the sharing of communal family land(s) on merit basis are constraints against land acquisition in the study area.

Most of the farmers saw sex discrimination as a factor militating against efficiency of land use. Result shows that about 69% of the respondents believed that not allowing women to use all lands for farming activities caused inefficiency of land use. Relatively, about 31% of the respondents revealed that the practice of not allowing women to own land is a form of sex discrimination, which does not favour efficient land use.

Further analysis of Table 1 disclosed that about 78% of the farmers are faced with the problem of low fertility of the land. Twenty Two percent of the respondents however, believed that low fertility of the land is not a constraint to the efficient use of land in the study area.

Table 1 also disclosed that 124 farmers (about 52%) accepted distance of land from the farming community as a great problem facing efficient land use in the study area. A relatively significant percentage of about 48% agreed that land distance does not pose any problem to land use efficiency. Additionally, land inheritance traditions constitute constraints to the efficiency of land use. Sixty five percent of the respondents opined that the tradition of sharing communal land among taxable adults only affect the efficiency of land use. Equally, 25% of the farmers sampled disclosed that non-inheritance of land by females affect negatively the efficiency of land use in the area.

Finally, the establishment of plantations, construction of building and crop drying among other constraints pose a problem to land use efficiency. These constraints constitute about 46%, 33% and 8% respectively.

From the standard deviations obtained for each of the classes of factors, some facts were obvious, namely; land distance had the lowest deviation of 4.0 from the mean of 120. This was followed by other competing land uses with the deviation of 26.9. However, land acquisition constraints and land inheritance traditions had high deviations of 31.62 and 70.8 respectively. The result implies that land distance was the most serious of these constraints against the efficiency of land use. Of course this goes to confirm the earlier deduction.

Table 2: Constraints Against the Efficiency of Labour Use

Type of Constraints	Frequency	Percentage	Mean	S.d	CV
High cost of labour	221	23.36	157.6	20.2	
Sex discrimination	180	19.03	157.6	20.2	
Emigration	210	22.2	157.6	20.2	12.82
Conflicting seasons	120	12.68	157.6	20.2	
Traditional beliefs	85	8.99	157.6	20.2	
Other competing labour uses	130	13.74	157.6	20.2	
Total	946	100.00%			

Source: Field Survey, 1999.

Constraints Against the Efficiency of Labour Use

Analysis of Table 2 discloses that the greatest problem militating against the efficient utilization of labour in the study area is the high cost of labour, which constitutes about 23% of the total constraints discussed. This is closely followed by the problem of emigration, with a score of about 22%. Sex discrimination and other competing labour uses were respectively identified by about 19% and 14% of the respondents as factors militating against the efficiency of labour use.

For instance, it was found that in some places, it has become a norm for certain farm operations to be exclusively reserved for either the male or the female folk. Thus, at times, there existed surplus supplies of the male labour for some operations while another area of operation might be suffering shortages. Invariably, this brings about a rise in the price charged for labour in those deficient areas where the female labour force may not be sufficient for the specified

task.

Also, about 13% and 9% of the respondents respectively disclosed that conflicting seasons and traditional beliefs affect the efficiency of labour use in the study area.

This is because both planting and harvesting seasons of the crops were found in most cases to be conflicting with the periods of school work. As a result, children and some parents (teachers) who form a good proportion of the available family labour supply could not put in maximum labour during the period.

Moreover, some of the markets were found to be drawing most of the available work force on certain days and this brought about the shortage of labour supply on some days while there were excess on some other days. Other competing uses of labour such as masonry, crafts were also constraining factors in labour availability for multiple cropping purposes.

In addition, it was observed that the standard deviation of the factors from the mean of 157.6 was 20.2. Statistically, it could be inferred that the factors identified as constraints against efficient labour use were significant.

Table 3: Constraints Against the Efficiency of Capital Use

Types of Constraint	Frequency	Percentage %	Mean	S.d	CV
Non-availability of Improved Varieties					
Yam	240	28.64	139.6	37.5	26.8
Cassava	25	2.98	139.6	37.5	
Maize	16	1.91	139.6	37.5	
Okra	132	15.75	139.6	37.5	
Cocoyam	240	28.64	139.6	37.5	
Pepper	185	22.08	139.6	37.5	
Total	838	100.00%			
Problem of Logistics					
High cost of modern inputs	234	35.89	217.3	7.4	3.41
Lack of adequate finance	215	32.98	217.3	7.4	
Non-availability of fertilizer	203	31.13	217.3	7.4	
Total	652	100.00%			
Inaccessibility of Formal credit sources because of:					
High interest rate	189	18.31	206.8	8.6	24.16
Lack of collaterals	223	21.61	206.8	8.6	
Rigorous processes	230	22.29	206.8	8.6	
Late arrival of loan	180	17.44	206.8	8.6	
Short repayment period	210	20.35	206.8	8.6	
Total	1034	100.00%			
Adverse effect of the use of modern inputs:					
Fertilizer use causes rotting	215	61.60	174.5	28.6	16.39
Tractor compacts the soil	134	38.40	174.5	28.6	
Total	349	100.00%			

Sources: Field Survey, 1999.

Table 4: Other Constraints Against the Efficiency of Resource Use in Multiple Cropping

Types of Constraint	Frequency	Percentage	Mean	S.d	CV
Lack of storage facility	196	21.37	152.8	25.6	16.75
Pest and diseases	231	25.19	152.8	25.6	
Poor marketing facilities	203	22.14	152.8	25.6	
Poor transportation facilities	140	15.27	152.8	25.6	
High processing cost	85	9.27	152.8	25.6	
Smouldering effect of some crops on other	62	6.76	152.8	25.6	
Total	917	100.00%			

Sources: Field Survey, 1999.

Constraints Against the Efficiency of Capital Use

The study revealed several constraints militating against the efficient use of capital in the area. These constraints are presented on Table 3. From the table, non-availability of improved varieties of yam and cocoyam constitute about 29% each. The constraint of non-availability of improved varieties of pepper and okra occupied 22% and 16% respectively. Also, the non-availability of improved varieties of cassava and maize represented about 3% and 2% respectively.

Again, further analysis of Table 3 reveals that high cost of modern inputs, lack of adequate finance and non-availability of fertilizer pose a great problem to the efficient utilization of capital. These constraints were respectively identified by about 36%, 33% and 31% of the farmers.

Severally and individually, the inaccessibility of formal credit sources is caused by rigorous processes involved in obtaining loan (22%); lack of collaterals (about 22%) and the short term repayment period (about 20%). Equally, the problems of high interest rate and the late arrival of loans were identified by about 18 and 17 percent of the respondents as constraints facing the efficient utilization of capital in the study area.

Following the results obtained in Table 3, the constraint of non-availability of improved varieties had a standard deviation of 37.5 from the mean of 139.6. This was closely followed by the adverse effect of the use of modern inputs, which had a standard deviation of 28.6 from a mean of 174.5. Problem of logistics and the inaccessibility of formal credit sources showed standard deviations of 7.4 and 8.6 from the means of 217.3 and 206.8 respectively.

Statistically, these factors were observed to have a coefficient of variation, CV, of less than 30% (Table 3). Thus, these factors were significant constraints militating against the efficiency of capital use. This again confirms the earlier conclusion made.

(d) Other Constraints Against the Efficiency of Resource Use in Multiple Cropping

Other constraints found militating against the efficient use of resources in the study area include lack of storage facility, which constitutes about 21%; incidence of pest and diseases (25%); poor marketing facilities (22%); and poor transportation facilities (15%). Other constraints are high processing cost and the smouldering effect of some crops on others. These constitute about 9% and 7% respectively.

Finally, the standard deviation of 25.6 from the mean of 152.8 was obtained for other constraints against the efficiency of resource use in multiple cropping. Statistically, a coefficient of variation (CV) of 16.75% was obtained and this indicates that the identified factors significantly militated against resource use in the study area as was earlier observed.

CONCLUSION

This study shows that the multiple croppers are faced with several problems in their production processes. These problems or constraints significantly affect the efficiency of resource use (land, labour and capital). Notable among them are high lease charges, discrimination against women on land use, low fertility of land, long distance of cultivable lands, high cost of labour, emigration, non-availability of improved varieties of yam and cocoyam, rigorous processes involved in obtaining loans, among others.

Hence, for any meaningful agricultural development in the area, these constraints must be drastically reduced. This can be done through efficient policy formulation and implementation, proper supervision of agricultural programmes, effective extension services and proper agricultural financing.

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