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The Determination and Analysis of Constraints in Resource Use Efficiency in Multiple Cropping Systems by Small-Holder Farmers in Ebonyi State, Nigeria

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Abstract

The constraints militating against the smallholder farmers in multiple-cropping system in Ebonyi State, Nigeria were analysed. A multi-stage sampling technique was adopted to sample and administer questionnaires to 240 smallholder multiple-croppers. Data were collected and analysed using descriptive statistics. High lease charges (45 percent), problems of land fragmentation (35 percent), the low fertility of the land (78 percent), the distance of cultivable land (52 percent) and sex discrimination (100 percent) were constraints militating against the efficiency of land use. The constraints against efficient labour use were the high cost of labour, emigration, sex discrimination, and other competing labour uses, which constituted 23 percent, 22 percent, 19 percent and 14 percent respectively. Responses regarding constraints against capital use referred to the non-availability of improved varieties of yam and cocoyam (29 percent), the high cost of modern inputs (36 percent), the lack of adequate finance (33 percent), and the lack of collaterals (22 percent). 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 therefore recommended.

Résumé

Cette contribution analyse les contraintes auxquelles sont confrontés les petits exploitants agricoles engagés dans le système de la multi-culture dans l'état d'Ebonyi, au Nigeria. Une technique d'échantillonnage à plusieurs niveaux a été employée pour tester et soumettre à un questionnaire 540 petits exploitants

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agricoles spécialisés dans la multi-culture. Les données ont ensuite été collectées et analysées à l'aide de statistiques descriptives. Les redevances de location (45 pour cent), les problèmes liés au morcellement de la terre en parcelles (35 pour cent), la faible fertilité de la terre (78 pour cent), la distance des terres cultivables (52 pour cent), ainsi que la discrimination sexuelle (100 pour cent) ont été les éléments avancés, constituant un frein à la bonne utilisation de la terre. Les éléments constituant un frein à une utilisation efficiente des ressources humaines disponibles sont le coût élevé de la main-d'œuvre, l'émigration, les discriminations sexuelles, ainsi que les autres formes d'utilisation des ressources humaines ; ceux-ci constituaient respectivement 23 pour cent, 22 pour cent, 19 pour cent et 14 pour cent. Les réponses relatives aux contraintes pesant sur une bonne utilisation du capital portaient sur l'absence de variétés améliorées d'ignames et de tarots (29 pour cent), le coût élevé des frais modernes de production (36 pour cent), le manque de financement adéquat (33 pour cent) et de collatéraux (22 pour cent). L'étude a confirmé que la multi-culture aurait été plus efficace, si ces contraintes étaient réduites ou supprimées. Des services de vulgarisation, ainsi que la formulation et la mise en place par le gouvernement d'une politique efficace ont été recommandés.

Introduction

Agricultural systems in Ebonyi State, whether mono, mixed or multiple cropping system have been traditional in nature and mainly concentrated in the hands of peasants or smallholder farmers. These smallholders 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 percent of the farming population in Nigeria (Madu 1995). As a result of the low-income status of these farmers, they are seldom able to accumulate capital goods. This makes their level of capacity utilisation in terms of credit facilities very low (Awoke and Obeta 1998).

Generally, smallholder farmers in Ebonyi State are mostly multiple-croppers who constitute about 85 percent of the farming population. Multiple cropping system can 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 in an irregular manner, without a well-defined planting pattern (Andrew and Kassan 1976; Francis 1986; Forbes 1992). The importance of this cropping system to the smallholder farmers in Ebonyi State cannot be over emphasised.

The problems and prospects of smallholder farmers in resource use relative to multiple-cropping system are 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-utilisation of capacity, which is associated with low returns. For example, Mac Arthur (1983) and Onwuekwe (1994) have observed that there is low labour utilisation and 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 (69.62 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 problems of supply and demand militate against the efficient use of the land resources. Anthony, Ezedinma and Ochapa (1995) pointed out that land fragmentation is a constraint in the optimal utilisation of land in tropical agriculture. Alimba and Ezinwa (2001) also noted that resource allocation under the existing traditional system of farming in eastern Nigeria is inefficient.

In addition, according to Ogunfowara and Olayide (1981), resources are not efficiently utilised 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, the peasant farmers largely under-develop them due to lack of requisite skills. Consequently, the problem of resource allocation and utilisation has assumed critical dimensions in traditional agriculture among the small holder farmers.

In relation to the process of resource utilisation for food and fibre production, under conditions of rapid economic development, rural communities are faced with problematic decisions regarding what, how and when to produce and utilise the scarce resources. Specifically, there is the problem of deciding on how much of the available factor productivity or resources should 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 the production process including the accessibility of the resources are great obstacles to efficient resource

utilisation. In addition, the problem of economic efficiency in the utilisation of resources has been the greatest concern of production economists. Efficient utilisation 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 utilisation.

It is the aim of this study to examine the problems and prospects of resource use in multiple cropping system by smallholder farmers in Ebonyi State. Ultimately, it is hoped that the study will help to bridge the gap between resource availability and efficient utilisation 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 in 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 7030' and longitude 5040' E and 6045' E (ABCCIMA 1997).

Climatically, Ebonyi State is semi-savannah with seasonal variations of hot, mild cold weather and mixed grid vegetation with all eastern prototypes including agrarian, forestry and swamp ideal for rice cultivation. It has a mean temperature of 300C during the hottest period (February–April) and mean temperature of 210C during the coldest period (December– January). The mean annual rainfall is between 1,500mm and 1,800mm. Naturally, the climate is a 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. However, agriculture appears to be the mainstay of Ebonyi State economy since Idachaba (1993) noted that about 80 percent of the inhabitants are mainly smallholder farmers. Hence, Ebonyi State is popularly known as the 'food basket' of the nation.

Sampling procedure

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 researchers to become acquainted with the socio-cultural and physical environment of these farmers. It was convenient 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 a 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 out of the thirteen 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 autonomous communities in each of the already chosen twelve local government areas. This gave a total of sixty autonomous communities. Then, stage three involved sampling three villages in each of the sixty autonomous communities. This gave a total of one hundred and eighty villages required for the study.

Furthermore, two small-holder farmers were randomly sampled out of the one hundred and eighty villages. This then gave a total of three hundred and sixty 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 multiple-cropping smallholder farmers out of the three hundred and sixty farmers 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 and analytical techniques

Data for this 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 smallholder 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 noteworthy that the data also provided useful information on socio-economic status of the smallholder 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 was mostly related to the characteristics and list of smallholder farmers in the chosen villages for this study.

The primary data collected for this study were analysed using descriptive and inferential statistics. Specifically, frequency distribution and percentages were employed in order to determine the constraints facing the small-holder farmers in resource uses in multiple cropping.

Results and discussion

In the course of this study, specific problems were identified to be militating against the efficient use of production resources (land, labour and capital) in the area. These problems included the following:

Constraints against the efficiency of land use

From Table 1, it can be seen that 45 percent of the respondents disclosed that high lease charges/cost of buying land militated against the efficient use of land in their farming activities. This is closely followed by the problem of land fragmentation, reported by 35 percent of the sample. However, about 4 percent and 15 percent of the farmers respectively revealed that the stringent customary laws and the sharing of communal family land(s) on a merit basis are constraints against land acquisition in the study area.

Most of the farmers saw sex discrimination as a factor militating against the efficiency of land use. About 69 percent of the respondents believed that not allowing women to use all lands for farming activities led to inefficient land use. Some 31 percent 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 examination of the data in Table 1 disclosed that about 78 percent 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: Constraints against the efficiency of land use

Type of Constraints	Frequency	Percentage (%)
Land Acquisitions Constraints		
Stringent Customary Laws	11	4.42
High lease charges/cost of buying	91	45.00
Sharing of Communal Family land not lands on merit basis to leased out	30	14.78
Land Fragmentation	70	35.00
Total	**202**	**100.00 %**
Sex discrimination		
Women do not own land	76	30.52
Women cannot use all lands	173	69.48
Total	**249***	**100.00 %**
Low fertility of Land		
Effect	186	77.5
No effect	54	2.5
Total	**240**	**100.00 %**
Land Distance		
Effect	124	51.67
No effect	116	48.33
Total	**240**	**100.00 %**
Land Inheritance Traditions		
Female do not inherit land	76	25
Age grade membership as a prerequisite	30	9.87
Communal land sharing for only taxable adults	198	65.13
Total	**304***	**100.00 %**
Other Competing Land use		
Building	120	33.33
Plantations	167	46.39
Animal rearing	25	6.95
Crop drying	30	8.33
Hunting	18	5.00
Total	**360***	**100.00 %**

Source: Field Survey, 1999.* Multiples responses were obtained in some cases.

From Table 1 it can also be seen that 124 farmers (about 52 percent) agreed that the distance of land from the farming community was 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 decreases the efficiency of land use. Equally, 25 percent of the farmers sampled said that the non-inheritance of land by females negatively affected the efficiency of land use in the area.

Finally, the establishment of plantations, construction of building and crop drying among other constraints posed a problem to land use efficiency. These constraints were noted by about 46 percent, 33 percent, and 8 percent of the sample respectively.

Constraints against the efficiency of labour use

The analysis of the results reported in Table 2 shows that the greatest problem militating against the efficient utilisation of labour in the study area is its high cost. This problem was mentioned by about 23 percent of the respondents. Nearly as many reponses mentioned the issue of emigration. Sex discrimination and other competing labour uses were respectively identified by about 19 percent and 14 percent 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 males or females. Thus, at times, there existed surplus supplies of male labour for some operations while another area of operation might be suffering shortages. Invariably, this brought about a rise in the price of labour in those areas where the female labour force was not be sufficient for the specified task.

Table 2: Constraints against the efficiency of labour use

Type of Constraints	Frequency	Percentage
High cost of labour	221	23.36
Sex discrimination	180	19.03
Emigration	210	22.2
Conflicting seasons	120	12.68
Traditional beliefs	85	8.99
Other competing labour uses	130	13.74
Total	946*	100.00%

Sources: Field Survey, 1999. Note: *Multiple responses.

Also, about 13 percent and 9 percent of the respondents respectively disclosed that conflicting seasons and traditional beliefs affected 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 conflict with the periods of schoolwork. 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 at such times while there was an excess on other days. Other competing uses of labour such as masonry and crafts were also constraining factors in labour availability for multiple cropping purposes.

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 in Table 3. From the Table, it can be seen that the non-availability of improved varieties of various crops was an impediement to efficient capital utilisation. The following deficiencies were reported: yam and cocoyam (about 29 percent each); pepper and okra (22 percent and 16 percent); and finally much lower problems encountered with reard to improved varieties of cassava and maize (3 percent and 2 percent respectively).

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

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

Table 3: Constraints against the efficiency of capital use

Type of Constraints	Frequency	Percentage (%)
Non-availability of Improved Varieties		
Yam	240	28.64
Cassava	25	2.98
Maize	16	1.91
Okra	132	15. 75
Cocoyam	240	28.64
Pepper	185	22.08
Total	**838**	**100.00 %**
Problem of Logistics		
High cost of modern inputs	234	35.89
Lack of adequate	215	32.98
Non-Availability of fertilizer	203	31.13
Total	**652***	**100.00 %**
Inaccessibility of Formal credit sources because of:		
High Interest rate	189	18.31
Lack of collaterals	223	21.61
Rigorous processes	230	22.29
Late arrival of loan	180	17.44
Short repayment period	210	20.35
Total	**1034***	**100.00 %**
Adverse effect of the use of modern inputs		
Fertilizer use causes rotting	215	61.60
Tractors compacts the soil	134	38.40
Total	**349***	**100.00 %**

Source: Field Survey, 1999. *Multiple responses.

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 the lack of storage facilities (about 21 percent); the incidence of pests and diseases (25 percent); poor marketing facilities (22 percent); and poor transportation facilities (15 percent). Other constraints mentioned included high processing costs and the damaging effect of some crops on others. These constitute about 9 percent and 7 percent respectively.

Table 4: Other constraints against the efficiency of resource use in multiple cropping

Types of Constraint	Frequency	Percentage
Lack of storage facility	196	21.37
Pest and diseases	231	25.19
Poor marketing facilities	203	22.14
Poor transportation facilities	140	15.27
High processing cost	85	9.27
Damaging effect of some crops on other crops	62	6.76
Total	917*	100.00 %

Source: Field Survey, 1999. *Multiple responses.

Conclusion

This study shows that the multiple croppers are faced with several problems in their production processes. These problems 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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